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The University of North Carolina at Greensboro (UNCG) is experiencing significant growth. The campus is part of a dynamic metropolitan area and contributes to the region’s development and success. But a shortage of developable land will constrain future campus growth and require new thinking about how people get to and around campus. This Campus Transportation Plan provides a transportation strategy to address the University’s current and future transportation needs. The Campus Transportation Plan recognizes the need for sustainable solutions to the University’s transportation challenges. The goal of this plan is to provide a menu of commuting alternatives that are attractive to people who normally drive alone to campus. The Plan encourages greater use of alternative transportation modes to reduce future parking needs, and creates a more pedestrian- and bike-friendly campus. Although the campus is not anticipated to experience parking shortfalls in the near-term, over time parking availability will decrease as demand increases and parking lots are developed for academic uses (currently there is a slight shortfall, which will be addressed by the return of temporarily lost spaces and a deck under housing that is under construction). This Plan addresses future parking shortages and makes recommendations for parking improvements based on the development plan outlined in the Campus Master Plan Update (2001).

The Campus Transportation Plan is organized around transportation modes. The Plan is divided into separate sections for transit, bicycles, pedestrians, travel demand management, and parking. Even though these modes and strategies are discussed separately, together they comprise a complete transportation system. The key is to plan now, before future parking shortages dictate growth policy. Planning now also allows travel demand management programs to develop and mature in the campus community, heading off a parking crisis in the future.

The Campus Transportation Plan also provides an implementation strategy. Specific actions and timeframes are recommended for each transportation mode and program. These actions are timed to meet projected campus demands based on buildout of the Campus Master Plan Update.

1.2 Other Studies and Plans

A number of relevant studies were consulted for this report. These studies include the Campus Master Plan Update (2001), The University of North Carolina at Greensboro Traffic Study (2002), The University of North Carolina at Greensboro Parking Master Plan (1999), the Greensboro Area Bicycle, Pedestrian, and Greenways Plan, and the Greensboro Area 2030 Long Range Transportation Plan.

1.2.1 Campus Master Plan Update

The Campus Master Plan Update (2001) (referred to hereafter as the Master Plan) is the guiding document for growth on the campus. The Master Plan...
provided a starting point for the Campus Transportation Plan. Underlying the Master Plan were goals to accommodate 15,000 students by 2008 and 18,600 students by 2020. The spring 2005 student enrollment at the University was approximately 15,500 students and is expected to eclipse 18,600 by the 2008-2009 academic year.

A number of deviations have been made from the Master Plan since the last update. To avoid unforeseen space shortages the demolition of the McIver Building has been delayed until after 2008. The building is now scheduled for demolition sometime after 2008. It is still planned that a new building of similar size will be constructed on the same location. Additionally, the Lee Street Parking Deck is no longer considered feasible after a study conducted by the University found that site restrictions prohibit the construction of a parking deck on that site.

1.2.2 The University of North Carolina at Greensboro Traffic Study (2002)
This report focuses on local streets and internal campus pedestrian connections. It also provides parking space vacancy counts conducted in 2000. The finding that 10% of spaces were vacant at peak times was factored into conclusions in the Campus Transportation Plan related to effective capacity and peak demand.

1.2.3 The University of North Carolina at Greensboro Parking Master Plan (1999)
Conducted in 1999, this study provides a number of parking options that were incorporated into the Master Plan. While this study examines park-and-ride lots (referred to as shuttle lots in the study) and a campus shuttle loop, it does not examine the potential to reduce parking demand through a comprehensive package of alternative transportation modes. For this reason, the Campus Transportation Plan is intended to supercede this study.

1.2.4 Greensboro Area Bicycle, Pedestrian, and Greenways Plan
The City of Greensboro is currently (Fall 2005) creating a new bikeways, sidewalk, and greenways master plan. As part of this study, the existing recreational bike routes are being replaced with new origin and destination based bike routes. Additionally, the need for new pedestrian facilities, including sidewalks and paths, is being evaluated. It is the goal of this study to identify and develop a system of paths, bike lanes, and safe streets that cyclists and pedestrians can use to commute between various points in Greensboro. This study forms the background for the bicycle and pedestrian recommendations of the Campus Transportation Plan. The University is working with the City to ensure that the two plans complement each other.

1.2.5 2030 Long Range Transportation Plan
The Greensboro Area 2030 Long Range Transportation Plan is the primary long-term planning document for transportation projects in the City of Greensboro. The Plan was updated in 2004 and will be updated again in 2007. The Thoroughfare Plan and Collector Street Plan segments of the 2030 Long Range Transportation Plan identify regionally significant roads, as well as define what role those roads are expected to have in the future.

1.3 Stakeholder Involvement
The Campus Transportation Plan was guided by a steering committee comprising staff members from various campus departments. The consultant met with the steering committee monthly. Broad stakeholder involvement also was a critical part of the study, and consisted of a series of meetings and presentations,
including meetings with:

- Faculty Senate
- Staff Council
- Student Government Association
- Parking Committee
- Commuter Student Deli
- Other interest groups (e.g., bicycle riders, trails users)

In addition, a travel survey was undertaken which allowed respondents to provide input on transportation issues.

### 1.4 Definitions

**Alternative Modes** – Modes of commuting to campus other than driving alone. Modes examined in this report include transit, cycling, walking, park-and-ride, and ridesharing.

**Collector** – A street of local significance that typically connects residential/local streets to thoroughfares or other collectors. For Greensboro, these streets are defined in the Collector Street Plan in the 2030 Long Range Transportation Plan.

**Effective Capacity** – The point at which a parking lot functions as if no spaces were available. For this study, the effective capacity is assumed to be 95% of the supply. See section 2.3.1 for a more in depth analysis of effective capacity at UNCG.

**Excess Capacity** – The number of spaces by which effective capacity is greater than parking demand. Excess capacity often leads to an increased number of people driving and parking on campus and a reduced use of alternative modes.

**Oversell Ratio** – The ratio of the number of parking permits sold to the number of parking spaces. For this study the oversell ratio is 1.30. See section 2.3.2 for a more in depth analysis of the oversell ratio at UNCG.

**Parking Deficit** – The number of spaces by which parking demand is greater than effective supply.

**Parking Demand** – The number of parking spaces necessary to meet the desires of all people who drive. For this study the parking demand is tied to population, such that for every additional person added to the University population, parking demand increases 0.34 spaces.

**Parking Demand Reduction** – The amount of the population that can be converted from driving and parking on campus to the use of alternative modes. Typically measured in the number of spaces parking demand can be reduced.

**Parking Supply** – Total number of parking spaces available for people who drive to the campus.

**Ridesharing** – the practice of multiple people commuting in the same vehicle. In the Triad ridesharing is in the form of carpooling or vanpooling.
Thoroughfare – Identified in local planning documents called “Thoroughfare Plans”, a thoroughfare is a road of regional significance that typically connects one part of a city with another or connects two cities. For planning purposes, cities in North Carolina separate thoroughfares into two classes: major and minor.

Travel Demand Management – Utilizing tools and techniques to maximize the usefulness of the existing parking supply. Techniques include park-and-ride, ridesharing, and complimentary measures that further incentivize alternative modes.
Section 2 - Existing Conditions

2.1 Campus Setting

The University of North Carolina at Greensboro campus is located in the heart of the City of Greensboro. With an enrollment of just over 15,500 students in spring 2005, the campus is experiencing significant growth. This growth is generally occurring within the current boundaries of the campus. The surrounding areas are mature, fully developed residential neighborhoods on three sides of the campus, with commercial/industrial development south of campus.

The campus is located west of the downtown area, separated by the College Hill neighborhood. The downtown has been enjoying a successful rebirth through numerous redevelopment projects. This success has also had positive impacts on the neighborhoods surrounding the downtown, especially the College Hill Neighborhood. As this neighborhood is becoming more attractive to homeowners, rental properties housing students in the area are being lost, decreasing the supply of off-campus student housing close to campus. This loss of close-in student housing is impacting student travel patterns. These new student travel patterns are one of the focus areas of this report.

2.2 Access to Campus

The campus is located within a grid street system, shown in Figure 2.1. Spring Garden Street, a predominantly two-lane east-west connection between downtown and western Greensboro, serves as the primary access to campus. While not defined as a thoroughfare in the 2030 Long Range Transportation Plan, it connects downtown Greensboro with western Greensboro and Wendover Avenue. While the boulevarding of Spring Garden Street in 1999 helped to curtail speeds and reduce the use of the street as a regional connection, a number of non-University people continue to utilize it.

In addition to Spring Garden Street, Lee Street to the south, and Market Street and Friendly Avenue to north, are east-west connections between downtown and western Greensboro. These streets are campus edge streets, providing only peripheral access to campus. They are defined as major thoroughfares in the 2030 Long Range Transportation Plan and are seen as preferred connections between downtown and western Greensboro from a regional standpoint.

Aycock Street, to the west of Campus, and Tate Street and McIver Street, to the east of campus, also function as campus edge streets. Aycock Street, providing access between southeast and northeast Greensboro, is identified as a major thoroughfare, while Tate Street and McIver Street are identified as collector streets.
2.3 Existing Parking Conditions

2.3.1 Parking Supply

According to a survey of commuting employees and students (detailed in Section 4), approximately 80% of people now drive alone to campus. The University allows anyone to buy a permit to park in University parking facilities. There are no blanket restrictions that prevent anyone, such as freshmen, on-campus students, or people who live near campus, from purchasing a parking permit. While some permits are restricted to faculty and staff and faculty/staff are not required to wait list for parking decks, in most cases students have the same ability to purchase parking permits as employees of the University.

As of May 2005, there were 6,580 parking spaces owned and operated by UNCG in the following locations:

- 3,081 spaces in on-campus surface parking lots
- 2,421 spaces in on-campus parking structures
- 710 spaces in an off-campus park-and-ride lot
- 368 spaces at the Northridge Property located on Spring Garden Street

The spaces at the Northridge Property, however, are utilized for site use and storage, and are not available to the campus population. This leaves 6,212 parking spaces for general use. In 2005, the total campus population was 18,025 people (15,500 students and 2,520 faculty/staff). This yields a current ratio of parking spaces to people of 0.34.

It is not directly possible to calculate this ratio or parking spaces per person for each of the groups on campus; faculty and staff, resident students, and commuter students. This is because persons from different groups park in the same lot. The overall ratio of 0.34 spaces per person does match the overall ratio developed by Walker Parking Associates in The University of North Carolina at Greensboro Parking Master Plan.
The following ratios for each group were assumed in that report:

- Faculty/Staff – 0.52
- Commuter Students – 0.25
- Resident Students – 0.41

The ratio by group has not be used in this report, however it is likely that the ratios still remain correct.

The ratio of 0.34 is roughly equivalent to many of the University's peers, including UNC-Chapel Hill (0.36), North Carolina State University (0.42), and Old Dominion University (0.28). It is a higher ratio than Appalachian State University (0.22) and the College of Charleston (0.24), and a lower ratio than Davidson College (0.86).

At peak times, a small number of spaces in all lots remain unused. This may be due to space turnover, searching for a space, or lots appearing full. The capacity at which a lot functions as full is known as the “effective capacity.” Based on occupancy counts, field observations, as well as the 2002 University of North Carolina at Greensboro Traffic Study, the effective capacity of lots on the campus of UNCG is estimated to be 95% of the total capacity. This yields an effective capacity for UNCG of roughly 5,900 parking spaces (95% of 6,212 spaces).

2.3.2 Permit Sales

In the 2004-2005 academic year, a total of 8,740 parking permits were sold. For that year the ratio of permits to spaces was 1.40. Table 2.1 details the oversell ratio by permit type. This ratio, however, was higher than typical years because a number of spaces were removed from the campus parking inventory on a temporary basis for construction. In typical years, the ratio of permits to parking spaces is closer to 1.30 (i.e., 8,500 permits for 6,212 spaces in the 2003-2004 academic year). This ratio (1.30) is used for this study.

Table 2.1 – Oversell Ratio by Permit Type

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Permits Sold</th>
<th>Spaces</th>
<th>Oversell Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>A,B,C,HC</td>
<td>4,850</td>
<td>2,937</td>
<td>1.65</td>
</tr>
<tr>
<td>D</td>
<td>2,300</td>
<td>2,346</td>
<td>0.98</td>
</tr>
<tr>
<td>R</td>
<td>90</td>
<td>82</td>
<td>1.10</td>
</tr>
<tr>
<td>E,M</td>
<td>1,500</td>
<td>710</td>
<td>2.11</td>
</tr>
<tr>
<td>Total</td>
<td>8,740</td>
<td>6,075</td>
<td>1.40</td>
</tr>
</tbody>
</table>

2.3.3 Parking Demand

At peak periods it is estimated that parking demand meets or slightly exceeds parking supply. This is based on observations of campus parking lots, the 2002 University of North Carolina at Greensboro Traffic Study, and the results from the travel survey. This demand includes the demand for the park-and-ride lot on the corner of Lee Street and Chapman Street. This lot, while off-campus, is considered by most to be equally attractive as on-campus parking options. Given that supply roughly equals demand at peak times, the ratio of people to parking spaces (0.34) can be used to estimate peak demands as well.
2.3.4 Parking Operations

UNCG currently employs a number of different permit options. Costs and information for the seven most typical are listed below in Table 2.2. Surface lot permits, regardless of group, are priced at $235 for the current year. As the predominance of surface lots are designated as a combination of the A, B, and/or C permit types all people with one of these three permits are competing for the same pool of spaces. Additionally, persons with a “D” permit compete against one another to be assigned to one of the three decks. As such, the on-campus permit system is a de facto two permit system, with one group of permits for surface lots and one group for parking decks.

Table 2.2 – Parking Permits for UNCG

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Cost per Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$235</td>
<td>For Faculty and Staff, valid in designated “A” surface lots</td>
</tr>
<tr>
<td>B</td>
<td>$235</td>
<td>For Resident Students, valid in designated “B” surface lots</td>
</tr>
<tr>
<td>C</td>
<td>$235</td>
<td>For Commuter Students, valid in designated “C” surface lots</td>
</tr>
<tr>
<td>D</td>
<td>$370</td>
<td>For any person, valid in one parking deck only</td>
</tr>
<tr>
<td>E</td>
<td>$115</td>
<td>For Commuter/Evening Students, valid in designated “C” surface lots after 1:00 p.m. or in the Par-and-Ride lot all day</td>
</tr>
<tr>
<td>M</td>
<td>$115</td>
<td>For any person, valid in “M” spaces only</td>
</tr>
</tbody>
</table>

2.4 Use of Other Commuting Modes

According to the travel survey, less than 20% of the campus population uses a mode other than driving alone to commute to campus. 7% indicated they used some form of ridesharing to commute to campus. Bicycling (6%) and walking (2%) were the most popular non-motorized forms of commuting to campus. The lack of infrastructure, such as additional transit routes and bicycling facilities, and the ease of obtaining on-campus parking permits are seen as the largest impediments to increasing the use of alternative modes.
Section 3 - Future Parking Needs

To date, there has been adequate parking for the typical needs of the campus, but demand is anticipated to outstrip availability in the near future. One transportation option available to the University as it grows is to attempt to continue adding parking at the same ratio as currently provided. The impacts of adding parking at current ratios is examined in this section, providing a baseline for comparing alternatives.

3.1 Transportation Challenges

University growth will result in an increased campus population, and potentially an associated need for more parking, while displacing existing surface parking for new buildings and other projects. The University is bordered by established residential neighborhoods on three sides and commercial/industrial uses on the south side. In the future, it will become increasingly difficult for the University to expand, especially near the College Hill Neighborhood.

As the University population increases, maintaining the current ratio of 0.34 parking spaces per person would require the construction of costly parking structures and the loss of a large amount of land that may otherwise be used for core academic purposes. Typically, a space in a parking deck can cost as much as $15,000, compared to $3,000 or less for a space in a paved surface lot. The annualized cost of a parking deck space (debt service and ongoing operating and maintenance) is approximately $1,500 per year.

3.2 Master Plan Development

The Campus Master Plan anticipated 15,000 students by 2008 (end of Phase I) and 18,600 students by 2020 (end of Phase II), and identified new building space to accommodate this growth. Through a combination of renovation, building construction and demolition, the University was anticipated to increase the assignable square feet (ASF) of floor space by 86,500 square feet prior to 2008. When the new Humanities Building and the new Studio Arts Center open in the fall of 2006 only the demolition of the McIver building will be left to complete the list of projects from Phase I of the Master Plan. An additional increase of 475,000 ASF of floor space between 2008 and 2020 was to be achieved solely through building construction (representing buildout of the campus).

To avoid space shortages not foreseen at the time the Master Plan was prepared, the demolition of the McIver Building has been rescheduled for after 2008. It is expected that McIver will be replaced by a building of similar size sometime before 2020. This will have no effect on the total amount of ASF added to the campus, but changes the totals of the two phases.

The Master Plan also identified a number of sites for new parking decks. While it is feasible to construct decks on most of these sites, it has been determined by the University that a deck cannot be constructed in a cost-effective manner on the site of the proposed Lee Street Deck due to zoning constraints and the expanding right-of-way needs of the rail corridor. For the purposes of this study,
it is assumed that no deck will be constructed on Lee Street.

While the land use scenarios are still valid, actual student growth has exceeded the Master Plan projections. The Master Plan no longer provides a realistic basis for projecting future parking shortfalls and needs, or the need for transportation alternatives to reduce parking demand. Updated student projections are discussed below.

### 3.3 Projected Parking Demand and Planned Supply

#### 3.3.1 Potential Future Parking Demand

As noted in Section 2.3.4, the current ratio of people to parking spaces can be applied to future campus population growth projections to estimate future parking demand, assuming current parking policies are maintained. To estimate the total campus population it was assumed that the faculty and staff growth rate would mirror the student growth rate (e.g. both grow at the same rate). The growth in student enrollment could then serve as proxy for total campus population growth and parking demand.

The University of North Carolina system maintains growth projections for each of the 16 member institutions for the next ten academic years. These projections were utilized for UNCG student growth through the 2015-2016 academic year. These projections are detailed in table 3.1.

The projected number of college-age people (between 17 and 25 years of age) in North Carolina after 2015-2016, obtained from the North Carolina State Demographics, was used to estimate student population growth. It was determined that this age group would grow at just under 1% per year from 2015 to 2025. Given that the percentage of students who attend college is expected to increase, the campus population can reasonably be expected to grow at a slightly faster rate than that of college-age people in North Carolina.

Two forecasts were made of student growth from 2016 to 2025. The first, a low growth rate scenario, utilized a 1.0% growth rate after 2015-2016, and results in approximately 21,000 students enrolled in 2025. The second, a high growth rate scenario, utilized a 1.5% growth rate after 2015-2016, and results in approximately 22,500 students enrolled in 2025. Tables 3.2 and 3.3 below detail the growth associated with these two scenarios, and the resulting parking demand, assuming current ratios. Figure 3.1 graphs the demand associated with both growth scenarios.

These student projections exceed the 2020 projections used for the Master Plan. Guiding the Master Plan was the goal to provide 95 assignable square feet (ASF) of building space for every student on campus. Given that student growth has occurred, and will continue to occur, at a rate higher than that predicted in the Master Plan, this goal will not be achieved. ASF per student can be used to validate the estimates of student and campus population growth. Table 3.4 below provides the ratio of ASF per student for a number of horizon years. There will be greater ASF per student in 2020 than 2008. Conditions in 2025, depending on the rate of growth after 2015, may be similar or slightly worse than conditions in 2008. In all cases the ASF per student is above 78. It is feasible that the University will be able to accommodate the population that is projected in this report.
Table 3.1 – Campus Population and Parking Demand Growth (2005 – 2015)

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</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>15,329</td>
<td>15,661</td>
<td>16,083</td>
<td>16,587</td>
<td>17,074</td>
<td>17,558</td>
<td>17,880</td>
<td>18,267</td>
<td>18,546</td>
<td>18,960</td>
<td>19,626</td>
</tr>
<tr>
<td>Faculty/Staff</td>
<td>2,525</td>
<td>2,580</td>
<td>2,649</td>
<td>2,700</td>
<td>2,779</td>
<td>2,858</td>
<td>2,910</td>
<td>2,973</td>
<td>3,019</td>
<td>3,086</td>
<td>3,195</td>
</tr>
<tr>
<td>Total Population</td>
<td>17,854</td>
<td>18,241</td>
<td>18,732</td>
<td>19,287</td>
<td>19,853</td>
<td>20,416</td>
<td>20,790</td>
<td>21,240</td>
<td>21,565</td>
<td>22,046</td>
<td>22,821</td>
</tr>
<tr>
<td>Parking Demand</td>
<td>6,042</td>
<td>6,173</td>
<td>6,339</td>
<td>6,527</td>
<td>6,719</td>
<td>6,909</td>
<td>7,036</td>
<td>7,188</td>
<td>7,298</td>
<td>7,461</td>
<td>7,723</td>
</tr>
</tbody>
</table>

Table 3.2 – Low Growth Rate Population and Parking Demand Growth (2016 – 2025)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>19,822</td>
<td>20,020</td>
<td>20,220</td>
<td>20,422</td>
<td>20,626</td>
<td>20,832</td>
<td>21,040</td>
<td>21,250</td>
<td>21,463</td>
<td>21,678</td>
</tr>
<tr>
<td>Faculty/Staff</td>
<td>3,227</td>
<td>3,259</td>
<td>3,292</td>
<td>3,325</td>
<td>3,358</td>
<td>3,392</td>
<td>3,426</td>
<td>3,460</td>
<td>3,495</td>
<td>3,530</td>
</tr>
<tr>
<td>Total Population</td>
<td>23,049</td>
<td>23,279</td>
<td>23,512</td>
<td>23,747</td>
<td>23,984</td>
<td>24,224</td>
<td>24,466</td>
<td>24,710</td>
<td>24,958</td>
<td>25,208</td>
</tr>
<tr>
<td>Parking Demand</td>
<td>7,800</td>
<td>7,878</td>
<td>7,957</td>
<td>8,036</td>
<td>8,117</td>
<td>8,198</td>
<td>8,280</td>
<td>8,362</td>
<td>8,446</td>
<td>8,531</td>
</tr>
</tbody>
</table>

Table 3.3 – High Growth Rate Population and Parking Demand Growth (2016 – 2025)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>19,920</td>
<td>20,219</td>
<td>20,522</td>
<td>20,830</td>
<td>21,142</td>
<td>21,459</td>
<td>21,781</td>
<td>22,108</td>
<td>22,440</td>
<td>22,777</td>
</tr>
<tr>
<td>Faculty/Staff</td>
<td>3,243</td>
<td>3,292</td>
<td>3,341</td>
<td>3,391</td>
<td>3,442</td>
<td>3,494</td>
<td>3,546</td>
<td>3,599</td>
<td>3,653</td>
<td>3,708</td>
</tr>
<tr>
<td>Total Population</td>
<td>23,163</td>
<td>23,511</td>
<td>23,863</td>
<td>24,221</td>
<td>24,584</td>
<td>24,953</td>
<td>25,327</td>
<td>25,707</td>
<td>26,093</td>
<td>26,485</td>
</tr>
<tr>
<td>Parking Demand</td>
<td>7,839</td>
<td>7,957</td>
<td>8,076</td>
<td>8,197</td>
<td>8,320</td>
<td>8,445</td>
<td>8,571</td>
<td>8,700</td>
<td>8,830</td>
<td>8,963</td>
</tr>
</tbody>
</table>

Figure 3.1 – Parking Demand by Year
### Table 3.4 – Student Growth and Assignable Square Feet (ASF)

<table>
<thead>
<tr>
<th>ASF per Student</th>
<th>ASF per Student in 2008</th>
<th>82</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASF per Student in 2020 (Low Growth)</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>ASF per Student in 2020 (High Growth)</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>ASF per Student in 2025 (Low Growth)</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>ASF per Student in 2025 (High Growth)</td>
<td>78</td>
</tr>
</tbody>
</table>

### 3.3.2 Future Parking Supply

The Master Plan showed the following additions to the parking supply:

- Parking Deck below Housing 2: 200 spaces (currently under construction)
- Oakland Avenue Deck Expansion: 500 spaces (constructed by Fall 2008)
- Tate Street Parking Deck: 1,000 spaces
- Parking Deck below Housing 3: 150 spaces (assumption based on number of beds)

The Master Plan also showed a parking deck on Lee Street, however subsequent studies have determined that the dimensions of the planned site are insufficient for a deck.

Therefore, in total, 700 parking spaces will be added prior to 2008 (the completion of phase 1 of the Master Plan), and an additional 1,150 spaces are called for between 2008 and 2020 (phase 2 of the Master Plan).

1,150 spaces will be removed from the parking supply inventory for construction of new buildings and parking decks. 400 of these lost spaces will be associated with the construction of the Tate Street Deck. The remainder will be lost as surface parking lots are redeveloped with academic buildings. Given the current ten-year Priority Needs List for the University, it is likely that these remaining spaces will be lost after 2015.

This will yield a parking supply of 7,400 spaces in 2008 with an effective supply of 7,040 spaces. While the supply will fluctuate year to year, the 2020 supply will be very similar to the 2008 supply with a total of 7,400 parking spaces with an effective capacity of approximately 7,040 spaces.

### 3.3.3 Future Parking Demand Versus Planned Supply

Table 3.5 details the projected parking demand, assuming current parking policies (i.e., no increase in use of alternative modes), in relation to the projected parking supply for the low and high growth rate scenarios. As shown in the table, it is expected parking demand will exceed available supply sometime between 2008 and 2020. By 2025 it is expected there will be a parking supply shortfall of between 790 and 1,220 spaces.
Table 3.5 – Future Parking Supply and Projected Demand

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Supply</th>
<th>Effective Supply</th>
<th>Low Growth Rate Demand</th>
<th>Low Growth Rate Surplus/ (Deficit)</th>
<th>High Growth Rate Demand</th>
<th>High Growth Rate Surplus/ (Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>7,400</td>
<td>7,040</td>
<td>6,538</td>
<td>502</td>
<td>6,538</td>
<td>502</td>
</tr>
<tr>
<td>2020</td>
<td>7,400</td>
<td>7,040</td>
<td>8,117</td>
<td>(1,077)</td>
<td>8,320</td>
<td>(1,280)</td>
</tr>
<tr>
<td>2025</td>
<td>7,400</td>
<td>7,040</td>
<td>8,531</td>
<td>(1,491)</td>
<td>8,963</td>
<td>(1,923)</td>
</tr>
</tbody>
</table>
Section 4 - Potential to Reduce Parking Demand

As shown in Section 3, continued growth of the campus population will have a dramatic effect on the demand for on-campus parking. Demand could grow to over 9,000 spaces by 2025, exceeding the planned supply by over 1,000 spaces. Many universities have discovered, however, that it is possible to reduce demand through the use of alternative transportation modes. The potential to reduce parking demand for UNCG was assessed by analyzing the home addresses of the campus population in conjunction with responses to a travel survey.

4.1 Address Geocode

For this study, home addresses of the campus population were mapped electronically, or "geocoded". Of the 16,602 address provided, some were not geocoded for the following reasons:

- 660 are outside of North Carolina
- 365 are PO boxes
- 3,692 are on campus

Of the remaining 11,885 addresses, 11,134 (94%) were geocoded. The geocoded addresses in Greensboro are shown below in Figure 4.1

Figure 4.1 – Addresses of the UNCG Campus Population in Greensboro

4.2 Travel Survey

With the assistance of the University's Office of Institutional Research, a sample of the campus community (employees and students) was surveyed about current travel patterns and desires for alternative modes of transportation. The survey contained a total of 25 questions. The final question allowed respondents to provide general comments on transportation at the University. The goal of the survey was to gauge the
level at which people at UNCG would use transit, ridesharing, cycling, new park and ride lots, and remote vehicle storage. Transit was specifically targeted to provide operational recommendation for the Higher Education Area Transit (HEAT) system. The remaining modes were chosen by the consultants because they were believed to be the most attractive options for people at UNCG.

A total of 2,082 responses were collected; 1,972 were collected utilizing a web-based form of the survey and 110 were collected at the Commuter Student Deli using paper based surveys. The survey provided a wealth of information about current travel patterns and desires for commuting alternatives. Key findings include:

- 80% of people who drive to campus currently drive alone to campus.
- An additional 7% carpool to campus.
- Bicycling (6%) and walking (2%) are the highest non-motorized modes.
- Less than 1% use transit.
- Less than 10% of respondents park off-campus.
- More than 60% of respondents have trouble finding a space when they returned to campus.
- Needing a car during the day was the main reason people don’t use other modes in most case.
- More than half of those who bicycle to campus have trouble finding bicycle parking.

A more complete summary of the data gathered in the travel survey, as well as a copy of the survey, are included as Appendix 1. In addition, specific data and responses for the individual modes are discussed in subsequent sections.

Additionally, the addresses of the survey respondents were collected and geocoded in the same way that home addresses were geocoded in Figure 4.1. The results are shown in Figure 4.2.

**Figure 4.2 – Geocoded Survey Responses**

4.3 Parking Demand Reduction

Estimating parking demand reduction requires estimating the number of people who could switch from driving alone to using alternative modes to get to campus. Accommodating resident student parking off-
campus can also be a strategy for reducing on-campus parking demand. Key alternative commuting modes include transit, park-and-ride, and ridesharing.

4.3.1 Potential to Reduce Parking Demand
For this study, the following steps were taken to estimate the potential to reduce parking demand at UNCG:

- Combined geocoded addresses of people who live off campus and geocoded addresses of survey respondents.
- Separated combined addresses into geographic markets, shown in Figure 4.3.
- Analyzed survey responses for each market to determine mode split, as well as features that would attract people who drive to use alternative modes.
- Used mode split data to determine the number of people who drive alone, shown in Table 4.1.
- Used attitudinal survey data to make assumptions about what portion of people who drive alone could be attracted to use individual alternative modes.
- Calculated the number of people that drive alone that could be attracted to use individual alternative modes.
- Totaled individual alternative mode use for each market to determine the total potential market for switching to alternative modes, shown in Table 4.2.

For example, of the 303 people in the Kernersville market who drive alone, 19 were projected to use ridesharing, 6 to use a Four Seasons Mall park-and-ride, and 14 to use a Wendover Avenue park-and-ride. Table 4.2 is the summation of these projections from all markets.

Certain alternatives are only attractive to people in certain markets. The markets attracted to the various modes are:

- Off-Campus Storage Lot (on-campus students)
- Higher Education Area Transit, or HEAT (people within two miles of campus)
- Greensboro Transit (people within the City of Greensboro)
- Carpooling/Vanpooling (All Markets)
- Park-and-ride (all markets)

At UNCG, one less person driving does not exactly correspond to one additional open parking space. The effective capacity (95%) and the oversell ratio (1.30, Section 2.3.2) affect this relationship such that for every 100 people who choose to no longer drive to campus, the parking demand is reduced by 81 spaces (1 permit equals 0.81 spaces).
**Figure 4.3 – Markets for Alternative Transportation Modes**

**Table 4.1 – People Who Drive Alone per Market**

<table>
<thead>
<tr>
<th>Sub-Area</th>
<th>Total Population</th>
<th>Students</th>
<th>Faculty/Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Than 2 Miles from Campus</td>
<td>1,678</td>
<td>1,186</td>
<td>492</td>
</tr>
<tr>
<td>Between 5 and 2 miles from Campus</td>
<td>1,850</td>
<td>1,253</td>
<td>596</td>
</tr>
<tr>
<td>NW Guilford</td>
<td>532</td>
<td>383</td>
<td>149</td>
</tr>
<tr>
<td>Burlington/Graham</td>
<td>381</td>
<td>333</td>
<td>48</td>
</tr>
<tr>
<td>North and East Greensboro/Guilford</td>
<td>359</td>
<td>242</td>
<td>116</td>
</tr>
<tr>
<td>West Greensboro/Guilford County</td>
<td>953</td>
<td>762</td>
<td>190</td>
</tr>
<tr>
<td>South and East Guilford</td>
<td>417</td>
<td>306</td>
<td>111</td>
</tr>
<tr>
<td>Reidsville/NE Guilford</td>
<td>160</td>
<td>115</td>
<td>45</td>
</tr>
<tr>
<td>High Point</td>
<td>833</td>
<td>687</td>
<td>146</td>
</tr>
<tr>
<td>Kernersville</td>
<td>303</td>
<td>250</td>
<td>53</td>
</tr>
<tr>
<td>Winston/King/Forsyth County</td>
<td>770</td>
<td>699</td>
<td>71</td>
</tr>
<tr>
<td>Randolph County</td>
<td>286</td>
<td>241</td>
<td>45</td>
</tr>
<tr>
<td>Research Triangle Park</td>
<td>853</td>
<td>769</td>
<td>80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,375</strong></td>
<td><strong>7,226</strong></td>
<td><strong>2,142</strong></td>
</tr>
</tbody>
</table>
Table 4.2 – Potential Market for Switching to Alternative Modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Parking Permit Reduction</th>
<th>Parking Space Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking Improvements</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cycling Improvements</td>
<td>104</td>
<td>84</td>
</tr>
<tr>
<td>HEAT Transit Service</td>
<td>450</td>
<td>364</td>
</tr>
<tr>
<td>GTA Transit Service</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>PART Transit Service</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Remote Storage Lot</td>
<td>400</td>
<td>380</td>
</tr>
<tr>
<td>Ridesharing</td>
<td>395</td>
<td>320</td>
</tr>
<tr>
<td>Four Seasons Mall Park-and-Ride</td>
<td>217</td>
<td>176</td>
</tr>
<tr>
<td>Friendly Shopping Center Park-and-Ride</td>
<td>207</td>
<td>168</td>
</tr>
<tr>
<td>Wal-Mart Parking Lot on Battleground Avenue Park-and-Ride</td>
<td>42</td>
<td>34</td>
</tr>
<tr>
<td>Old Carolina Circle Mall Location Park-and-Ride</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Wendover Avenue near Interstate 40 Park-and-Ride</td>
<td>138</td>
<td>112</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,012</strong></td>
<td><strong>1,685</strong></td>
</tr>
</tbody>
</table>

4.3.2 Probable Reduction in Parking Demand

As shown in Table 4.2, a number of options, especially the park-and-ride lots furthest from campus, are not expected to attract a large amount of drivers. The following park-and-ride lots are not sufficiently cost efficient to implement:

- Park-and-Ride lot at Wal-Mart on Battleground
- Park-and-Ride lot at Wal-Mart on Wendover
- Park-and-Ride lot at Pyramids Athletic Center on Cone Boulevard (former Carolina Circle Mall Location)

Attracting everyone in the market to switch to an alternative mode would require the University to enact heavy restrictions that, given the lack of alternative commuting options in the City of Greensboro and Piedmont region as a whole, are untenable. Attractions to some modes were reduced to take into account these factors. Table 4.3 details the probable reduction in parking permit sales by mode and by type of permit. Table 4.4 details the parking demand reduction by mode. Given these reductions, it is expected that the current parking demand can be reduced by approximately 1,120 parking spaces. The annual costs for building, operating and maintaining the structured parking that would have been required to accommodate this demand is $1.68 million (assuming $1,500 annual costs for 1,120 parking spaces). For a more complete cost/benefit analysis see section 10.3.
If the use of alternative modes grows at the same rate as student population growth, the parking demand in 2020 could be reduced by between 1,500 and 1,535 spaces. This reduction could grow to between 1,575 and 1,650 spaces by 2025.

Table 4.3 – Probable Reduction in Parking Permit Sales by Mode and Permit Type

<table>
<thead>
<tr>
<th>Mode</th>
<th>A Permit Holders</th>
<th>B Permit Holders</th>
<th>C Permit Holders</th>
<th>Total Parking Permit Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking Improvements</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cycling Improvements</td>
<td>5</td>
<td>0</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>HEAT Transit Service</td>
<td>0</td>
<td>0</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>GTA Transit Service</td>
<td>5</td>
<td>5</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>PART Transit Service</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Remote Storage Lot</td>
<td>0</td>
<td>370</td>
<td>0</td>
<td>370</td>
</tr>
<tr>
<td>Ridesharing</td>
<td>140</td>
<td>0</td>
<td>60</td>
<td>200</td>
</tr>
<tr>
<td>Four Seasons Mall park-and-ride</td>
<td>180</td>
<td>0</td>
<td>70</td>
<td>250</td>
</tr>
<tr>
<td>Friendly Shopping Center park-and-ride</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wal-Mart Parking Lot on Battleground Avenue park-and-ride</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Old Carolina Circle Mall Location park-and-ride</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wendover Avenue near Interstate 40 park-and-ride</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other park-and-ride</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>330</strong></td>
<td><strong>375</strong></td>
<td><strong>615</strong></td>
<td><strong>1,320</strong></td>
</tr>
</tbody>
</table>
## Table 4.4 – Probable Reduction in Parking Demand

<table>
<thead>
<tr>
<th>Mode</th>
<th>Parking Permit Reduction</th>
<th>Parking Space Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking Improvements</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cycling Improvements</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>HEAT Transit Service</td>
<td>400</td>
<td>324</td>
</tr>
<tr>
<td>GTA Transit Service</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>PART Transit Service</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Remote Storage Lot</td>
<td>370</td>
<td>352</td>
</tr>
<tr>
<td>Ridesharing</td>
<td>200</td>
<td>162</td>
</tr>
<tr>
<td>Four Seasons Mall</td>
<td>250</td>
<td>202</td>
</tr>
<tr>
<td>Friendly Shopping Center</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wal-Mart Parking Lot</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Battleground Avenue</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Old Carolina Circle Mall</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Location</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wendover Avenue</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interstate 40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other park-and-ride</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,320</strong></td>
<td><strong>1,120</strong></td>
</tr>
</tbody>
</table>
Section 5 - Transit Plan

Bus transit is the most utilized alternative mode for commuting to campuses in the United States. Given the relative proximity of most students to campus, buses can quickly traverse the distance and deliver students to core areas of campus. Some universities operate their own transit service, while others cooperate with a local transit agency for service. UNCG currently operates shuttle service to the park-and-ride lot on Lee Street and evening shuttle service to points on campus.

5.1 Existing Transit

The Greensboro Transit Authority (GTA) operates 14 transit routes in the City of Greensboro. All routes are on a one-hour headway and leave the downtown transit hub on the hour. Only one route directly serves the University, and a second route provides some service along the northern periphery of campus.

In addition to GTA’s service, the Piedmont Authority for Regional Transportation (PART) operates three regional bus routes that connect the cities of Greensboro, Winston-Salem, and High Point. Similar to GTA, these routes operate on a one-hour headway. No direct service is provided to UNCG via PART.

5.2 Proposed Transit

In partnership with a number of local colleges and universities, GTA has proposed a new set of routes. This service, known as the Higher Education Area Transit, or HEAT, will connect most of the colleges and universities in Greensboro, as well as provide some spot service for specific institutions. The service is scheduled to begin a three year trial in the fall of 2006. Students from participating schools will have free access to the HEAT routes and all GTA bus routes. As part of this new service, three new routes have been proposed to directly service UNCG:

- **West Route** – This route will connect the downtown transit hub with the major institutions of learning in the City of Greensboro. It will operate on a one hour headway, but leave the transit hub 30 minutes past the hour to complement existing GTA service that leaves on the hour.
- **Inner Circulator** – This route will connect UNCG with Greensboro College, the downtown transit hub and various locations in downtown Greensboro.
- **Campus Loop** – This route will provide local service to the University to those living along Walker Avenue and Spring Garden Street between campus and Holden Road.

Figures 5.1 through 5.3 illustrate these UCS routes.
Figure 5.1 - East-West Route

Figure 5.2 - Inner Circulator
After the three-year trial, participating schools will decide whether to continue the partnership. During the trial period, the bulk of operating costs will be covered by a federal Congestion Management and Air Quality grant. After the trial period, a new funding source will have to be identified if the local colleges and universities decide to continue participating. Funding will most likely come from the participating institutions.

**5.3 Potential Modifications to HEAT Service**

The HEAT service, particularly the Inner Circulator and the Campus Loop, is tailored to meet the specific needs of UNCG. However, a few revisions could be made to the planned routes to provide better service to people traveling to UNCG, including improvements to routes and bus stops.

**5.3.1 Routes**

Routes should be better tailored to existing University population densities. Figure 5.4 illustrates the density of the University population to the east of campus in comparison to the proposed HEAT routes. Figure 5.5 illustrates similar conditions to the west of campus. Figure 5.5 illustrates how the density of the University population falls dramatically west of Elam Avenue. It is recommended that Elam Avenue be used as the western edge of the Campus Loop when service begins. It is also recommended that the Campus Loop service run predominantly in a counterclockwise manner.
Figure 5.4 – Population Density East of Campus

Figure 5.5 – Population Density West of Campus
5.3.2 Stops

The current plan is for the HEAT service to utilize existing GTA stops. These stops are not located to meet the needs of the University population. Respondents to the travel survey were asked what features are most desirable in a transit system. As shown in Figure 5.6, more than half of the survey respondents said that having a bus stop close to their point of origin was desirable. It is recommended that the following stops be utilized 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
- Spring Garden and Stirling

Figure 5.7 on the following page details the recommended changes to the UCS service.
5.4 Future Issues

5.4.1 Monitoring
At the end of the HEAT trial period, the University will need to determine whether to continue to participate in the partnership with GTA, or even to continue the service. One measure will be the savings in parking costs. As indicated in Section 4, the HEAT service could reduce parking demand by approximately 320 spaces (more as the campus population grows). The cost of providing 320 spaces in a deck would be approximately $480,000 per year ($1,500 per space for debt service and operating and maintenance). Other benefits include reduced traffic and an improved pedestrian environment, and freeing up land for other uses. A successful HEAT service could also spur more student housing along the routes (which in turn could offset the loss of student housing in the College Hill Neighborhood).

The success of the HEAT service will be judged on (a) total ridership, and (b) the number of riders who switched from driving and parking (which in turn can be translated into savings in parking construction). Ridership counts and future travel surveys will determine both of these. On-board surveys also would provide insight into rider characteristics.

It should be noted, however, that the projected surplus parking during this trial period could dampen use of the HEAT service. Effective and widespread marketing of the service, in conjunction with incentives described in Section 8, will be critical in these years.

The University will also need to decide whether to continue the partnership with GTA, or find another provider. Given the cost of operating a bus (currently about $53 per hour not including capital costs), the cost for the two routes serving the University will be approximately $270,000 per year (current cost).
Adding the annualized cost of purchasing two buses (estimated at $37,000 per bus) brings the total cost to $345,000. Provided the service continued to be open to the public, regardless of the operator, it would be eligible for government funding to offset the cost. The University would also need to determine if GTA is providing a level of quality and reliability that meets the needs of its users.

5.4.2 Service Expansion

If the HEAT service is maintained, some modifications may be needed to maximize its effectiveness in the future. Given the expected increase in the student population, as well as the redevelopment that is likely to occur in the College Hill Neighborhood, it is anticipated that the student population south of campus and west of Elam Avenue will grow. Transit service will need to be extended to both of these areas. For the population west of Elam Avenue, the Campus Loop service could be expanded as far west as Holden Road. For the population south of campus a new service would be needed.

In the future, two new campuses will be jointly operated by UNCG and North Carolina Agricultural and Technical State University (NCA&TSU). These campuses, referred to as Millennial Campuses, will be located at the existing North Carolina School for the Deaf, near US 29 and the NCA&TSU farm on Lee Street. They are planned to serve the research needs of both universities. When they do become operational (currently not expected prior to 2015)? a number of people will need to commute between campuses. It is recommended that a new transit service connect the existing University campus to the new Millennial Campuses at that time.

Over time it may be desirable for transit users to have access to real time information on the transit system. One option is to install global positioning systems (GPS) in buses that provide users web-based real-time data on the location of buses. A number of universities, including North Carolina State University (http://ncsu.transloc-inc.com/), currently provide this information online.

5.4.3 Funding

It is likely that additional funds will be needed to support the operation of whatever transit service exists beyond the level required during the initial trial. The University will need to identify a dedicated funding stream to continue to support the HEAT service, provided it is still cost-effective and fits the needs, mission and vision of the institution. Typical funding streams for university transit systems come from two places: student fees and increased parking permit fees.

Student fees provide a steady and predictable source of income to support campus transit initiatives. Fees typically range from $16 - $88 per semester ($1 to $8 or more per credit hour). Figure 5.8 details the transportation fees by semester from a number of institutions. The second funding source, based on an increase of parking permit costs, requires the users of parking to pay a rate higher than that necessary to cover the cost of the parking system only. This system in effect subsidizes the transit service, and spreads costs among all members of the university population that park on campus. Transit service is provided at no direct cost to those people that opt to utilize transit.
5.5 Summary of Transit Recommendations

Make the following changes to the planned UCS Service:
- Utilize the Walker Avenue Circle behind Jackson Library as the primary transit hub on campus
- Utilize Elam as western limit of Campus Shuttle service:
- 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
  - Spring Garden and Stirling
- Route Inner Circulator along neighborhood streets
- Dependent on GTA Feasibility

Long-Term Recommendations
- Expand the Campus Loop route west to Holden Avenue as population density warrants
- Provide service to the Millennial Campuses
- Provide a new service south of campus as population density warrants
- Identify funding source
  - Student fees
  - Increased parking permit costs
  - Some combination of the two
- Provide real-time bus information available on-line
Section 6 - Bicycle Plan

Bicycles are a primary transportation mode for college communities throughout the country, especially for students. They are a cheap, easy-to-use way to get to and around campus, avoiding traffic congestion and the hunt for on-campus parking.

6.1 Existing Bicycling Ridership and Attitudes

Bicycle ridership to campus is relatively low. According to the travel survey, approximately 2% of all people traveling to campus, or 300 people, cycle to campus on a daily basis. Faculty and staff are as likely as students to cycle to campus, and those most likely to cycle to campus live within two miles of campus.

The travel survey gave some indications of how cycling might be encouraged. Respondents were asked what improvements would be needed for them to cycle to campus, even two or three days a month. The most popular answers were: bike lanes to campus, bike paths to campus, and reduced vehicle conflicts. Respondents were also asked if it was difficult to find a bicycle parking space on campus. Over half stated that they experienced some trouble finding a space, and 20% responded that they experience trouble finding a space on a daily basis. Nearly 60% said that no type of improvement would induce them to cycle to campus. Figures 6.1 and 6.2 detail the responses to the desired cycling features and the ability to find bicycle parking on campus.

Figure 6.1 – Desired Cycling Features
6.2 Traveling to Campus

The city streets around the campus lack an extensive system of on-street or off-street bicycle facilities. The major approaches to campus do not have bike lanes, in contrast to the existing bicycle lane on Spring Garden Street on campus. Despite the lack of bike lanes, most streets near campus are relatively safe for bicycle use. Figure 6.3 below details the streets near campus that are perceived to be most safe for bicycling to and around campus.

The Lake Daniel Greenway north of campus is the only existing off-street bike path near campus. It is expected that the Battleground Rail-Trail will come near campus in the future. The City of Greensboro is undertaking a bikeways and greenways study to identify new bicycle routes in the city. The University should work closely with the City to provide a complete and useful bicycle system.

Currently, the only way to access campus from the south is through the two rail underpasses on Aycock Street and Tate Street. These tight underpasses make cycling difficult and dangerous. Lane widths in
these areas are not perceived to be wide enough to accommodate motorists and cyclists, and the pavement in these areas is in need of repair. It is recommended that the University continue to work with the City to improve these underpasses. In the future, it may be desirable to provide additional bicycle access between Lee Street and Oakland Avenue, between Tate Street and Aycock Street. Doing so would greatly increase the attractiveness of cycling from south of campus. Some survey responses indicated a desire for this connection. This connection is only recommended if it can be constructed in a cost effective manner for UNCG.

6.3 Traveling Around Campus

Once on campus, bicycle conditions greatly improve. Bicycle lanes on Spring Garden Street, the College Avenue pedestrian mall, and the College Avenue pedestrian bridge provide facilities for cyclists that have no motor vehicle conflicts. The lack of standard markings in the bicycle lanes on Spring Garden Street, may confuse cyclists and motorists by not effectively communicating that the lane is for bicycle use only. Motorists utilize the bicycle lane as a wide shoulder and bicyclists ride in the wrong direction in the bike lane. It is recommended that the University add standard marking to the bike lane on Spring Garden Street.

The heart of campus needs more bike parking. As of May 2005, there were 724 spaces provided in bicycle racks throughout campus. Bicycle rack occupancy counts taken in August/September 2005 found that a number of bicycle racks in the heart of campus were full, with a number of bicycles left chained to stair rails or trees. It is recommended that additional bike racks be added on campus, especially near building entrances, and that covered bicycle parking be provided in new buildings. Some existing buildings can be retrofitted to accommodate covered bicycle parking. Covered bicycle parking should be added to existing buildings under overhangs, projections and breezeways, as well as in parking decks.

6.4 Summary of Bicycle Recommendations

- Work with the City of Greensboro to develop and implement the Bikeways and Greenways Program. Ensure that University and City bicycle plans complement one another.
- Identify safe connections to the Lake Daniel Greenway and the future Battleground Rail Trail.
- Work with the City to stripe and mark bicycle lanes on Spring Garden Street from Downtown, through campus, to Holden Avenue.
• Provide bicycle parking at every building entrance. Locations specifically needing additional bicycle spaces are:
  > Science Building near North Drive Child Day Care;
  > Stone Building near College Avenue entrances;
  > McIver Building near Foust Building;
  > Mary Foust Residence Hall;
  > Guilford Residence Hall; and
  > South of Spring Garden Street, as need arises.

• 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.

• Work with the Bike Me! Collective to educate the campus population and promote bicycling on campus.
• Continue to work to improve the rail underpasses on Tate Street and Aycock Street.
• Pursue an additional connection between Lee Street and Oakland Avenue if it can be done in a safe, cost-effective manner.
• Provide an on-campus bike repair station in a convenient and accessible location.
• Distribute the map of safe streets for bicycling (Figure 6.3) to students.

A symptom of insufficient bike racks
Section 7 - Pedestrian Plan

7.1 Current Pedestrian Activity and Attitudes

According to the travel survey, on a typical weekday approximately 7% of the campus population walks to campus (approximately 1,000 people). As expected, students are more likely to walk to campus than faculty or staff, with nearly 8% of students, but only about 4% of faculty and staff, commuting to campus on foot. Currently, the bulk of residences near campus are student rental properties. Given the redevelopment of the College Hill Neighborhood, it is likely that this area will house fewer students in the future. The number of people walking to campus from the College Hill Neighborhood may decrease in future years. The University’s desire to maintain the current ratio of on-campus resident students to total students (1 on-campus student to 3 off-campus students) should help to offset any potential decrease in walking.

7.2 Traveling to Campus

Pedestrian access to campus is generally good from all directions, with the exception of from the south. While intersection treatments are needed along Aycock Street and Tate Street, there are sidewalks on most streets north, east, and west of campus. South of campus a number of streets lack sidewalks or other safe pedestrian facilities. The University should work with the City to provide sidewalks where they do not currently exist and to fill in missing links in the sidewalk network. Those projects by order of importance are:

High Priority:

- Warren Street from Walker Avenue to Spring Garden Street (both sides)
- Silver Avenue from Richardson Street to Oak Street (both sides)
- Oak Street from Silver Avenue to Gregory Street (south side)

Medium Priority:

- Oak Street from Silver Avenue to Aycock Street (north side)
- Brice Street from Warren Street to Elam Avenue (both sides)
- S Chapman Street from Walker Avenue to Spring Garden Street (east side only)
- Haywood Street from Silver Avenue to Aycock Street (both sides)
- Hertford Street from Silver Avenue to Aycock Street (both sides)

Low Priority:

- McCormick Street from Oak Street to Lee Street (both sides)
- Neal Street from Oak Street to Lee Street (both sides)
- Portland Street from Oak Street to Haywood Street (both sides)
- Highland Avenue from Oak Street to Haywood Street (both sides)
- Richardson Street from Neal Street to Highland Avenue (both sides)
- Granite Street from Brice Street to Spring Garden Street (both sides)
sides)
- Englewood Street from Brice to Spring Garden (both sides)
- Sherwood from Chapman to Warren (both sides)

Figure 7.1 illustrates these projects in relation to campus.

**Figure 7.1 – Prioritized Sidewalk Infill Projects**

As with cycling, the lack of connection between Lee Street and Oakland Avenue between Tate Street and Aycock Street is an impediment to walking between campus and areas to the south. The University should work with the City to improve the rail underpasses and pursue an additional connection between Lee Street and Oakland Avenue if a connection can be made in a manner that is cost-effective for the University.

### 7.3 Traveling Around Campus

The campus has a strong internal pedestrian network. Automobile travel through the heart of campus is restricted, limiting the number of conflict points between pedestrians and motorists. The one possible exception is Spring Garden Street. As the area south of Spring Garden Street is redeveloped with academic buildings pedestrian traffic across the street will increase. The increased pedestrian activity will help to lower vehicle speeds. A number of the recommendations in this report (e.g. the bike lane on Spring Garden Street) will increase non-motorized activity on Spring Garden Street. This additional activity will reduce the usefulness of Spring Garden Street as a regional automobile connection, potentially shifting traffic to other streets.

### 7.4 Summary of Pedestrian Recommendations

- Install brick or stamped concrete crosswalks on all crosswalks (consistent with the existing campus design theme) at the following intersections:
  > Spring Garden Street and Aycock Street;
  > Walker Avenue And Aycock Street; and
  > Spring Garden Street and Tate Street.
• Work with the City of Greensboro to construct sidewalks in keeping with the prioritized list of sidewalk infill projects.
• Reduce vehicle speeds on Spring Garden Street.
• Increase driver awareness of pedestrians.
• Continue to work to improve the rail underpasses on Tate Street and Aycock Street.
• Pursue an additional connection between Lee Street and Oakland Avenue if it can be done in a safe, cost-effective manner.
Section 8 - Travel Demand Management Plan

In addition to promoting cycling, walking and transit, there are a number of other techniques which the University can employ to reduce parking demand. The options with the highest chance of success are park-and-ride, ridesharing, and a range of other travel demand management (TDM) techniques. Each of these strategies meets the specific needs of a particular group of parking consumers, often fulfilling needs that are currently unmet. These programs provide people traveling to the campus with a menu of options that permit them to choose how they want their commuting needs met.

8.1 Park-and-Ride

8.1.1 Deficiencies of Existing Park-and-Ride
Park-and-ride is a popular option at the University. Demand is so high that the lot on the corner of Lee Street and Chapman Street was expanded from 710 spaces to approximately 1,000 spaces for the 2005-2006 academic year. The only impediment to park-and-ride being more successful is the limited hours of operation and limited capacity. Currently, shuttle service between campus and the lot is provided at ten minute intervals between 7:00 A.M. and 7:00 P.M. After 7:00 P.M. the gates to the park-and-ride lot are locked and vehicles remaining overnight are ticketed. The 7:00 P.M. closing makes this option inconvenient, and often impossible, for students with evening classes to use. It is therefore recommended that the University extend this service to 10:00 P.M., with shuttle service provided every 20 to 30 minutes after 7:00 P.M. to serve the needs of students with evening classes.

To coincide with extended night-time service it is also recommended that the E-permit statutes be revised so that the permit is valid on campus only after 2:00 P.M., as opposed to 1:00 P.M. This will help reduce vehicle congestion on-campus and increase functionality of the on-campus parking infrastructure during the noon peak period.

8.1.2 New Park-and-Ride Lots
Based on the travel survey results and the popularity of the existing park-and-ride lot, many people who drive to campus are willing to utilize lots farther away from campus, provided parking permit costs are free, or inexpensive. Respondents to the survey were asked which locations they would be willing to use. The responses are summarized in Figure 8.1. The Four Seasons Mall and Friendly Shopping Center are the two locations most desired as potential park-and-ride lots. Friendly Shopping Center, with limited parking options and high parking demand, does not seem to be a likely candidate for a new park-and-ride lot. Four Seasons Mall, and the JC Penney parking deck specifically, seem the most likely location for a new park-and-ride lot. Currently, the top two levels of the JC Penney parking deck are unused on a daily basis. It is recommended that the University approach mall manager to create a new park-and-ride lot at Four Seasons Mall, potentially utilizing the top two levels of the JC Penney parking deck.
For example, park-and-ride has been highly effective at the University of North Carolina at Chapel Hill. To compensate for the scarcity of parking on campus, the University recently added a new park-and-ride lot at the Friday Center, which filled almost immediately. Because the lot is conveniently located on NC 54, the major connection between Chapel Hill and Interstate 40, it is highly attractive to potential users. Bus service is provided every five to ten minutes and bus travel times to campus are comparable to vehicle travel times. The program has been so successful that some people have turned in parking permits for on-campus lots to use the park-and-ride system.

### 8.1.3 Remote Storage Lots

Remote storage lots allow on-campus, resident students the ability to store their vehicle at a safe, off-campus location. Access to storage lots is generally provided by bus service during the day. Campus Safety personnel typically provide evening access for emergency needs. Storage lots are typically fenced and patrolled by Campus Safety. Lots can either be gravel or paved. The benefit of storage lots above other TDM measures is that for every vehicle moved to the storage lot, one parking space is opened on campus.

As shown in Figure 8.2, resident students have a strong willingness to utilize storage lots. It is recommended that the University identify a suitable location and build a 500-space storage lot approximately one to two miles from campus. The Northridge Property, for example, would be an ideal location for a remote storage lot, but its current use and long-term plans may make this location impractical for use as a remote storage lot. Other potential locations are along or near Aycock Street south of Lee Street, or along Spring Garden Street, west of the Northridge Property.
8.2 Ridesharing

There are two main forms of ridesharing: vanpooling and carpooling. In the Piedmont Region, vanpooling is administered by the Piedmont Authority for Regional Transportation, PART. Under their program, PART provides a van for commuting to a group of at least nine people (one driver and at least eight riders). Drivers ride for free and are afforded limited personal use of the van. Riders pay a monthly fee based on the number of people in the vanpool and the distance traveled. Applications for vanpools and ridematching services are offered via PART’s vanpooling website. To further incentivize vanpooling, it is recommended that the University provide reserved parking spaces for all vanpools in prime campus locations.

Carpooling is typically for groups of two to four people, and is not necessarily restricted to people traveling to the same destination. Carpools frequently drop members off at one location and continue on to a final destination.

Ridesharing is more effective when information and resources are available to promote and coordinate ridematching services. Currently there are two ridematching services available to members of the UNCG campus population. The Carpool Club operated by the UNCG Parking Services, matches riders who are specifically looking to commute to the campus. The Share the Ride NC website provides a ridematching service for all people in the state of North Carolina. It is recommended that the University advertise the Carpool Club website more extensively. This could include a note on the bottom of all e-mails to the campus population from the Parking Department, signage in the Elliott University Center, or information included in student orientation information. To further incentivize carpooling, carpoolers could be offered reduced parking permits and reserved parking spaces.
Permit prices for carpools must be lower than permits for single drivers to be attractive. For example, at Cornell University a typical permit costs $293.62 per year. If two people agree to commute together, the same permit is free. If three people commute the group is given a reserve space and a $156.02 rebate. For a group of four or more people the rebate increases to $326.76. This program is open to all full time employees who receive benefits. Participants are not eligible for an individual parking permit. It is further incentivized with books of daily parking passes and free access to local transit.

Reserved parking for carpoolers not only incentivizes carpooling but provides the University with the ability to promote the option on a daily basis at little or no cost. Providing a reserved space removes one of the largest obstacles to parking on campus, the morning hunt for a space. Also, signed spaces reserved for carpoolers that are in desirable and visible locations advertise the program to the rest of the university population.

8.3 Complementary Measures

8.3.1 Travel Demand Management Coordinator
It is highly recommended that the University identify or hire a Travel Demand Management Coordinator who will be responsible for the overall transportation needs of the campus. The TDM coordinator promotes the program, assists students, faculty and staff in learning about the program, and adapts the system to the changing needs of the campus population. This person will also communicate and negotiate with local and regional agencies to achieve the goals of the Campus Transportation Plan, such as working directly with the Greensboro Metropolitan Planning Organization and Department of Transportation to construct the missing segments of the sidewalk network in the vicinity of campus. This person could be a new hire, or, more likely in the short-term, a person familiar with the parking system who could undertake additional outreach to the campus population and regional transportation planning agencies. It is likely that in the future the duties of this position will grow requiring a dedicated, full-time position.

8.3.2 Guaranteed Ride Home Program
A guaranteed ride home program should be provided for people who do not drive alone to campus. The ride may be guaranteed by reimbursing taxi costs, allowing overnight use of fleet vehicles, or other means. This encourages people to switch modes by removing the fear of being stranded. Universities with such programs report that it is rarely used, as workers tend to have co-workers drive them in emergencies, but that it is a valuable safety net for those who choose not to bring their car to campus. It is recommended that the University develop a guaranteed ride home program. At North Carolina State University, people in carpools or vanpools are reimbursed up to $100 annually for taxi fares for emergency rides home.

8.3.3 Commuter Incentives Program
A Commuter Incentives Program provides a package of benefits for people who enroll and agree not to purchase a parking permit and enroll in the program. The incentives can include parking vouchers, opportunities to win prizes or obtain discounts at participating merchants, and a guaranteed ride home. Parking vouchers are offered to participants that can be used on days when they need to bring their own vehicle. Each voucher covers one day of free parking to campus. A typical program provides 10 vouchers per year. For people who choose to carpool, reduced parking permit costs and reserved parking spaces are given. It is recommended that the University develop a Commuter Incentives Program and allow those who choose not to purchase a parking permit to enroll at no cost.
At Virginia Tech, all students, faculty, and staff who choose not to buy a parking permit are allowed to enroll in the Commuter Incentives Program. Enrollees are provided with ten daily parking permits per semester and the ability to use the guaranteed ride home program. Carpoolers are provided with reduced permits costs, the ability to use the guaranteed ride home program, and five daily parking permits per semester.

### 8.3.4 Car-Sharing

A car-sharing program provides cars for short-term use during the day for people who do not bring their own car to campus. Typically, these programs function as short-term car rental stations. Companies such as Flexcar (http://www.flexcar.com) and Zipcar (http://www.zipcar.com) offer these programs. Faculty, staff, and students who are at least 21 years old and have good driving records are given access to a fleet of shared cars that can be reserved online, over the phone or in person. The cars can be used for official or personal business. Individuals, departments or other campus organizations can become members for an annual fee (as low as $20 a year). The cars are rented by the hour and are available at all hours. The cars make it feasible for people who have converted to alternative modes to make business or personal trips by car during the day, eliminating another obstacle to switching modes. The Zipcar Company operates programs on several college campuses, including Princeton University, Harvard University, Boston University, Rutgers University, and UNC-Chapel Hill, at minimal cost to the institution.

### 8.3.5 Flex-Parking

A flex-parking, or pay-as-you park, program allows users to pay only for the time they park, in contrast to the typical arrangement where an annual, semester, or monthly parking permit allows unlimited parking. This encourages users to avoid bringing their vehicles if they can travel by alternative means (thus reducing parking demand) because they are more aware of the daily costs of parking and have an incentive to use alternative modes. Motorists use either a smart card (where parking facilities are gated) or an in-vehicle meter that is visible from the outside of the vehicle and activated when the vehicle is parked. Some universities have converted permit lots to metered lots as a low cost form of implementing flex-parking. The University of Wisconsin-Madison and Carnegie Mellon University use this program. This program, while not recommended for the University at this time, may be an attractive option in the future.

### 8.3.6 Parking Cash-Out

Parking cash-out is a new TDM strategy being employed at a number of institutions. Instead of increasing parking rates, employers pay employees not to drive. At the University, this payment could come in the form of a tuition subsidy, or reduced cost for use of the Student Rec Center, since direct payments to employees is not permitted at public institutions in North Carolina. The cost of a permit to the employee is not just the face value of the permit, but also the money that is foregone by continuing to drive alone. One institution in particular, Stanford University, has implemented such a program with much success. While a relatively new strategy, it has been researched by Donald Shoup in “Parking Cash Out” and by Will Toor and Spenser W. Havlick in “Transportation & Sustainable Campus Communities”. So far, this strategy is most commonly utilized by large office complexes and private universities.

### 8.3.7 Regional Transit Initiatives

The Piedmont Authority for Regional Transportation (PART) has recently taken the lead in regional transportation planning in the Piedmont-Triad region. As part of their work, PART has been studying the potential effectiveness of various regional transit options. The Master Plan incorporated the latest regional transit planning at the time and identified a regional rail stop behind the Oakland Avenue Parking Deck. Since that time, however, PART has begun to examine regional bus transit in addition to regional rail service. It is important
for UNCG to maintain the identified site as a potential stop for regional rail service, but also allow the flexibility to incorporate a regional bus transit stop. The most likely location for a regional transit stop would be along Lee Street, especially if a new pedestrian and bike connection is provided between Lee Street and Oakland Avenue. It is recommended that any parking provided in this area incorporate sufficient facilities to accommodate standard 40’ city buses.

8.4 Summary of Travel Demand Management Recommendations

Park-and-ride
• Extend hours of operation of existing park-and-ride lot to 10:00 P.M., with shuttle service provided on 20-30 minute headways after 7:00 P.M.
• Operate a new park-and-ride service from Four Seasons Mall and Friendly Shopping Center, if feasible.
  > Permits for this option should be as inexpensive as possible.
• Develop a storage lot with a total of 500 spaces.

Ridesharing (Vanpooling and Carpooling)
• Provide reserved parking for vanpools.
• Promote the Carpool Club ridematching service for carpoolers and vanpoolers.
• Provide reserved and preferred parking for carpoolers/vanpoolers.

Complementary Measures
• Identify or hire a transportation demand management coordinator to educate, promote, and adapt alternative modes to changing needs.
• Institute and promote a Commuter Incentive Program. This program would provide 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 (long-term recommendation).
• Explore the opportunities for introducing a parking cash-out program and/or a flex-parking system.
  > The cash-out program could be in the form of reduced tuition fees for students and reduced fees for use of the Student Rec Center for faculty and staff who agree not to purchase a parking permit.
  > A flex-parking system may require additional infrastructure, but may be more feasible as more of the parking is provided in gated lots and parking structures.
Section 9 - Parking Plan

This section updates the parking component of the Master Plan to reflect the revised growth projections and likely reductions in parking demand resulting from the implementation of the travel demand management strategies.

As indicated in Section 4, parking demand will peak between 6,950 and 7,300 parking spaces if the demand reduction strategies identified in the Campus Transportation Plan are implemented. Section 3 shows that the total supply of parking is anticipated to be 7,400 spaces in 2025, or an effective supply of 7,040 spaces. This includes projected surface parking losses, and four new decks:

- Parking Deck below Housing 2: 200 spaces (currently under construction)
- Oakland Avenue Deck Expansion: 500 spaces (in design, construction scheduled to commence in 2007)
- Tate Street Parking Deck: 1,000 spaces
- Parking Deck below Housing 3: 150 spaces (assumption based on number of beds)

This study has determined that the two latter decks, planned for construction after 2008, may not be the best approach to address the University’s long-term parking needs. The Tate Street Deck displaces a large amount of surface parking, further upping the cost per net space added (the deck would add a net of only 600 spaces). In addition, the Tate Street site is suitable and should be reserved for future buildings. Decks under buildings, such as housing, are very costly.

If no further decks were constructed after 2008 (i.e., only the Housing 2 deck and Oakland Avenue Deck Expansion were constructed), the supply of parking spaces in 2025 would be 6,650 spaces, with an effective supply of approximately 6,320 spaces. This would produce a parking space deficit of between 700 and 1,000 parking spaces, even with the proposed travel demand management strategies. The goal then, for this section of the Plan, is to identify the best way to accommodate additional parking spaces on campus after 2008.

9.1 Recommendations for Parking Improvements

It is recommended that the University add 700 parking spaces to the campus inventory between 2015 and 2020. Two options have been identified:

- Constructing a parking deck, which would be the more costly option. If this option is preferred, it is recommended that the site for the proposed Housing 3 project be used if it is determined that the additional housing is not required. This would add parking in an area of high demand, while not reducing the number of sites available for academic buildings.
- Constructing new surface parking south of the railroad tracks. This would have a lower initial cost, but would need to be served by shuttles. Overall the total cost would be lower than a deck provided the lot is close to the campus. The University has and is acquiring additional property between Lee Street and the railroad tracks that could be suitable for this purpose.
9.2 Possible Changes to Parking Policy

Parking system policy changes can be a valuable tool. Policy changes can increase the effectiveness of the parking reduction strategies discussed in preceding sections of this report and to increase the efficiency of the existing parking system. These policy changes generally come in two forms. The first, and more broad, is a change in who is eligible for a parking permit. The second is a change in operations, or how parking is allocated.

9.2.1 Changes to Permit Eligibility

The University does not currently restrict anyone from purchasing a permit to park on campus. This may need to change over time, for various reasons. First, restrictions may be necessary to achieve use of alternative modes at levels that make them cost-effective to supply. Second, minor restrictions could further limit the parking demand. If growth is higher than expected in the low-growth rate forecast, restrictions may be needed to force additional users to use alternative modes, and to keep parking demand below parking supply. It is therefore recommended that the University examine restricting parking to certain groups, or combination of groups (e.g. freshmen, on-campus students, students living within a certain distance of the campus, etc.) to keep parking demand levels below parking supply. This is common on many campuses in North Carolina, including East Carolina University, Appalachian State University, the University of North Carolina at Chapel Hill, and North Carolina State University.

9.2.2 Changes to Operations

In general, there are two ways to allocate on-campus parking spaces on college campuses. The first is to allocate permits within a limited number of permit categories. UNCG’s permit system is currently set up this way. As a de facto two permit system, there is one permit group for surface lots and one group for parking decks. This is typically easier to implement and manage, and provides users with more options of where to park. This system can breakdown, however, if too many users are going after too few spaces. On some campuses, it also encourages people to hunt for spaces in the closest lots, causing traffic congestion.

The second system allocates permits within a variety of permit categories. In extreme cases, each parking lot has a distinct permit type. This system maximizes efficiency by strictly limiting the number of persons who are eligible to park in a given area, and reduces the tendency to hunt for spaces in multiple lots. It can be difficult to administer, however, and puts limits on the number of parking options available to parking patrons.

Systems using fewer permits categories are typically preferred on college campuses. Multiple permit category systems are generally only recommended when one or more of the following conditions are met:

1. The pricing structure does not accurately reflect the value of a space,
2. Lots on campus are not used equally or used efficiently, or
3. Traffic conditions necessitate reducing trips through busy intersections to hunt for parking spaces.

At present, the University does not meet any of the three conditions. The permits for surface lots (A, B, C) at UNCG are all priced the same ($235 per year), but because most of the campus parking lots are located on the periphery of campus there are no “prime” lots that would demand a higher permit cost. The current parking supply is used very efficiently, with very few spaces remaining unused in any one lot at peak time. And while traffic on Spring Garden Street is relatively high, the parallel street, Oakland Avenue, provides an
alternative that is used by drivers “hunting” for spaces. It is therefore recommended that the University continue to utilize existing systems to allocate parking permits and spaces now and as additional facilities come online. The current system works well and can be expected to continue to do so by allowing users to choose what area amongst many best suits their needs that day.

9.3 Summary of Parking Recommendations

- Construct no further stand alone parking structures beyond those currently under construction.
- 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:
  - Parcels between Lee Street and the railroad (high priority); or
  - One on-campus deck (low priority).
- Maintain the current system for allocating permits and spaces in individual lots.
- If alternatives alone are not attractive enough keep parking demand below supply by restricting the following groups or combination of groups:
  - People living near campus;
  - Freshmen; and
  - On-campus students.
Section 10 - Phasing, Monitoring, and Cost

Based on the parking supply and demand projections in Section 3, the University will have sufficient parking for the near-term. While this will ease the transition from a parking-oriented base to a multi-modal base, it is important that the University begin early to implement the plans outlined in this report. This section provides three phasing scenarios to guide implementation.

10.1 Phasing

With the exception of the new park-and-ride lots, the recommendations made in this report can be quickly implemented with relatively low costs. The recommendations are intended to be phased in over time. Three scenarios are presented below to aid with implementation. Scenario 1 uses incremental phasing, where programs come online as they are needed to keep parking demand below supply as long as possible. Scenario 2 implements the entire plan, with the exception of the new park-and-ride lots, immediately. Scenario 3 delays the construction of the Oakland Avenue Deck Expansion, while opening the remote storage lot in 2008.

The following changes are common to all scenarios:

- The HEAT service is assumed to be implemented in 2006.
- Consistent with Section 9, only those decks under construction or in design (deck under Housing 2 and Oakland Avenue Deck Expansion) are assumed for the future parking supply.
- All losses to the supply are anticipated to occur planned for between 2016 and 2020.
- All parking demand reduction plans are expected to take three years to achieve their goals.
- Construction of a deck in lieu of Housing 3 or a surface lot along Lee Street in 2018 (refer to Section 9).

10.1.1 Scenario 1

In this scenario, the HEAT service is the only parking demand reduction strategy implemented in 2006. Other trip reduction strategies are introduced later than the other two scenarios. The ridesharing incentives commence in 2010 and the remaining strategies in 2015. The Oakland Deck Expansion opens in 2008. Figure 10.1 details the parking supply and demand on an annual basis in this scenario.
10.1.2 Scenario 2
In Scenario 2, all parking demand reduction strategies are implemented in 2006, with the exception of the new park-and-ride lot, which is implemented in 2018. Figure 10.2 details the expected parking supply and demand on an annual basis for Scenario 2.

Figure 10.2 - Scenario 2: Parking Supply and Demand

Under this scenario, the parking demand in 2008 is expected to be approximately 6,190 spaces, while the effective supply is expected to be 7,040 spaces, yielding an excess capacity of 850 spaces. Scenario 1 will minimize costs over time because the parking reduction strategies will come online only when needed, delaying associated costs as long as possible. Scenario 1 may not be sufficient to change people’s attitudes toward the use of alternative modes.

10.1.3 Scenario 3
Under Scenario 3, the remote storage lot is brought online in 2008, while the construction of the Oakland Avenue Deck Expansion is delayed until 2015. The bike improvements, GTA passes and ridesharing incentives are implemented in 2010 and the new park-and-ride lot in 2015. Figure 10.3 details the expected annual supply and demand for Scenario 3.
Under this scenario, the parking demand would be approximately 6,000 spaces in 2008 while the effective supply would be 6,560 spaces. The excess supply of 560 spaces is less than that of Scenarios 1 and 2. As with the other scenarios, the excess supply and inexpensive permit costs will reduce the effectiveness of the demand reduction strategies. To compensate for this, the remote storage lot could be 100 spaces in 2008 and slowly expanded to 500 spaces in the future. If the storage lot were only 100 spaces in 2008 the demand would be approximately 6,140 spaces, further reducing the excess capacity to 420 spaces.

10.1.4 Phasing Recommendation

While not as aggressive as Scenario 2, or as inexpensive as Scenario 1, the phasing of Scenario 3 should be sufficient to achieve some long-term change in the attitudes toward alternative modes, while keeping costs manageable. It is recommended that the University implement the Campus Transportation Plan in a manner consistent with Scenario 3.

10.2 Monitoring

The University will need to monitor the program as it is implemented to ensure that the targeted use of alternative modes is being achieved. In addition to reviewing the demand for parking permits and parking facility occupancy, the travel survey conducted as part of this study should be repeated every three years starting in 2008. The survey will provide the University with new mode split information, as well as information on the effectiveness of the alternative modes. This will be particularly helpful for the monitoring of the transit service. If analysis of the survey data concludes that use of alternative modes is below desired levels, parking restrictions should be implemented.

The University will also need to update the campus population data so that the parking demand projections remain accurate over time. To do this, the University should use actual enrollment figures and the newest enrollment projections to revise the parking demand projections consistent with the manner described in this report (0.34 spaces per person). If the campus population grows beyond the projections in this report, it may be necessary to expand the program beyond the limits set in this Plan, or to add ad-
ditional parking beyond the level called for in Section 9 of this report.

Monitoring of the HEAT trial period is discussed in Section 5.

10.3 Cost

Substantial increases in funding for alternatives will be required to achieve the reductions described in Section 4. Table 10.1 below shows the estimated annual cost to implement each proposed strategy. These costs are order-of-magnitude only, and actual costs must be based on a detailed plan. The costs for the alternatives were developed using the following methods:

- Cycling Improvements – No major infrastructure additions are necessary to accomplish the cycling recommendations in this report. The $5,000 should be sufficient to add new bike racks and provide some covered bike parking.
- Heat Transit Service - During the three-year trial period of the HEAT service, the University will incur a cost of only $70,000 per year, since the service will be subsidized. A cost of $270,000 is used for budgetary purposes since this is the actual cost for operating this service.
- GTA Transit Service – Assumes a cost of $100 per year for a transit pass.
- Remote Storage Lot – $1,500,000 is an order of magnitude cost for purchasing land for the lot. $125,000 is the cost of running dedicated shuttle service to this lot. Costs could be reduced if land was leased or previously owned and/or the lot is on an existing transit line.
- Ridesharing – Costs are associated with advertising and promoting the option.
- Park-and-Ride – $135,000 is the cost of running dedicated service to Four Seasons Mall (20 minute intervals for 11 hours a day with doubled service three hours a day for 180 days a year).
- TDM Coordinator – $150,000 includes coordinator, advertising, and incentives.

It is important to note that the total cost of $815,000 per year is considerably less than the $1.68 million in annual costs for building, operating and maintaining the structured parking that would have been required to accommodate this demand ($1,500 annual cost per space for 1,120 spaces), described in Section 4.

Table 10.1 - Annual Cost by Mode in 2005 Dollars

<table>
<thead>
<tr>
<th>Mode</th>
<th>Parking Permit Reduction</th>
<th>Parking Space Reduction</th>
<th>Capital Costs</th>
<th>Annual Costs</th>
<th>Total Annualized Cost</th>
<th>Cost per Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycling Improvements</td>
<td>50</td>
<td>40</td>
<td>$</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$125</td>
</tr>
<tr>
<td>HEAT Transit Service</td>
<td>400</td>
<td>324</td>
<td>$</td>
<td>$270,000</td>
<td>$270,000</td>
<td>$ 833</td>
</tr>
<tr>
<td>GTA Transit Service</td>
<td>50</td>
<td>40</td>
<td>$</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$125</td>
</tr>
<tr>
<td>Remote Storage Lot</td>
<td>370</td>
<td>352</td>
<td>$1,500,000</td>
<td>$125,000</td>
<td>$240,000</td>
<td>$ 682</td>
</tr>
<tr>
<td>Ridesharing</td>
<td>200</td>
<td>162</td>
<td>$</td>
<td>$10,000</td>
<td>$10,000</td>
<td>$ 62</td>
</tr>
<tr>
<td>Four Seasons Mall park-and-ride</td>
<td>250</td>
<td>202</td>
<td>$</td>
<td>$135,000</td>
<td>$135,000</td>
<td>$ 668</td>
</tr>
<tr>
<td>TDM Coordinator</td>
<td>-</td>
<td>-</td>
<td>$</td>
<td>$150,000</td>
<td>$150,000</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,320</strong></td>
<td><strong>1,120</strong></td>
<td><strong>$1,500,000</strong></td>
<td><strong>$700,000</strong></td>
<td><strong>$ 815,000</strong></td>
<td><strong>$ 728</strong></td>
</tr>
</tbody>
</table>