UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

TRANSPORTATION PLAN UPDATE

final report
november 2012

THE UNIVERSITY of NORTH CAROLINA GREENSBORO

Kimley-Horn and Associates, Inc.

This plan is the direct result of the contributions from numerous people. We extend our sincere appreciation to the countless faculty, staff, and students who participated in the planning process and guided the development of this plan. We also wish to think the City of Greensboro and our partners in the community for their involvement. Everyone's time, input, and energy are greatly appreciated.

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In 2009, the University of North Carolina at Greensboro (UNCG) developed a strategic plan to guide decision-making from 2009 to 2014. A committee of more than 70 faculty, staff, students, alumni, and community members collaborated to develop a "strategic, transformative, dynamic, value-driven, and outcome-based plan." Among the core values expressed in the 2009-2014 Strategic Plan is a commitment to sustainability. The University defines sustainability as "Academics, operations, and outreach…conducted with careful attention to the enduring interconnectedness of social equity, the environment, the economy, and aesthetics." The University has acknowledged that fulfillment of this commitment will require considerations for transportation and campus access.

Over the past several years, the University has made progress toward increasing transportation choice to, from, and within the campus. Today, students can bicycle through campus in dedicated lanes on Spring Garden Street, walk through the heart of campus along the College Avenue pedestrian mall, connect to Greensboro and the region by bus, or rent a Zipcar for a quick trip across town. These tangible examples of sustainability in action are reinforced through numerous previous and ongoing planning efforts that direct policies and decision-making. The *University of North Carolina at Greensboro Transportation Master Plan Update* blends these ideas into a consolidated framework that guides campus access and internal circulation through the 2018 school year and beyond.

Planning Process

At its best, university-based transportation planning evolves from a collaborative process led by campus officials and involving faculty, staff, students, and the surrounding community. The project team engages these stakeholders through multiple channels of communication and numerous feedback loops. The planning process for such plans should be rooted in an outreach platform that gathers, processes, and applies a diversity of opinions from the campus community and its neighbors. The data collection and analysis process builds on the community outreach efforts and culminates in the logical presentation of recommendations and a step-by-step approach to implementation.

Community Outreach

The campus population and the general public interact with the University and its transportation system in different ways; however, they encounter similar issues. Given these experiences, both groups understand the strengths and weaknesses of the transportation system (particularly access to and from campus) and feel the impact of transportation decisions on a daily basis. Community outreach enables campus and local officials and the project team to tap into this special knowledge. Outreach for the *UNCG Transportation Master Plan Update* included online and face-to-face interaction. Two principles of public outreach were adhered to:

1. Faculty, staff, students, and the surrounding community have a personal understanding of the transportation network, and planning decisions have a direct impact on their daily lives.
2. Groups can share in the collective vision for the overall plan or specific recommendations even as they hold differing opinions on how its vision should be achieved.

Respecting these principles, community outreach for the *Update* facilitated open dialogue about the

issues affecting the campus population as well as the general public. The following sections provide an overview of the community outreach methods and structure. More detail on the collective outcome of these efforts is provided in the chapters that follow.

Advisory Committee

At the outset of the project, a group of campus officials was selected to act as a sounding board throughout the planning process. The Advisory Committee ensured the plan respected agreed-upon goals, recognized previous planning efforts, and incorporated the assorted perspectives found throughout campus and the surrounding community. The Advisory Committee was instrumental in providing initial direction for the plan and ensuring the final product respected the purpose and goals described later in this chapter. Members of the Advisory Committee represented the following University departments:

- Facilities Design & Construction
- Campus Enterprises
- Business Affairs
- Parking Operations and Campus Access Management (POCAM)
- Sustainability

The Advisory Committee met monthly during the planning process, concluding its project role with a review of the final plan. However, the Advisory Committee also is charged with championing the plan's recommendations through implementation.

Web-Based Survey

While the Advisory Committee and a review of previous and ongoing plans revealed a variety of issues and potential solutions related to transportation, it was necessary to gather input from a larger swath of the campus population. This was accomplished via a web-based questionnaire. The online questionnaire was distributed to faculty, staff, and students through a campus-wide email message. The link to the questionnaire also was made available on various University websites. The questionnaire assessed existing campus access, multimodal provisions, and investment priorities, focusing on the range of travel options available and desired travel behaviors. Results from this survey have been tabulated for consideration in the needs assessment and formulation of recommendations. A general overview of the survey is provided in Chapter 2, with mode-specific outcomes described in the chapters that follow.

Campus Open House

A Campus Open House—held October 27, 2011 at the Elliott University Center—was designed to review project goals, verify issues and concerns, and solicit comments on recommended solutions. With a float-in format, interested persons could stop by anytime between 12:30 p.m. and 7:30 p.m. for one-on-one discussions with the project team. Brief presentations at 2:00 p.m. and 6:00 p.m. outlined the purpose of the *Update* and the planning process, introduced background information, and set the stage for the interactive conversations at one of four stations – 1) What We Heard, 2) Bicycle and Pedestrian, 3) Transit, and 4) Vehicular Access and Parking. A summary of the results is provided in Chapter 2. Comments from the Open House were used to finalize recommendations.

Data Collection and Analysis

The *UNCG Transportation Master Plan Update* addresses the various ways students, faculty, staff, and visitors travel to, from, and within campus. While these travel modes are presented in different chapters, the

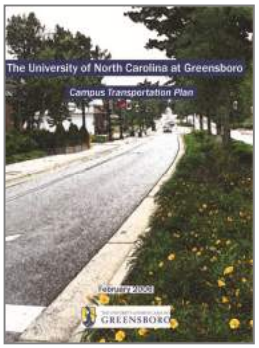
collective review of existing conditions and development of recommendations included special consideration of how modes interact. The Advisory Committee assisted with the general data assembly (e.g., historical trends and projections for faculty, staff, and student counts) and data assembly for each mode (e.g., previous plans, facilities, transit routes, ridership trends, and parking occupancy). The project team used this data and subsequent analysis to develop a series of recommendations for consideration by the Advisory Committee, campus population, and general community.

Planning Context

To maximize its effectiveness, the *UNCG Transportation Master Plan Update* should be coordinated with other campus, municipal, and regional plans and/or policies that impact planning efforts on campus. This section provides a general review of key plans. Although this list does not constitute all of the previous or ongoing planning efforts, it does review important documents that have informed the development of the *Update*.

UNCG Campus Transportation Plan

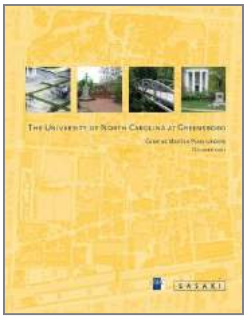
February 2006



The 2006 UNCG Campus Transportation Plan serves as the starting point for the *Transportation Master Plan Update*. The Campus Transportation Plan outlines a transportation strategy to address University growth. The plan is organized around transportation modes with separate sections for transit, bicycles, pedestrians, travel demand management, and parking. The plan focuses on addressing future parking shortages through a series of initiatives that target parking demand.

UNCG Campus Master Plan Update

October 2007



The 2007 Campus Master Plan Update takes a comprehensive look at campus development trends and future needs. The Plan guides the University through a period of expected growth through 2025 and expresses the need for collaboration with local partners. Building upon previous planning efforts, the Campus Master Plan Update addresses the structure and form of the built environment, prioritizes the use of existing campus spaces, identifies sites for preservation and future development, and suggests ways to improve the University's approach to landscape, circulation patterns, and access.

UNCG Campus Bicycle Master Plan

May 2008

The UNCG Campus Bicycle Master Plan was completed in 2008 as the University's first comprehensive bicycle study. The plan promotes bicycling as a sustainable mode of travel on campus through a series of facility enhancements, ancillary improvements, and program recommendations. Directed by a Steering Committee comprising students, faculty, and staff, the plan focuses on creating a safe bicycling environment and providing convenient routes for commuters and recreational riders.

UNCG Strategic Plan 2009-2014

September 2010

The UNCG Strategic Plan 2009-2014 was developed during 2008-2009 by a committee of more than 70 faculty, staff, students, alumni, and community members. The plan, which is revisited every year, guides the strategic procurement and allocation of resources, responds to prevailing circumstances,

ensures the University's values are upheld, and exerts an impact on the lives of students and the community. The plan includes a vision and mission statement as well as a series of five values—inclusiveness, collaboration, sustainability, responsibility, and transparency. The plan also includes five strategic areas, each of which has established objectives.

UNCG Strategic Housing Plan 2020

August 2009

The Strategic Housing Plan, completed in August 2009, takes a long range view of campus housing within the larger institutional context. The plan references the confluence of factors such as increasing complexity of UNCG's mission, traditional notions of the campus and undergraduate experience, growth in enrollment, and rising demand for student housing. The plan also accounts for institutional partnerships for community and economic development.

Spartan Village

Statistics show students living on campus during their first semester at UNCG are more likely to enjoy success as a student and graduate. The 2009 Strategic Housing Plan recognized this trend and called for a 10% increase in the percentage of undergraduate students living in University housing. After years of planning and coordinating with stakeholders on campus and in the surrounding community, the University received approval in the fall of 2011 to begin construction on Spartan Village. The Village will extend the campus to the south across Lee Street. At full build-out, the Village will include 1,400 student beds, a recreation center, 350,000 square feet of institutional space, and 51,000 square feet of mixed-use space. The initial phase will include 800 beds and 15,000 square feet of mixed-use space (in a collection of four buildings) and a police station.

Planning Themes

Several themes emerged during the outreach efforts for this project and were documented in other plans and studies. The following initiatives encapsulate the general themes of efficiency and sustainability. Though not formalized, these ideas also guided recommendations of the *Update*.

- Sustainability—Sustainability was established as one of five core values as part of the 2009 Strategic Plan. The campus transportation system is an important contributor to projects and services that "enhance the environmental, human, and financial capital of the University."
- Livability—Livability is a critical component of the campus atmosphere and likely a deciding factor for many applicants. Factors that contribute to the livability of a university campus and the surrounding community include the design and functionality of the built environment, the way uses are coordinated, and the choices provided in the transportation network.
- Coordination—Coordination will occur on multiple levels—with previous and ongoing planning efforts, among different departments on campus, with surrounding neighborhoods, and between the University and the City.

Purpose and Goals

The *UNCG Transportation Plan Update* refreshes strategies outlined in previous plans to reflect new growth trends and campus development. The overall purpose of the plan is to devise a 5-year blueprint to enhance the sustainability of campus through a coordinated, multimodal approach to campus access and mobility. During initial discussions with the Advisory Committee, a series of conversations were synthesized into a set of goals to direct the plan. These goals were intended to provide a framework for developing ideas, options, and recommendations. The goals also provide a measure with which to evaluate the effectiveness of the overall plan. In short, results of the planning process are intended to support the following:

- The UNCG Transportation Master Plan Update will integrate campus expansion plans south of Lee Street with a coherent, multimodal connectivity plan and an integrated approach to parking allocation.
- The UNCG Transportation Master Plan Update will provide a revised understanding of existing campus transportation dynamics, including modes of access, parking, and travel demand management.
- The UNCG Transportation Master Plan Update will evaluate parking demand and allocation with an emphasis on the potential to reduce the demand for parking in the future.
- The UNCG Transportation Master Plan Update will include a forward-looking approach to moving people to, from, and within campus through a coordinated set of multimodal solutions.
- The UNCG Transportation Master Plan Update will consider the distribution and analysis of handicap-accessible spaces.

Premises of Plan Documentation

The *UNCG Transportation Plan Update* tackles issues and concerns identified during previous planning efforts as well as issues that surfaced during the course of the planning process for the *Update*. The report catalogs these efforts, outlines the issues, and presents recommendations to achieve the purpose and goals of the plan. The report evolved based on the following premises.

- The report is not intended to educate the reader on standard planning practice. Instead, it focuses on the processes and results specific to the *UNCG Transportation Plan Update*.
- The report documents issues and concerns for campus transportation and presents a series of recommendations based on planning, analysis, and community involvement.
- The report has been organized to provide concise representation of issues and recommendations, and, to the extent possible, utilizes visual cues to effectively convey ideas.
- The report and its supporting deliverables are intended to be living documents that provide structured recommendations with flexibility to phase improvements appropriately.

Report Components

The UNCG Transportation Master Plan Update report summarizes the plan's focus on multimodal transportation strategies, as reflected in the components of the plan. The report includes the following chapters.

- Campus Context (Chapter 2)—Reviews local, regional, and statewide dynamics and examines growth trends related to faculty, staff, and students. Describes access to campus and summarizes community feedback.
- Bicycle and Pedestrian Element (Chapter 3)—Describes the bicycle and pedestrian framework and planning context. Documents preferred circulation patterns and details facility and policy recommendations. Emphasizes connections to and from campus.
- Transit Element (Chapter 4)—Describes the transit framework and planning context. Documents circulation patterns for transit with special consideration for access to and from the Mixed-Use Village south of Lee Street.
- Vehicular Access and Parking (Chapter 5)—Discusses dynamics associated with parking supply, demand, and allocation on campus. Provides an overview of UNCG's travel demand management programs and policies. Summarizes anticipated parking reduction based on the multimodal recommendations.
- Action Plan (Chapter 6)—Outlines a strategy to fully implement recommendations, including phasing and policy considerations.

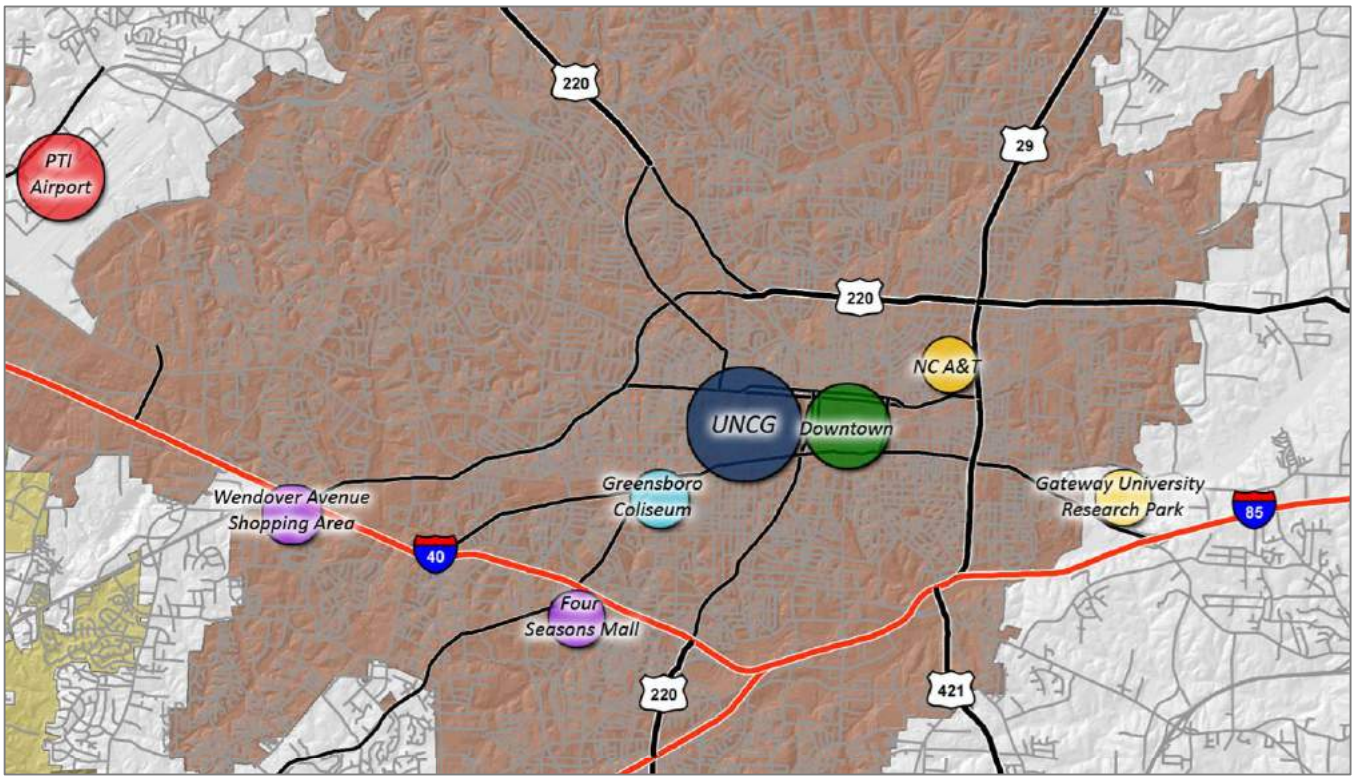
It's essential that University leaders, campus advocates, and the community plan and provide appropriate transportation infrastructure in a way that promotes sustainability and livability. Simply stated, good transportation is the key to building upon the growth and success of the University. Conventional transportation planning that caters to personal vehicles and focuses on improvements to roads and parking infrastructure can help only so much. Strategic investment in roads and parking must be balanced with improvements to the bicycle, pedestrian, and transit network and consideration of travel demand management strategies.

The *University of North Carolina at Greensboro Transportation Master Plan Update* promotes better access and mobility for students, faculty, staff, and visitors with a focus on the continued development of a truly multimodal transportation system. The plan picks up where previous efforts left off, incorporating new factors such as campus expansion and established initiatives such as sustainability. The *Update* features tools that successfully merge access and mobility between modes and across geographies.

Local Dynamics

The University of North Carolina at Greensboro is located one mile west of downtown Greensboro, the state's third-largest city with a population of 270,000. In addition to UNCG, the city of Greensboro boasts six other colleges: North Carolina Agricultural and Technical State University (NC A&T), Greensboro College, Guilford College, Elon Law School, Bennett College, and Guilford Technical Community College. Together, these institutions provide significant resources to the City in terms of education facilities and economic development. These colleges are connected to UNCG through physical infrastructure as well as collaborative endeavors. The Gateway University Research Park is a tangible representation of UNCG's connection to its sister institutions. The park represents a joint research campus developed by UNCG and NC A&T at two locations in Greensboro—the South Campus off Lee Street near the I-40/I-85 interchange, and the North Campus northeast of Greensboro off US 29 near Reedy Fork and Bryan Park.

Regional Context



Campus Access

The University benefits from a variety of ways to conveniently access campus. These access modes provide choices for faculty, staff, students, and visitors. The level of service varies among the modes.

Bicycle and Pedestrian Facilities

As a compact campus with few through streets, the University is very walkable. In fact, nearly any point on campus can be reached within a 10-minute walk from the center of campus. North-south routes on campus are more readily defined for pedestrians, while east-west routes are less apparent. While the campus itself is walkable, numerous barriers pose challenges to safe access on bike or foot to campus from most directions. These barriers include Aycock Street and the Norfolk Southern Railroad to the south. A general lack of facilities to the north also creates challenges. See Chapter 3 for more information on bicycle and pedestrian facilities.

Transit Service

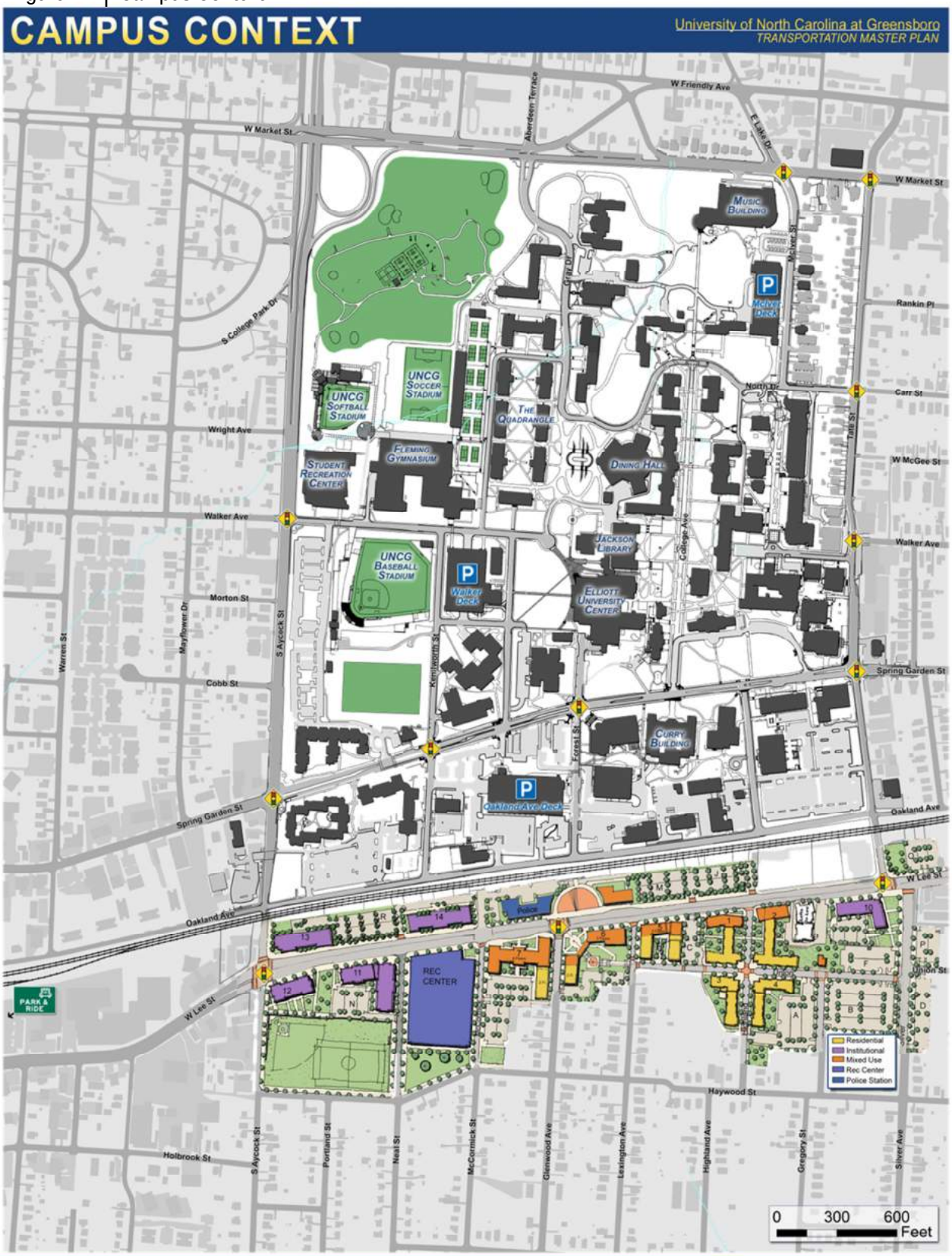
Transit service to and from UNCG has expanded over the last several years and is gaining in popularity. Service is provided from a transit hub centrally located at the end of Walker Avenue on the west side of Jackson Library for the Spartan Chariot, HEAT (Higher Education Area Transit), and PART (Piedmont Authority for Regional Transportation) routes. The campus also can be accessed via a shuttle from a network of park-and-ride facilities near the University. See Chapter 4 for more information on transit service.

Arterial Roadways

Nestled in the city's roadway grid network, a series of north-south and east-west roadways connects vehicular traffic to the campus from points in Greensboro and throughout the Piedmont region. The major north-south routes providing access to campus are Aycock Street (the western boundary of campus) and Tate Street (the eastern boundary of campus). East-west routes Market Street and Lee Street provide northern and southern boundaries of the existing campus, respectively. Spring Garden Street is a major east-west route in the Greensboro area and despite enhanced landscaping and traffic calming measures continues to serve through traffic as a connection between downtown and points to the west.

Figure 2.1 shows the campus context.

Figure 2.1 | Campus Context



Community Statistics

Over the past few years, population growth on campus among faculty, staff, and students has remained relatively low. However, on a given day, the campus still hosts more than 20,000 people.

Population Trends

Students

Long-range enrollment projections were last completed by the Office of Institutional Research in 2008. Likewise, the overall University of North Carolina system has not prepared new official enrollment estimates. Based on available data and current trends, the size of the student population is expected to remain relatively flat for the next several academic years. Current trends impacting growth in enrollment include UNCG scaling back the size of the freshman class to improve academic quality and expected budget cuts in the next several years. Table 2.1 shows student enrollment projections for the next five years from the 2006 Campus Transportation Plan and the *Update*.

Table 2.1 – Student Enrollment

Year	Projections	
	2006 Plan	2012 Update
2006	16,728	n/a
2011	17,880	17,152
2012	18,267	17,216
2013	18,546	17,258
2014	18,960	17,310
2015	19,626	17,393

Source: UNCG Office of Institutional Research

The numbers in this table exclude distance education, such as iSchool. And while these figures are general estimates and show small enrollment growth each year, the constraints facing the University could result in the first decline in campus-based enrollment in more than a decade.

Faculty and Staff

In August 2011, the University employed more than 3,300 faculty and staff. Table 2.2 shows the breakdown by employee type. The 2006 Campus Transportation Master Plan reported 2,525 faculty and staff in 2005 and 2,580 in 2006. Based on these figures, the size of the faculty and staff has grown approximately 28%.

Table 2.2 – Faculty and Staff (2011)

Classification	Number
Permanent	
Faculty	890
Staff (exempt)	575
Staff (non-exempt)	1,194
Temporary	
Faculty	190
Staff (exempt)	71
Staff (non-exempt)	127
Other Staff	
Dining (Chartwells)	260
Bookstore (Barnes & Noble)	7
Total	3,314

Source: UNCG Parking Operations & Campus Access Management

Implications

The significant growth at UNCG over the last few decades has slowed in recent years. The 2006 Transportation Master Plan projected growth of approximately 17% through 2015. Revised numbers suggest the growth will be closer to 4% between 2006 and 2015 and 1.5% between 2011 and 2015. But the impact on the transportation network (parking demand and desire for multimodal facilities) cannot be determined based solely on the rise in on-campus population. The University has taken a structured approach to encouraging sustainable transportation decisions by the campus population. As the existing population switches from single-occupancy vehicles, the result is a rise in bicycle, pedestrian, and transit use as well as lower demand for parking permits (see Chapter 6 for more information).

Community Feedback

Successful plans embrace an inclusive process with involvement from individuals and groups that regularly face the issues at hand and will be most impacted (positively or negatively) by potential solutions. Community outreach efforts for the *UNCG Transportation Plan Update* introduced in Chapter 1 revealed several overarching issues:

- The perception of campus transportation and the openness to certain recommendations varies among the different campus population groups (faculty, staff, and students).
- The campus community is receptive to traveling by means other than single-occupancy vehicles, though bicycle and pedestrian facilities and transit service need to be convenient to attract new users.
- Safety for pedestrians is a concern, especially at frequent conflict points between pedestrians and vehicles or bicyclists.
- Traffic congestion and on-campus parking are identified as areas in need of improvement.

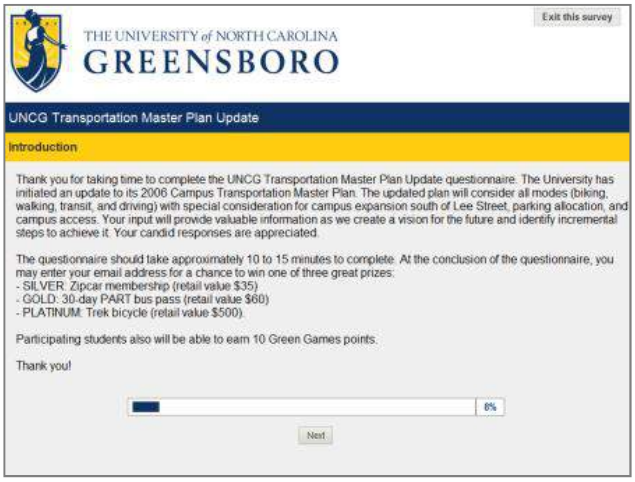
These issues as well as more specific outcomes surfaced during the community outreach channels detailed on the following pages.

Web-Based Survey

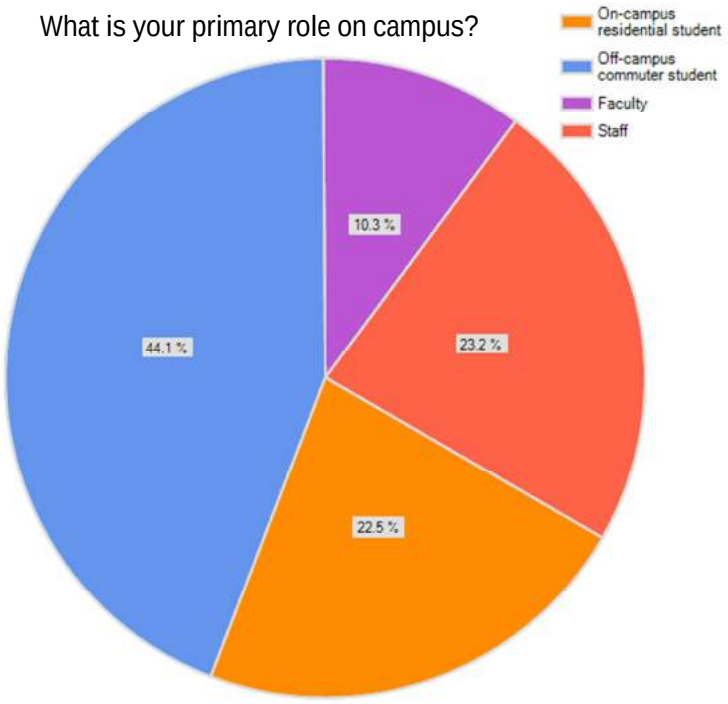
While a wide variety of needs and interests were identified through discussions with the Advisory Committee, additional input was desired. A web-based questionnaire distributed to faculty, staff, and students via email provided information on a variety of topics. The survey evaluated existing conditions and strategies developed to improve safety and mobility on campus and in the vicinity of the University. Though the survey was helpful in identifying perceptions about parking and transportation issues, the survey responses differed from more reliable data. However, the 2,500 responses proved helpful in assessing transportation issues and potential strategies.

The questionnaire was organized around several categories of questions, including Introduction and Background; Rating Campus Access; Driving and Parking; Biking, Walking, and Riding Transit; and Priorities and Implementation. It included questions about changes in the transportation system, travel patterns to campus, and desirability for multimodal provisions. Other questions challenged respondents to make choices related to transportation alternatives and priorities.

The text and graphics that follow illustrate a few of the general trends as expressed through the survey. Additional results are presented in the chapters that follow.



What is your primary role on campus?



Demographic questions helped determine who was completing the survey and allowed the opinions of faculty, staff, and students to be viewed independently. However, respondents to the survey did not represent actual percentage of faculty, staff, and students on campus.

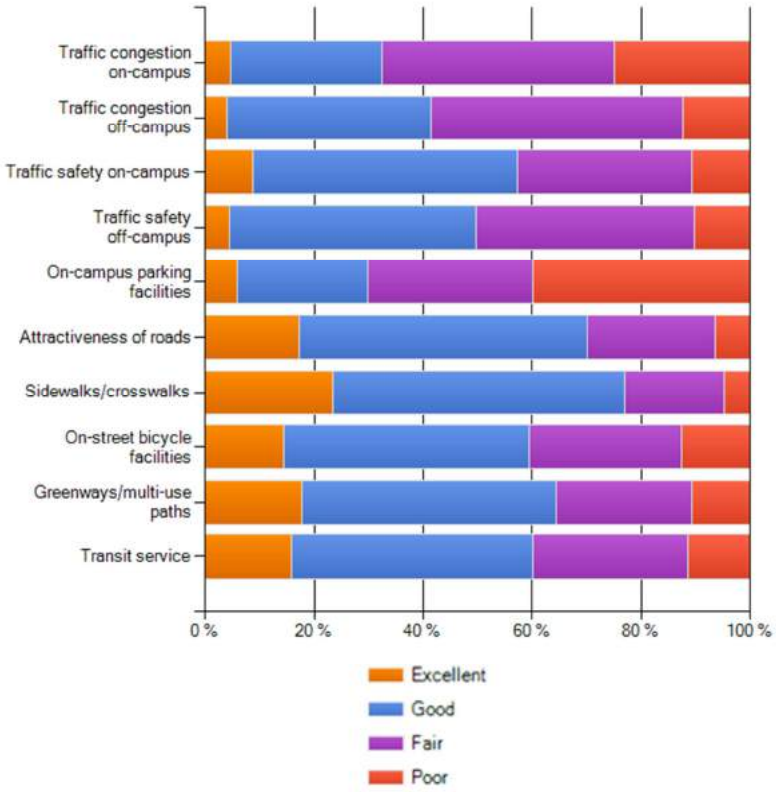
- Faculty: 2011 actual = 5%, survey = 10%
- Staff: 2011 actual = 11%, survey = 23%
- Students: 2011 actual = 84%, survey = 67%

Because faculty and staff have not embraced alternative modes at the level of students, answers tend to favor automobile issues and solutions over other modes as shown in the graphs on this page.

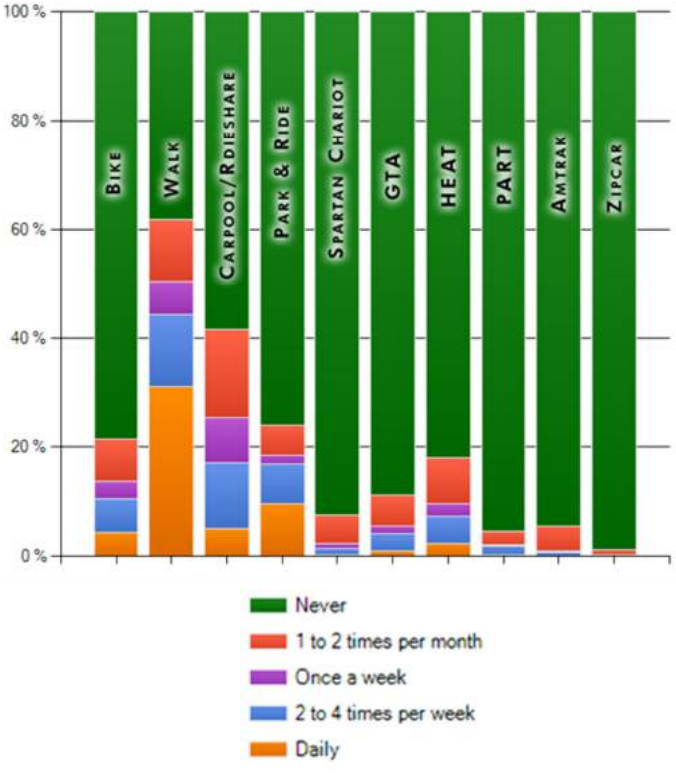
Do you feel that living or working on campus necessitates having a car on campus?

Yes (47.1%) | No (52.9%)

Overall, how would you rate the following pieces of the campus access system?

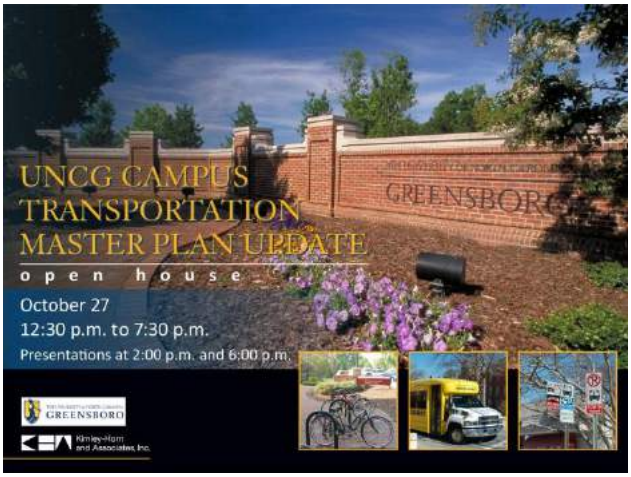


On average, how often do you use the following transportation options?



Campus Open House

Comments received during the web-based survey and discussions with the Advisory Committee formed the basis of the updated plan. Prior to submitting a full draft of the *Update,* the project team reached out to the campus community and surrounding neighborhoods to review existing conditions, discuss emerging trends and themes, and evaluate preliminary recommendations.



The Campus Open House was conducted October 27, 2011 from 12:30 p.m. to 7:30 p.m. at the Elliott University Center. Four stations were set up – 1) What We Heard, 2) Bicycle and Pedestrian, 3) Transit and Ridesharing, and 4) Vehicle Access and Parking. Each station was staffed with a member of the project team and included a series of maps and exhibits to illustrate existing conditions and recommendations. Attendees were invited to visit the stations to learn more about areas of personal interest. Presentations were given at 2:00 p.m. and 6:00 p.m. to describe the planning context, planning process, questionnaire results, planning themes, the plan's purpose and goals, and a brief introduction of each element. A large group question and answer session concluded the presentation.

A total of 68 people signed in at the welcome table. The sign-in sheet asked participants to note their role on campus, which indicated 25 undergraduate students, 17 graduate students, 12 faculty/staff, and 14 community members attended the meeting. Some participants selected more than one category. Overall, some of the plan's recommendations were adjusted based on the information provided at the open house. Results specific to individual elements are detailed in the appropriate chapters of this report.

Conclusion

As mentioned in Chapter 1, the recommendations that form the core of this plan represent the collective vision for a safe, multimodal, and interconnected transportation system that supports the University's continued focus on sustainability and attention to campus expansion to the south. The chapters that follow—beginning with the bicycle and pedestrian element and concluding with an implementation plan—adhere to this vision.

Bicycling and walking are essential components of the transportation system in and around the University of North Carolina at Greensboro. The proximity of the campus to residences makes the campus an ideal setting for non-motorized travel. University staff and administrators have made a commitment to create safe environments for bicyclists and pedestrians traveling to, from, and within campus. In 2008, UNCG developed a Campus Bicycle Master Plan to guide the development of campus bicycle facilities, programs, and policies to encourage cycling. Pedestrian and bicycle travel has also been examined through the Campus Transportation Master Plan (2006) and the Campus Master Plan (2007).

UNCG's efforts to create a desirable environment for bicycle and pedestrian travel have been recognized by two different organizations. In 2010, UNCG was named one of the Best Workplaces for Commuters by the National Center for Transit Research. This honor signifies the availability of attractive options for commuter travel, including bicycling, walking, transit use, carpooling, and car sharing. In 2011, UNCG earned a Bronze-level Bicycle-Friendly University designation. Selected for this honor in its inaugural class, UNCG was recognized for providing an excellent environment for bicycle travel.

The Bicycle and Pedestrian Element of the *University of North Carolina at Greensboro Transportation Master Plan Update* documents the University's existing facilities and programs and summarizes feedback regarding non-motorized travel. Previous planning efforts are referenced and built upon to create a recommended set of bicycle, pedestrian, and greenway facilities. The *Update* is not intended to replace these unique planning efforts. Rather, the intent is to blend the recommendations of those plans with current feedback and the other elements of the *Update*.

This chapter begins with an overview of the bicycle and pedestrian framework and planning context before documenting preferred circulation patterns for bicyclists and pedestrians. The chapter concludes by detailing facility and policy recommendations with an emphasis on connections to and from campus.

Bicycle and Pedestrian Framework

The benefits of cycling and walking are well documented. Taking trips by bike or on foot improves the environment, promotes good health, saves money, eases the burden on roadways, and enhances the livability of campus. Many people who travel to UNCG on a daily basis choose to bike or walk for one or more of these reasons.

As the UNCG campus has grown and faculty, staff, and students have chosen to live farther from campus, connecting homes to the University via a network of viable bicycle and pedestrian facilities has become more difficult. The expansion of the campus and complementary land uses also has resulted in the need to cross several facilities that act as barriers to bicycle and pedestrian travel. These facilities include Aycock Street, Market Street, the railroad, and Lee Street.

If the overall purpose of the *Update* is to create a balanced, multimodal transportation system for accessing and moving around campus, the planning and delivery of a safe and accessible bicycle and pedestrian network must be provided within the following framework.

Five Es of Bicycle & Pedestrian Planning

The collective projects and programs recommended for UNCG and its surrounding area can be grouped into one or more of the following interrelated components.

- Engineering—Engineering refers to the network of pathways that must be planned, designed, and constructed.
- Education—Once the pathways are in place, cyclists and pedestrians must be made aware of the location and proper use of facilities as well as the destinations they connect.
- Encouragement—People need to be encouraged to bicycle and walk to validate the investment and reap the benefits.
- Enforcement—To ensure the safety of all users and the long-term sustainability of the bicycle and pedestrian system, the formal and informal "rules of the road" must be enforced.
- Evaluation—A regular review of the bicycle and pedestrian network should include an assessment of cycling and walking activity, safety analysis, and ways the campus continues to work to improve these numbers.

Types of Users

Different reasons for traveling by bike or foot, combined with varying skill levels, require a flexible and responsive bicycle and pedestrian plan. Bicycling and walking often fall into two distinct categories based on trip purpose. Utilitarian, non-discretionary travel is prevalent in a college setting, where many students lack access to a vehicle and rely on transit, bicycling, and walking. Other members of the community may choose non-motorized travel for utilitarian trips to promote physical fitness, environmental stewardship, and/or cost savings. Recreational, discretionary travel recognizes the health benefits of walking and bicycling and promotes the livability of the campus.

Both user types require a complete network of bicycle and pedestrian facilities as well as programs that educate and encourage current and future users. Cyclists can be categorized based on their level of riding skill. Advanced cyclists can safely ride on thoroughfares with higher traffic volumes and speeds. These cyclists prefer shared roadways in lieu of striped bike lanes and paths. Basic cyclists are less comfortable riding in traffic without special accommodations and often prefer multi-use paths or bike lanes.

Types of Facilities

Roadways need to be designed with an eye toward both the intended use by cyclists and pedestrians and how the facility fits into a system-wide network. Design considerations also should be given to ancillary bicycle facilities and amenities such as bike racks and stations, bikes on buses and bike amenities at transit stops, and bike-friendly drainage inlets. For pedestrians, attention must be given to curb ramps as well as marked crosswalks and enhancements such as raised crosswalks, pedestrian refuge islands, and curb extensions.

Planning Context

Bicycling and walking are important modes of transportation in and around UNCG today and will remain so in the future. Regardless of the trip purpose, bicycling and walking provide a high level of independence, flexibility, and freedom of choice relative to where you want to go and when you want to get there. Prior to developing a set of recommended bicycle and pedestrian improvements for UNCG, it's important to understand existing conditions. This section documents previous planning efforts; current bicycle, pedestrian, and greenway facilities in place; and feedback received from students, faculty, and staff about the positive and negative elements of the non-motorized transportation system.

Previous Planning Efforts

UNCG, the City of Greensboro, and the Greensboro Urban Area Metropolitan Planning Organization have undertaken planning efforts in recent years to address the needs of bicyclists and pedestrians. These plans, combined with ongoing research at the state and federal level, help to establish the vision for the recommendations in this chapter.

The University of North Carolina at Greensboro Campus Bicycle Master Plan

May 2008

The UNCG Bicycle Master Plan was developed in 2008 to identify necessary improvements to the bicycle network in and around the UNCG campus. This plan provided an evaluation of current riding conditions and facilities, a study of the bicycle circulation and parking needs on campus, bicycle facility design guidelines, and a set of policy and program recommendations.

The Bicycle Circulation Plan recommended on- and off-road improvements to the bicycle network. Drawing from the Greensboro Urban Area Bicycle, Pedestrian, & Greenway Master Plan, a set of recommendations were formulated to serve internal campus needs as well as the needs of bicyclists traveling to and from campus. Recommendations were developed further to examine proposed facility types and cost estimates. Barriers to bicycle travel such as intersections, railroad crossings, and natural features were also examined.

Special focus was given in the UNCG Bicycle Master Plan to bicycle parking needs. This plan examined bicycle parking design standards and policies to address parking locations and quantities. Locations where additional bicycle parking is needed were identified, with the top 25 bicycle parking needs prioritized based on user feedback.

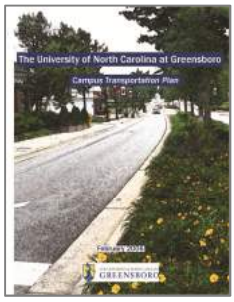
Progress on the 2008 Campus Bicycle Master Plan

Recommendations included the following.

- Lighting improvements at Tate and Aycock Street railroad underpasses
  - UPDATE: Pedestrian and bicycle improvements have been completed for both underpasses.
- Campus-wide intersection improvements
  - UPDATE: Improvements such as enhanced signage and markings have been implemented at select intersections.
- Bicycle parking location and facility improvements
  - UPDATE: Bicycle parking has been and continues to be added on campus, not only for new buildings but also at strategic locations around high-demand areas.
- Program and policy recommendations
  - UPDATE: Several programs recommended in the plan have been put in place. These include the creation of a bicycle safety brochure, targeted enforcement campaigns, bicycle registration, and promotion of alternative transportation events.

The University of North Carolina at Greensboro Campus Transportation Plan

February 2006



The original UNCG Campus Transportation Plan was prepared in 2006 to document the vision for the campus transportation network and obtain feedback from the campus population about their transportation needs. Based on this background, a set of multimodal recommendations was developed to address the existing and future needs of the UNCG campus. The following general themes are found in the 2006 plan:

- Heavy emphasis on parking needs, including bicycle parking.
- Recommended bicycle parking near every building entrance on campus.
- Recommended covered bicycle parking at strategic locations around the campus.
- Emphasis on connections with existing and proposed on- and off-road bicycle facilities outside the campus area (e.g. the Lake Daniel Greenway and the future Battleground Rail Trail)
- Identification of locations for aesthetic and safety improvements
- Ancillary facilities and education programs

See the insets for specific bicycle and pedestrian recommendations as well as progress on this plan.

Progress on the 2006 UNCG Campus Transportation Plan | Pedestrian

Pedestrian recommendations of the 2006 Campus Transportation Plan (Section 7.4) included the following.

- Install brick or stamped concrete crosswalks on all crosswalks (consistent with the existing campus design theme) at the intersection of Spring Garden Street and Aycock Street, Walker Avenue and Aycock Street, and Spring Garden Street and Tate Street.
  - UPDATE: This recommendation has been implemented.
- Work with the City of Greensboro to construct sidewalks in keeping with the prioritized list of sidewalk infill projects.
  - UPDATE: Ongoing coordination with the City has resulted in priority sidewalks being reflected in subsequent plans.
- Reduce vehicle speeds on Spring Garden Street.
  - UPDATE: Medians and bike lanes were installed to calm traffic and 20mph speed limit signs are posted. University police conduct occasional speed wagon checkpoints.
- Increase driver awareness of pedestrians.
  - UPDATE: University police created a pedestrian safety task force in 2010 and conducted a safety awareness campaign in Spring 2011. University police and POCAM collaborated in 2011 to create a safety brochure for drivers, cyclists, and pedestrians.
- Continue to work to improve the rail underpasses on Tate Street and Aycock Street.
  - UPDATE: Implementation of this recommendation is ongoing with long-term improvements being coordinated with the City and the rail operator. Work on the Aycock Street overpass appears on the FY2014-2020 Metropolitan Transportation Improvement Program as an unfunded project. Right-of-way acquisition is slated for FY2022 with construction in FY2023.
- Pursue an additional connection between Lee Street and Oakland Avenue if it can be done in a safe, cost-effective manner.
  - UPDATE: The pedestrian underpass at Forest Street is anticipated to open in Fall 2013.

Progress on the 2006 UNCG Campus Transportation Plan | Bicycle

Bicycle recommendations of the 2006 Campus Transportation Plan (Section 6.4) included the following.

- Work with the City of Greensboro to develop and implement the Bikeways and Greenways Program.
  - UPDATE: The 2008 Campus Bicycle Master Plan Steering Committee included representation from the City of Greensboro and references existing plans adopted by the City.
- Ensure that University and City bicycle plans complement one another.
  - UPDATE: UNCG has consulted with the Greensboro Bicycle & Pedestrian Coordinator.
- Identify safe connections to the Lake Daniel Greenway and the future Battleground Rail Trail.
  - UPDATE: Connections to the Lake Daniel Greenway are recommended via East Lake Drive and to the future Battleground Rail Trail via Carr Street and Walker Avenue.
- Work with the City to stripe and mark bicycle lanes on Spring Garden Street from Downtown, through campus, to Holden Road.
  - UPDATE: This recommendation has been implemented.
- Provide bicycle parking at every building entrance. Locations specifically needing additional bicycle spaces are referenced below with a status update.
  - UPDATE: Phase 2 bicycle racks are currently in design with construction scheduled for completion by 6/10/12. This project will result in additional permanent bicycle racks at Sullivan Science, Stone, Petty, Foust, and Gatewood Studio Arts as well as 4 Dero Fixit stations at McIver Deck, Jefferson Suites, Walker Circle, and Gray Drive near Gove Student Health Center. Portable racks will be located to satisfy demand for bicycle parking in other locations as needed.
- Provide covered bicycle parking in strategic locations on campus. Likely candidates include Walker Avenue Parking Deck, Music Building, Oakland Avenue Parking Deck, Graham Building, Taylor Theatre, and Elliott University Center.
  - UPDATE: Covered parking has not yet been provided in these locations.
- Work with the Bike Me! Collective to educate the campus population and promote bicycling on campus.
  - UPDATE: Though the Bike Me! Collective is no longer active, UNCG Spartan Cycles collaborates with the local non-profit advocacy group Bicycling in Greensboro (BIG).
- Continue to work to improve the rail underpasses on Tate Street and Aycock Street.
  - UPDATE: This recommendation has been implemented.
- Pursue an additional connection between Lee Street and Oakland Avenue if it can be done in a safe, cost-effective manner.
  - UPDATE: The pedestrian underpass at Forest Street is anticipated to open in Fall 2013.
- Provide an on-campus bike repair station in a convenient and accessible location.
  - UPDATE: Student mechanics with Spartan Cycles provide basic maintenance and minor repairs for registered bicycles at Oakland Deck approximately 10 hours per week by appointment. Local bike shops host free bike clinics on campus at least twice each semester.
- Distribute the map of safe streets for bicycling to students.
  - UPDATE: GDOT bike maps printed in 2007 have been distributed on campus though the maps are currently out of print (updated GDOT bike map currently only available online).

The University of North Carolina at Greensboro Campus Master Plan Update

October 2007

The UNCG Campus Master Plan Update was developed to provide a holistic view of the current needs and future growth of the UNCG campus. This plan not only included transportation, but also focused on land uses, character areas, and the vision for the campus as a whole.

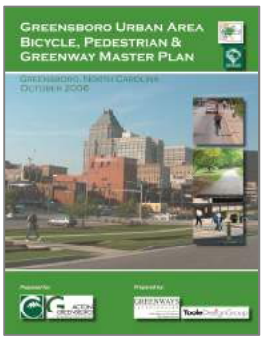
Part of the vision for UNCG is enhancing its reputation as a bicycle- and pedestrian-friendly campus. To do this, bicycle and pedestrian recommendations were developed that interface with the existing and proposed transit and roadway network. Improvements included creating new and improving existing east-west pedestrian pathways, while also strengthening important north-south pedestrian corridors. A new pedestrian bridge along Lee Street was recommended to connect with a future multimodal transit hub and as a location for future covered bicycle parking.

Bicycle recommendations were based on the 2006 Transportation Master Plan and included a mix of corridor improvements and spot enhancements. The plan promotes the creation of striped bicycle lanes along major corridors such as Walker Avenue and Tate Street. Railway underpasses at Aycock and Tate Streets were recommended for refurbishment or replacement, creating a safer and more appealing environment for both bicyclists and pedestrians. Bicycle amenities such as showers and bike pumps were recommended for implementation at strategic bike stations around campus. Bicycle parking needs identified in the 2006 UNCG Campus Transportation Plan were reaffirmed in this plan.

The needs of the bicycle and pedestrian population also were addressed through the vision for future land uses developed in the UNCG Campus Master Plan. This plan focused on promoting a compact, pedestrian-oriented campus with a healthy mix of land uses in redeveloping or growing areas.

Greensboro Urban Area Bicycle, Pedestrian, & Greenway Master Plan

October 2006



The Greensboro Urban Area Metropolitan Planning Organization developed the Bicycle, Pedestrian, & Greenway Master Plan to reaffirm the area's commitment to growing into a bicycle- and pedestrian-friendly community. The plan addressed bicycling and walking needs throughout the MPO as well as focused on specific needs within the City of Greensboro. UNCG and its surrounding neighborhoods were identified as a special area of focus.

The plan recommended a network of on-road bicycle, on-road pedestrian, and greenway facilities. One hundred different greenway recommendations were developed for the metro area, encompassing all levels of paved and natural surface trails. Over 418 miles of greenways were recommended in the MPO area, with 252 miles of those within the City of Greensboro. Almost 900 miles of on-road bicycle facilities were recommended for the MPO. This number includes a major commitment to striped bicycle lanes, with over 131 miles of this facility type recommended. More than 532 miles of paved shoulders were also recommended. On-road pedestrian facilities were also strongly supported, with 364 new sidewalk miles proposed.

Bicycle and Pedestrian Safety Strategies in North Carolina: Statewide Input and Priorities Synthesis Report

May 2011

The North Carolina Department of Transportation (NCDOT) led a statewide public involvement effort in late 2010 and early 2011 to identify problems and potential solutions specific to bicycle and pedestrian safety. This effort included a survey distributed by NCDOT that generated more than 16,000 responses. The survey found a clear majority of respondents did not feel their communities were safe for recreational or utilitarian bicycling. The lack of on-road bicycle facilities was stated as the chief reason for this safety issue. Similarly, less than 43% of respondents reported feeling safe to walk to destinations in their communities, citing a lack of connected sidewalk facilities. Notably, over 90% of survey respondents felt a safe bicycle and pedestrian network in their community would enhance their well-being and quality of life.

Using this information, NCDOT has been able to determine a set of priorities for statewide bicycle and pedestrian planning. The highest priority is to move forward with implementation of the recently adopted statewide Complete Streets Policy, which encourages the consideration of all transportation modes when making improvements. An allocation of additional funding for multimodal projects was identified as a priority to help further these objectives. In addition, more robust education and enforcement efforts statewide were identified to increase public awareness of non-motorized travel.

Existing Facilities

UNCG has been recognized for its commitment to bicycle and pedestrian travel. UNCG features high quality bicycle and pedestrian environments with significant travel by bicycle and foot. Priority pedestrian circulation patterns rely heavily on the Lake, Tate, Stirling, College, Walker, Spring Garden, and Forest corridors. Priority bicycle circulation patterns rely heavily on the Tate, Gray, West, Carr, Walker, College, Forest, Spring Garden, and Aycock corridors.

The UNCG campus is very walkable, with almost all of the campus within a 10-minute walk from Jackson Library. Sidewalks are found on most roads within and leading away from campus and pedestrian pathways crisscrossing campus. Spring Garden Street features striped bicycle lanes, a planted median, and sidewalks, making it a highly functional multimodal roadway on campus. The striped bicycle lanes change to a sharrow at the eastern border of campus. College Avenue has been converted to a

pedestrian and bicycle facility that offers north-south circulation. Many roads within campus have adequate, high-quality sidewalks. Small improvements such as curb ramps and crosswalk repainting are the most significant needs.

The region contains almost 100 miles of greenways, with 81 of those miles existing within the City of Greensboro. The MPO also has more than 125 miles of on-road bike facilities, including a mile of bicycle lanes on Spring Garden Street. Additionally, only 29 miles of these on-road bike facilities consist of paved shoulders.

Currently, 501 loops are in place, providing capacity for 1,002 bikes. These existing bicycle racks provide adequate parking for a majority of campus, however, some areas still need additional bike parking facilities.

Figure 3.1 shows the existing bicycle and pedestrian context, along with current bicycle parking locations. This map also documents bicycle and pedestrian crash locations for 2007 to 2010 as provided by the City of Greensboro.

Bicycle and Pedestrian Crashes

To identify areas where additional attention needs to be devoted to safety issues, bicycle and pedestrian crash locations were obtained for the past four years (2007-2010) from the City of Greensboro. These crashes primarily involve conflicts between autos and bicycles or autos and pedestrians. In a dense campus environment such as UNCG with a heavy demand for non-motorized travel, it's not unexpected to have higher crash rates for these modes. However, improvements to certain corridors and intersections can be considered to improve overall travel safety for the campus.

The reported crash locations shown in Figure 3.1 were compared to results from the web-based survey. One survey question asked respondents if some of the largest intersections in or around the UNCG campus needed to be improved for pedestrian safety. Figure 3.2 documents the responses to this question—intersections indicated by respondents as most in need of improvement are noted by higher percentages of "Definitely" (blue) and "Somewhat" (red) responses.

When comparing this information, the intersections and crossings along Aycock Street were perceived to have the greatest need of safety improvements. This perception was borne out by crash data indicating that crashes along Aycock Street were more prevalent than along Tate Street. Survey respondents rated the intersections of Aycock Street with Walker Avenue and Lee Street as the two most in need of improvement, with the intersection of Aycock Street and Spring Garden Street close behind. The bicycle and pedestrian improvements made to Spring Garden Street were recognized by survey respondents, resulting in lower percentages of safety improvement needs being expressed for that corridor.

Figure 3.1 | Bicycle and Pedestrian Context

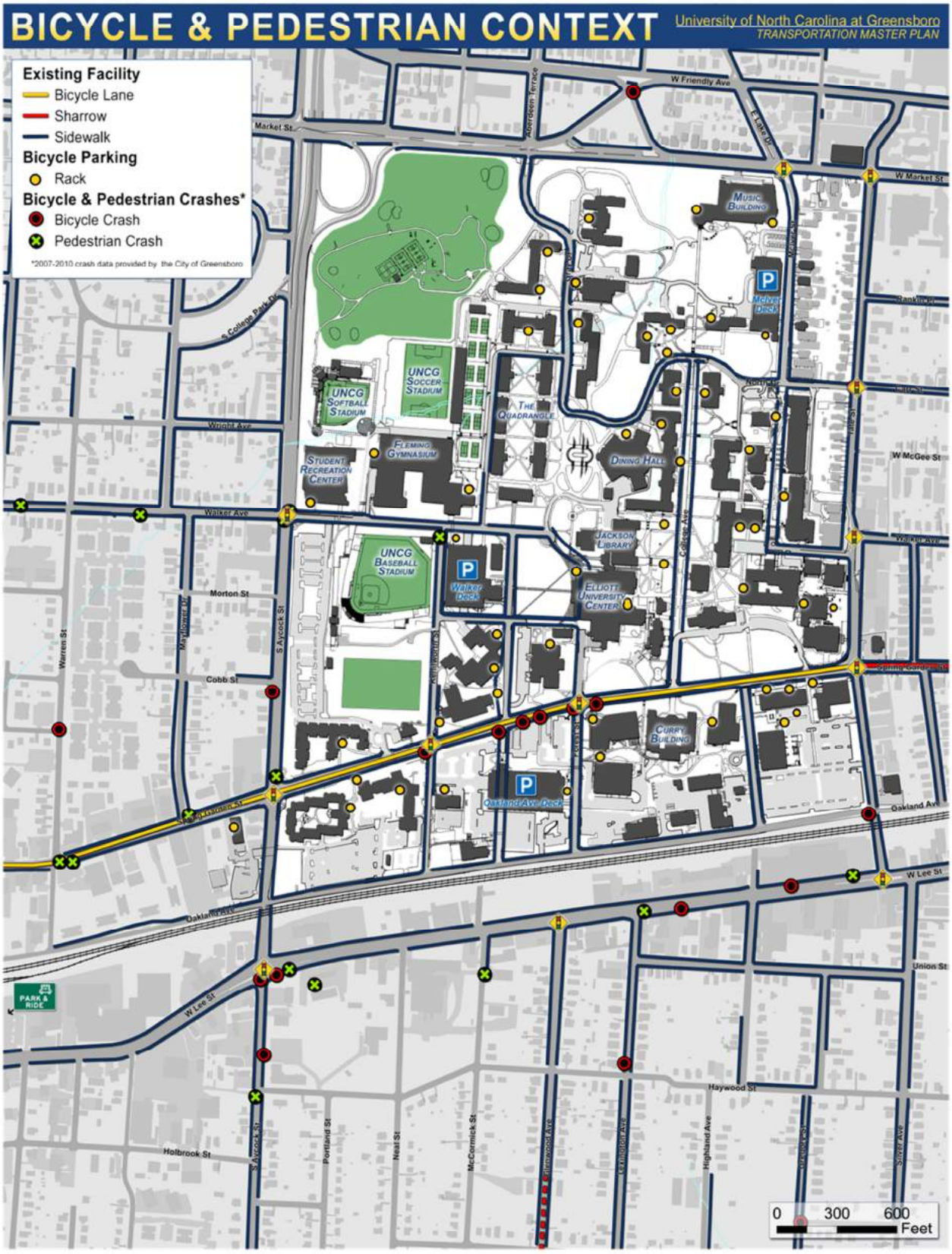
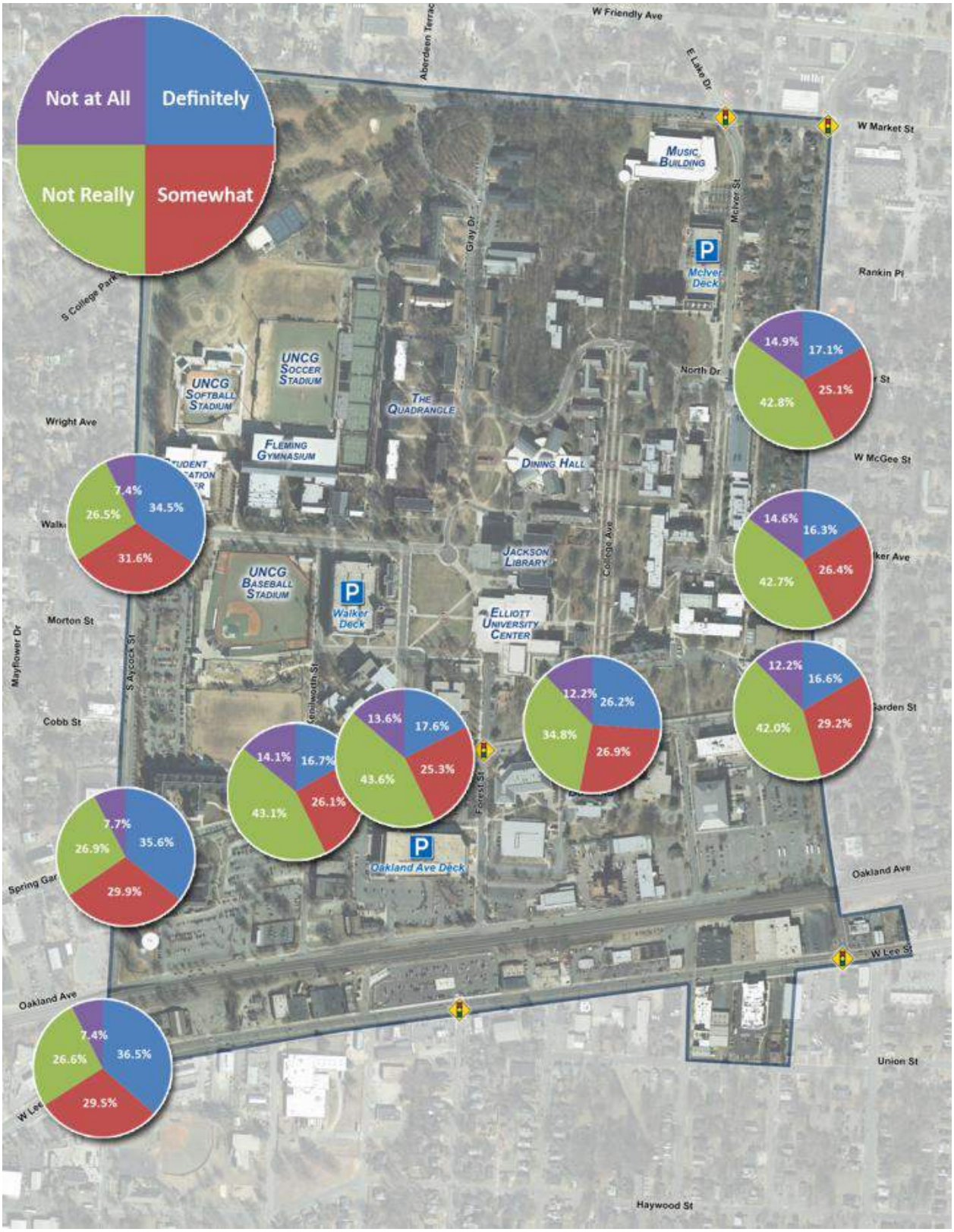


Figure 3.2 | Need for Bicycle and Pedestrian Intersection Improvements



Campus Community Perception

The web-based survey provided feedback from a subset of the campus population. As described in Chapter 2, the unscientific survey did not completely represent the general demographics of campus—responses were disproportionately weighted toward members of the campus community that choose personal automobiles as their preferred mode of transportation. In addition to the survey, additional opportunity for public outreach was provided through the Campus Open House held in October 2011. Collectively, this feedback was vetted through the Advisory Committee for use in the development of recommendations. The following issues emerged.

- A clear need was communicated for enhanced east-west travel opportunities within the campus, particularly for pedestrians.
- Room for improvement exists on many corridors in and around campus to promote bicycle friendliness.
- Several barriers to pedestrian and bicycle travel were noted, such as the railroad crossings at Aycock Street and Tate Street.
- Bicycle parking issues were identified, noting locations such as the Petty Science Building and Mendenhall Residence Hall where the need for racks is immediate.
- Covered bicycle parking also emerged as a desired amenity on campus.

Web-Based Survey

Feedback from the survey demonstrates some measure of desire for bicycle and pedestrian improvements in and around the UNCG campus. Items of note from the survey include the following.

- Sidewalks and crosswalks were generally well regarded (75% of respondents viewed them as excellent or good), but the rating fell to 50% for greenways and multi-use paths and 44% for on-street bicycle facilities.
- Distance from campus was the largest issue for respondents about why they do not bike, though this response may be reflective to the subset of the campus community that completed the survey.
- Adding greenways and striped bike lanes were favored by respondents.
- Nearly a quarter of respondents also said they might be interested in renting a bicycle for a fee.

Campus Open House

Numerous comments at the open house related to bicycle and pedestrian travel. While not all comments were carried forward as recommendations, each was evaluated.

- Improve the crosswalks at Tate Street/Lee Street and Aycock Street/Lee Street.
- Consider left-turn phasing for eastbound and westbound Walker Avenue at Aycock Street to improve pedestrian safety.
- Need more walk time at Walker Avenue/Aycock Street crossing.
- Improve pedestrian crossing safety on Spring Garden Street near Tate Street.
- Need to address bicycle connections to EUC/Library and connections on campus.
- Add stop signs on Spring Garden Street to calm traffic and improve pedestrian safety.
- Need central locations for bikes (bike lockers, storage) or bike station.
- Need an on-campus bike sharing program.
- Create bicycle lanes coming from South Aycock Street to campus.
- Need traffic calming/elevated crosswalks on Spring Garden Street. Drivers don't see or ignore poorly marked existing crosswalks.
- Need more active enforcement of speed, yield to pedestrians, etc.

Recommendations

Based on the existing conditions, travel issues, and public feedback analyzed during the data gathering phase of this plan, a set of recommendations has been developed. The recommendations address these needs while also integrating with the transit and auto needs detailed elsewhere in the plan.

Bicycle and Pedestrian Circulation

To promote this holistic system, recommendations development began with a study of the bicycle and pedestrian circulation issues in and around UNCG. When analyzing the connectivity of an area for pedestrians, it is first important to understand the distance that is being covered. Since walking speeds are comparatively slow, destination points become less viable for pedestrian travel when they are farther away. Figure 3.3 shows the pedestrian connectivity of the UNCG campus and its surroundings. To gain a perspective on travel times for pedestrians, walking radii were calculated from two major campus destination points—the Jackson Library and the intersection of Lee Street and Glenwood Avenue. Using an average person's walking speed, the distance a person could travel in five minutes was calculated from each destination point. These distances are shown by yellow dashed circles on Figure 3.3. Upon examination, it is evident that a large portion of the campus can be traversed within a five-minute walk.

Currently, pedestrians can make straightforward and efficient connections via a series of north-south routes on campus. Sidewalks are provided along such key roadways as Aycock Street, Tate Street, College Avenue, and McIver Street. Many of these routes also include connections across Spring Garden Street, while a handful of them continue across the railroad tracks to Lee Street.

East-west routing for pedestrians is more difficult. Few of the east-west roadways travel all the way through the UNCG campus. While this traffic diversion reduces automobile traffic in the campus interior, it also means that pedestrians must rely on off-road sidewalks and greenways for these connections. For east-west roadways that connect through campus, high vehicular traffic volumes make them less suitable for pedestrians. The improvements that have been made to Spring Garden Street attempt to offset this issue at that location.

Figure 3.4 shows the typical bicycle circulation patterns through the campus. Due to the lack of dedicated bicycle facilities in most locations, the north-south routes surrounding the campus are less attractive for bicyclists. As with pedestrians, many bicycle movements in the campus interior must occur on off-road facilities such as greenways. Despite the lack of quick and efficient facilities for bicycle travel in some locations, the demand to move between many recreational, residential, and academic facilities remains high.

The provision of striped bike lanes on Spring Garden Street has created a safer and more direct option for east-west travel by bicyclists. Users will typically avoid the high volumes along Lee Street, and instead use Haywood Street if they are traveling along the southern portion of campus. The railroad tracks remain a crossing barrier for bicyclists, with crossings currently limited to Tate Street and Aycock Street with a third to be provided via the Pedestrian Underpass at Forest Street.

Figure 3.3 | Pedestrian Connectivity

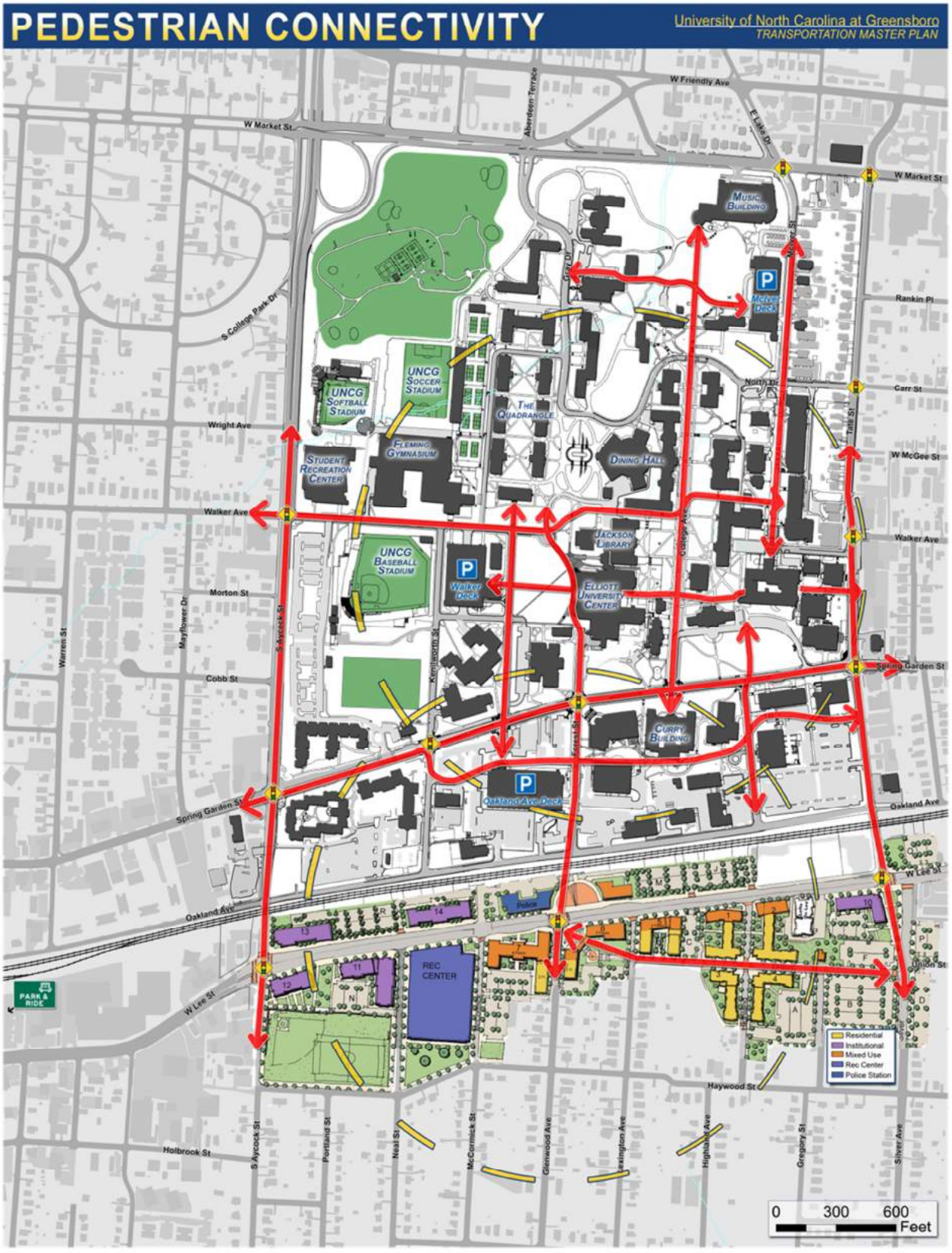
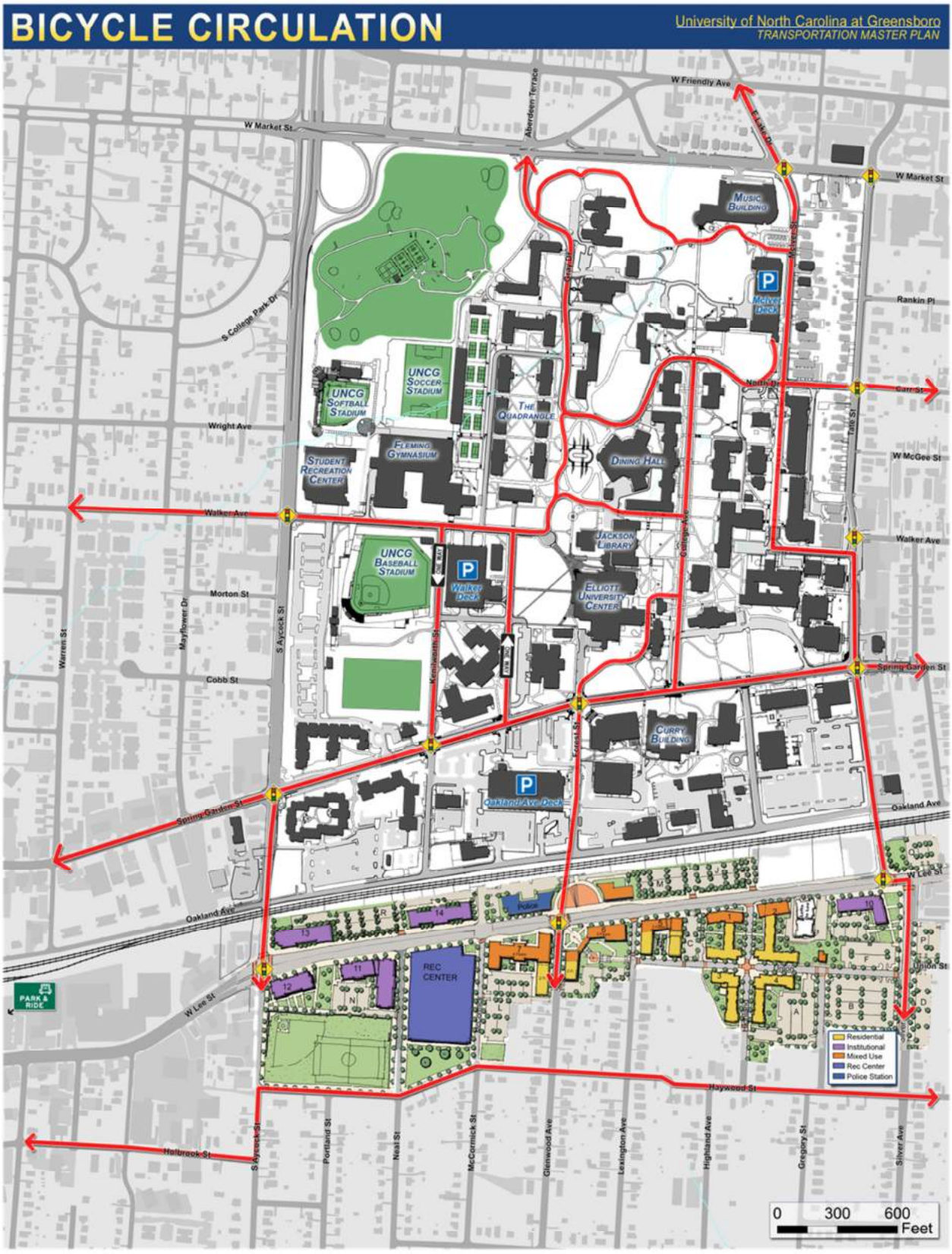


Figure 3.4 | Bicycle Circulation



Facility Recommendations

Detailed recommendations for pedestrian and bicycle facilities can be found in Figure 3.5 and Figure 3.6, respectively. The following sections discuss the proposed facility recommendations for sidewalks, on-road bicycle facilities, greenways/sidepaths, and bicycle parking.

On-Road Pedestrian Recommendations

Figure 3.5 shows a series of proposed sidewalks and intersection crossing improvements to enhance the UNCG on-road pedestrian network.

- Construct new sidewalks to fill in existing gaps in sidewalk system.
  - North Drive (Main Campus)
  - Oakland Avenue (Main Campus)
  - Kenilworth St (Main Campus)
  - Theta St (Main Campus)
  - Haywood Street (Spartan Village)
  - Neal Street (Spartan Village)
  - Union Street (Spartan Village)
  - Highland Avenue (Spartan Village)
  - Wright Avenue (Neighborhood)
  - Mayflower Drive (Neighborhood)
  - Cobb Street (Neighborhood)
- Install high visibility crosswalks.
  - All signalized crossings of Aycock St
  - Tate St and Oakland Ave
  - Carr St and McIver St
  - Gray Dr near Gove Student Health
  - Gray Dr and West St
  - Kenilworth St and Theta St
  - Union St and Gregory
  - Union St and Highland Ave
  - Oakland Ave and Kenilworth St
  - Oakland Ave and Highland Ave
  - Oakland Ave and Stirling St
- Install ground-mounted pedestrian crossing signs.
  - Gray Dr near Gove Student Health
  - Walker Ave and Stirling St
  - Theta St
- Construct curb extensions.
  - Aycock St and Walker Ave
  - Gray Dr near Gove Student Health
  - Gray Dr and West St
  - Oakland Ave and Forest St
  - Oakland Ave and Highland Ave
- Construct median refuge islands.
  - Aycock St between Spring Garden St and Walker Ave (raised planted)
  - Tate St north of RR underpass (raised planted)
  - Spring Garden St at Stirling St (extend existing)
- Install PedAdvance signals.
  - Aycock St and Walker Ave
  - Aycock St and Spring Garden St
  - Aycock St and Forest St
  - Aycock St and Lee St
  - Lee St and Glenwood Ave
  - Lee St and Tate St/Silver Ave
  - Tate St and Spring Garden St
  - Tate St and Walker Ave
  - Tate St and Carr St
  - Tate St and Market St
  - Market St and Lake Rd
- Install pedestrian countdown signals.
  - Market St and Tate St
  - Tate St and Carr St
  - Aycock St and Lee St
  - Lee St and Glenwood Ave
  - Lee St and Tate/Silver Ave
- Construct wide sidewalk.
  - Forest St between Spring Garden St and the Elliott University Center

Aycock Street Improvements

The UNCG Transportation Master Plan Update identifies Aycock Street as a pedestrian focus area. Aycock Street originally was envisioned as a north-south freeway connection through Greensboro as evidenced by the interchange at Market Street and a wide cross section north of Walker Avenue. The wide cross section encourages speeding and contributes to safety concerns. Crossing Aycock Street on foot was consistently identified as a major safety concern during campus and community outreach efforts. Motorists along Aycock Street conflict with pedestrians, many of which cross at unsignalized mid-block locations. The intersection of Aycock Street and Walker Avenue is the only signalized crossing north of Spring Garden Street, but the addition of a third northbound lane and traffic turning from westbound Walker Avenue to northbound Aycock Street contributes to the safety concerns on this segment of Aycock Street.

Improvements to Aycock Street north of Walker Avenue (shown in the graphic to the right and described below), aim to calm the street and encourage pedestrians to cross at the improved signalized intersection. Specific recommendations include:

- Construct landscaped medians to direct pedestrians to signalized crossings
- Install PedAdvance signals at each signalized crossing.
- Increase the lighting at the intersection of Aycock Street and Walker Avenue
- Construct a curb extension (bulbout) at Walker Avenue.
- Remove the third northbound lane between Walker Avenue and the Market Street onramp by striping the existing pavement to restrict use.
- Move service vehicle access from Walker Avenue to the rear of the Student Recreation Center to improve pedestrian safety.
- Construct a sidepath from the existing path by the Softball Stadium to Market Street.

Safety concerns also are evident from Walker Avenue south to Spring Garden Street, where students consistently cross Aycock Street mid-block and take unprotected refuge in the center turn lane. Further study of this portion of the corridor is needed, and improvements could be coordinated with ongoing plans to reconstruct the rail underpass on Aycock Street.

On-Road Bicycle Recommendations

Figure 3.6 displays on-road bicycle facility recommendations on and around the UNCG campus.

- Create bicycle boulevards with pavement markings, signage, traffic calming, and mini-circles.
  - Union St
  - Aberdeen Terr
  - Lake Dr
  - Haywood St
  - Walker Ave (west of Aycock St)
  - Lexington Ave
  - McGee St
  - Edgar St (northern connection to Carr St)
- Add a striped bicycle lane.
  - Silver Ave
  - College Ave from Administration Dr to Spring Garden St (green painted contraflow bicycle lane)
- Paint sharrows.
  - North Dr
  - McIver St
  - Walker Ave
  - Forest St (Oakland Ave to Spring Garden St)
  - Aycock St (south of Walker Ave)
  - Kenilworth St
  - Stirling St

Off-Road Recommendations

Figures 3.5 and 3.6 show proposed off-road campus connectors and sidepath facilities. These facilities typically are designed to serve both bicyclists and pedestrians.

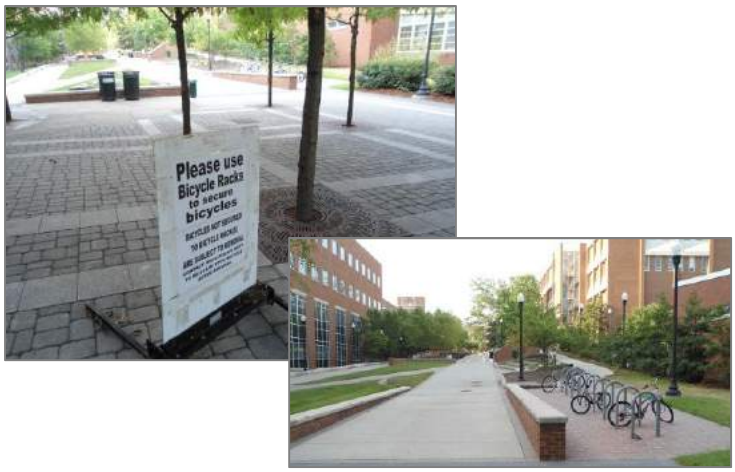
- Construct sidepath.
  - Aycock St from Walker Ave to Market St
- Enhance campus connector paths.
  - Connection between Lee St and Forest St (Pedestrian Underpass)
  - Union St extension between Lexington Ave and Glenwood Ave
  - College Ave
  - Connection between Forest St/Spring Garden St intersection and College Ave
  - Connection between Gray Dr and College Ave via the Walker Ave Circle
  - Connection between Gray Dr and McIver St
  - Connection to North Dr behind the Sullivan Science and Eberhart buildings

Bicycle Parking Recommendations

Figure 3.6 shows existing and proposed bicycle parking locations on campus. The UNCG Bicycle Master Plan recommended "Inverted U" or "Stadium" racks as the campus standard, which bike shelters and bike lockers at strategic locations.

See Section 5 of The UNCG Bicycle Master Plan for more detail, including site requirements

- Install bicycle racks near convenient access to buildings.
    - Stone Building near College Avenue entrances (5 U racks – 10 spaces)
    - Petty Building (1 stadium rack – 8 spaces)
    - Spartan Village as development occurs
- Replace portable racks with permanent loops.
    - Sullivan Science Building near North Drive Child Day Care (1 stadium rack – 8 spaces)
    - McIver Building near Foust Building (1 stadium rack – 8 spaces)
    - Mary Foust Residence Hall (1 stadium rack – 8 spaces)
    - Guilford Residence Hall (2 stadium racks – 16 spaces)
    - Near Tower Village and MHRA Moore Humanities (3 stadium racks – 24 spaces)



Install bicycle stations (covered parking, showers, and bike pumps).

- Oakland Avenue Deck (3 lockers – 6 spaces)
- McIver Parking Deck (1 shelter with u racks – 8 spaces)
- Walker Circle (1 shelter with u racks – 10 spaces)
- Graham Building (1 shelter with u racks – 8 spaces)
- Proposed Rec Center (3 lockers – 6 spaces; 1 shelter with u racks – 8 spaces)
- Taylor/Brown/Carmichael Plaza (2 shelters with u racks – 16 spaces)
- Elliott University Center – College Avenue on the east side the EUC (2 shelters with u racks – 16 spaces)

Changes in demand for bicycle parking over time is best understood with regular bicycle parking occupancy counts. Parking Operations and Campus Access Management has collected counts for the past two years, a practice that should continue in the future. The occupancy counts should be compared with the list of recommended parking facilities to determine if changes are warranted.

Parking policies described in the UNCG Bicycle Master Plan should dictate the type and capacity of bicycle parking provided for new development, including Spartan Village. General guidelines from the Bicycle Master Plan include:

- Residential – 1 space per 4 units
- Academic – 1 space per 5 building occupants
- Sports/Recreation – 1 space per 40 to 100 seats
- Operations – 1 space per 5 building occupants
- Parking Deck – 1 space per 20 automobile spaces
- Park-and-Ride Lots – 1 space per 20 automobile spaces

Figure 3.5 | Pedestrian Recommendations

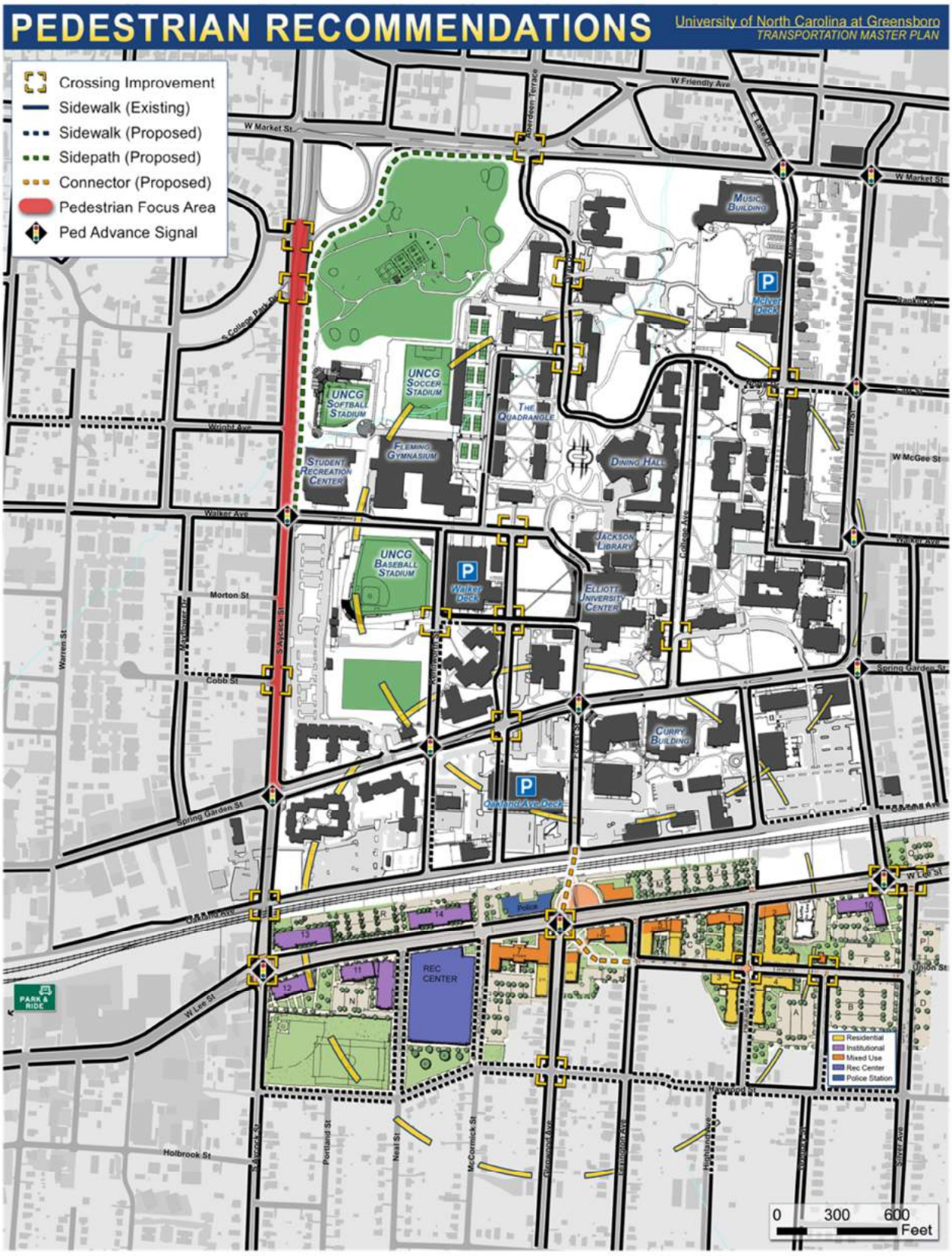
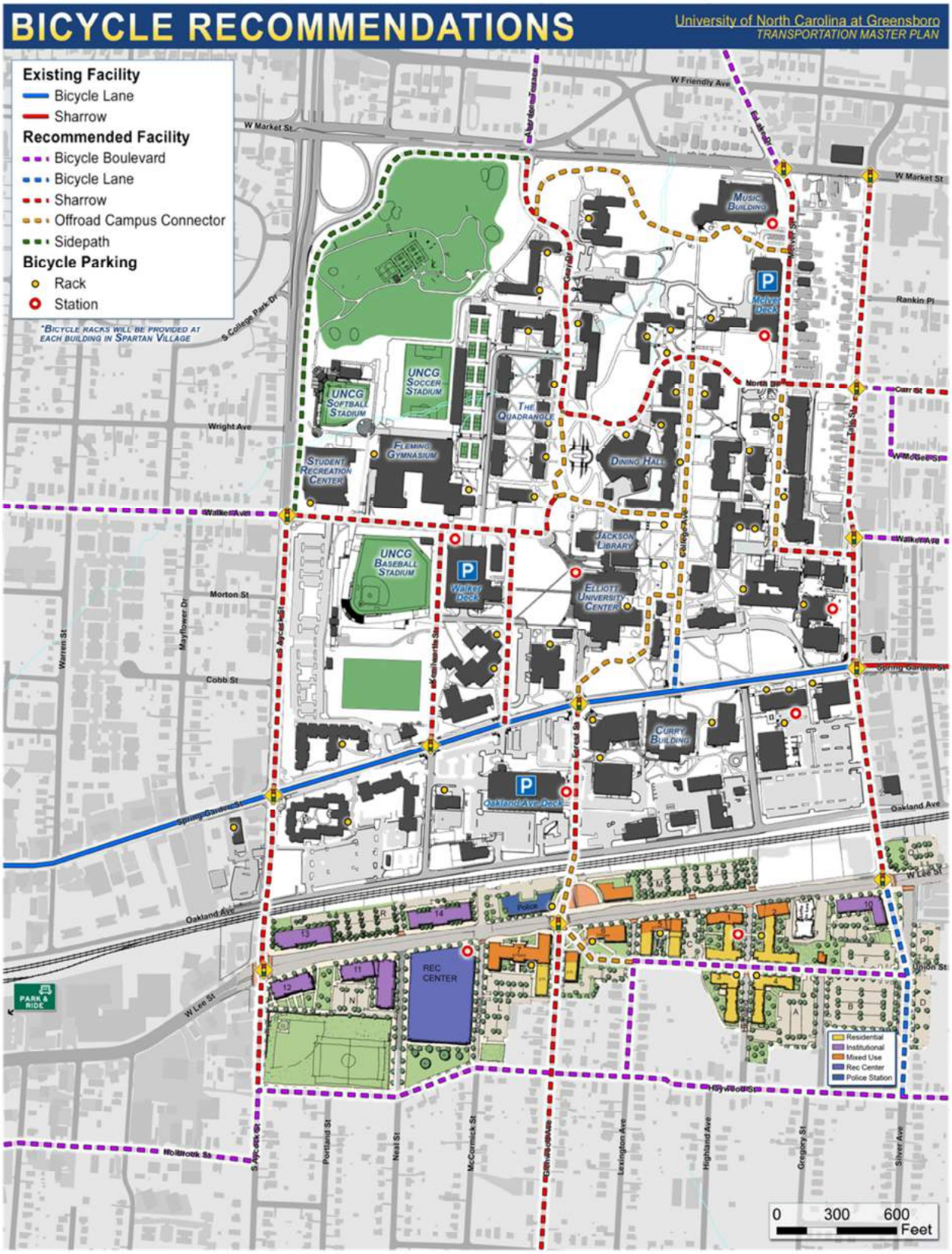


Figure 3.6 | Bicycle Recommendations



Program Recommendations

The bicycle and pedestrian network needs a supporting program of encouragement, education, and enforcement initiatives. The following programs have been applied successfully in municipal and collegiate settings around the United States and could be considered for implementation at UNCG.

Encouragement Programs

University Programs

Providing bicycle-related information to incoming students has been an effective way for UNCG to increase student's bicycle awareness and safety on campus. *It is recommended that the University include bicycle materials in the orientation packet for new employees (faculty and staff).* The packet could include bicycle registration and bicycle safety information, lists of bicycle retailers, the bicycle rules and regulations, and a map of existing bicycle facilities and recommended routes.

A bicycle map is particularly important for encouraging the active and safe use of bicycle facilities. *It is recommended that the University coordinate with GDOT to ensure the next revision to the City's Bicycle Map includes the existing and proposed facilities from the Update.* The maps should be readily available online and in print. *It is recommended that the University provide a link to the Greensboro Bicycle Map on POCAM's bicycle webpage and print copies for distribution on campus.*

Bicycle Sharing Program

Bicycle sharing programs appear in all shapes and sizes in cities and campuses throughout the world. The central concept is offering free (or nearly free) access to bicycles to reduce the use of automobiles for short trips. A system of volunteer-run hubs or kiosks would be located throughout the campus, and the campus community registered with the program present membership cards to check out a bicycle for a specified period of time.

When the Spartan Cycles bike sharing program began Fall 2010, free bike loans were offered to students. To sustain the program long term, free bike sharing is now limited to departments and student groups only. Individual students and staff may rent a bicycle, helmet, lock, and key for $25 per semester with basic maintenance included. The Spartan Cycles program currently is managed by a student intern working approximately 10 hours per week. Plans to grow the bike program by partnering with the Spartan Trader campus consignment shop are under consideration.

It is recommended that the University implement a bicycle sharing program with kiosks set up near the Walker Avenue Circle, Curry Building, and Phase 1 of Spartan Village.

Alternative Transportation Events

The University has sponsored events such as the Green Games and Bike-to-Work Day to promote non-motorized transportation. These activities will continue to be a critical component of UNCGs success in shifting the campus community away from single-occupant vehicles. Coordinating days, weeks, and even months that specifically promote alternative transportation options has proven to be a good method of increasing the number of students who try alternative options, but more focus is needed on faculty and staff. Bike programming and marketing specifically for faculty and staff occurs during the summer months when fewer students are on campus. UNCG partners with Bicycling in Greensboro, the City of Greensboro, and local bike shops to provide refueling stations, summer bike rentals, and other programs in May including National Bike to Work Day. *It is recommended that the University tailor some programs (e.g. foster a faculty versus staff green*

commute challenge) and continue to partner with the City of Greensboro to improve the visibility and viability of programs with faculty and staff.

Collaboration with City of Greensboro and the Greensboro Urban Area MPO

The 2006 UNCG Campus Transportation Plan and 2008 Campus Bicycle Master Plan emphasized coordination between the University and City for bicycle and pedestrian initiatives. The UNCG Office of Business Affairs maintains a collaborative working relationship with the City and the Greensboro Department of Transportation (GDOT). UNCG Campus Enterprises, and specifically Parking Operations and Campus Access Management (POCAM), are in contact with GDOT and the Greensboro Urban Area Metropolitan Planning Organization (MPO). *It is recommended that the University continue to work with the City of Greensboro and the Greensboro Urban Area MPO to have representation on transportation advisory committees that address citywide issues of non-motorized transportation policy and planning.*

Education and Enforcement

Public Education and Enforcement Programs

UNCG has taken a proactive approach to education and enforcement, efforts which are coordinated by the UNCG Police Department. University police created a pedestrian safety task force in 2010 and conducted a safety awareness campaign during the Spring semester of 2011. Also in 2011, University police and POCAM collaborated in 2011 to create a safety brochure for drivers, cyclists, and pedestrians. *It is recommended that the University make the safety awareness campaign an annual event.* A simple approach such as the "Same Road, Same Rights, Same Rules" campaign may be used. Note: This phrase is trademarked by Probicycle.com, but public and non-profit entities typically are granted permission to use the phrase without charge. This approach is geared toward both motorists and bicyclists. Education should focus on the awareness of motorists' need to yield to pedestrians in the crosswalks and a pedestrian's responsibility of not walking in front of oncoming traffic.

Enforcement Programs

Bicycle theft can be a deterrent to bicycle use, especially to users with higher-end bicycles. One program that has been used to track down bicycle theft rings is a sting operation using a homing device. An attractive bicycle with a homing device in the frame is placed in a location where numerous bicycles have been stolen with minimal protection. If stolen, the bicycle can be tracked. *It is recommended that the University implement a theft enforcement program.*

Speed Enforcement

Keeping traffic speeds low is essential for the safety of UNCG staff and students. University and City law enforcement can use a variety of techniques such as ticketing and speed trailers to enforce speed limits on roadways adjacent to UNCG. *It is recommended that the University conduct regular speed checkpoints.*

Conclusion

The success of UNCG's bicycle and pedestrian system ultimately depends not only on the facilities provided but also on the encouragement and education efforts of the University. The commitment of UNCG to provide a robust bicycle and pedestrian network demonstrates the desire to promote non-motorized travel. The thorough and timely maintenance of these facilities will reassure prospective users that the facilities will be safe and accessible. Outreach programs to educate students, faculty, staff, and visitors about the amenities available to them will help maintain high visibility for non-motorized travel. When all of these practices combine, they will expand upon the successful non-motorized program at UNCG.


Summary of Recommendations

The UNCG Transportation Master Plan Update includes the following recommendations:

Facilities

- Improve Aycock Street with a landscaped median, crossing enhancements, and removal of the third northbound lane north of Walker Avenue.
- Construct new sidewalks to fill in existing gaps in sidewalk system at 11 specified locations.
- Install high visibility crosswalks at 11 specified locations and all signalized crossings of Aycock Street.
- Install ground-mounted pedestrian crossing signs at three specified locations.
- Construct curb extensions at five specified locations.
- Construct median refuge islands along Tate Street and a portion of Spring Garden Street.
- Conduct additional study of Aycock Street between Lee Street and Walker Avenue.
- Install PedAdvance signals at all signalized crossings adjacent to and on campus.
- Install pedestrian countdown signals at five specified locations.
- Construct a wide sidewalk on Forest Street.
- Create bicycle boulevards along eight identified corridors.
- Add striped bicycle lanes on Silver Avenue and College Avenue.
- Paint sharrows on seven identified corridors.
- Construct a sidepath along Aycock Street from Walker Avenue to Market Street.
- Enhance campus connector paths at seven specified locations.
- Install bicycle racks near convenient access to buildings.
- Replace portable racks with permanent loops.
- Install bicycle stations at nine locations.

Program and Policies

- Include bicycle materials be included in the orientation packet for new employees (faculty and staff).
- Coordinate with GDOT to ensure the next revision to the City's Bicycle Map includes the existing and proposed facilities from the Update.
- Provide a link to the Greensboro Bicycle Map be provided on POCAM's bicycle webpage and print copies for distribution on campus.
- Implement a bicycle sharing program with kiosks set up near the Walker Avenue Circle, Curry Building, and Phase 1 of Spartan Village.
- Tailor some programs and partner with the City of Greensboro to improve the visibility and viability of programs with faculty and staff.
- Work with the City of Greensboro and the Greensboro Urban Area MPO to have representation on transportation advisory committees.
- Make the safety awareness campaign an annual event.

Nationally, many people agree that they would use transit if service was fast, frequent, dependable, and easy to use. Like a complete system of roads, sidewalks, and bikeways, transit must provide connections to the places people need or want to go at a time when they need to get there. Given the framework of transit-supportive urban form inherent to a college campus, transit enhancements have a high probability of success in providing choice to riders and reducing demand for single-occupancy vehicles.

Likewise, transit can provide a safer, more pedestrian-friendly, and less environmentally impactful trip for faculty, staff, and students traveling to, from, and within the UNCG campus. The Transit Element of the *University of North Carolina at Greensboro Transportation Master Plan Update* describes the current transit network available to the campus community, reveals how receptive potential users may be to expanded services, and provides basic recommendations for University-sponsored service.

Transit Framework

In the five years since the 2006 Campus Transportation Master Plan was completed, the University has expanded the transit offerings for faculty, staff, and students. The Spartan Chariot and Higher Education Area Transit (HEAT) are two services that show University staff continues to acknowledge the importance of public transportation in providing mobility. The collective result of the *Update* should be an integrated, balanced intermodal transportation system that safely and efficiently moves people between activity nodes. Effective transit planning and service delivery operates within the following framework.

Transit and Campus Development

The urban form of a college campus (building scale, orientation, and use) is a major reason transit on college campuses works well. It should be no surprise that transit often is one of the most utilized forms of transportation to travel to and from college campuses across the nation.

Connectivity between off- and on-campus transit routes improves the overall convenience and ease of using transit as a means of traveling to campus and getting around on campus. Improving the mobility of faculty, staff, and students between on-campus destinations is an important consideration as Spartan Village takes shape.

Transit and Travel Demand Management

Transit can reduce travel demand and improve traffic operations by decreasing the number of single-occupancy vehicles on the roadway

network. In many urban areas, heavy traffic congestion results from this increased demand on the roads. In general, congestion can be reduced by encouraging the use of transit. Perhaps more important on a college campus, the use of transit can reduce the demand for parking. The strategy of better managing travel demand by encouraging transit necessitates that road users who currently travel alone via personal vehicle choose to utilize transit instead, not only increasing transit ridership but also decreasing the number of single-occupancy vehicles using the roadway.

Planning Context

As a critical component of a complete transportation system, transit is significantly impacted by the decisions made for other modes. Including bus pullouts when retrofitting an arterial street or ensuring curb extensions are designed to accommodate the turning radius of a bus are two examples. At its best, transit provides an efficient and inexpensive transportation mode. The planning context for the Transit Element begins with an overview of existing conditions and considers the feedback of staff, stakeholders, and the general public as well as previous planning efforts.

Previous Planning Efforts

When planning and designing effective transit service, it's essential to understand travel patterns, activity centers external to campus, and the operating environment of the system. Plans and studies that preceded the *Update* have assessed existing services, the growth of campus, ridership trends (and projections), technological advancements, and coordination opportunities. Plans at a regional scale have helped establish a long-term vision for transit without concrete funding to fulfill it. Relevant transit plans considered in the development of the Transit Element for the *Update* include the following.

- 2006 UNCG Transportation Master Plan: The existing Transportation Master Plan describes existing and proposed transit routes. At the time the plan was completed, the HEAT service was in its infancy and the Spartan Chariot had not taken shape. Recommendations focus on utilizing the Walker Avenue circle as a transit hub and making minor changes to routing and service delivery.
- 2007 UNCG Campus Master Plan Update: As a long-term vision plan, the 2007 Campus Master Plan Update stops short of crafting new recommendations for public transit at UNCG. Instead, the plan reiterates the recommendations from the 2006 transportation plan and identifies providing access to UNCG's campus via public transit as a key consideration moving forward.
- 2010 Regional Transit Development Plan: The Piedmont Authority for Regional Transportation (PART) developed the Regional Transit Development Plan to accommodate regional growth and address challenges in a sustainable way. The plan identifies Lee Street/High Point Road as a transit emphasis corridor (15 or 30 minute headways, transit signal priority, enhanced amenities), connects the University to downtown via a streetcar, and designates a transit center at UNCG.

These plans formed the baseline for the development of the *Update's* Transit Element.

Progress on the 2006 UNCG Campus Transportation Plan | Transit

Recommendations of the 2006 Campus Transportation Plan (Section 5.5) included the following.

- Utilize the Walker Avenue Circle behind Jackson Library as the primary transit hub on campus.
  - UPDATE: The Walker Avenue Circle currently serves as a hub for HEAT, PART, and Spartan Chariot buses.
- Utilize Elam as western limit of Campus Shuttle service.
  - UPDATE: HEAT Route 73 serves Elam.
- Utilize the following stops for the Campus Loop route: Walker Avenue Hub, Walker and Warren, Walker and Chapman, Walker and Elam, Elam and Spring Garden, Spring Garden and Chapman, Spring Garden and Warren, and Spring Garden and Stirling.
  - UPDATE: These stops are served by HEAT Route 73.
- Route Inner Circulator along neighborhood streets.
  - UPDATE: HEAT Route 73 circulates through surrounding neighborhoods.
- Dependent on GTA Feasibility.
  - UPDATE: Students and employees may ride all GTA routes fare free with Spartan Card, and GTA Routes 1, 2, and 9 have stops on and/or near campus.
- Expand the Campus Loop route west to Holden Avenue as population density warrants.
  - UPDATE: Extending services from campus west to Holden Avenue is not a priority at this time.
- Provide service to the Millennial Campuses.
  - UPDATE: Service to the Millennial Campuses is not provided at this time but should remain a long-term recommendation.
- Provide a new service south of campus as population density warrants.
  - UPDATE: The HEAT shopping shuttle connects to Four Seasons Mall. The Spartan Chariot began service to Lofts on Lee in Fall 2011. The Spartan Chariot Express service will begin Fall 2013.
- Identify funding source: student fees, increased parking permit costs, some combination of the two.
  - UPDATE: Since the 2006 plan, students have paid a transportation fee and permit costs have increased.
- Provide real-time bus information available on-line.
  - UPDATE: The University has installed mogo GPS on Spartan Chariot buses and provides real-time information online.

Existing Services

UNCG encourages transit for traveling to, from, and within campus. A centrally located on-campus transit hub at the Walker Avenue circle links the Spartan Chariot, Higher Education Area Transit (HEAT), and Piedmont Authority for Regional Transportation (PART). Within walking distance are also other HEAT and Greensboro Transit Authority (GTA) bus stops. The sections below provide a brief overview of transit service at UNCG. A series of two context maps (Figure 4.1 & 4.2) follow the sections and show service in relation to the campus.

UNCG Spartan Chariot

The Spartan Chariot operates on a loop route circling UNCG's campus, stopping at 11 locations during the weekdays and 17 locations during the evenings and weekends. Riders of the Spartan Chariot may connect to HEAT and GTA routes via the UNCG transit hub at the Walker Avenue circle. Figure 4.1 shows the weekday daytime route.

Between the 2009-2010 and 2010-2011 school year, the number of rides on the Spartan Chariot increased 7.5% while the percentage of miles decreased 2.0%. The slight drop in mileage was due to minor schedule adjustments and reduced need to serve the park-and-ride lot late at night.

Park & Ride Shuttles

Park & Ride shuttle service is offered for commuters who live off campus and park in the park-and-ride lot at 1720 West Lee Street across from the Greensboro Coliseum Complex. This lot is restricted to those with an appropriate permit and is open Monday to Thursday 7:00 a.m. to 10:00 p.m. and Friday 7:00 a.m. to 7:00 p.m. The shuttle departs every 10 to 15 minutes and stops at three campus locations:

- Lot 8 near Financial Aid
- Forest Street near McNutt and Moore Humanities MHRA
- Spring Garden Street in front of the Graham Building

Park-and-ride miles and rides increased 6.7% and 18.1%, respectively, from 2009-2010 to 2010-2011. This increase is due to increased E permit sales and new late night service.

Higher Education Area Transit

HEAT was launched in 2006 by GTA and seven local colleges and universities (UNCG, Bennett College, Elon University School of Law, Greensboro College, Guilford College, Guilford Technical Community College, and NC A&T). HEAT operates nine routes and provides fare-free service for qualifying students from UNCG, Greensboro College, Guilford College, and NC A&T. Because HEAT covers large distances and is designed to be an express service, bus stops along its routes are kept to a minimum to decrease travel times. However, HEAT shares many of its stops with GTA stops, so riders can easily connect to the GTA transit network to reach their destination.

Since the inception of HEAT, GTA has regularly reported ridership trends and participation by member institutions. Table 4.1 shows a historical comparison of student ridership by school as reported in the HEAT 2010-11 annual report. Between the 2008-09 and 2010-2011 school years, UNCG ridership increased more than 200% from 96,198 to 294,202. UNCG accounts for 43% of all HEAT ridership.

Table 4.1 - Historical HEAT Ridership

College/University	2010-11	2009-10	2008-09	2007-08	2006-07
UNCG	294,202	197,061	137,276	96,198	93,337
NC A&T*	263,193	202,169	143,485	69,052	24,030
Bennett College	79,216	65,073	43,175	50,974	28,754
Guilford College	24,993	17,533	11,726	8,307	9,114
GTCC	21,060	16,236	353,796	268,564	204,270
Greensboro College	1,645	0	3,232	2,761	2,684
Elon University School of Law	19	28	101	173	9
Total	*684,328*	*498,100*	*692,791*	*496,029*	*362,198*
*Same-school Total^*	*661,623*	*481,864*	*335,763*	*224,704*	*155,244*

** NC A&T 2007-08 data missing for August through mid-October*

^ Total excludes GTCC and Greensboro College

Source: The Greensboro Transit Authority HEAT Program, Year 5: 2010-2011

Service from UNCG to popular destinations in the city includes:

- Off-Campus Housing (apartment communities on Walker Avenue, Chapman Street, and Spring Garden Street) – From the Walker Avenue circle via HEAT 73
- Downtown (as well as NC A&T, Bennett College, and transfers at the Depot) – From the Walker Avenue circle via HEAT 72 to the Depot downtown
- Friendly Center (dining, movies, and shopping as well as Guilford College) – From the Walker Avenue circle via HEAT 71 west to Friendly Center
- Late Night and Weekends (east to downtown or west to Guilford College) – From the Walker Avenue circle via HEAT 70/71 with service until 3:00 a.m. Thursday through Saturday

HEAT service is free to UNCG students with a valid ID.

Greensboro Transit Authority

Created in 1991, GTA serves the City of Greensboro by providing bus services on 15 routes Monday through Saturday and 7 routes on Sundays. The GTA fleet consists of 42 fixed-route buses. Service from UNCG to popular locations in the city includes:

- Greensboro Coliseum – From the GTA bus stop at Tate Street and Lee Street via Route 2
- Four Seasons Town Centre – From the GTA bus stop at Tate Street and Lee Street via Route 2
- Wendover Avenue (Walmart) – From the GTA bus stop at Spring Garden Street and Aycock Street via Route 1

GTA service is free to students with a valid ID. GTA also provides a paratransit service called Specialized Community Area Transportation (SCAT) for persons with disabilities who cannot use the fixed-route vehicles. From 2009-2010 to 2010-2011, the number of rides on HEAT/GTA increased 49.9%.

Piedmont Authority for Regional Transportation

PART provides 14 weekday routes and 2 weekend routes connecting several cities in the Piedmont Triad area and beyond, including Winston-Salem, Greensboro, Chapel Hill, and Durham.

Service from UNCG to popular locations beyond the city includes:

- South to Asheboro – From the Walker Avenue circle via PART Route 10 Randolph County Express to Asheboro ($2.40 round trip for students; $4.80 for non-students)
- West to the Mountains – From the Walker Avenue circle via HEAT 72 to the Depot downtown, transfer to PART Route 7 Mountaineer Express to Boone (operated by Coach America – $20 round trip for students; $28 for non-students)
- East to Chapel Hill – From the Walker Avenue circle via HEAT 72 to the Depot downtown, transfer to a PART bus going to the PART Hub, transfer to PART Route 4 Medical Connections ($14 round trip for students; $28 for non-students)

PART also offers a variety of commuter services including an emergency ride home program, vanpools, and direct bus routes from Davidson and Randolph Counties to UNCG. Routes also provide service to the Piedmont Triad International Airport. PART maintains 27 park-and-ride lots and operates a bus fleet consisting of 45 vehicles.

In 2010-2011, 184 regional PART bus passes were sold at UNCG, 82 by employees and 102 by students.

Figure 4.1 | Transit Context – University

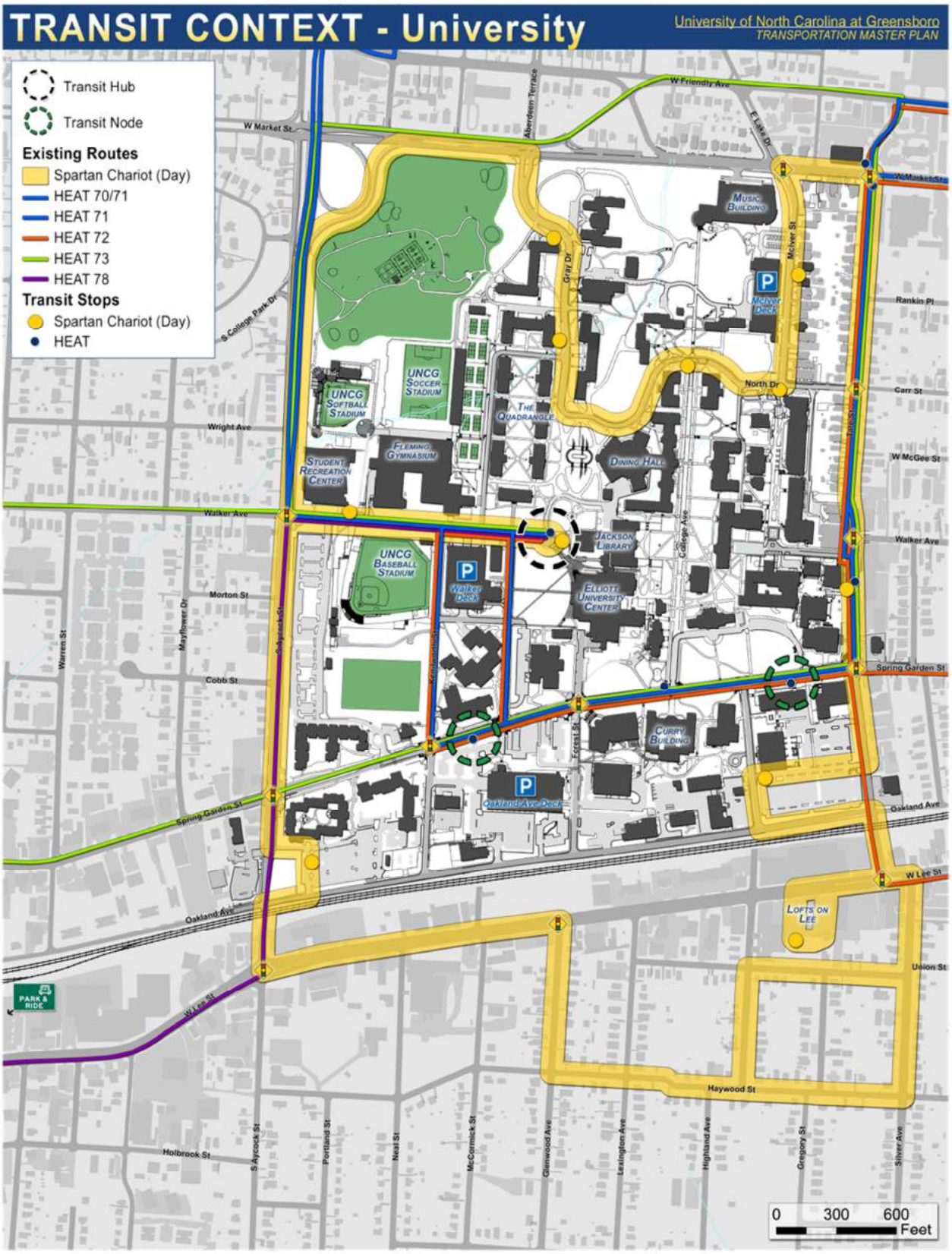
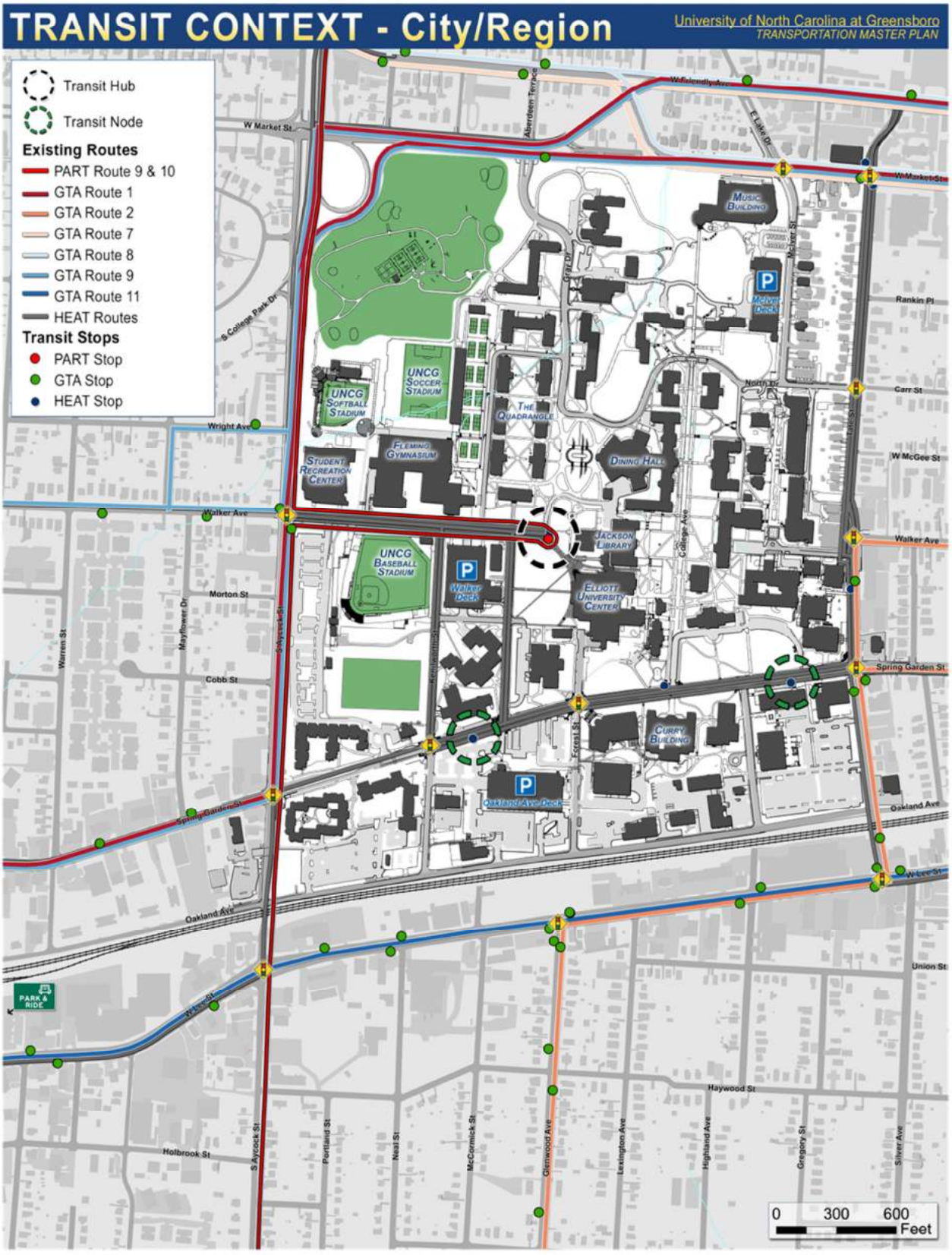


Figure 4.2 | Transit Context – City/Region



Proximity of Transit Services

Most transit riders will walk up to a quarter mile to reach a stop. In pedestrian-friendly areas, travelers may walk up to a half mile. As part of the *Update*, a proximity analysis was conducted in which the addresses of UNCG and commuter students, faculty, and staff were mapped to determine their proximity to bus stops and park-and-ride lots.

Commuter Students

For the purposes of this analysis, commuter students were defined as any student living in off-campus housing. The data provided for this analysis was dependent upon information provided by students as their local address. Some students listed out-of-state addresses as local. Prior to calculating the percentages shown below, these out-of-state addresses were removed. As shown in Table 4.2, commuter students have relatively good access to campus by bus from their place of residence. Approximately 28.2% of these students live within a half mile of a GTA bus stop, and 12.6% live within a half mile of a HEAT stop. Because the Spartan Chariot route does not stray from campus, many of the students within proximity to a Spartan Chariot stop also are within walking distance of campus. Table 4.3 shows two out of three students are within 10 miles of a PART park-and-ride lot.

Table 4.2 - Commuter Student Residences within Distance of Bus Stop

Service	Bus Stops	¼-mile		½-mile	
		Persons	%	Persons	%
GTA	1,075	2,525	22.5%	3,166	28.2%
HEAT	67	1,058	9.4%	1,419	12.6%
Spartan Chariot	16	439	3.9%	845	7.5%
PART	41	108	1.0%	796	7.1%
Total	1,162	2,551	22.7%	3,266	29.1%

Table 4.3 - Commuter Student Residences within Distance of PART Park-and-Ride Lot

5 miles		10 miles	
Persons	%	Persons	%
6,236	55.6%	7,738	69.0%

Faculty and Staff

As shown in Table 4.4, approximately one-third of UNCG's faculty and staff reside within a quarter mile of a GTA bus stop. Approximately 43% of faculty and staff are within a half-mile walk to a bus stop. With 1,075 of the bus stops attributed to GTA (a much larger number compared to Spartan Chariot, HEAT, or PART), it's not surprising that most faculty and staff who live near a bus stop would be dependent on GTA. Indeed, many of the HEAT stops are shared with GTA.

While only 1% of the addresses are within a quarter mile of a PART bus stop, PART's network of 27 park-and-ride lots extends the reach of the service. Table 4.5 shows 71% of faculty and staff live within 5 miles of a PART park-and-ride lot and 88% live within 10 miles.

Table 4.4 - Faculty and Staff Residences within Distance of Bus Stop

Service	Bus Stops	¼-mile		½-mile	
		Persons	%	Persons	%
GTA	1,075	774	31.1%	1,057	42.5%
HEAT	67	166	6.7%	336	13.5%
Spartan Chariot	16	68	2.7%	160	6.4%
PART	41	37	1.5%	228	9.2%
Total	1,162	780	31.4%	1,073	43.2%

Table 4.5 - Faculty and Staff Residences within Distance of PART Park-and-Ride Lot

5 miles		10 miles	
Persons	%	Persons	%
1,764	71.0%	2,179	87.7%

Figures 4.3 to 4.8 show the transit networks of GTA, HEAT, and PART as well as their respective quarter-mile and half-mile buffer zones for each bus stop. Also displayed are the residences of the University's commuter students, faculty, and staff.

The GTA network covers much of Greensboro and is accessible to 42.5% of UNCG staff and faculty and 28.2% of UNCG commuter students. However, Figures 4.3 and 4.4 reveal clusters of commuter students, staff, and faculty are not within walking distance of any GTA bus stops. One such cluster exists in the northwestern portion of Greensboro, while another can be seen on the north side. A small cluster of residences in the southwest are not within walking distance of a GTA bus stop.

HEAT provides transit service focused on the city's colleges and universities, and its bus stops are a subset of GTA's bus stops. Even so, 12.6% of UNCG commuter students are within walking distance of HEAT bus stops. UNCG provides local matching funds to allow their students to ride the HEAT buses without paying a fare. Figures 4.5 and 4.6 show the proximity of commuter students and faculty and staff to HEAT stops.

PART's park-and-ride lots are accessible to a large percentage of both UNCG commuter students and faculty and staff. Of the 3,793 addresses that do not fall in the 5- or 10-mile buffer zones for park-and-ride lots, 722 are in Durham and Chapel Hill. While PART's routes extend to Durham and Chapel Hill, no park-and-ride lots currently exist within these cities. These routes provide service for medical appointments once a day, though the general public can ride with a reservation if space is available. Additionally, 403 of the addresses are located in Charlotte. Figures 4.7 and 4.8 show the proximity of commuter students and faculty and staff to PART's park-and-ride lots.

As mentioned, many commuter students, faculty, and staff within walking distance of a bus stop (most likely a GTA, HEAT, or PART bus stop) also are within walking distance of the campus. Therefore, the most important aspect of the Spartan Chariot network concerning the use of transit to travel to and from campus is its transit hub, which provides connections to the HEAT and PART networks.

Figure 4.3 - GTA Transit Buffer Map with UNCG Commuter Students

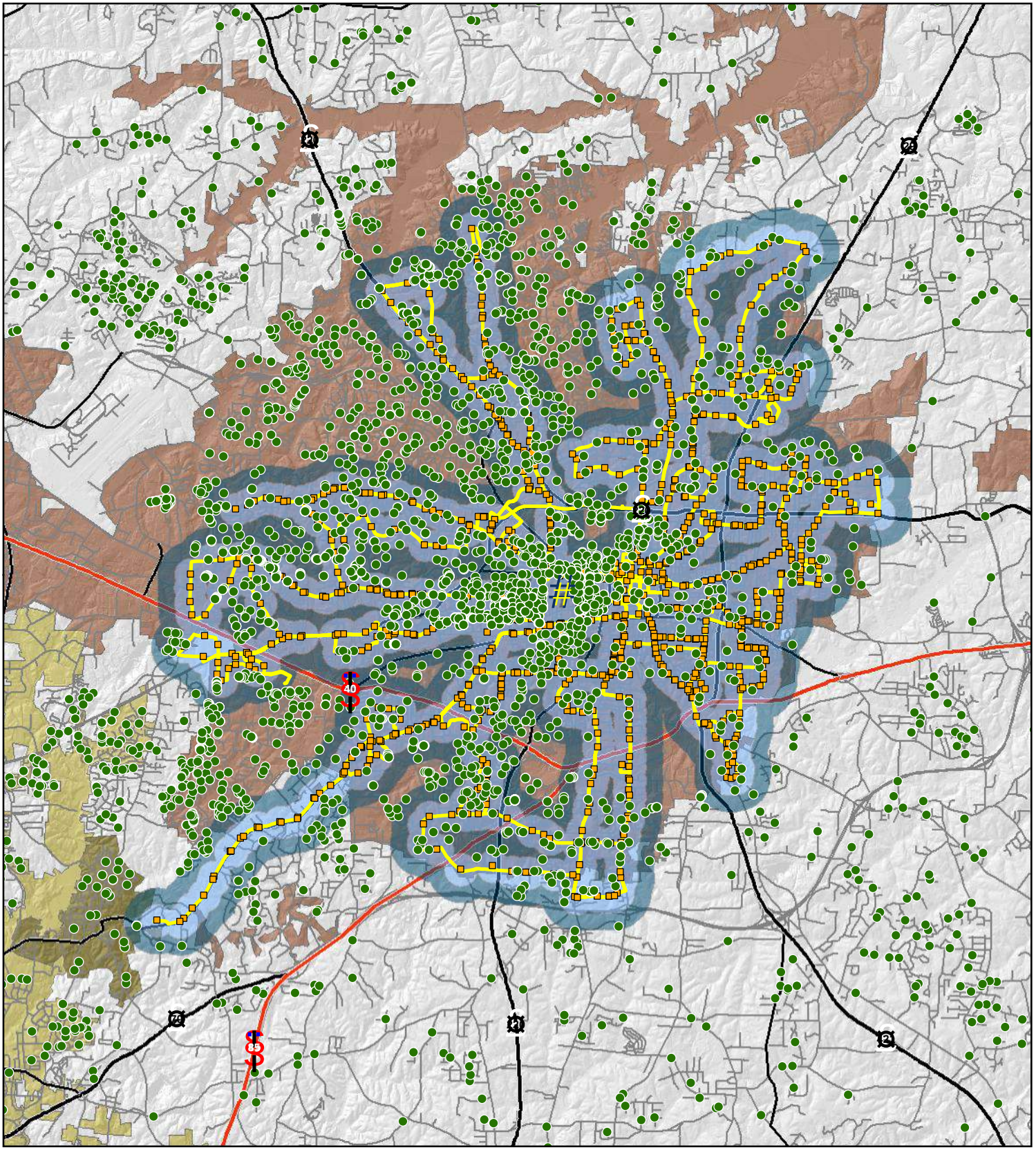


Figure 4.4 - GTA Transit Buffer Map with UNCG Staff and Faculty

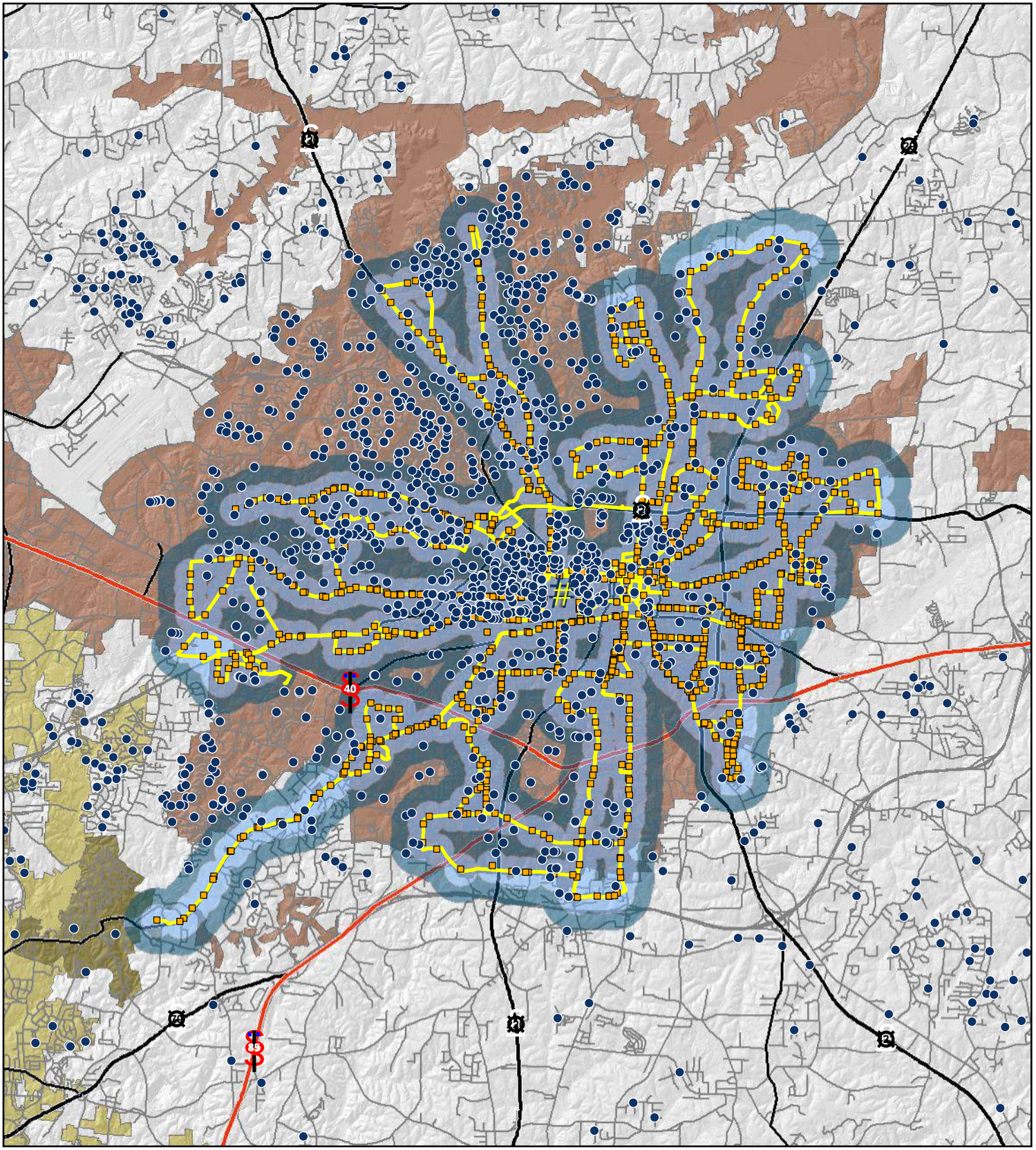


Figure 4.5 - HEAT Transit Buffer Map with UNCG Commuter Students

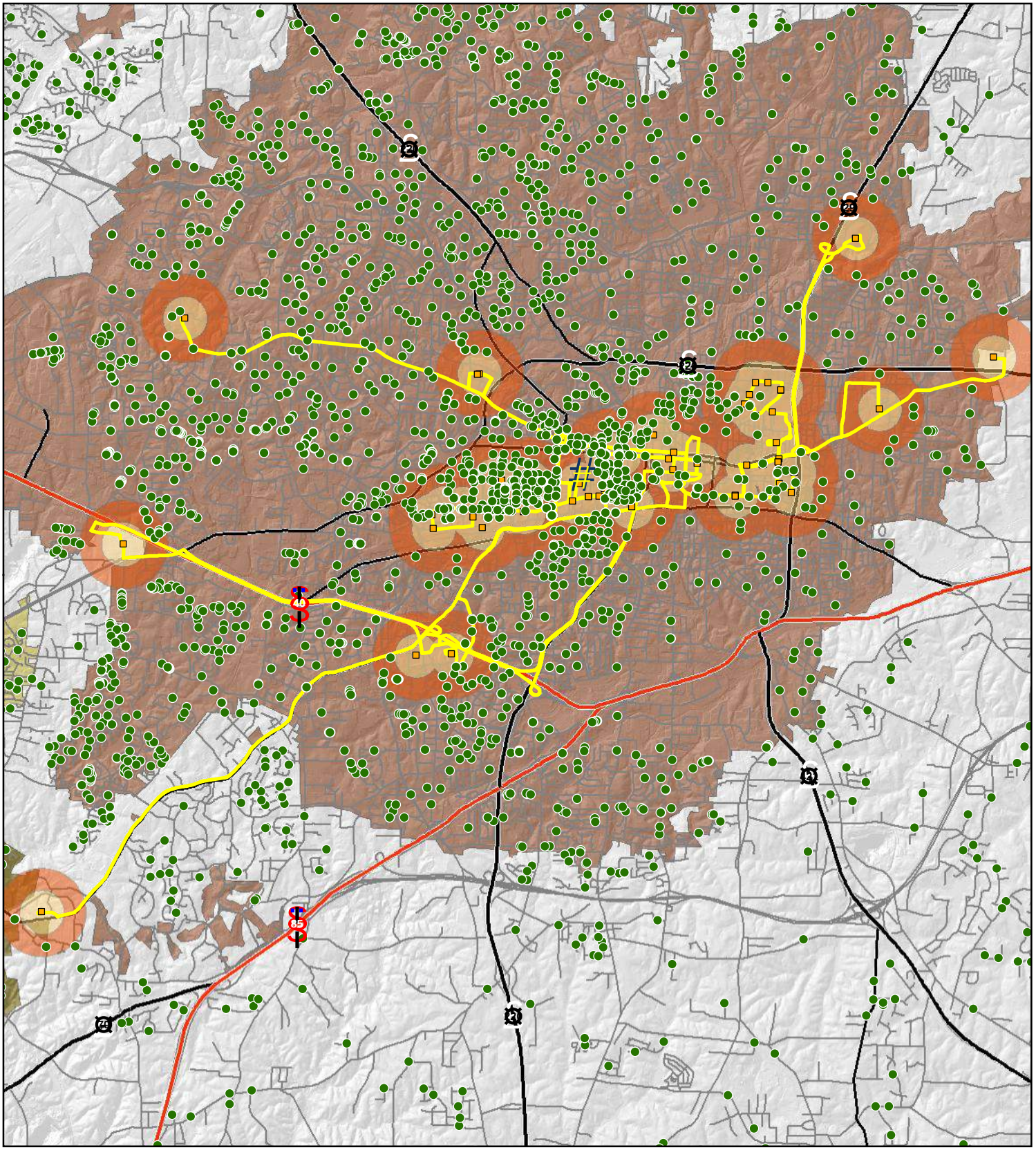


Figure 4.6 - HEAT Transit Buffer Map with UNCG Staff and Faculty

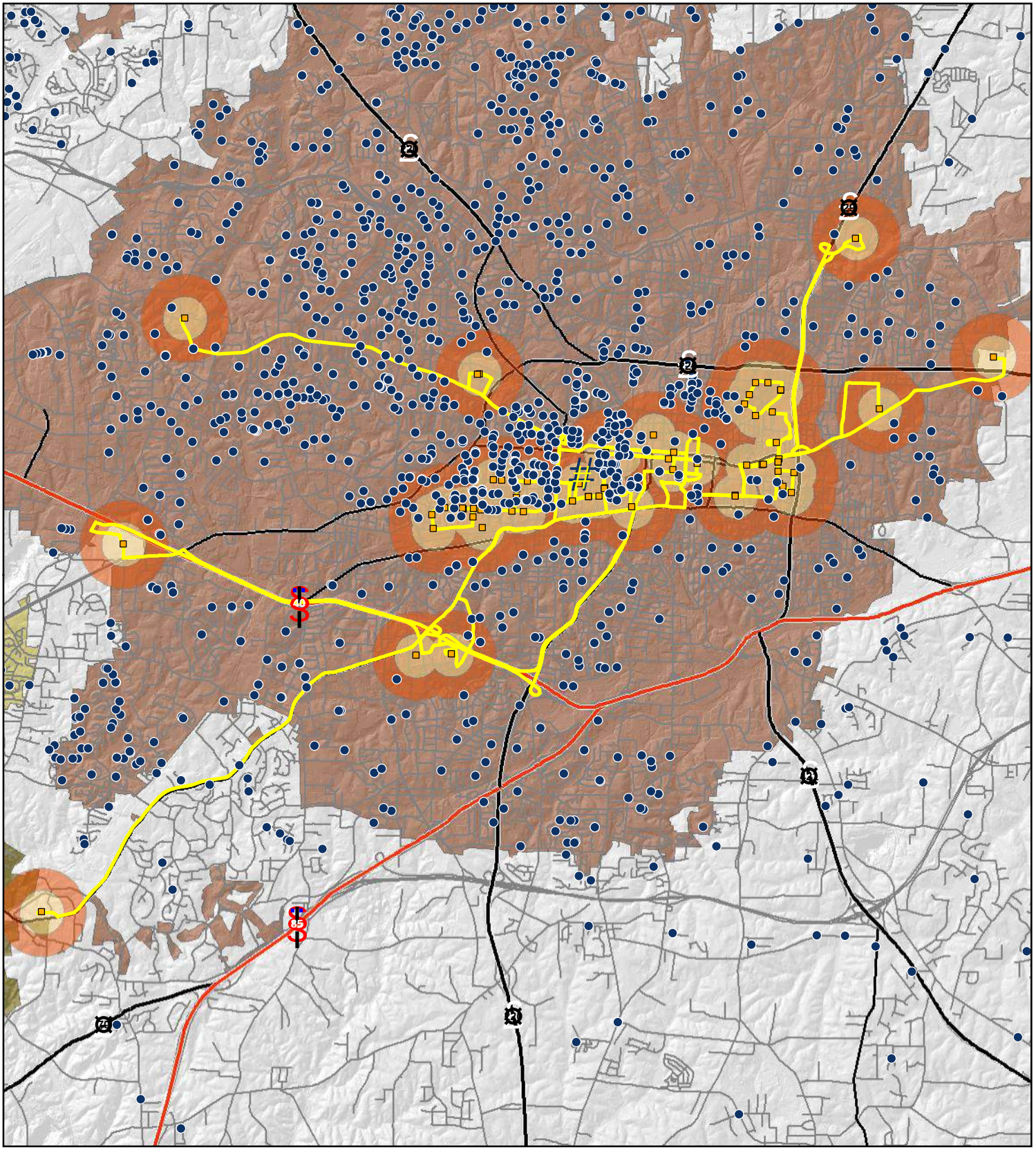


Figure 4.7 - PART Transit Buffer Map with UNCG Commuter Students

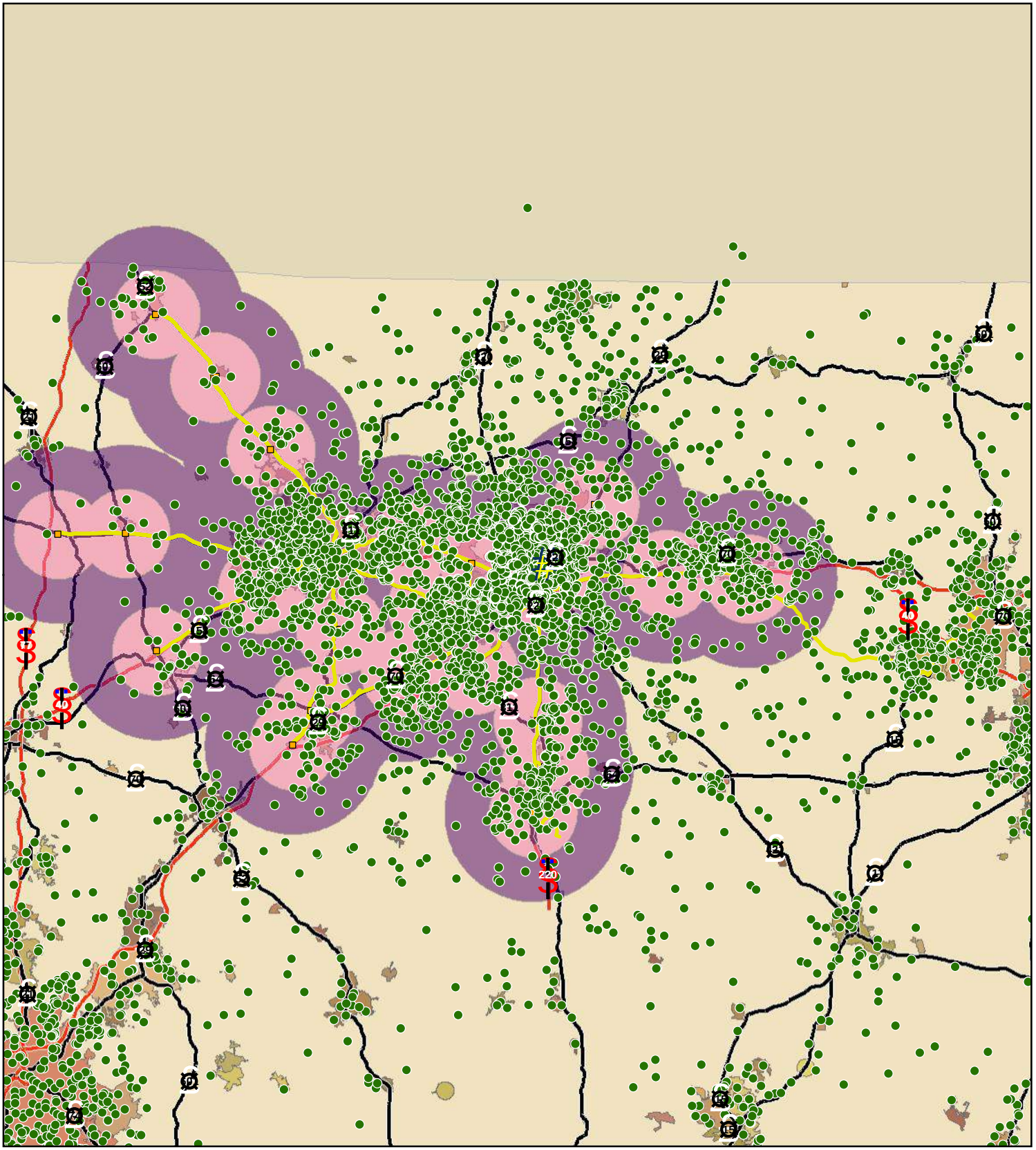
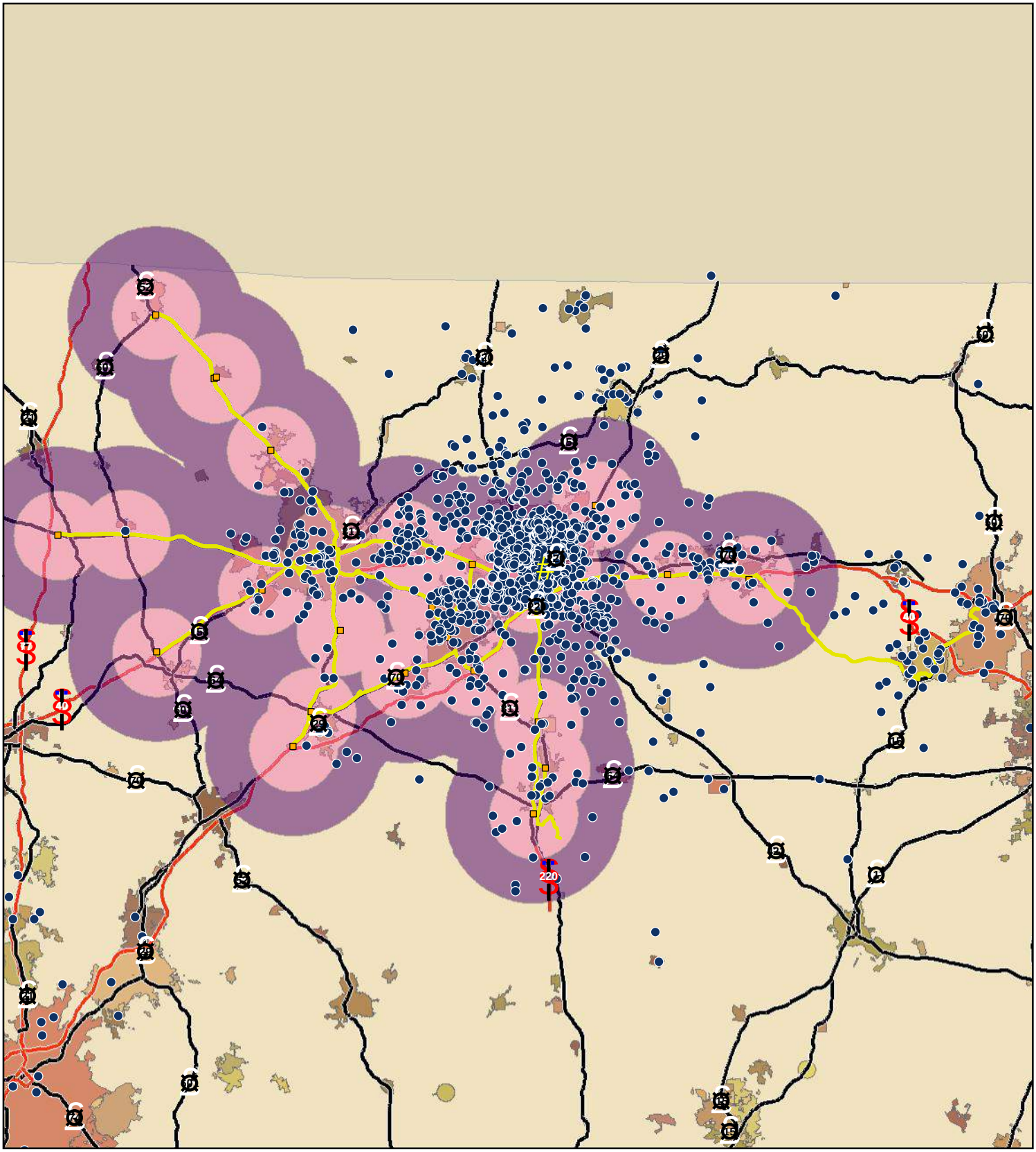


Figure 4.8 - PART Transit Buffer Map with UNCG Staff and Faculty



Campus Community Perception

Surveys

The perception of transit has changed over the last several years. In August 2008, the University initiated a campus transit survey and responses were gathered directly from riders on the bus as well as online. The survey provided insight into ridership trends, experiences, and desires for new service. The 2008 survey revealed 80% of respondents were very satisfied or somewhat satisfied with park-and-ride service and approximately 86% wait 15 minutes or less for a shuttle. More than 88% of respondents stated they were very satisfied or somewhat satisfied with the Spartan Chariot and approximately 75% wait 15 minutes or less for a bus. Comments and suggestions from the 2008 survey revealed a desire for longer service hours and more convenient stops.

As mentioned in previous chapters, a non-scientific web-based survey was distributed via email to faculty, staff, and students to gather feedback specific to the *Update*. Due to discrepancies between the sample collected through the online survey and observed behaviors, the frequency of alternative mode use revealed in the survey is in question. However, some responses appear to mirror observed behaviors. When asked to rate transit service, 60% of the respondents rated transit as "excellent" or "good." Based on the survey, the campus community also was very receptive to transit. Faster routes (times similar to driving) and bus stops closer to destinations were identified as improvements most likely to increase transit use.

Campus Open House

Results of the survey were confirmed during discussions at the Campus Open House. Convenience is the key to increasing transit ridership. In general, the majority of UNCG faculty, staff, and students would increase their use of transit with:

- More stops near popular destinations
- Decreased headways (increased frequency)
- Shortened routes (quicker to destination)
- Lower cost

The Open House also enabled the project team to discuss preliminary recommendations with current and potential riders. Specific comments from these discussions were evaluated for incorporation in the plan. General comments included the need for simplified schedules and the need for continued coordination among service providers.

Recommendations

Daily activities on campus require some form of personal mobility. The level of mobility afforded to faculty, staff, and students at UNCG is improving. Good—not just adequate—public transportation closes a gap in a sustainable transportation system. The vision continues to be that public transportation is a travel mode of choice for a greater portion of the campus population and that those traveling to campus become less reliant on private vehicles. For this to become a reality, the University understands the impact that campus expansion (particularly Spartan Village) will have on future transit service. The recommendations that follow focus on expanding service to accommodate the physical growth of the campus. The University also understands the critical role partnerships with local transit agencies and other universities continue to play in the delivery of service. The *Update* does not make recommendations to the transit service provided by other agencies.

Spartan Chariot Express/Spartan Village

The core component of the transit concept is the implementation of the Spartan Chariot Express route slated to begin service in Fall 2013. The Express service will transport faculty, staff, and students between main campus and Spartan Village. Figure 4.9 illustrates the proposed route. The transit

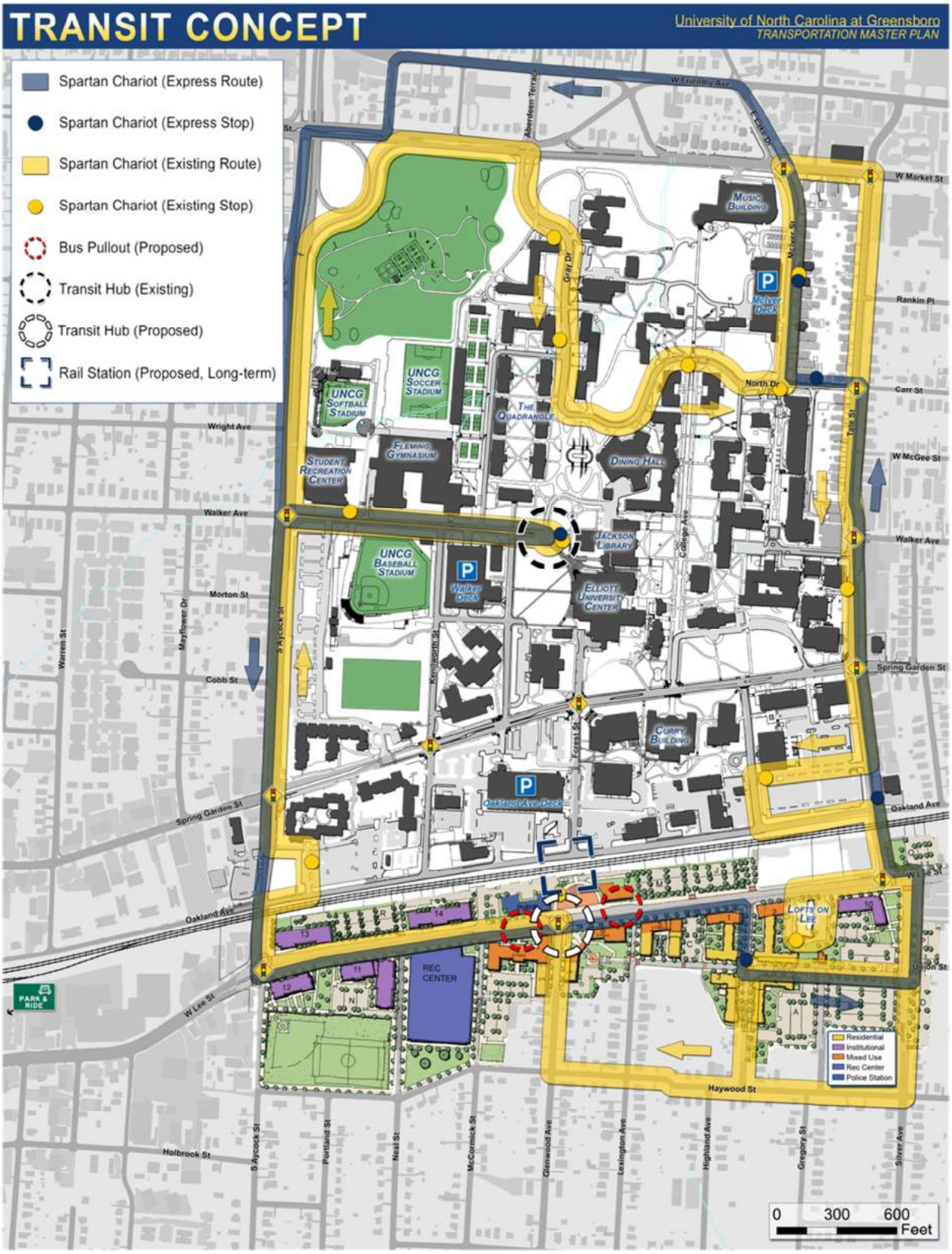
concept includes the following considerations and recommendations:

- The existing Spartan Chariot route remains unchanged in terms of route and stops.
- The Spartan Chariot should stop at the parking lot scheduled to open in Fall 2012 near the corner of Silver Avenue and Union Street.
- The Quad Fountain bus stop currently out of service due to the ongoing renovation of the Quad should be restored once construction is complete.
- The Spartan Chariot Express should supplement the existing Spartan Chariot route by providing counter-clockwise circulation with fewer stops.
- Initially, the Spartan Chariot Express should include stops at Walker Avenue Circle, Spartan Village (Phase 1 housing), Tate Street at Oakland Avenue, Carr Street near the Sullivan Science Building, and McIver Street near the School of Music.
- To supplement connectivity between Spartan Village and locations served by GTA, HEAT, and PART, a second transit hub is recommended at Lee Street and Glenwood Avenue (a recommendation that also appears in the 2007 Campus Master Plan). This location includes bus pullouts, both eastbound and westbound. It also provides convenient access to a future rail station and the main campus via the Pedestrian Underpass. The Transit Hub is recommended as an enhanced bus stop with shelters that will serve the Spartan Chariot, Spartan Chariot Express, HEAT, GTA, and PART.
- An additional stop should be provided in the Transit Hub at Lee Street and Glenwood Avenue when Phase 2 of the Spartan Village opens in 2015.
- Bus pullout locations should be provided on Lee Street as part of the redesign of the corridor. Pullouts are recommended just prior to the Glenwood Avenue intersection for both eastbound and westbound directions. These locations are in proximity of the Pedestrian Underpass, and riders destined for Spartan Village can disembark the Spartan Chariot Express without having to cross Lee Street.
- The University should conduct additional study of bus stops to account for continued transit growth over time.

Other Recommendations

- The University should work with the City of Greensboro and the development community to encourage residential infill development for student housing within the existing HEAT 73 route. (Note: Private developers built student apartments west of Holden Road beyond the HEAT 73 route. Student residents have access to GTA 1 fare-free in addition to private shuttles provided by the property owners.)
- Direct PART service should be provided to campus from the PART Regional Hub on NC 68. In the interim, riders should be encouraged to transfer at Four Seasons to avoid having to go downtown to the Depot and backtrack to the University.
- Service to the Millennial Campuses is recommended as a long-term option as development occurs.
- Partner with the Computer Science department to conduct a design contest for a smartphone transit vehicle locator application.
- Partner with PART to maximize park-and-ride options for out-of-town faculty, staff, and students

Figure 4.9 | Transit Concept



Conclusion

Transit is vital to a healthy and sustainable campus—now and in the future. The focus of the Transit Element is to promote transit as a safe, convenient, and dependable form of transportation with connections throughout Greensboro and the Triad. This chapter took shape with the understanding that solutions for transit extend beyond what typically is considered transit planning. Strategies presented in other elements of the *Update* will help solidify transit as a viable alternative for faculty, staff, and students regardless of their proximity to campus. These strategies include:

- Maintaining a consistent bicycle and pedestrian network that allows riders to safely move between bus stops and their final destination.
- Ensuring that campus expansion supports existing and future transit service.
- Blending transit improvements with a coordinated travel demand management plan.

The addition of Spartan Village requires expansion of the transit system. Perhaps more so than any other element of the *Update*, transit has flourished since the 2006 plan. For growth to continue and for service to be extended to the village, the University and its local partners must maintain a commitment to progressive planning and constantly assess service delivery even as they actively seek innovative funding sources for short- and long-term investments.

Summary of Recommendations

The UNCG Transportation Master Plan Update includes the following recommendations:

Spartan Chariot Express/Spartan Village

- Maintain the existing Spartan Chariot route.
- Add a Spartan Chariot stop at the Silver Avenue/Union Street parking lot in Fall 2012.
- Restore service at the Quad Fountain bus stop when renovations of the Quad are complete.
- Launch the Spartan Chariot Express in Fall 2013 as a counter-clockwise circulator route with limited stops.
- Create a transit hub in Spartan Village at the intersection of Lee Street and Glenwood Avenue with bus pullouts and shelters.
- Add stops for the Spartan Chariot and Spartan Chariot Express route at the new transit hub.
- Voice support for the bus pullout locations on Lee Street and encourage implementation as part of the redesign of the corridor.

Other Recommendations

- Work with the City of Greensboro and development community to encourage residential infill development for student housing within the existing HEAT 73 route.
- Educate/encourage PART riders to transfer at Four Seasons to avoid having to go downtown to the Depot and backtrack to the University.
- Support direct service to campus by PART from the PART Regional Hub on NC 68.
- Evaluate potential service to the Millennial Campuses as a long-term option as development occurs.
- Partner with the Computer Science department to conduct a design contest for a smartphone transit vehicle locator application
- Partner with PART to maximize park-and-ride options for out-of-town faculty, staff, and students.
- Develop partnership between UNCG Center for Geographic Information Science, GTA, and PART to utilize Google Transit for sharing bus information with riders.

The University of North Carolina at Greensboro is located within the street grid network of Greensboro just west of downtown. While the grid network makes it easier to integrate bicycling, walking, and riding transit into the fabric of the transportation network, it also limits the ability to provide large-scale improvements to the roadway network. Within the last decade, improvements to Spring Garden Street on campus have created a significant amenity for the campus community. However, these improvements have done little to limit the east-west through traffic on campus. Diverting some through trips to Lee Street is a valid objective for the University.

The previous chapters have shown the *University of North Carolina at Greensboro Transportation Master Plan Update* is focusing on multimodal strategies for campus access. Other elements of the plan have addressed hotspot conflicts between pedestrians, cyclists, and vehicles. The Parking and Travel Demand Management chapter describes parking supply, demand, and allocation on campus in the context of future growth and describes a series of travel demand management strategies that will further reduce parking demand.

Vehicular Access & Parking

A discussion of vehicle access requires an understanding of the local roadway network. How vehicles access UNCG is related to the type of facilities that surround and bisect campus. The functional classification of streets near campus provides the necessary framework to evaluate vehicular access.

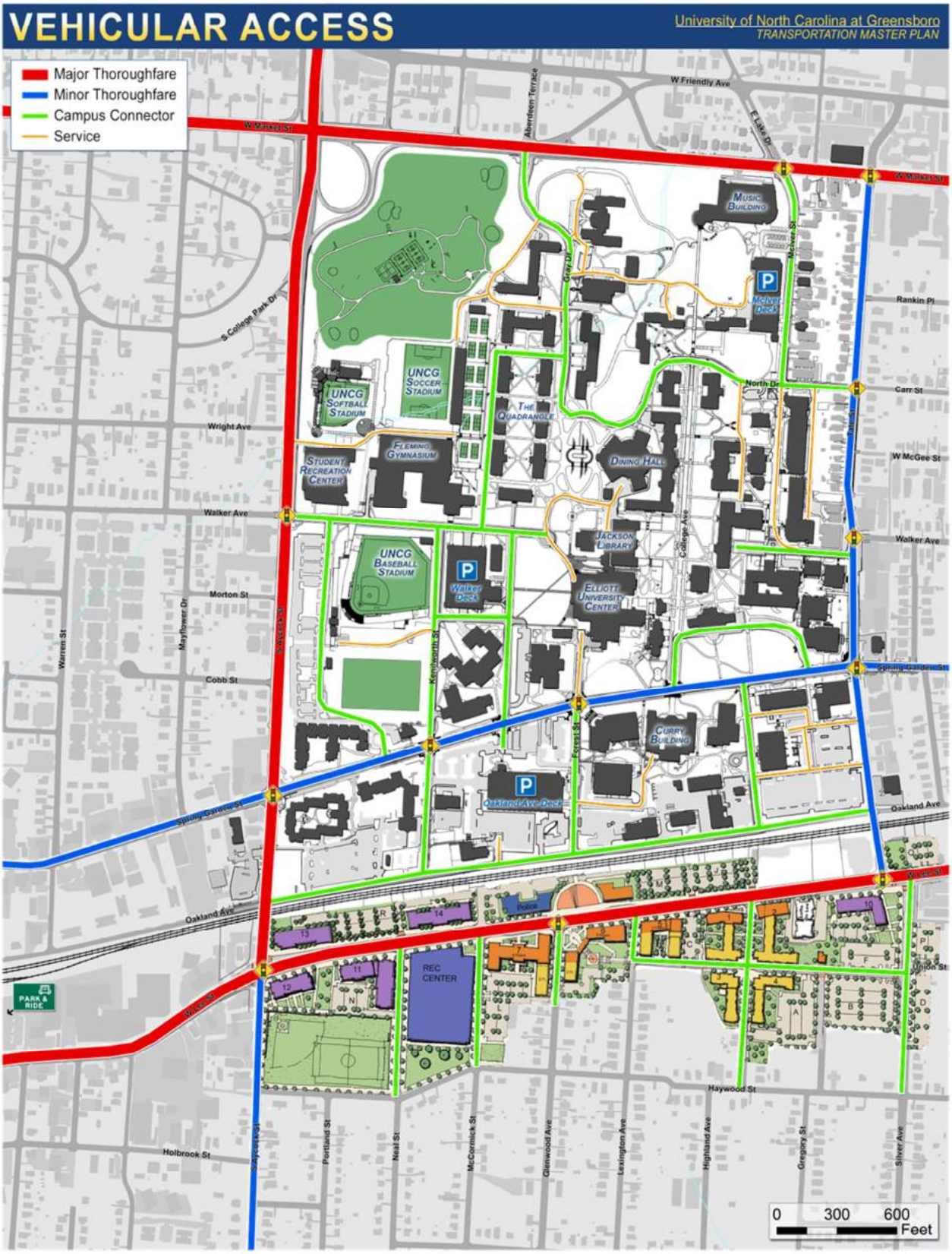
Vehicular Access & Parking Framework

The classification of streets into "functional" categories aids in communication among policy makers, planners, engineers, and citizens. In a campus environment, it defines the street in terms of roadway design, operations, and character and designates the type of traffic the street is intended to serve. Figure 5.1 shows the classification of streets in the UNCG network as well as the surrounding roadway network. Classifications include major and minor thoroughfares, campus connectors, and service roads.

Two considerations for distinguishing thoroughfares from campus connectors are access and mobility. Thoroughfares promote mobility by limiting access points (intersections and driveways). Too much mobility at high speeds limits access by pedestrians and bicyclists, which is an existing problem on Aycock Street. The thoroughfare is designed to carry more traffic than generated within its corridor (i.e., higher speeds, higher volumes, and longer distances). Campus connectors provide access and serve University patrons, neighborhood residents, and merchants as they reach their destination. These streets should be low speed, low volume facilities designed for short distances and are not intended for use by through traffic.

Once on campus, motorists need appropriate, reliable, and (to some extent) convenient places to park. Understanding and accommodating this need is accomplished by balancing parking demand (based on land uses) with parking supply (the number and location of parking provided).

Figure 5.1 | Vehicular Access



Existing Conditions – Vehicular Access

The size and scale of development on campus affects vehicular access and parking. The UNCG campus currently contains multiple building use types, including instruction, student services, academic support, institutional support, athletics/recreation, housing, and operations and maintenance. The total gross square footage of each of the building use types on campus is shown in Table 5.1.

Table 5.1 – Existing Building Gross Square Footage

Building Use Type	Gross Square Footage
Instruction	2,101,279
Student Services	445,482
Academic Support	237,955
Institutional Support	180,805
Athletics/Recreation	85,988
Housing	2,388,637
Operations & Maintenance	79,873
Total	5,517,019

An in-depth understanding of existing conditions and previous planning efforts provides a foundation to support recommendations. UNCG is bordered on the west by Aycock Street, on the south by Lee Street, on the east by Tate Street, and on the north by West Market Street. These streets are described below in terms of functional classification. The classification of streets into "functional" categories aids in communication among policy makers, planners, engineers, and citizens. Major thoroughfares serve medium- to long-distance travel and connect minor thoroughfares and campus connectors to other higher-level facilities. Minor thoroughfares primarily serve local travel and connect to major thoroughfares and other minor thoroughfares.

- West Market Street is a four-lane median-divided major thoroughfare that connects downtown Greensboro with neighborhoods to the west. It is a regionally significant corridor. West Market Street can be a barrier to bicyclists.
- Aycock Street is a five-lane undivided major thoroughfare that runs north-south along the western edge of campus. Aycock Street separates UNCG from the College Park neighborhood and numerous faculty, staff, and student residences. Pedestrian crossings at signals and mid-block create safety problems along Aycock Street, as described in Chapter 3.
- Lee Street is a five-lane undivided major thoroughfare. Lee Street is a regionally significant corridor that connects Downtown Greensboro with the University, the entertainment district surrounding the Greensboro Coliseum, and I-40. While Lee Street currently is the southern border of campus, expansion plans will make this street an east-west connector internal to the campus.
- Tate Street is a two-lane minor thoroughfare on the eastern edge of campus that serves north-south neighborhood and campus traffic accessing Lee Street or Market Street.

While these streets primarily provide access to campus, they also serve the role of accommodating through traffic in the Greensboro area. Modifications to these streets must balance the needs of UNCG with those of the City of Greensboro and surrounding neighborhoods.

Previous Planning Efforts

2006 University of North Carolina at Greensboro Campus Transportation Plan

The 2006 UNCG Campus Transportation Plan established a vision for the campus transportation network and offered a set of recommendations to address the existing and future needs of the UNCG campus. Heavy emphasis was placed on parking needs based on campus growth. See the inset for recommendations and progress specific to parking.

2007 University of North Carolina at Greensboro Campus Master Plan Update

The UNCG Campus Master Plan Update takes a long-term approach to campus development. While the focus is on land use and the built environment, the plan addresses vehicular access, service access,

and parking and seeks to limit conflicts between motorists and bicyclists/pedestrians.

Greensboro Urban Area Metropolitan Planning Organization 2035 Long Range Transportation Plan

The Greensboro Urban Area Metropolitan Planning Organization (MPO) 2035 Long Range Transportation Plan (LRTP) outlines plans for highway improvements through 2035. In this plan, the railroad underpass at Aycock Street is slated for replacement in 2025. Although this is later than the planning horizon for this *Update*, the replacement of this underpass will provide a critical upgrade to Aycock Street that not only will improve access around UNCG but also improve the connection between the existing UNCG campus and Spartan Village. The LRTP also mentions the railroad grade separation at Tate Street. Improvements at this location would provide many of the same benefits as the proposed improvements at the Aycock Street railroad underpass.

As part of the Greensboro Urban Area (MPO) Comprehensive Transportation Plan, Lee Street and Aycock Street near UNCG are identified as needing improvement, but the plan lacks detailed recommendations. Suggestions from this *Update* should be taken into consideration in the future when improvements are made to these corridors.

Existing Conditions – Parking

Parking Supply and Occupancy

The majority of the parking supply on campus is provided in 68 surface parking lots and four structured parking facilities. In addition, parking is available in on-street parking areas and remote, off-campus park-and-ride lots. The largest structured parking facility is the Oakland Avenue Deck (974 spaces) and the largest of the surface parking facilities is the remote park-and-ride lot located at 1720 West Lee Street (1,048 spaces).

From August 22 through August 25, 2011, UNCG collected occupancy data at several surface parking and structured parking facilities. Data was collected each day on the hour from 8:00 a.m. to 2:00 p.m. and was compared to surface and structured parking capacities. The average results of the occupancy survey were used to determine the existing parking conditions on campus. The results of this survey are shown in Table 5.2.

A parking system is considered at capacity when occupancy is no more than 90% of capacity. The 10% excess supply keeps the time required to find a parking space within reason and promotes a perception of adequate parking. When parking occupancy exceeds these levels, there may be

Progress on the 2006 UNCG Campus Transportation Plan | Parking

Recommendations of the 2006 Campus Transportation Plan (Section 9.3) included the following.

- Construct no further standalone parking structures beyond those currently under construction.
  - UPDATE: No new parking structures have been constructed.
- Provide 700 additional spaces on top of the parking supply forecast for 2008 to offset parking lost to building construction. These spaces could be provided at the parcels between Lee Street and the railroad (high priority) or one on-campus deck (low priority).
  - UPDATE: Additional parking supply has been provided at the following locations: 915 Northridge (150 spaces), 1200 West Lee Street (220 spaces), 1410 West Lee Street (in design), and Spartan Village (in design). The 2012 Update includes revised projections of parking supply needs.
- Maintain the current system for allocating permits and spaces in individual lots.
  - UPDATE: This recommendation has been implemented.
- If alternatives alone are not attractive enough to keep parking demand below supply by restricting the following groups or combination of groups: People living near campus; Freshmen; and On-campus students.
  - UPDATE: No restrictions are currently in effect, though supply is sufficient to meet demand.

Table 5.2 – Existing Parking Occupancy (% of spaces occupied)[1]

Parking Facility	Capacity	Occupancy						
		8:00am	9:00 am	10:00 am	11:00 am	12:00pm	1:00pm	2:00pm
Lot 1A	64	0%	2%	5%	11%	11%	9%	9%
Lot 1C	42	2%	2%	2%	5%	2%	5%	5%
Lot 1	144	17%	17%	35%	42%	57%	55%	51%
Lot 2	47	30%	47%	98%	98%	96%	98%	94%
Lot 3 North	41	59%	80%	100%	98%	100%	98%	93%
Lot 3 South	61	66%	90%	100%	100%	100%	97%	95%
Lot 4	89	66%	99%	100%	100%	99%	97%	94%
Lot 7 North	142	82%	99%	100%	99%	99%	98%	99%
Lot 7 South	332	12%	59%	100%	100%	97%	95%	93%
Lot 8 North	97	100%	100%	100%	100%	100%	100%	100%
Lot 8 South	182	60%	88%	100%	100%	99%	99%	99%
Lot 9 North	253	94%	99%	100%	100%	100%	99%	99%
Lot 9 South	156	38%	45%	63%	75%	76%	75%	72%
Park-and-Ride	1,048	17%	38%	57%	71%	71%	67%	66%
Spring Garden	198	69%	71%	69%	70%	69%	70%	69%
Walker Deck	796	33%	66%	84%	93%	93%	93%	92%
Oakland Deck	974	27%	55%	77%	87%	87%	85%	88%
McIver Deck	651	34%	65%	83%	88%	87%	86%	84%
Total	5,317	36%	60%	77%	84%	84%	83%	82%

delays and frustration in finding a space, and patrons may be forced to use a space that is too far from their destination or does not offer a comfortable walking environment. This margin also allows for: 1) the activity of vehicles moving in and out of parking stalls during busy periods; 2) surges in short-term parking activity; and 3) the temporary loss of spaces due to improperly parked vehicles, weather conditions, construction activity, etc.

Throughout much of the observation period, parking on campus exceeded 85% occupancy. This level indicates that a patron may not be able to find a parking space within a reasonable amount of time. The larger parking facilities (parking decks and park-and-ride lots) did not exceed 85% occupancy until closer to mid-day. As an aggregate, parking occupancy met or exceeded 85% occupancy at 11:00 a.m. and 12:00 p.m. The Appendix includes a series of figures that represent parking demand on campus at the times occupancy data was collected.

Since 2005, UNCG's parking occupancy has dropped from 95% to 86% during a time of significant enrollment growth. Despite limited availability of convenient parking in the central area of campus, access is well balanced with existing parking facilities (lots and decks) and transportation services. The Oakland Avenue Parking Deck, Park & Ride, Spartan Village (under construction), and other perimeter/remote lots can meet projected demand for parking through 2018.

Parking Demand

Student enrollment and university employment are the main predictors of parking demand in a campus environment. To estimate future demand for parking, enrollment projections for the five-year

period for academic years 2011-12 through 2015-16 were obtained from the University. These projections, which are shown in Table 5.3, show very little projected growth in enrollment over the next five years. (Prior to 2009, the University of North Carolina System provided long-range enrollment projections for each member institutions. However, the system no longer provides these projections.)

The University desires a longer-range projection of parking needs for planning purposes. (It should be noted that the timeframe to program, design, and construct a structured parking facility typically can take five years.) Enrollment data from the UNCG Office of Institutional Research was reviewed to create a "low" and "high" long-term growth scenario. Five-year enrollment trends were calculated from 1990 to 2010, and growth rates have varied significantly during the history of the University.

- During the lowest five-year period (from 1995 to 2000) campus enrollment increased only 0.7%.
- During the highest five-year period (from 2000 to 2005) enrollment increased approximately 26%.

"Low" and "high" growth scenarios were developed for 2015-16 through 2025-26. Projections provided for the next five years show a five-year growth rate of 1.4%. Using this information, five-year growth rates of 1% (or approximately .199% annually) for the "low" scenario and 10% (or approximately 1.924% annually) for the "high" scenario were arbitrarily selected.

Past projections of parking demand estimated the number of faculty and staff as a percentage of enrollment. According to 2011 data, staff encompassed approximately 19% of the campus population of 20,500. For the purposes of projecting future campus population and demand, this percentage was used.

Historic information was used to calculate parking demand. The 2006 UNCG Transportation Master Plan estimated parking demand at 33.84 spaces for every 100 members of the campus population. However, Travel Demand Management (TDM) measures implemented by the University since the 2006 plan have significantly reduced the demand for parking on campus. Demand for parking permits has dropped approximately 21%. To approximate the current parking demand, the 2011 observed parking demand (4,343 vehicles as determined by occupancy counts conducted by UNCG staff) was divided by the number of faculty, staff, and students on campus. This calculation estimates the current parking demand at 21.18 spaces for every 100 members of the campus population. This number was used to project future parking demand.

The parking demand as a percent of total campus population for "low" and "high" growth scenarios is shown in Table 5.3. Assuming demand for parking remains consistent (i.e. demand neither increases nor decreases compared to the observed 2011 data), additional parking is not needed until after the planning horizon in the "low" growth scenario. With the same assumptions in the "high" growth scenario, additional parking would be needed in year 2018.

Table 5.3 – Growth Scenarios and Parking Demand

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Student Enrollment[1]														
17,152	17,216	17,258	17,310	17,393										
				Low Scenario[2]	17,428	17,463	17,498	17,533	17,568	17,603	17,638	17,673	17,708	17,743
				High Scenario[3]	17,728	18,069	18,417	18,771	19,132	19,500	19,875	20,257	20,647	21,044
Faculty/Staff[4]														
3,314	3,326	3,334	3,345	3,361										
				Low Scenario	3,367	3,374	3,381	3,388	3,394	3,401	3,408	3,415	3,421	3,428
				High Scenario	3,425	3,491	3,558	3,627	3,697	3,768	3,840	3,914	3,989	4,066
Total Campus Population														
20,466	20,542	20,592	20,655	20,754										
				Low Scenario	20,795	20,837	20,879	20,921	20,962	21,004	21,046	21,088	21,129	21,171
				High Scenario	21,153	21,560	21,975	22,398	22,829	23,268	23,715	24,171	24,636	25,110
Parking Demand														
4,343	4,359	4,370	4,383	4,404										
				Low Scenario	4,413	4,422	4,431	4,440	4,448	4,457	4,466	4,475	4,484	4,493
				High Scenario	4,489	4,575	4,663	4,753	4,844	4,938	5,032	5,129	5,228	5,328

[1] Enrollment projections (headcount) for 2011 through 2015 were provided by UNCG.

[2] Low growth scenario assumes 1% increase per five-year interval between 2016 and 2025.

[3] High growth scenario assumes 10% increase per five-year interval between 2016 and 2025.

[4] Faculty and staff projections are estimated to be equal to 19% of enrollment based on 2011 actual percentage.

Spartan Village Parking

Parking scenarios were developed for the *UNCG Transportation Master Plan Update* based on the phased buildout of Spartan Village, which includes several building use types such as institutional support, athletics/recreation, and housing. Additional parking also is included in each phase: Mixed-Use Village – Phase 1 (772 spaces), New Police Station (68 spaces), New Recreation Center (150 spaces), and Mixed-Use Village – Phase 2 (768 spaces).

The different uses and expected parking supply form the basis for future parking demand calculations. Using proposed square footages, along with parking demand generation ratios calibrated to the UNCG campus, and time of day parking distribution, future parking demand was projected for each scenario. A parking model developed to predict parking demands included the ability to measure shared parking among zones and to account for parking reduction as motorists switch to other modes. Based on the model results, the UNCG campus as a whole is expected to remain below its actual capacity for each scenario. While local zonal deficits occur for some zones after sharing surplus, the campus as a whole is projected to consistently have parking occupancies between 82% and 87%. Based on these outcomes, no additional parking capacity is recommended for the main campus in the planning horizon and the anticipated parking supply currently designed in Spartan Village is sufficient. See the Appendix for more information.

Recommendations

The recommendations that follow are based on the analysis of parking supply and demand and campus population projections.

Parking Permits

Marketing—The University's travel demand management initiatives have been very successful and significantly increased transit ridership, bicycling, and walking. However, balance is important in all systems. According to the survey conducted for this plan, parking is perceived to be in short supply when in actuality nearly 2,000 fewer permits were sold compared to five years ago. Most likely, the parking "problem" on campus is merely a perception expressed by the sample of surveys received. A marketing program that makes staff and students aware of the availability of parking and transit options may improve this perception. *It is recommended that UNCG enhance marketing efforts for parking permits, especially the availability of permits in the garages.*

Parking Rate Study—The existing parking rate structure and policies do not properly influence parking behavior. For example, 2-hour free on-street parking is available behind the Walker Avenue deck on the west side of Kenliworth Street. The hourly rate to park in the deck is $2 for the first hour and $1 for subsequent hours. User demand for surface and on-street parking (due to its convenience) typically exceeds the demand for garage parking. Many agencies price surface parking at a higher rate than garage parking to foster demand for garage parking. Another example is the metered parking located near the McIver deck. The rate for this parking is $1 hour, while the rate for parking within the deck is $2 hour.

It is recommended that UNCG initiate a parking rate study that evaluates permit rates, hourly rates, and meter rates. The rate study should review the feasibility of replacing existing mechanical meters with pay-on-foot pay stations that accept credit cards. (Agencies that have implemented pay stations that accept credit cards have reported increases in revenue of up to 30% per meter.) The

study also should review the location of the existing parking meters and recommend potential removal and installation of fee based, short-term parking.

The current permit structure divides permits into four broad categories: On campus deck ($445/year), on campus surface ($302/year), Park-and-Ride ($175/year) and the Northridge employee ($30/year). The differential in fee between on campus parking permits ($302 to $445) when compared to the park-and-ride permit for the 1200 West Lee Street Lot ($175) seems appropriate. However, the fee for the Northridge lot seems low when compared to other parking facilities. The study also could explore pricing central campus parking (Walker Avenue Parking Deck) higher than perimeter parking (Oakland Avenue Parking Deck).

Online Permit Sales and License Plate Recognition—Universities such as the University of Maryland, Texas Tech, and BYU have implemented online sale of parking permits that use the vehicle license plates as the unique vehicle identifier. This system eliminates student wait times as well as the need for parking permits. Parking enforcement occurs using mobile license plate recognition systems (LPR). Enforcement personnel use scanners to compare the license plate with the registered database of paid permit users. Some Universities have reported cost savings of up to $100,000 by eliminating the need to print parking permits. *It is recommended that UNCG implement online permit sales with license plate recognition.*

(For more information on LPR enforcement and on-line permits, see the link below to frequently asked questions (FAQ) from the University of Maryland Department of Transportation.)

www.transportation.umd.edu/images/parking/PDFs/CLPR%20FAQ%20Fall.pdf

Permit Oversell—Many Universities oversell parking permits (typically by 5 to 10% of the facility's capacity) to account for the fact that not every user is on campus at the same time. Contingency plans are developed for rare instances where the facility is full (such as during an event) and parking patrons are directed to another lot. Based on information provided, it does not appear that UNCG currently oversells permits. In fact, the University is underselling parking permits in the garages. *It is recommended that the University offer for sale a number of permits equal to the capacity of the Oakland Avenue and McIver Street Parking Decks on a trial basis.* This recommendation should occur through gradual incremental increases. If staff does not purchase all permits offered, more permits should be available for sale to students.

Parking Permit Fee Increase—An outcome of the recommended parking rate study should be a five-year plan that recommends changes in the parking fee structure. If refinancing the existing garage debt is feasible, increases in parking permits may be avoidable. However, the continuing drop in demand for parking permits needs to be monitored to assure adequate revenue is collected to cover the existing debt obligation. *It is recommended that the University monitor permit sales and evaluate parking permit increases.* Future changes in parking fees should be implemented over different academic years (e.g. increase permit prices one year and hourly rates the next year).

Spartan Village Parking

Over the next five years, initial development of the Spartan Village will occur. Prior to the initiation of Spartan Village, approximately 200 on-street parking spaces were located in the Village planning area (roughly the area bounded by Lee Street on the north, Silver Street on the east, Haywood Street on the south and Aycock Street on the west). As this area transitions from a residential community to a college campus, issues associated with parking likely will arise. As an example, the first phase of the Spartan Village will add approximately 800 beds of housing near Union Avenue and Highland Street.

In the absence of a plan of action, students who live in this housing would park on street to avoid permit fees, which in turn would affect parking in the existing neighborhood. In addition, a plan for on-street parking on Lee Street within the Spartan Village is necessary to guide future development on that corridor.

Spartan Village

On-street parking control in the Spartan Village can be placed into three classifications: 1) No Parking Zones, 2) Residential Parking Permit Zones, and 3) On-Street Time-Limited Parking Zones. The locations of these zones are shown in Figure 5.2.

No Parking Zones—On-street parking in Spartan Village should be prohibited near street intersections, driveways, or areas where the street is not wide enough to accommodate travel lanes and on-street parking. *It is recommended that on-street parking in Spartan Village be prohibited on the north side of Lee Street and on portions of Aycock Street.*

Residential Parking Permit Zones—The University and City of Greensboro previously worked together to implement a residential parking permit program in the College Hill area east of UNCG. In this program, residents apply to the City to receive a residential parking permit that allows them to park on street without being subject to the posted time limitations. Vehicles that do not display these parking permits are limited to the posted time restriction (typically two hours).

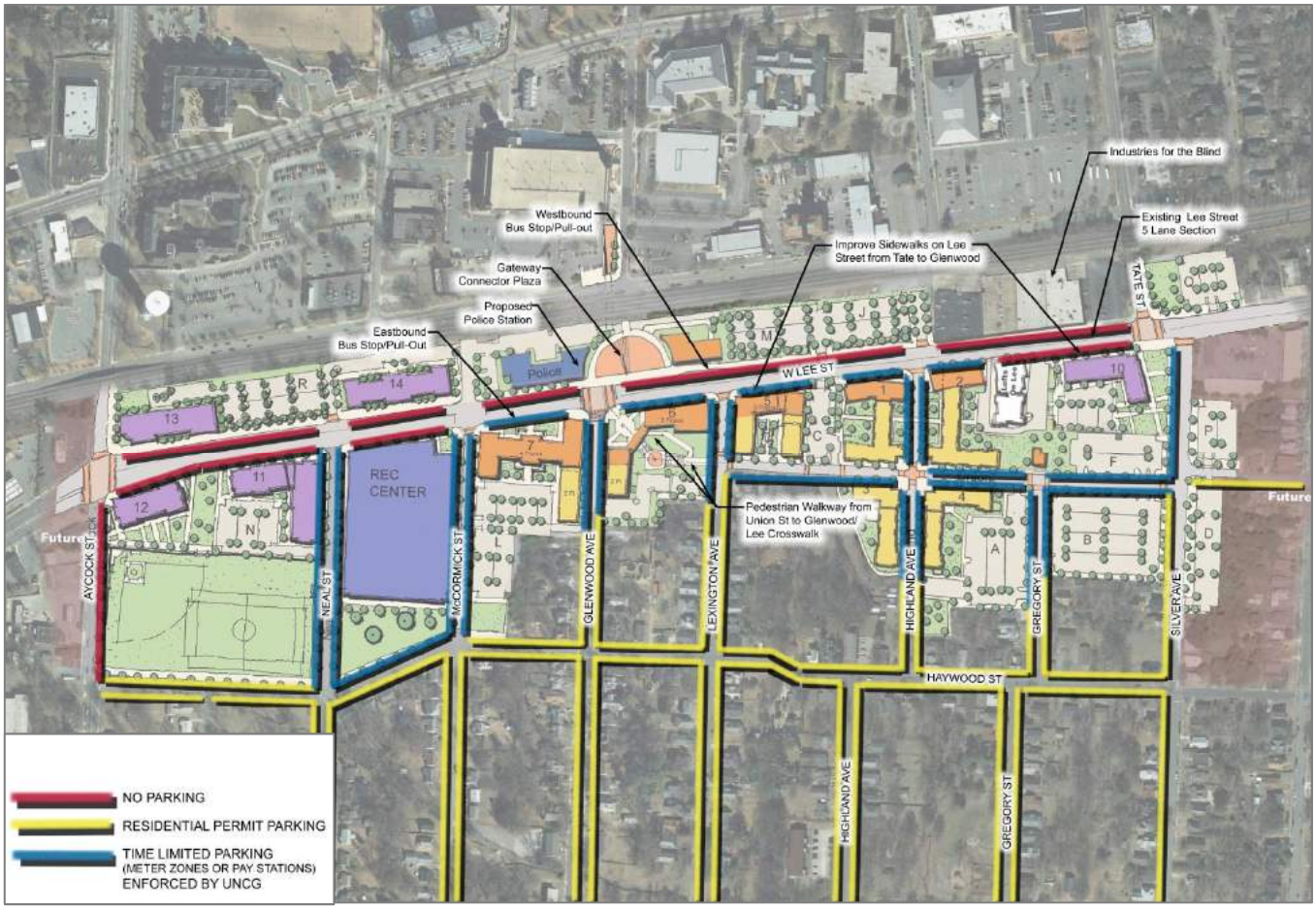
It is recommended that prior to the completion of the first phase of Spartan Village, the University and City work with the Glenwood neighborhood to implement a similar residential parking permit program. Residential parking permits should be implemented for areas within the Glenwood neighborhood where students may perceive long-term on-street parking to be convenient. Initially, the residential parking permit program should include all of the south side of Haywood Street and portions of the side streets (Highland Street, Lexington Avenue, and Glenwood Avenue) that remain private property.

On-Street Time-Limited Parking Zones—On-street parking should be encouraged but controlled and managed for other portions of Spartan Village, particularly around the proposed housing, retail areas, and recreation center. On the main campus, a combination of time-limited parking zones (typically two hours) and meter-controlled spaces are used where on-street parking exists. *It is recommended the University consider the implementation of parking pay stations to assist in parking management in Spartan Village.* Pay stations that accept credit card payment are strongly suggested.

Varying time limits should be considered for the different parts of Spartan Village. For example, the on-street parking near the proposed retail should be limited to one hour while the limits on Neal Street, Glenwood Avenue, and Union Avenue may be as long as four hours. To maximize the effectiveness of the on-street parking program, it is recommended the parking restrictions be enforced from 8:00 a.m. to 8:00 p.m. Whether or not to allow overnight on-street parking on Union Avenue is another issue for consideration.

It is recommended that the University seek authorization from the City of Greensboro to enforce the time-limited parking zones identified in this section in the areas near Spartan Village.

Figure 5.2 | Spartan Village Parking Enforcement Zones



Travel Demand Management

The University of North Carolina at Greensboro has made a commitment to providing a range of attractive transportation options for its students, faculty, staff, and visitors. The Planning Themes discussed in Chapter 1 put this commitment into an even larger context by highlighting the connections to sustainability and livability. A range of viable transportation choices makes a campus more livable. Transportation options such as bicycling, walking, and transit promote the sustainability of the campus by reducing dependence on cars.

Travel demand management (TDM) strategies are another critical element in the creation of a sustainable and livable environment. TDM strategies offer a set of physical improvements, programs, and policies designed to reduce congestion on and near campus and to provide alternatives to driving alone. A combination of incentives and disincentives can encourage behavior changes for commuters, such as traveling during less congested times or taking an alternative mode to work. In addition to reducing congestion, TDM actions reduce costs associated with using and maintaining personal automobiles, increase mobility and choice, conserve energy, and improve air and water quality.

TDM recommendations are based on feedback received through community outreach, discussions with the Advisory Committee, and a review of best practices. This chapter begins with a discussion of these best practices and strategies and concludes with a set of recommended alternatives for the UNCG area.

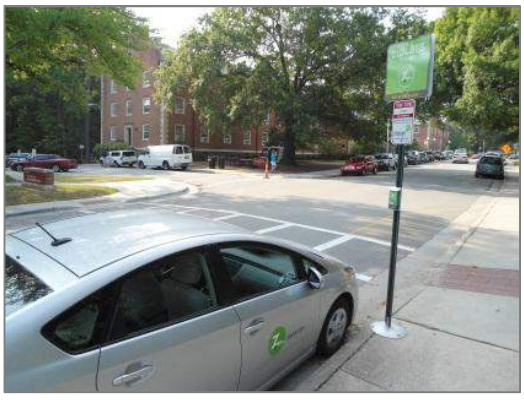
Overview

Travel Demand Management (TDM) aims to achieve efficient use of the transportation network through changes in travel patterns (e.g. shifting from automobile to non-automobile modes, from single-occupant vehicles to higher occupancy vehicles, and from peak-hour travel to off-peak travel). In other words, TDM measures change travel behavior (how, when, and where people travel). Strategies tied to a TDM plan focus on the demand side (behavior changes) rather than the supply side (infrastructure improvements).

Objectives of typical TDM strategies include:

1) improving multimodal transportation options;
2) providing incentives to change travel mode, time, or destination;
3) improving land use accessibility; and
4) reforming transportation policies and programs to provide funding for TDM.

Congestion and parking demand can be reduced by increasing campus awareness of travel choices and by changing the travel habits of staff or students. As the University has seen in the last few years, changes in when and how the campus population travels to campus can significantly reduce demand for parking and spread traffic more evenly throughout the day.





Progress on the 2006 UNCG Campus Transportation Plan | Travel Demand Management

Recommendations of the 2006 Campus Transportation Plan (Section 8.4) included the following.

- Extend hours of operation of existing park-and-ride lot to 10:00 p.m. with shuttle service provided on 20- to 30-minute headways after 7:00 p.m.
    - UPDATE: The Park & Ride shuttle operates 7:00 a.m.to 10:00 p.m. Monday-Thursday and 7:00 a.m. to 7:00 p.m. on Friday with 10-minute service before 5:00 p.m. and 15-minute service after.
- Operate a new park-and-ride service from Four Seasons Mall and Friendly Shopping Center, if feasible.
    - UPDATE: Service to Four Seasons Mall and Friendly Shopping Center is provided by HEAT.
- Permits for this option should be as inexpensive as possible.
    - UPDATE: Park & Ride permits are less expensive than A/B/C surface lot permits and deck permits. HEAT is fare-free with a SpartanCard campus ID.
- Develop a storage lot with a total of 500 spaces.
    - UPDATE: The gated lot at 915 Northridge accommodates approximately 150 vehicles. The gated lot at 1200 West Lee Street accommodates 220 vehicles.
- Provide reserved parking for vanpools.
    - UPDATE: The Parking Operations & Campus Access Management department collaborates with PART to promote vanpooling. Reserved parking is offered though no vanpools have formed yet.
- Promote the Carpool Club ridematching service for carpoolers and vanpoolers.
    - UPDATE: The original Carpool Club was upgraded to Zimride Fall 2010.
- Provide reserved and preferred parking for carpoolers/vanpoolers.
    - UPDATE: Preferential parking for carpoolers/vanpoolers is under consideration.
- Identify or hire a transportation demand management coordinator to educate, promote, and adapt alternative modes to changing needs.
    - UPDATE: This recommendation has been implemented.
- Institute and promote a Commuter Incentive Program with incentives for those who pledge not to buy a parking permit, including parking vouchers, guaranteed ride home program, preferred parking for carpoolers/vanpoolers, and use of Zipcars.
    - UPDATE: The University has implemented a guaranteed ride home program (provided by PART) and Zipcars. Parking vouchers and preferred parking for carpoolers/vanpoolers is under consideration.
- Explore the opportunities for introducing a parking cash-out program and/or a flex-parking system.
    - UPDATE: No cash out program or flex parking system has been implemented.

TDM Measures

Rideshare

Ridesharing typically refers to carpooling and vanpooling, representing a direct effort to maximize the number of passengers in each vehicle. Participation in ridesharing is maximized when it provides flexibility and commuters can choose to rideshare part-time (e.g., two or three times per week). Class schedules that vary throughout the week make it especially important for students to be able to rideshare part-time. Ridesharing options can be categorized into the following alternatives:

- Carpools typically use vehicles owned by the users themselves.
- Vanpools are more suitable options for longer commutes and typically use vans supplied by employers, for-profit vanpool companies, non-profit organizations, or government agencies. Vanpools can be self-supporting by having operating expenses covered by the riders. Vanpools could be an attractive option to faculty, staff, or students living farther from campus who are willing to adopt more regular departure and return times.
- Transit and shuttle services can provide direct transportation to campus or give those who choose to carpool or vanpool a means of moving between destinations once they arrive at their worksite. At UNCG, this includes a combination of services such as the Spartan Chariot, HEAT, GTA, and PART. Park-and-ride services also provide an option for individuals interested in riding transit who lack direct access to service near their residence. Existing and proposed transit services are covered in more detail in Chapter 4.

An interesting dynamic of ridesharing, particularly regarding carpooling and vanpooling, is how greater use of the service directly provides greater opportunities for prospective riders to find someone with similar commuting patterns (origin, destination, time, etc.). This iterative process ties the success of ridesharing to the marketing and education strategies used in its implementation. Zimride, a matching service used by UNCG, is described in a subsequent section.

Bicycle and Pedestrian

The transportation systems of vibrant university campuses such as UNCG include infrastructure for bicycles and pedestrians as well as methods for travelers to conveniently switch modes. Those charged with TDM program implementation face a variety of issues related to bicycling and walking as described in Chapter 3. Bicycle and pedestrian recommendations under the TDM umbrella fall include ancillary facilities (e.g. bicycle parking and bicycle racks on buses); education, enforcement, and encouragement programs; and planning for bicycling and walking (especially coordination between UNCG and local agencies).

Alternate Travel Schedules

As described earlier in this chapter, UNCG sees peaks and valleys of traffic on campus and parking demand. However, congestion levels around campus are influenced not only by the school itself but also by the traffic traveling into and out of central Greensboro. When applied strategically, alternate work schedules balance the demand on the transportation system. Alternate work schedule options include compressed work week (e.g. nine-hour work days with one day off every other week), flexible work hours, staggered work hours (e.g. employees report and leave at 15- to 30-minute interval), and telecommuting.

Land Use and Development

The connection between transportation and land use has been studied through numerous planning efforts such as the 2007 Campus Master Plan Update. UNCG is actively pursuing a development and growth strategy favoring compact centers that combine complementary land uses. Spartan Village is an excellent example of this philosophy. When considered together, decisions and investments regarding all elements have a significant bearing on

future development patterns on campus. The quantity and location of travel demand can be influenced by land use decisions, highlighting the factors (i.e., trip generation, trip length, and travel mode) that influence transportation efficiency. As mentioned in Chapter 4, the University should work with the City of Greensboro and the development community to encourage infill residential development near campus for students, faculty, and staff.

Marketing, Education, and Implementation

Marketing, education, and implementation speak to the larger need for a continuous and inclusive process—from plan development through initiation to evaluation. These strategies further define consumer needs and preferences, refine appropriate products and services, distribute information about products and services to existing and potential users, and promote their use. Marketing, education, and implementation are critical components of implementing TDM strategies to reduce SOVs and minimize parking demand.

Planning Context

Travel demand management strategies are a recurring theme in the transportation plans and master plans developed recently by UNCG. The UNCG Campus Master Plan Update promotes a connected community with symbiotic land use and transportation. Existing programs and facilities on campus and in Greensboro establish a solid groundwork for the continuation of TDM initiatives.

Existing TDM Programs and Policies

UNCG's commitment to sustainability has focused attention on the benefits of travel demand management, and resources and manpower are allocated to a Campus Access Management program. Visitors to the UNCG website can find information about transit, bicycling, walking, and ridesharing. Real-time updates also are provided through social media to alert potential users about opportunities or temporary issues. A variety of travel demand management programs exist on or around campus. Some of the most notable programs are described below.

- Spartan Chariot—The Spartan Chariot circulates campus on weekdays and weekends to help the campus population move easily without having to use a personal vehicle. Riders can track the position of the bus along the route online in real time. See Chapter 4.
- Park-and-Ride—A park-and-ride shuttle operates on weekdays every 10 to 15 minutes between the park-and-ride lot at the Greensboro Coliseum Complex and three designated campus locations (Lot 8, Forest Street, and Spring Garden Street). PART operates 27 park-and-ride lots throughout the Piedmont with express bus service to Downtown Greensboro. See Chapter 4.
- Zipcar—Zipcars arrived at UNCG in 2010 to provide students, staff, and faculty the ability to reserve a car on campus for short trips. Zipcars are located off Gray Drive near the Gove Student Health Center.
- Zimride—The Zimride network allows UNCG students, staff, and faculty to find drivers and riders with similar travel patterns for daily commute carpooling and occasional ride sharing. A calendar feature was added in 2012 enabling participants to track their sustainable transportation activities and earn points for prizes.
- Bicycle Sharing—Spartan Cycles bicycle sharing at UNCG began in 2010 and the program expanded to include bicycle rentals in 2011. Through a partnership with Healthy UNCG, participants can log bicycle travel miles to earn rewards. See Chapter 3.
- Emergency Ride Home—The UNCG Emergency Ride Home program provides participants with a reliable way home on days they have chosen to use an alternative transportation option. This system is designed to encourage use of bicycling, walking, transit, and ridesharing by providing a safety net if an emergency should arise. This is a free service provided to UNCG students, faculty, and staff by PART.

Campus Community Perception

A critical part of a successful TDM program is promoting awareness of available services. Through community outreach for the *Update*, participating faculty, staff, and students were asked to provide feedback on the effectiveness of these programs and how they are publicized. Results of the surveys are summarized in the charts on the following page.

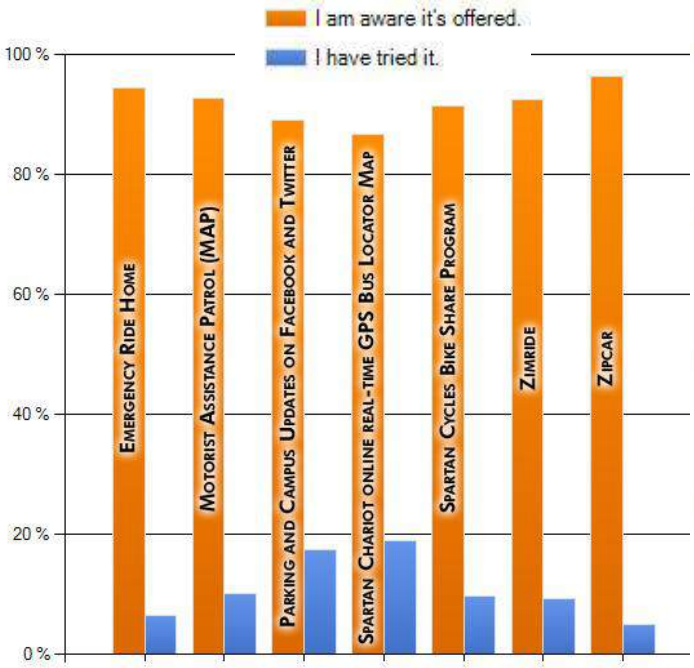
Survey respondents were asked if they were aware of available travel demand management options. Respondents indicated they had heard of the TDM options (more than 85% of respondents indicated they had heard of all the options listed), which confirms the success of program education efforts. Respondents who indicated they had tried the available services were significantly less. The options with the fewest respondents participating were the emergency ride home service (which requires participation in other ridesharing options) and the Zipcar service (in which cost was identified as a limiting factor).

Respondents indicating they had not tried a service were then asked to discuss why they had not participated. The majority of these respondents indicated they had no interest in the services being offered. Beyond this response, the need for access to a car was stated as the primary reason for not taking advantage of these services. The exception to this finding was for the Zipcar program, where over a quarter of respondents indicated cost was their biggest deterrent from using the system.

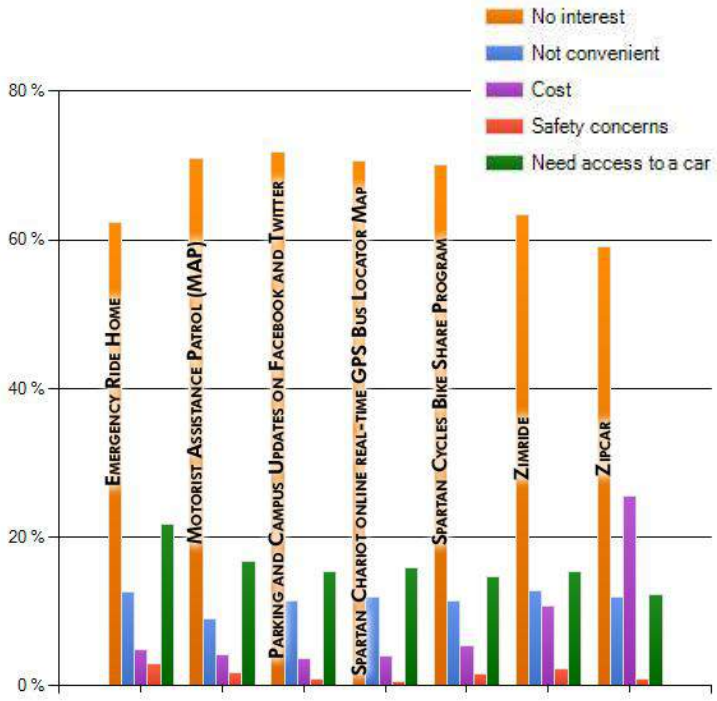
Survey respondents also were asked if they would be willing to pay a fee to rent a bicycle. Of the more than 20% of respondents that said they might be interested, approximately half indicated they would prefer a daily or weekly rental. On average, respondents would be willing to pay around $2.50 per hour for a bike rental, $7.50 per day, and $20 per week.

While the survey was not statistically valid nor a full representation of the campus community, the results helped in evaluating trends.

Are you aware of the following transportation options? Have you tried them?



If you are aware but haven't tried them, why not?



Recommendations

UNCG's commitment to providing a balanced transportation system to students, faculty, and staff led to its recognition as a Best Workplace for Commuters by the National Center for Transit Research. The University of North Carolina at Greensboro has been proactive in pursuing and implementing programs that further the objectives of its travel demand management program. With this in mind, the TDM recommendations in the *Update* build upon existing programs and facilities. Figure 5.3 shows many of the existing and proposed amenities relating to travel demand management on and around the UNCG campus.

Bicycle, Pedestrian, and Transit

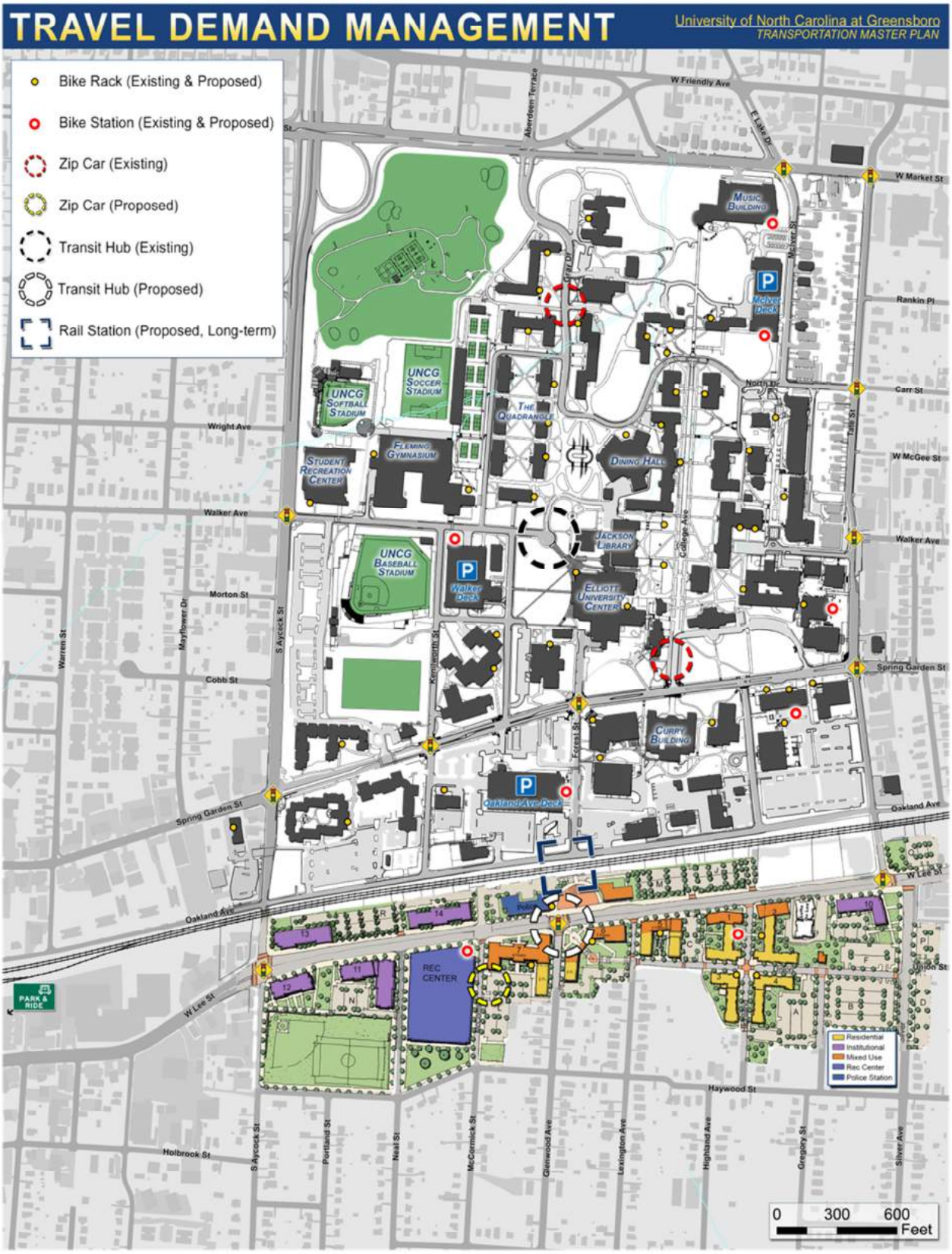
Recommendations in other chapters of the *Update* directly relate to TDM principles. Recommendations described in other chapters relevant to travel demand management include:

- Bicycle sharing programs, including the Spartan Cycles initiative (Chapter 3), provide bicycle travel opportunities to interested participants with minimum cost or hassle.
- Encouragement and education programs for bicycles and pedestrians facilitate the use of non-motorized travel onto and around campus (Chapter 3).
- Park-and-ride shuttle service (Chapter 4) provides transit options to people who might otherwise be limited by their distance from transit lines.

Additional recommendations include:

- UNCG already has parking available for over 1,000 bicycles. *It is recommended that the University construct additional bicycle racks adjacent to major destination points.*
- *It is recommended that the University provide bike stations at high traffic areas around campus as indicated in Figure 3.6.* UNCG has adopted a progressive approach by including advanced bike storage facilities in the construction of Spartan Village. Bicycle storage advancement is also being leveraged for LEED certification points in new construction efforts.
- *It is recommended that the University add a Zipcar location in Spartan Village* (such as near the new Rec Center).
- *It is recommended that a new transit hub (bus pullouts, benches, etc.) be located in Spartan Village near the intersection of Lee Street and Glenwood Avenue.* This transit hub would provide a point for area transit services to serve users in the southern portion of the campus.
- To date, students have used TDM options at a greater rate than faculty and staff. Incentives for carpooling and vanpooling may encourage more faculty and staff to participate. In Fall 2012, a Carpool Club incentive program was launched. *It is recommended that University provide parking vouchers and preferred parking in the parking decks for carpoolers/vanpoolers.*
- PART has expressed interest in conducting additional outreach for the campus community regarding the park-and-ride facilities it operates. Meanwhile, the campus community has requested more direct PART service to campus, especially from the PART Regional Hub on NC 68. *It is recommended that the University encourage PART to implement direct service to campus.* Until then, riders should be encouraged to transfer at Four Seasons to avoid having to go downtown to the Depot and backtrack to the University.
- If the proposed commuter rail line through Greensboro is implemented, the area around the Pedestrian Underpass will be considered for a rail station. This location would provide an easy connection to such amenities as the proposed transit hub, several bike stations, and the new Zipcar facility.
- *It is recommended that the University install paid charging stations for alternative energy vehicles in each parking deck.*

Figure 5.3 | Travel Demand Management



Impact of TDM on Parking

Efforts to provide and encourage alternative ways to travel to campus have reduced parking demand since the 2006 plan.

Parking Demand and Revenue

Annual ridership of HEAT has grown significantly—more than 200%—since its inception in 2006 (see Table 4.1 in Chapter 4). It is informative to compare changes in transit ridership to the sale of parking permits between 2006 and 2011. The chart on this page shows that while transit ridership has increased more than 200% since 2006, the number of parking permits sold annually has dropped by almost 2,000 permits.

As the chart indicates, the Travel Demand Management (TDM) measures undertaken by the University have successfully encouraged transit use but decreased parking demand and revenue. Assuming an average annual permit fee of approximately $300, the 21% drop in parking permits means the parking system lost an estimated $600,000 in annual revenue in 2010-11 compared to 2006-07. The parking system is self-funded (i.e. it does not receive University funding). If the trend of decreasing demand for parking permits continues, parking officials may have to increase parking permit rates to fund the debt obligation for the parking decks.

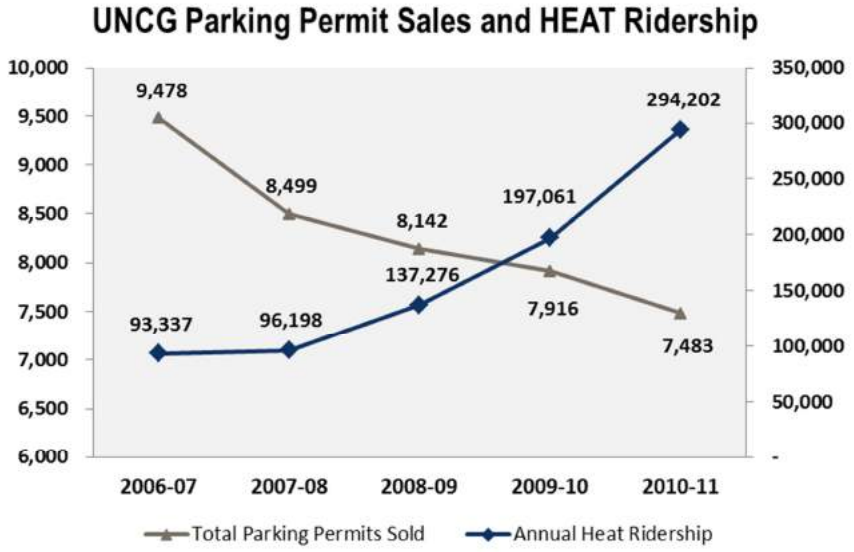


Table 5.4 Permit Sales by Type by Year

Permit Type	2006-07	2007-08	2008-09	2009-10	2010-11	5-year change
A	743	741	743	691	690	-53
B	2,036	1,711	1,643	1,427	1,091	-945
C	2,015	1,873	1,653	1,699	1,363	-652
DE	140	121	91	88	119	-21
E	2,117	1,870	1,647	1,573	1,708	-409
EB					204	204
GR	57	55	49	45	45	-12
K	1,116	947	897	826	753	-363
KB			47	58	100	100
LB				197	46	46
M	493	432	536	475	463	-30
MB			37	39	77	77
RA		27	97	111	121	121
SGB	178	176	180	183	197	19
W	583	546	516	495	490	-93
WB			6	9	16	16
Total	9,478	8,499	8,142	7,916	7,483	

Sales by Permit Type

A closer examination of the parking permit sales reveals the sales trend of individual permit sales. Table 5.4 shows the annual parking permit sales by type from 2006-07 to 2010-11.

The permit types that have experienced the most significant drop in demand over the last five years are:

- "B" Permit—Student on-campus surface lot permits; annual fee $302, down 46%
- "K" Permit—Faculty Oakland Avenue Parking Deck permits, annual fee $445, down 33%
- "C" Permit—Student commuter surface lot permits; annual fee $302, down 32%

The permit types that have experienced the most significant increase in demand over the last five years are:

- "EB" Permit—The residential remote lot at 1200 West Lee Street; annual fee of $175, up 204 in 2010-2011. This may be a lower cost replacement permit for some students who used to purchase "B" permits
- "RA" Permit—Staff Employee lot at 915 Northridge Street; annual fee of $30. This may be a lower cost replacement permit for some staff who used to purchase "K" Permits.

The trend in permit sales not only illustrates the University's success in providing alternative ways to commute to campus, it also shows that students have been quicker to shift their travel patterns away from personal automobiles. It also is interesting to note that student demand for permits to park in the parking decks (KB, MB, and WB) have increased over the five-year period, while staff demand for permits (K, M and W) to park in in the same facilities has decreased.

Table 5.5 Permit Sales by Type by Year

Parking Facility	Capacity	2005-06		2010-11	
		Total Permits	% of Capacity	Total Permits	% of Capacity
Oakland Avenue	974	1,116	115%	853	88%
Walker Avenue	796	583	73%	506	64%
McIver Street	651	493	76%	540	83%

As shown in Table 5.5, the number of permits sold in each of the parking decks has decreased over the last 5 years. In 2005-06, students were not allowed to purchase permits in the parking decks. However, in 2010-11 a limited number of permits were available for student purchase. (According to POCAM's web page, no student permits are currently available for any of the parking decks. A waitlist is maintained for those who wish to park in the decks.)

Parking occupancy data furnished by UNCG was compared with historic permit sales to calculate a % of capacity. For the Oakland Avenue and McIver Street decks, the observed peak occupancy corresponded to approximately the number of permits sold. The Walker Avenue Deck recorded a significantly higher occupancy than the permit sales. This is not unexpected due to the number of visitors who use the Walker Avenue Deck.

Impact of TDM on Air Quality

The Greensboro area and UNCG have taken a proactive approach to air quality issues. By establishing an Early Action Compact with the Environmental Protection Area, the Triad currently is designated as in attainment for the 8-hour ozone standard. In fact, the Greensboro area is in attainment for all criteria pollutants except the 1997 annual $PM_{2.5}$ standard.

To continue the positive momentum for air quality, it is essential for the University to continue actively seeking ways to reduce motorized travel miles. Criteria pollutants will continue to serve as a benchmark for air quality performance. However, as the effects of greenhouse gases are becoming better known, it also is important to consider the overall greenhouse gas footprint for future growth and development.

Travel demand management strategies provide an excellent way to minimize the use of motorized vehicles. The TDM Encyclopedia, developed by the Victoria Transport Policy Institute, provides guidance on the reduction in parking demand that can be expected with the implementation of certain TDM measures. Considering recommendations in this plan such as enhanced bicycle facilities, improved walking and cycling environments, ridesharing, and transit improvements, parking demand could decrease as much as 15% compared to levels with no TDM measures in place. This reduction in parking demand directly translates to a reduction in motorized vehicle traffic on campus.

The Environmental Protection Agency provides a mechanism for estimating greenhouse gas emissions, including carbon dioxide. Table 5.6 shows the correlation between reduced parking demand and reductions in CO_2 emissions. This table references the low growth and high growth scenarios established in Table 5.3.

Conclusion

The University of North Carolina at Greensboro has taken a proactive approach to addressing vehicular access and parking through travel demand management strategies. By planning for future needs of the existing campus with an eye toward Spartan Village, UNCG can improve vehicular access and parking in a context-sensitive, multimodal way. Reducing the number of faculty, staff, and students that drive alone to campus will reduce parking demand and help balance existing and future supply. The end result will be critical to achieve the long-term sustainability goals championed by the University.

Table 5.6 - Impact of TDM on Greenhouse Gas Emissions

	2011	2015	2020		2025	
			Low Growth	High Growth	Low Growth	High Growth
Parking Demand	4,343	4,404	4,448	4,844	4,493	5,328
Reduction in Parking Demand[1]	N/A	661	667	727	674	799
Parking Demand with TDM Measures	N/A	3,743	3,781	4,117	3,819	4,529
CO_2 Emissions Reduced (metric tons)[2]	N/A	3.4	3.4	3.8	3.5	4.2

[1]Assumes a 15% reduction in parking due to TDM measures.

[2]Assumes reduction in parking demand correlates to reduction in passenger vehicles.
http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Summary of Recommendations

The UNCG Transportation Master Plan Update includes the following recommendations:

Parking

- Enhance marketing efforts for parking permits, especially the availability of permits in the garages.
- Initiate a parking rate study that evaluates permit rates, hourly rates, and meter rates.
- Implement online permit sales with license plate recognition.
- Offer for sale a number of permits equal to the capacity of the Oakland Avenue and McIver Street Parking Decks on a trial basis.
- Monitor permit sales and evaluate parking permit increases.
- Prohibit on-street parking on the north side of Lee Street and on the portions of Aycock Street in Spartan Village.
- Work with the City and the Glenwood neighborhood to implement a residential parking permit program in Glenwood prior to the completion of the first phase of Spartan Village.
- Consider the implementation of parking pay stations to assist in parking management in Spartan Village.
- Seek authorization from the City of Greensboro to enforce the time-limited parking zones in the areas near Spartan Village.
- Express to the City of Greensboro the priority the University places on improving Aycock Street.
- Install charging stations for alternative energy vehicles in each parking deck

Travel Demand Management

- Construct additional bicycle racks adjacent to major destination points.
- Provide bike stations at high traffic areas around campus as indicated in Figure 3.6.
- Add a third Zipcar location in Spartan Village.
- Locate a new transit hub in Spartan Village near the intersection of Lee Street and Glenwood Avenue.
- Provide parking vouchers and preferred parking in the parking decks for carpoolers/vanpoolers.

The planning process for the *University of North Carolina at Greensboro Transportation Master Plan Update* required coordination among administrative and academic departments on campus, the student body, and community stakeholders. Implementing the plan is no different. Success will depend upon how well campus leaders from a variety of departments can balance competing interests. This task is made easier by describing a series of defined steps—or action items—to move the process forward. In simple terms, the Action Plan provides a blueprint for implementation. From the outset of the plan, the purpose was to enhance the sustainability of campus through a coordinated, multimodal approach to campus access and mobility.

The foundation of the Action Plan is the commitment of identified partners (University and community), awareness of transportation issues on and near campus, and strategic initiatives that support behavioral-based changes and emphasize alternatives to single-occupancy vehicles. The Action Plan sets the stage for the successful orchestration of the facilities, policies, and programs recommended throughout the *Update*. The core of this chapter is the Action Plan, which lists specific policies and projects as well as considerations for implementation. Clearly defined action items serve two purposes: 1) they enable the University to track progress and schedule future improvements, and 2) they help the University identify ways to enhance sustainability on campus through well-guided transportation decisions.

Purpose and Goals

The *UNCG Transportation Master Plan Update* refreshes strategies outlined in previous plans to reflect new growth trends and campus development. The overall purpose of the plan is to devise a blueprint to enhance the sustainability of campus through a coordinated, multimodal approach to campus access and mobility. Introduced in Chapter 1, the following goals were intended to provide a framework for developing ideas, options, and recommendations.

- The UNCG Transportation Master Plan Update will integrate campus expansion plans south of Lee Street with a coherent, multimodal connectivity plan and an integrated approach to parking allocation.
- The UNCG Transportation Master Plan Update will provide a revised understanding of existing campus transportation dynamics, including modes of access, parking, and travel demand management.
- The UNCG Transportation Master Plan Update will evaluate parking demand and allocation with an emphasis on the potential to reduce the demand for parking in the future.
- The UNCG Transportation Master Plan Update will include a forward-looking approach to moving people to, from, and within campus through a coordinated set of multimodal solutions.
- The UNCG Transportation Master Plan Update will consider the distribution and analysis of handicap-accessible spaces.

Implementation Framework

A sustainable transportation system will emerge from consensus among stakeholders on their role and responsibility as partners charged with implementing the plan's recommendations.

Controlling Factors

Several factors will determine the timing and execution of the *Update's* recommendations.

- The degree of control or influence the University, the City of Greensboro, and other partners have relative to their desire to implement changes.
- The availability of personnel and financial resources to implement specific programs.
- Whether an action item is an independent project or program or a component of an effort that involves multiple projects, programs, or policies.
- The interdependence of various action items, in particular the degree to which implementing one item is dependent upon the successful completion of another item.

University Partners

Partners charged with carrying forward the recommendations of the *Update* represent an important collection of stakeholders on campus and in the community committed to successful programs that encourage a diversity of options for traveling to, from, and within campus. Many of these partners have actively participated in the Advisory Committee, web-based survey, Campus Open House, or individual discussions as the plan took shape. These partners include:

- UNCG Administration
    - Facilities Design & Construction
    - Parking Operations and Campus Access Management
    - Campus Enterprises
    - Sustainability
- UNCG Faculty and Support Staff
- UNCG Students
- City of Greensboro
- Greensboro Urban Area MPO
- Guilford County
- Greensboro Transit Authority
- Piedmont Authority for Regional Transportation
- North Carolina Department of Transportation

These partners likely will be active participants in many of the action items described in previous chapters and prioritized in the following pages. These agencies will guide, coordinate, and advocate for enhanced travel options.

Campus Community Perception

In addition to identifying issues and testing potential solutions, the web-based survey asked respondents to spend money on a variety of transportation improvements. When dividing $10 among a series of improvements, they could choose to spend all the money on one category or distribute it among several. Given the general demographic of the survey sample was weighted toward those that drive alone to campus, it's not surprising that most money was allocated to parking. As discussed in Chapter 5, the parking problems identified by the survey are based more on perception rather than actual data. The result of the $10 question further indicates the importance of parking among the campus community. Pedestrian crossings were the second-highest money getter. Responses from faculty, staff, and students also were compared against one another. Faculty and staff placed a higher emphasis on pedestrian crossings and greenways/trails while parking was the big ticket item for residential and commuter students. When asked if they would support higher parking fees to fund these improvements, approximately 60% said yes with little variation among the campus community groups.

Action Plan

This section lists appropriate actions to implement the recommendations of the *Update* based on three timeframes—Immediate (Within 2 years), Mid Term (3 to 5 years), and Long Term (More than 5 years). Priorities were determined based on a combination of perceived need and relative ease of implementation. Many of the tasks are recommended to be initiated in the next five years, coinciding with campus redevelopment or development activities. The success of this plan hinges on the University's continuing to educate the campus community about sustainable transportation and parking options. As with any planning effort, community support can encourage implementation, while opposition can significantly delay a project.

The Action Plan Matrix (Table 6.1) lists specific physical and policy/program recommendations for each modal elements of the plan: Bicycle and Pedestrian, Transit, Parking, and Travel Demand Management. Many of these recommendations can be administered concurrently as resources (funding and staff time) permit. The priorities or phasing are provided here with the understanding that University and City of Greensboro initiatives may dictate future changes. While some improvements require coordination or assistance by the City of Greensboro or NCDOT, most of the responsibility for implementing recommendations naturally lies with the University.

Table 6.1 – Action Plan Matrix

Recommendation	Type	Benefit	Resources Required
Immediate (Within 2 years)			
Bicycle and Pedestrian			
Construct new sidewalks to fill in existing gaps in sidewalk system. • Kenilworth St (adjacent to the Bryan Building and on the eastside south of Spring Garden Street) • Theta St (adjacent to the Bryan Building)	Physical	Safety Connectivity Mobility Accessibility	$25/linear foot
Construct wide sidewalk. • Forest St between Spring Garden St and the Elliott University Center	Physical	Safety Connectivity Mobility Accessibility	$50/linear foot
Install continental high visibility crosswalks. • All signalized crossings of Aycock St • Tate St and Oakland Ave • Carr St and McIver St • Gray Dr near Gove Student Health • Gray Dr and West St • Kenilworth St and Theta St • Union St and Gregory • Union St and Highland Ave	Physical	Safety Mobility Accessibility	$5,000/each

Recommendation	Type	Benefit	Resources Required
Bicycle and Pedestrian (continued)			
Install ground-mounted pedestrian crossing sign. • Gray Dr near Gove Student Health • Walker Ave and Stirling St • Theta St	Physical	Safety	$200/each
Construct curb extension around on-street parking. • Aycock St and Walker St	Physical	Safety Accessibility	$20,000/intersection
Install PedAdvance signal. • Aycock St and Walker St • Aycock St and Walker Ave • Aycock St and Spring Garden St • Aycock St and Forest St • Lee St and Glenwood Ave • Lee St and Tate St/Silver Ave	Physical	Safety	$5,000/intersection
Create bicycle boulevards with pavement markings, signage, traffic calming, and mini-circles. • Union St • Aberdeen Terr • Haywood St	Physical	Safety Connectivity Mobility	Varies
Add a green painted contraflow bike lanes. • College Ave from Administration Dr to Spring Garden St	Physical	Safety Connectivity Mobility	$10,000/mile
Paint sharrows (shared-lane markings) on key roadways. • North Dr • McIver St • Walker Ave • Forest St (Oakland Ave to Spring Garden St) • Aycock St • Tate St	Physical	Safety Connectivity Mobility	$2,000/mile or $200/sharrow
Enhance campus connector. • Connection between Lee St and Forest St (Pedestrian Underpass) • Connection between Lexington Ave and Glenwood Ave	Physical	Safety Connectivity Mobility Accessibility	Varies

Recommendation	Type	Benefit	Resources Required
Bicycle and Pedestrian (continued)			
Install bicycle racks near convenient access to buildings. • Stone Building near College Avenue entrances (5 U racks – 10 spaces) • Petty Building (1 stadium rack – 8 spaces) • Spartan Village (as development occurs) (see UNCG Bicycle Master Plan for number of spaces based on development type and intensity)	Physical	Convenience Security	U rack ($140) Stadium Rack ($465) Bike Lockers ($1,500) Bike Shelter ($3,000)
Install bicycle stations. • Walker Circle (1 shelter with u racks – 10 spaces)	Physical	Convenience Security	U rack ($140) Bike Shelter ($3,000)
Express to the City of Greensboro the priority the University places on improving Aycock Street.	Policy/ Program	Safety Coordination	Staff Time
Distribute bicycle education and encouragement materials. • Include bicycle materials be included in the orientation packet for new employees (faculty and staff). • Coordinate with GDOT to ensure the next revision to the City's Bicycle Map includes the existing and proposed facilities from the Update. • Provide a link to the Greensboro Bicycle Map be provided on POCAM's bicycle webpage and print copies for distribution on campus.	Policy/ Program	Safety Mobility SOV Reduction Coordination	Staff Time Printed Materials
Initiate a faculty versus staff green commute challenge during the Green Games.	Policy/ Program	SOV Reduction	Staff Time Printed Materials
Work with the City of Greensboro and the Greensboro Urban Area MPO to have representation on transportation advisory committees that address citywide issues of non-motorized transportation policy and planning.	Policy/ Program	Coordination	Staff Time
Implement a bicycle sharing program with kiosks near the Walker Avenue Circle and Curry Building.	Policy/ Program	Mobility SOV Reduction Convenience	Requires additional study
Make the safety awareness campaign an annual event.	Policy/ Program	Safety	Staff Time Printed Materials
Transit			
Continue to promote partnerships with transit providers in the City and region.	Policy/ Program	Coordination Mobility SOV Reduction	Staff Time
Maintain the existing Spartan Chariot route.	Policy/ Program	Mobility SOV Reduction	N/A

Recommendation	Type	Benefit	Resources Required
Transit (continued)			
Add a Spartan Chariot stop at the Silver Avenue/Union Street parking lot (Fall 2012).	Policy/ Program	Mobility SOV Reduction	$5,000 for shelter, sign, and amenities
Restore service at the Quad Fountain bus stop (when renovations of the Quad are complete).	Policy/ Program	Mobility SOV Reduction	N/A
Launch the Spartan Chariot Express as a counter-clockwise circulator route with limited stops (Fall 2013).	Policy/ Program	Mobility SOV Reduction	Requires additional study
Voice support for the bus pullout locations on Lee Street and encourage implementation as part of the redesign of the corridor.	Policy/ Program	Mobility Safety	Staff Time
Educate/encourage PART riders to transfer at Four Seasons to avoid having to go downtown to the Depot and backtrack to the University.	Policy/ Program	Mobility SOV Reduction	Staff Time
Partner with the Computer Science department to conduct a design contest for a smartphone transit vehicle locator application.	Policy/ Program	Coordination Promotion	Staff Time Printed Materials
Partner with PART to maximize park-and-ride options for out-of-town faculty, staff, and students.	Policy/ Program	Mobility SOV Reduction	Staff Time
Parking			
Enhance marketing efforts for parking permits, especially the availability of permits in the garages.	Policy/ Program	Financial Stability Efficiency	Staff Time Printed Materials
Initiate a parking rate study that evaluates permit rates, hourly rates, and meter rates.	Policy/ Program	Financial Stability Efficiency	$35,000 to $50,000 (depending on scope)
Implement online permit sales with license plate recognition.	Policy/ Program	Convenience Efficiency	$40,000/vehicle plus central software
Prohibit on-street parking on the north side of Lee Street and on the portions of Aycock Street in Spartan Village.	Policy/ Program	Safety	N/A
Encourage on-campus residents to choose remote lots for vehicle storage.	Policy/ Program	Efficiency	Staff Time
Offer for sale a number of permits equal to the capacity of the Oakland Avenue and McIver Street Parking Decks on a trial basis.	Policy/ Program	Financial Stability	N/A
Travel Demand Management			
Maintain existing TDM programs.	Policy/ Program	Mobility SOV Reduction	N/A

Recommendation	Type	Benefit	Resources Required
Mid Term (3 to 5 years)			
Bicycle and Pedestrian			
Construct curb extension around on-street parking. • Gray Dr near Gove Student Health • Gray Dr and West St	Physical	Safety Accessibility	$20,000/intersection
Construct median for pedestrian refuge. • Tate St north of RR underpass (raised planted) • Spring Garden St at Stirling St (extend existing)	Physical	Safety	$50/linear foot
Install PedAdvance signal. • Aycock St and Lee St • Tate St and Spring Garden St • Tate St and Walker Ave • Tate St and Carr St • Tate St and Market St • Market St and Lake Rd	Physical	Safety	$5,000/intersection
Create bicycle boulevards with pavement markings, signage, traffic calming, and mini-circles. • Walker Ave (west of Aycock St)	Physical	Safety Connectivity Mobility	Varies
Add a standard striped bicycle lane. • Silver Ave (as part of the development of Spartan Village)	Physical	Safety Connectivity Mobility	$10,000/mile
Paint sharrows (shared-lane markings) on key roadways. • Kenilworth St • Stirling St	Physical	Safety Connectivity Mobility	$2,000/mile or $200/sharrow
Enhance campus connector. • College Ave	Physical	Safety Connectivity Mobility Accessibility	Varies
Install bicycle racks near convenient access to buildings. • Spartan Village (as development occurs)	Physical	Convenience Security	U rack ($140) Stadium Rack ($465) Bike Lockers ($1,500) Bike Shelter ($3,000)

Recommendation	Type	Benefit	Resources Required
Bicycle and Pedestrian (continued)			
Replace portable racks with permanent loops. • Science Building near North Drive Child Day Care (1 stadium rack – 8 spaces) • McIver Building near Foust Building (1 stadium rack – 8 spaces) • Mary Foust Residence Hall (1 stadium rack – 8 spaces) • Guilford Residence Hall (2 stadium racks – 16 spaces) • Near Tower Village and MHRA Moore Humanities (3 stadium racks – 24 spaces)	Physical	Convenience Security	U rack ($140) Stadium Rack ($465)
Install bicycle stations. • Oakland Avenue Deck (3 lockers – 6 spaces) • McIver Parking Deck (1 shelter with u racks – 8 spaces)	Physical	Convenience Security	U rack ($140) Bike Lockers ($1,500) Bike Shelter ($3,000)
Expand the bicycle sharing program by adding a kiosk near Phase 1 of Spartan Village.	Policy/ Program	Mobility SOV Reduction Convenience	Requires additional study
Implement a theft enforcement program with a bicycle homing device.	Policy/ Program	Security	Varies
Transit			
Create a transit hub in Spartan Village at the intersection of Lee Street and Glenwood Avenue with bus pullouts and shelters.	Physical	Mobility SOV Reduction	Included in Lee Street Improvements
Add stops for the Spartan Chariot and Spartan Chariot Express route at the new transit hub.	Policy/ Program	Mobility SOV Reduction	Included in Lee Street Improvements
Work with the City of Greensboro and the development community to encourage residential infill development for student housing within the existing HEAT 73 route.	Policy/ Program	Coordination Mobility SOV Reduction	Staff Time
Support direct service to campus by PART from the PART Regional Hub on NC 68.	Policy/ Program	Coordination Mobility SOV Reduction	Staff Time
Review growth at the Gateway Campus and determine if changes to HEAT are necessary to better serve these locations.	Policy/ Program	Coordination Mobility SOV Reduction	Staff Time

Recommendation	Type	Benefit	Resources Required
Parking			
Monitor permit sales and evaluate parking permit increases.	Policy/ Program	Financial Stability	Staff Time
Work with the City and the Glenwood neighborhood to implement a residential parking permit program in Glenwood prior to the completion of the first phase of Spartan Village.	Policy/ Program	Coordination Town Relations	Staff Time
Consider the implementation of parking pay stations to assist in parking management in Spartan Village.	Policy/ Program	Convenience	$25,000 to $40,000/pay station
Seek authorization from the City of Greensboro to enforce the time-limited parking zones in the areas near Spartan Village.	Policy/ Program	Financial Stability	Staff Time
Install charging stations for alternative energy vehicles in each parking deck.	Physical	Sustainability	$6,000/unit
Travel Demand Management			
Add a third Zipcar location in Spartan Village.	Policy/ Program	Mobility SOV Reduction	TBD
Provide parking vouchers and preferred parking in the parking decks for carpoolers/vanpoolers.	Policy/ Program	Mobility SOV Reduction	Staff Time Printed Materials
Long Term (More than 5 years)			
Bicycle and Pedestrian			
Construct new sidewalks to fill in existing gaps in sidewalk system. • McGee St	Physical	Safety Connectivity Mobility Accessibility	$25/linear foot
Install continental high visibility crosswalks. • Oakland Ave and Kenilworth St • Oakland Ave and Highland Ave • Oakland Ave and Stirling St	Physical	Safety Mobility Accessibility	$5,000/each
Construct curb extension around on-street parking. • Oakland Ave and Forest St • Oakland Ave and Highland Ave	Physical	Safety Accessibility	$20,000/intersection
Create bicycle boulevards with pavement markings, signage, traffic calming, and mini-circles. • Lexington Ave • McGee St • Edgar St (northern connection to Carr St) • Aycock St (between Hollbrook St and Haywood St) • Hollbrook St	Physical	Safety Connectivity Mobility	Varies

Recommendation	Type	Benefit	Resources Required
Bicycle and Pedestrian (continued)			
Construct new sidepath. • Aycock St from Walker Ave to Market St	Physical	Safety Connectivity Mobility Accessibility	$50/linear foot
Enhance campus connector. • Connection between Forest St/Spring Garden St intersection and College Ave • Connection between Gray Dr and College Ave via the Walker Ave Circle • Connection between Gray Dr and McIver St • Connection to North Dr behind the Sullivan Science and Eberhart buildings	Physical	Safety Connectivity Mobility Accessibility	Varies
Install bicycle racks near convenient access to buildings. • Spartan Village (as development occurs) (see UNCG Bicycle Master Plan for number of spaces based on development type and intensity)	Physical	Convenience Security	U rack ($140) Stadium Rack ($465) Bike Lockers ($1,500) Bike Shelter ($3,000)
Install bicycle stations. • Walker Circle (1 shelter with u racks – 10 spaces) • Graham Building (1 shelter with u racks – 8 spaces) • Proposed Rec Center (3 lockers – 6 spaces; 1 shelter with u racks – 8 spaces) • Taylor/Brown/Carmichael Plaza (2 shelters with u racks – 16 spaces) • Elliott University Center (2 shelters with u racks – 16 spaces)	Physical	Convenience Security	U rack ($140) Bike Lockers ($1,500) Bike Shelter ($3,000)
Transit			
Evaluate potential service to the Millennial Campuses as a long-term option as development occurs.	Policy/ Program	Mobility SOV Reduction	Staff Time

Conclusion

The 2006 Campus Transportation Plan provides the starting point for a renewed Transportation Master Plan. And while a new Campus Master Plan was prepared in 2007, numerous changes have occurred in recent years. The University has rapidly moved from planning to design to the verge of construction on a historic expansion of the campus to the south.

The *University of North Carolina at Greensboro Transportation Master Plan Update* recognizes the importance of parking and transportation issues associated with existing campus operations as well as planned expansion. The plan illustrates the need to address safe movements of bicyclists and pedestrians along and across Lee Street and Aycock Street, the need for continued focus on transit and travel demand management, and the need for a parking approach that efficiently allocates demand.

Numerous individuals collaborated within the context of the *Update* to establish a baseline of understanding upon which to assess needs and identify recommendations. The umbrella under which the plan took shape was the set of goals and a general purpose that included devising a blueprint to enhance the sustainability of campus through a coordinated, multimodal approach to campus access and mobility. The actionable recommendations of the plan should meet the immediate challenges of the University, its people, and the surrounding community.

Beyond simple planning horizons, the *Update* should set the stage for improved choice in personal transportation, coordinated public transportation, seamless rideshare integration, and a bicycle and pedestrian network designed with the user in mind. The plan recognizes that faculty, staff, and students who arrive on campus without a personal automobile will need to be able to travel where and when they want with minimal constraints. The *University of North Carolina at Greensboro Transportation Master Plan Update* should serve as a livable document that equips administrators to address unforeseen changes and to capitalize on opportunities as they present themselves.

Parking Demand Model

A parking system is considered at capacity when occupancy is at 85% to 90% of capacity. The 10% to 15% excess supply keeps the time required to find a parking space within reason and promotes a perception of adequate parking. When parking occupancy exceeds these levels, there may be delays and frustration in finding a space, and patrons may be forced to use a space that is too far from their destination or does not offer a comfortable walking environment. This margin also allows for: 1) the activity of vehicles moving in and out of parking stalls during busy periods; 2) surges in short-term parking activity; and 3) the temporary loss of spaces due to improperly parked vehicles, weather conditions, construction activity, etc.

Throughout much of the observation period, parking on campus exceeded 85% occupancy. This level indicates that a patron may not be able to find a parking space within a reasonable amount of time. The larger parking facilities (parking decks and park-and-ride lots) did not exceed 85% occupancy until closer to mid-day. As an aggregate, parking occupancy met or exceeded 85% occupancy at 11:00 a.m. and 12:00 p.m.

Figures A.1 through A.7 are graphical representations of parking demand parking demand on campus at the times occupancy data was collected. Different colors in these figures represent varying degrees of occupancy in each of the surface parking and structured parking facilities. Within these figures, red signifies a facility with greater than 85% occupancy, orange represents 70 to 85% occupancy, light green represents 50 to 70% occupancy, and dark green represents less than 50% occupancy.

These parking occupancy percentages were used to calibrate parking demand generation ratios to the UNCG campus. The ratios used in this analysis are shown in Table A.1.

Table A.1 – Parking Demand Generation Ratios

Building Use Type	Demand Ratio
Instruction	1 space / 900 sf
Student Services	1 space / 1,200 sf
Academic Support	1 space / 900 sf
Institutional Support	1 space / 300 sf
Athletics/Recreation	1 space / 750 sf
Housing	1 space / 600 sf
Operations & Maintenance	1 space / 3,000 sf

The baseline used for the above parking demand generation ratios was the City of Greensboro Land Development Ordinance (LDO), dated July 1, 2010. The ratios presented in the LDO were adjusted and calibrated accordingly such that the generation ratios matched the existing condition occupancy data that was collected by UNCG, resulting in a tailored set of parking demand ratio requirements for the campus.

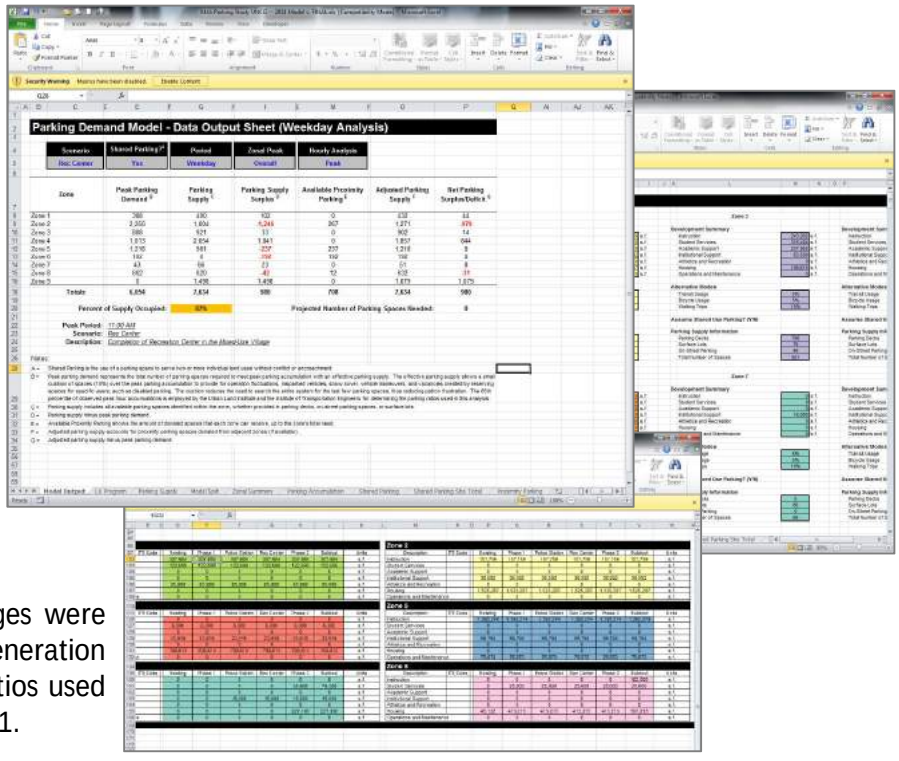


Figure A.1 | Existing Condition Occupancy (8:00 a.m.)

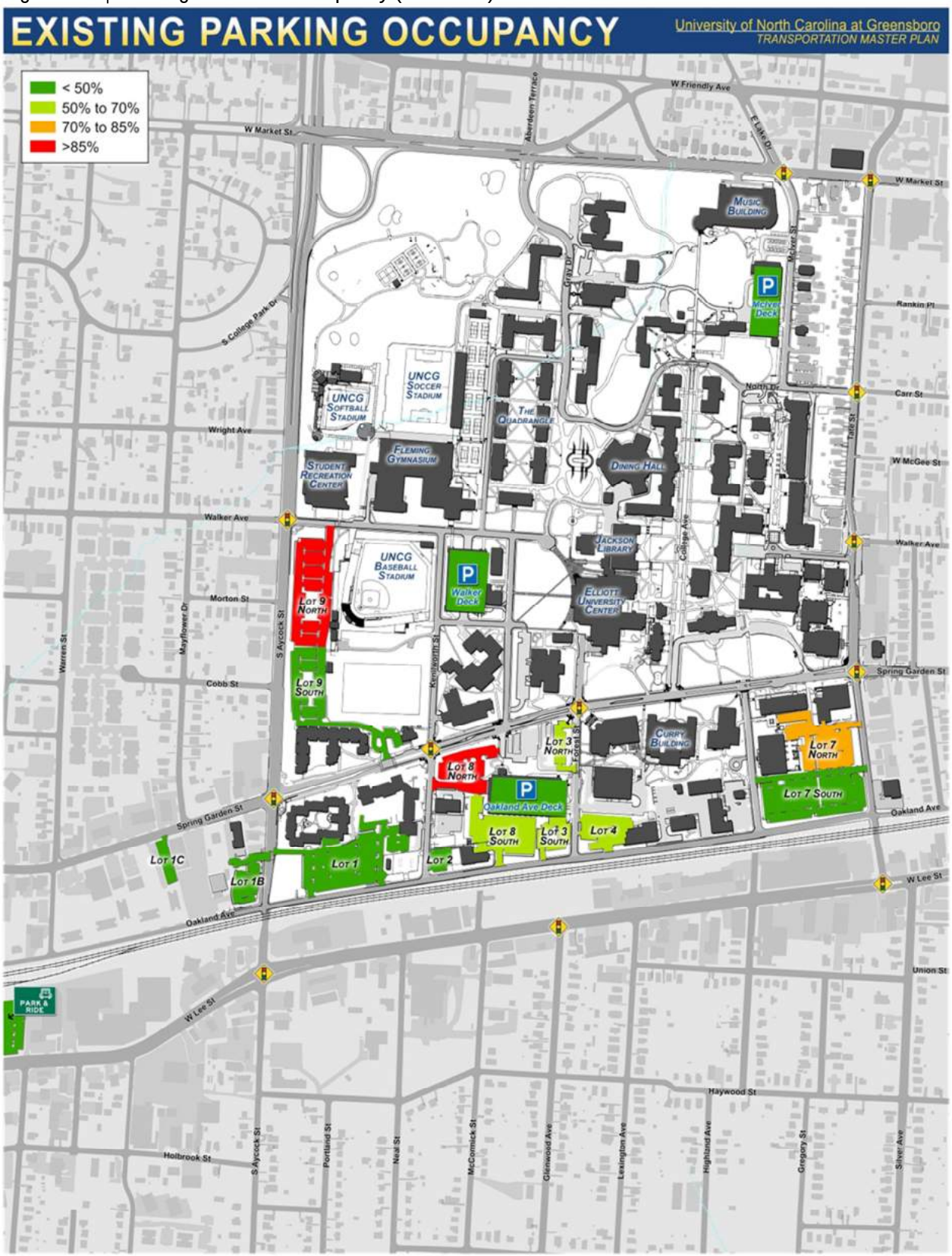


Figure A.2 | Existing Condition Occupancy (9:00 a.m.)

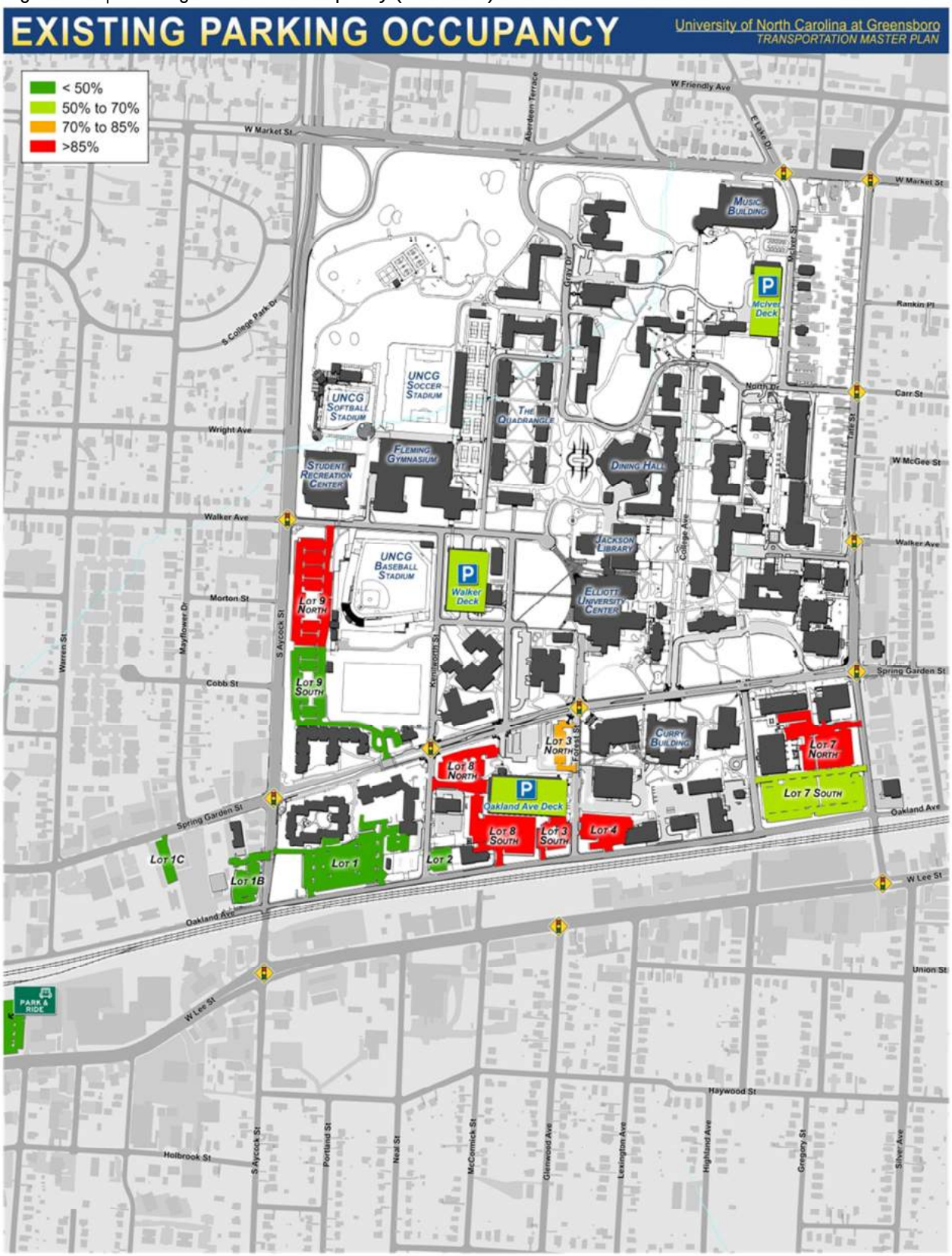


Figure A.3 | Existing Condition Occupancy (10:00 a.m.)

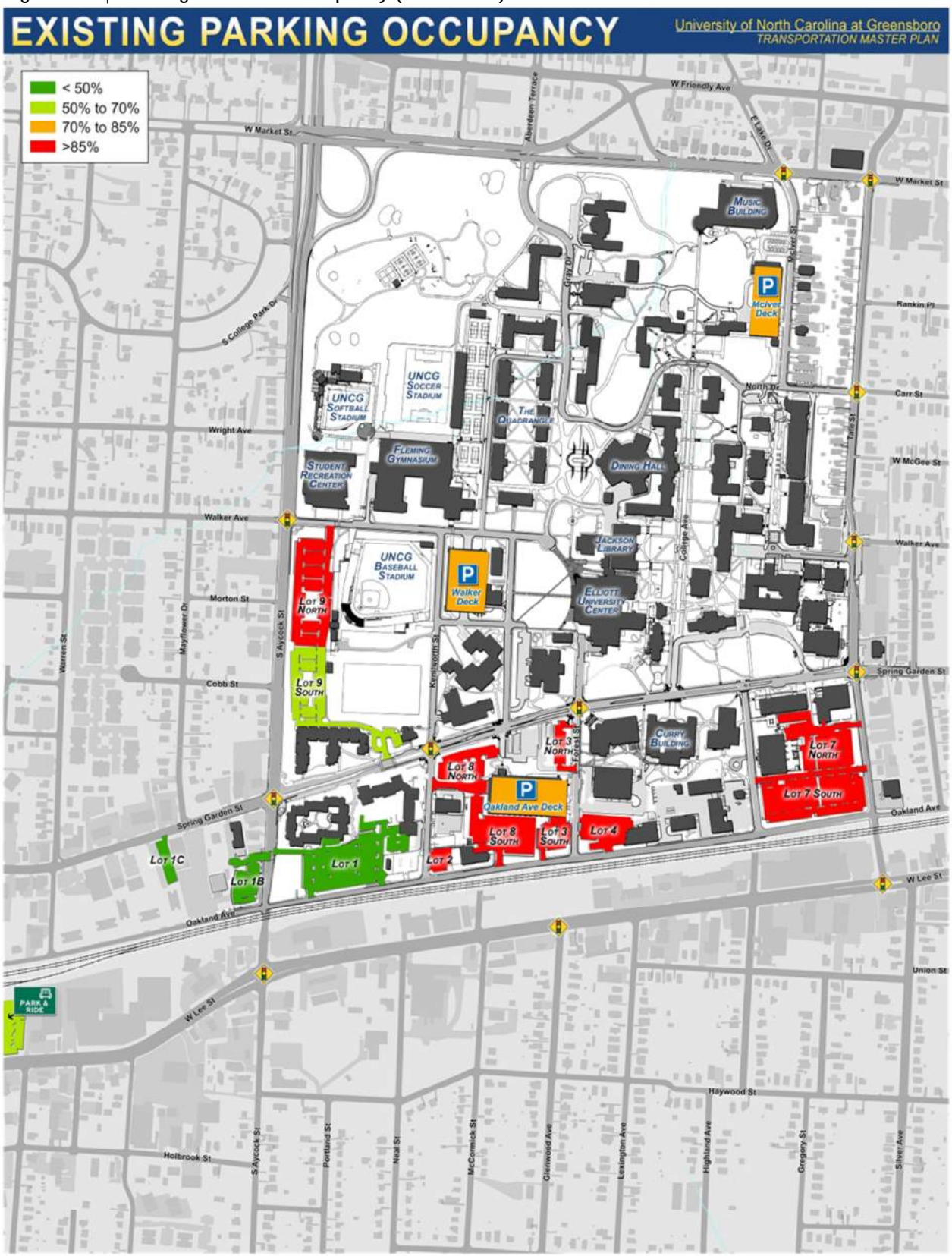


Figure A.4 | Existing Condition Occupancy (11:00 a.m.)

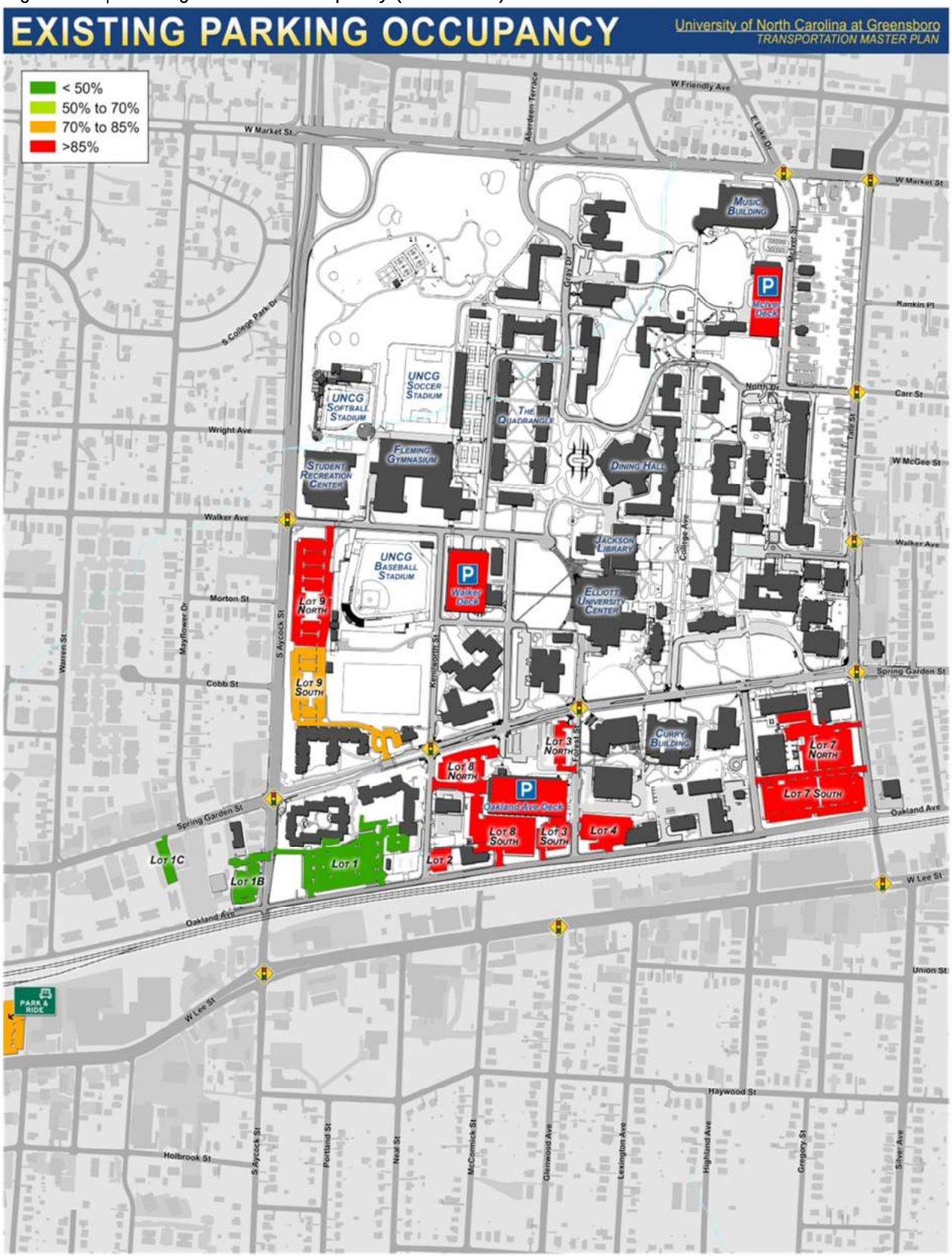


Figure A.5 | Existing Condition Occupancy (12:00 p.m.)

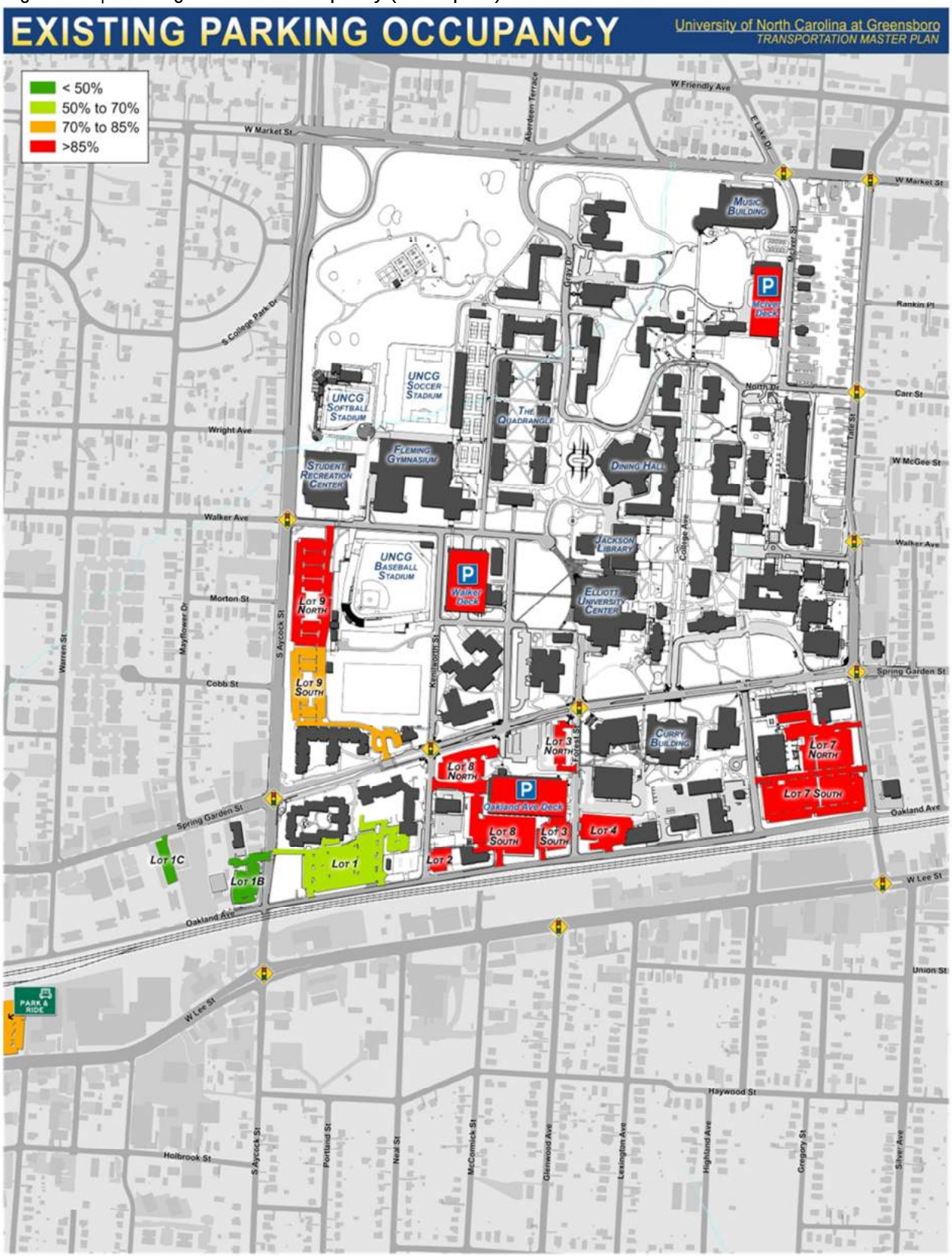


Figure A.6 | Existing Condition Occupancy (1:00 p.m.)

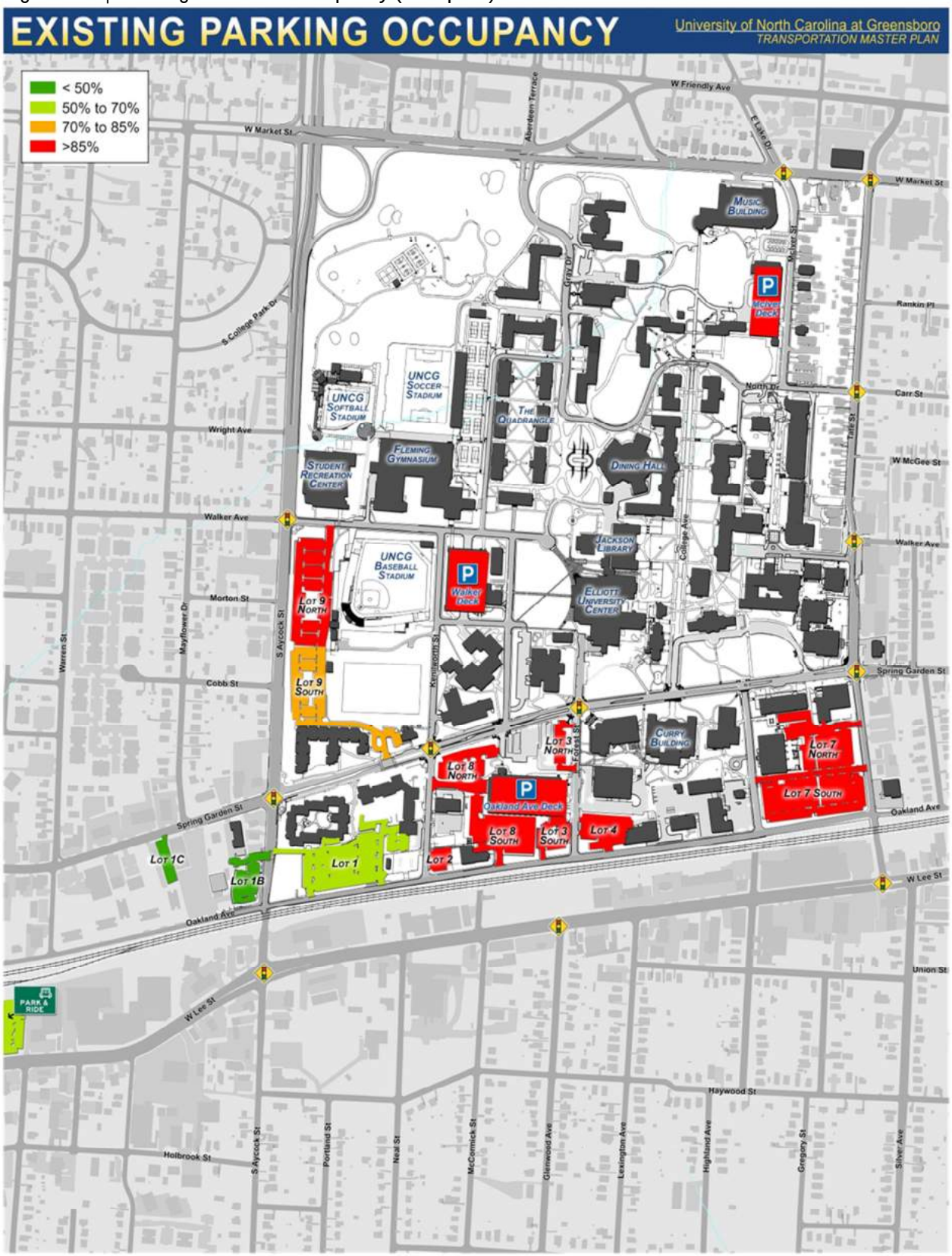
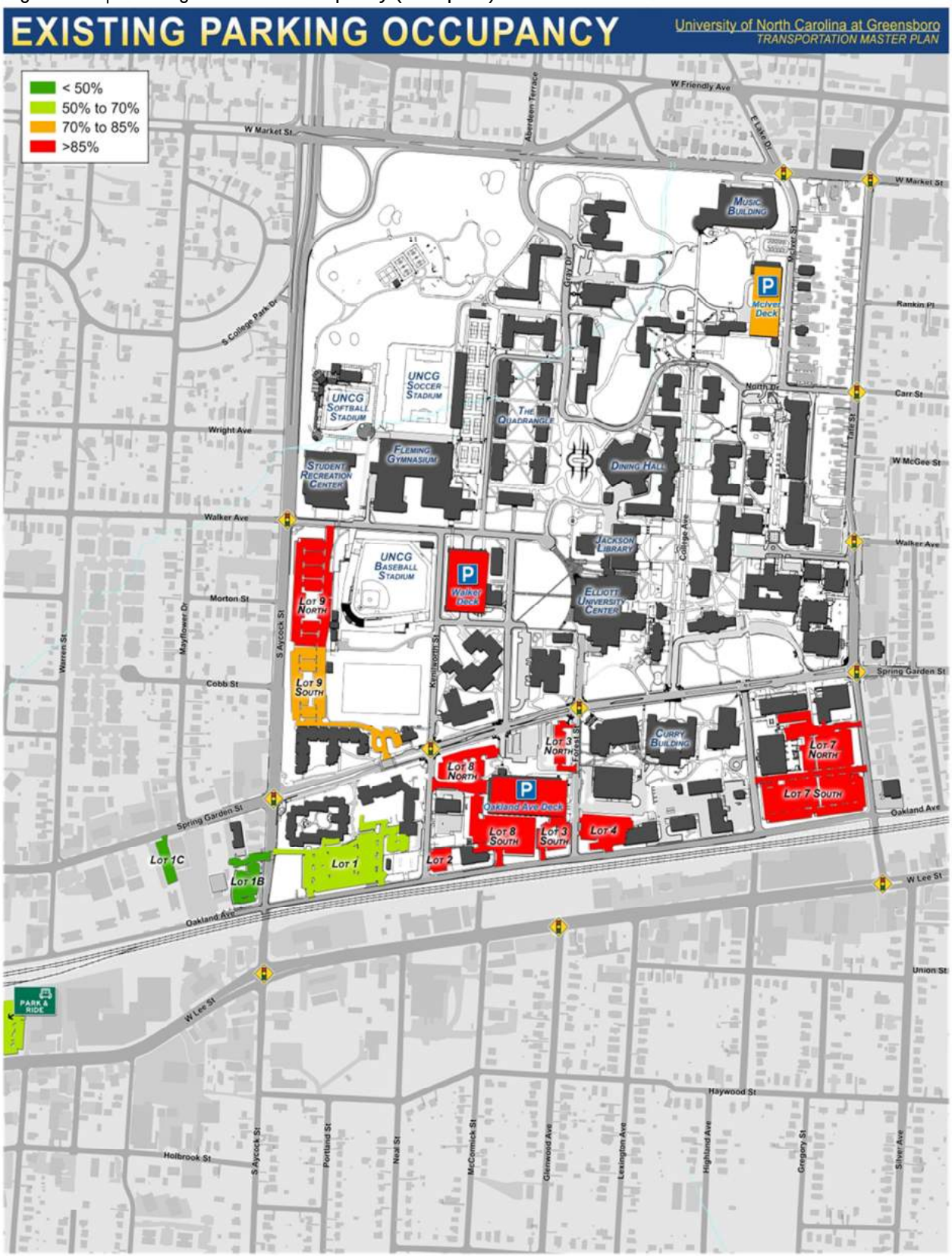


Figure A.7 | Existing Condition Occupancy (2:00 p.m.)



Future Scenarios

The proposed future scenarios considered in this study are focused around expansion of the existing campus to the south (i.e. Spartan Village). Several building use types are involved in the expansion and redevelopment, including institutional support, athletics/recreation, and housing. The proposed future scenarios considered in this study are shown in Table A.2.

Table A.2 Proposed Future Scenarios

Proposed Future Scenario	Building Use Type	Building Area
Spartan Village Phase 1	Student Services	25,600 sf
	Housing	368,091 sf
New Police Station	Institutional Support	16,000 sf
New Recreation Center	Athletics/ Recreation	225,000 sf
Spartan Village Phase 2	Student Services	50,900 sf
	Housing	227,100 sf
Spartan Village Full Buildout	Instruction	349,800 sf
	Student Services	23,400 sf
	Housing	184,000 sf

Refer to Figures A.8 through A.12 for a graphical representation of each of the above scenarios.

This expansion and redevelopment is proposed on a combination of existing property (between the railroad tracks and West Lee Street) and new property that UNCG is in the process of acquiring (south of West Lee Street). The above outlined phasing of the expansion and redevelopment is based on the latest information provided by UNCG as of the date of this report.

The proposed expansion and redevelopment on the portion of existing property owned by UNCG will result in permanent loss of existing spaces. This includes the existing remote park-and-ride lot located at 1200 West Lee Street that is serviced by the Spartan Chariot. This parking lot currently has 224 total spaces, all of which will be permanently lost as part of the expansion and redevelopment.

The proposed additional building use types for Spartan Village are the basis for the future parking demand calculations. Using their proposed square footages, along with parking demand generation ratios calibrated to the UNCG campus and time of day parking distribution, future parking demand was projected for each of the future scenarios.

Based on smaller projected enrollment growth, no additional parking capacity is recommended for the main campus in the planning horizon.

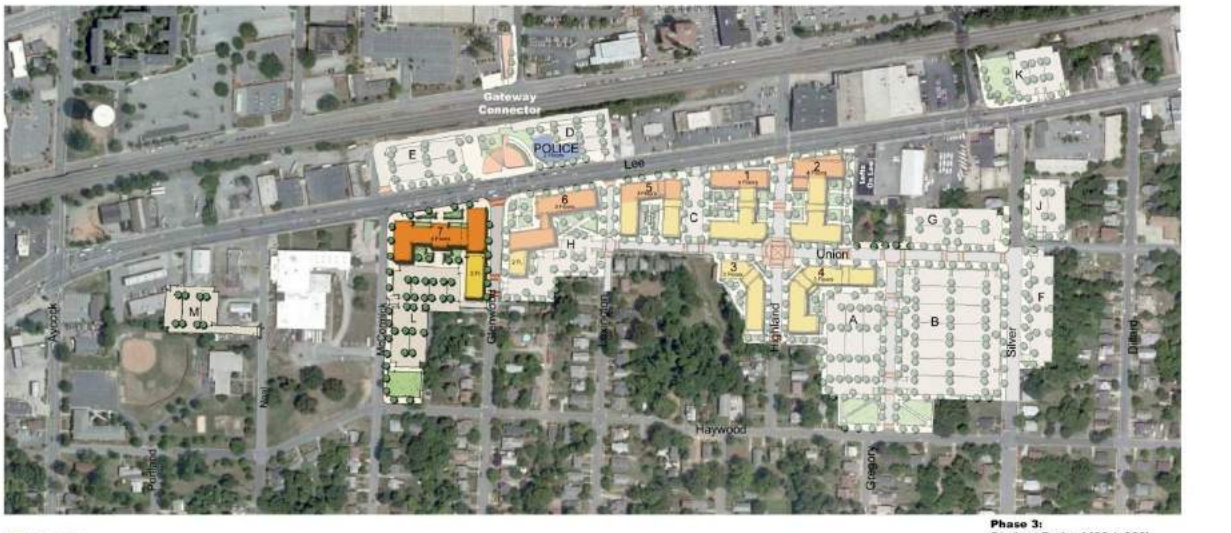
Figure A.8 | Spartan Village – Phase 1

Figure A.9 | New Recreation Center

Figure A.10 | Spartan Village – Phase 2

Phase 2
"Union Square"

Figure A.11 | Spartan Village – Phase 3



Phase 3
"Glenwood Square"

Figure A.12 | Spartan Village – Full Buildout

Parking Demand Analysis

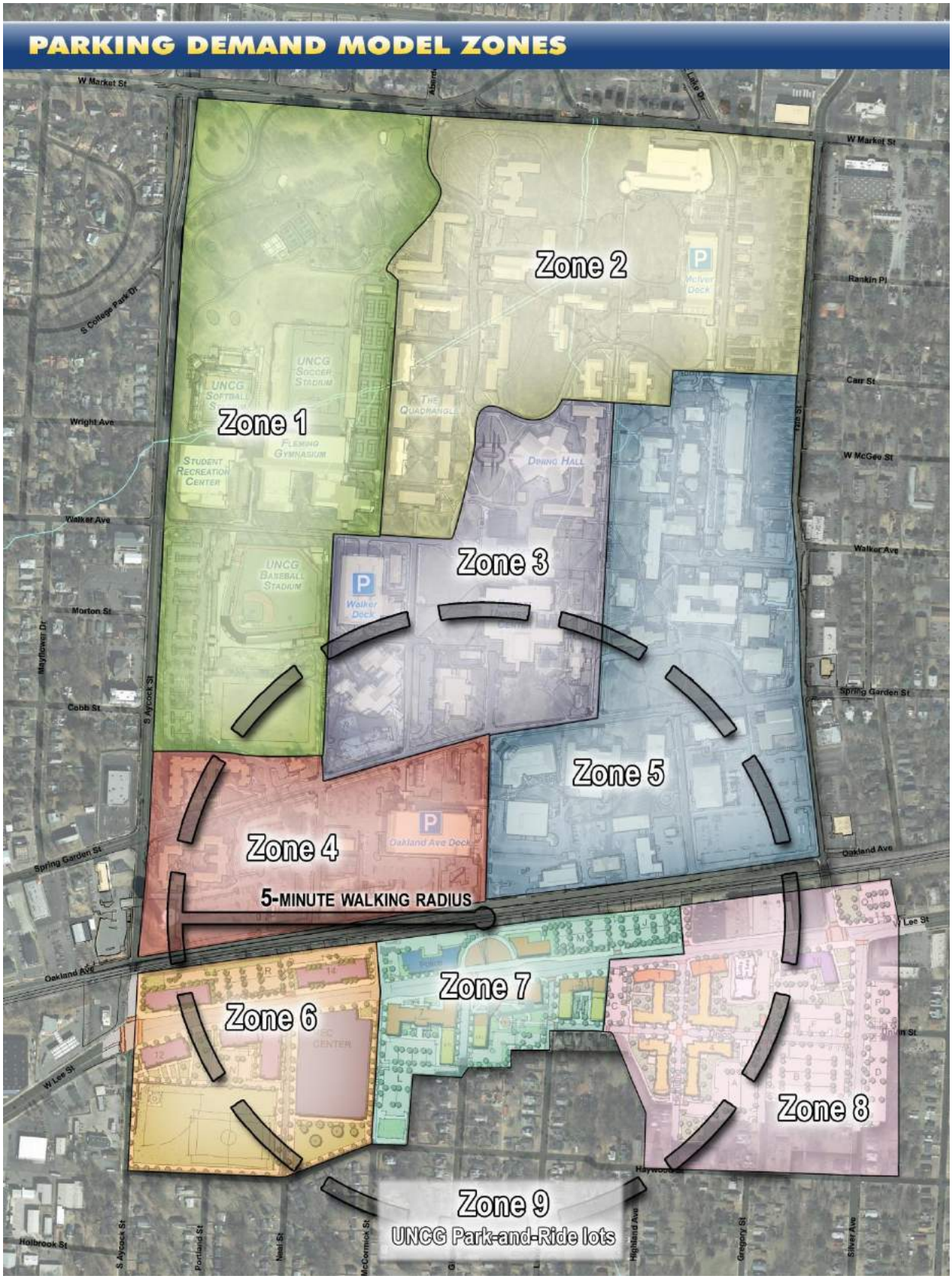
Using the data collected during this project and the proposed future expansion and redevelopment south of the railroad tracks and West Lee Street, a parking model was developed to predict parking demands for various scenarios for Spartan Village. The future scenarios do not include construction phases for the expansion and redevelopment—rather the completed, end of phase condition.

To measure localized demands, the UNCG campus was analyzed with nine distinct parking zones as shown in Figure A.13. Zone 1 through Zone 5 includes the main campus, Zone 6 through Zone 8 includes Spartan Village, and Zone 9 includes remote storage and park-and-ride lots.

The model includes a walking tolerance assumption, which allows a parking deficit in one zone to be mitigated through surplus parking in an adjacent zone within the accepted walking tolerance. The City of Greensboro Unified Development Ordinance allows the Planning Director to permit up to 100% of required parking to be shared within 1,000 feet walking distance. It should be recognized that walking tolerances in a campus setting are inherently different than a typical urban environment, and the observed tolerance for walking from a parking space to a destination at UNCG often is more than ½-mile or more than twice the standard set in city code. The *2007 Campus Master Plan Update* sets the walking tolerance as a 5-minute walk or ¼-mile, which is carried forward in the *UNCG Transportation Master Plan Update*. Figure A.13 shows the ¼-mile (5-minute) walking radius centered on the pedestrian underpass.

Each of the zones as well as the campus as a whole was analyzed regarding parking demand versus supply for each of the future scenarios for Spartan Village. The results of this analysis are provided in Table A.3. The following subsections provide a description of each of the scenarios and a slightly more detailed look at the parking demands and effects of each scenario, through full buildout.

Figure A.13 | Parking Zones



Existing Condition (2011)

Based on the data collected by UNCG and our understanding of the parking system, the existing parking supply is adequate to meet parking demands on campus. The data collected indicate a peak parking occupancy of 86%. Day-to-day fluctuations could modify the occupancy levels up or down by 5%; however, even at 91% occupancy, with frequent users of the system, the parking supply on campus should be enough to provide adequate access to students, faculty, staff, and visitors. At this occupancy level, there is an approximate 979-space surplus in the system.

This occupancy level is adequate; however, it is approaching the limits of an effective parking supply. Once parking occupancy reaches 90%, it becomes increasingly more difficult for students, faculty, staff, and visitors to find available parking, and the perception of parking problems increases.

Spartan Village – Phase 1

After completion of Phase 1 of the expansion and redevelopment of campus south of the railroad tracks and West Lee Street, the overall campus parking occupancy reduces to 85%. Included in this scenario are the addition of Student Services and Housing building use types as well as additional parking supply within Zone 8. Also included in this scenario are the removal of the existing parking spaces located at the 1200 West Lee Street park-and-ride lot and the addition of 450 spaces at the 1600 West Lee Street park-and-ride lot.

In this scenario, there is projected to be a deficit of approximately 42 parking spaces in Zone 8. While the overall campus is projected to have adequate parking, Zone 8 is too far from the main campus to effectively share parking capacity.

Table A.3 Parking Surplus/Deficit by Scenario*

Parking Zone	Future Scenario					
	Existing Condition (2011)	Spartan Village Phase 1	New Police Station	New Recreation Center	Spartan Village Phase 2	Spartan Village Full Buildout
Zone 1	43	43	44	44	44	46
Zone 2	1,009	979	979	979	979	929
Zone 3	14	14	14	14	14	15
Zone 4	955	963	953	844	919	936
Zone 5	0	0	0	0	0	0
Zone 6	0	0	0	0	0	76
Zone 7	0	0	12	8	116	0
Zone 8	14	42	31	31	261	19
Zone 9	962	1,149	1,158	1,079	1,133	1,123
Total Campus Surplus/Deficit	979 (86%)	1,149 (85%)	1,172 (85%)	1,079 (87%)	1,509 (82%)	1,248 (86%)

**Red text signifies a deficit or no surplus, whereas black text signifies a surplus.*

New Police Station

This scenario adds a new police station within Zone 7, including surface parking spaces associated with that building. There are 49 reserved spaces dedicated to the police station with 17 spaces available for public use. The result of this scenario is an overall campus parking occupancy of 85%.

New Recreation Center

After completion of the new recreation center in Zone 6, the overall campus parking occupancy increases to 87%. This scenario adds only the recreation center facility with no additional parking.

This occupancy level is adequate; however, it is approaching the limits of an effective parking supply. Once parking occupancy reaches 90%, it becomes increasingly more difficult for students, faculty, staff, and visitors to find available parking and the perception of parking problems increases.

The current master plan does not include any parking supply for the proposed recreation center. Table A.4 depicts the distribution of parking demand over a typical day for a typical recreation center. This table shows that the peak demand for parking at a recreation center typically occurs at hours where parking demand is "off-peak"; therefore, allowing existing parking facilities (particularly the Oakland Avenue Deck) to share parking capacity with the recreation center.

Table A.4 Hourly Time-of-Day Factor (Recreation Center)

Time of Day	Percentage	Time of Day	Percentage
6:00 a.m.	70%	4:00 p.m.	80%
7:00 a.m.	40%	5:00 p.m.	90%
8:00 a.m.	40%	6:00 p.m.	100%
9:00 a.m.	70%	7:00 p.m.	90%
10:00 a.m.	70%	8:00 p.m.	80%
11:00 a.m.	80%	9:00 p.m.	70%
12:00 noon	60%	10:00 p.m.	35%
1:00 p.m.	70%	11:00 p.m.	10%
2:00 p.m.	70%	12:00 a.m.	0%
3:00 p.m.	70%		

Spartan Village – Phase 2

For the purposes of this analysis, Phases 2 and 3 were combined in to one scenario titled Phase 2. This scenario includes the addition of Student Services and Housing building use types in Zone 7, as well as additional parking supply to Zone 6, Zone 7, and Zone 8. The result of this scenario reduces the overall campus occupancy to 82%.

Spartan Village – Full Buildout

Full buildout of Spartan Village includes Instructional building use type in Zone 6 and Zone 8, as well as additional Student Services and Housing building use types in Zone 7 and Zone 8, respectively. Full buildout also includes additional parking supply in Zone 6 and Zone 7, and the removal of some parking in Zone 8 to make room for additional buildings. The result of this expansion and redevelopment is an overall campus occupancy of 86%.

This occupancy level is adequate; however, it is approaching the limits of an effective parking supply. Once parking occupancy reaches 90%, it becomes increasingly more difficult for students, faculty, staff, and visitors to find available parking and the perception of parking problems increases

Recommendations

Based on the results of the parking demand projections, the UNCG campus as a whole is expected to remain below its actual capacity for each scenario of the planning horizon. In fact, the campus parking system is projected to function within the ideal 85% to 90% occupancy range. Using 2011 Existing Conditions data collected by UNCG, the campus has a surplus of approximately 979 spaces (86% occupancy) with the current parking facility configurations. Based on expansion plans to the south (Spartan Village), the parking surplus is projected to increase to 1,248 spaces (86% occupancy). This value assumes full buildout of the campus expansion south of Lee Street in addition to parking supply modifications to existing park-and-ride facilities and the addition of a park-and-ride facility at 1600 West Lee Street.

In a typical parking analysis, occupancies greater than 85% cause concern as usage in this level indicates users will have difficulties finding the last available spaces and walking distances might become frustrating. Based on the types of users on campus and predominance of student, faculty, and staff parking, the UNCG campus can exceed this 85% threshold, especially if the projected deficiencies are located in student, faculty, and staff parking areas where users have a good understanding of where to find available spaces. Occupancy in visitor parking locations should remain at or below the 85% threshold.

While local zonal deficits occur in each scenario for some zones after sharing surplus from other zones, the campus as a whole is projected to consistently have parking occupancies between 82% and 87%. Given the types of users who come to the UNCG campus, the local zonal deficits on the main campus do not pose much of a concern, as students, faculty, staff, and visitors typically understand they may not be able to park adjacent to their destination. This is especially true in locations where several buildings do not have parking directly adjacent.

Based on projected parking demands, it will be important to continue to utilize park-and-ride services from remote parking facilities to campus. This service allows the parking system to operate at optimal occupancy and reduces the potential for overcrowding of parking on campus. A potential drawback to this type of operation is revenue stream. Pushing parking to remote park-and-ride facilities, where permits are priced lower than on-campus options, reduces the amount of money collected by the University for parking. However, this system provides a more customer-friendly situation on campus to visitors and those who choose to purchase on-campus permits.

A focus on Spartan Village (Zone 6 through Zone 8) results in an existing condition surplus of 14 spaces (81% occupancy). In the *Spartan Village – Full Buildout* scenario, the resulting surplus is 57 spaces (97% occupancy). This occupancy exceeds the ideal 85% threshold and is near the ultimate capacity of the parking supply. Intermediate phases, including *Spartan Village – Phase 1* and *New Recreation Center*, project parking demand to exceed the available parking supply by 42 spaces (107% occupancy) and 112 spaces (114% occupancy), respectively. As a result of high parking demand compared to parking supply in the village, additional parking should be added to the supply in place and operational as part of the *Spartan Village – Phase 1* and *New Recreation Center* scenarios.

- For the occupancy within Zone 6 through Zone 7 to function in the 85% range for Spartan *Village – Phase 1* scenario, approximately 150 additional spaces would need to be provided beyond what is in the current Master Plan.
- For the occupancy within Zone 6 through Zone 7 to function in the 85% range for the *New Recreation Center* scenario, an additional 125 spaces (in addition to the 150 spaces recommended for Spartan *Village – Phase 1* scenario) would need to be provided beyond what is in the current Master Plan.
- With 275 additional parking spaces to the Zone 6 through Zone 8 supply, the *Full Buildout* scenario in these zones results in a surplus of 332 spaces (84% occupancy).

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