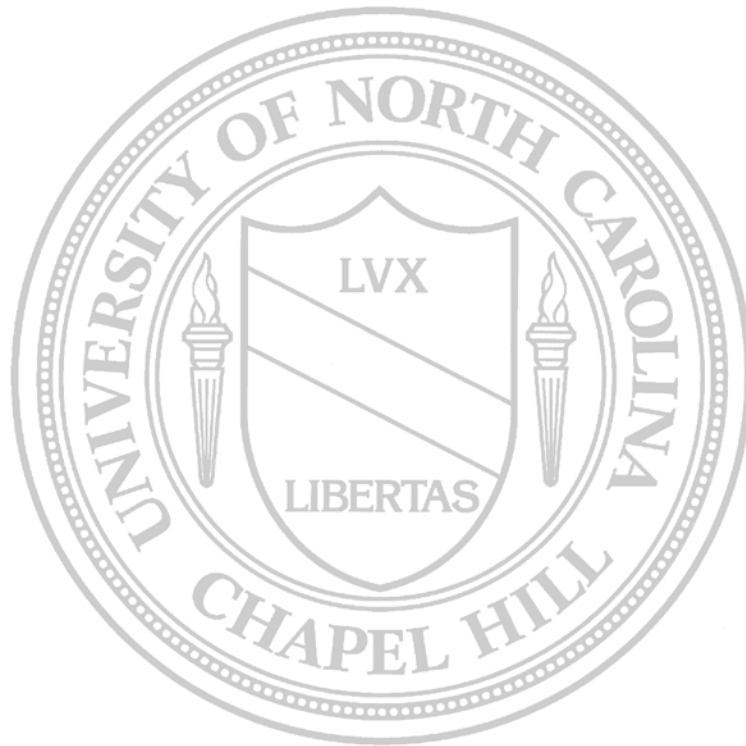


The University of North Carolina at Chapel Hill

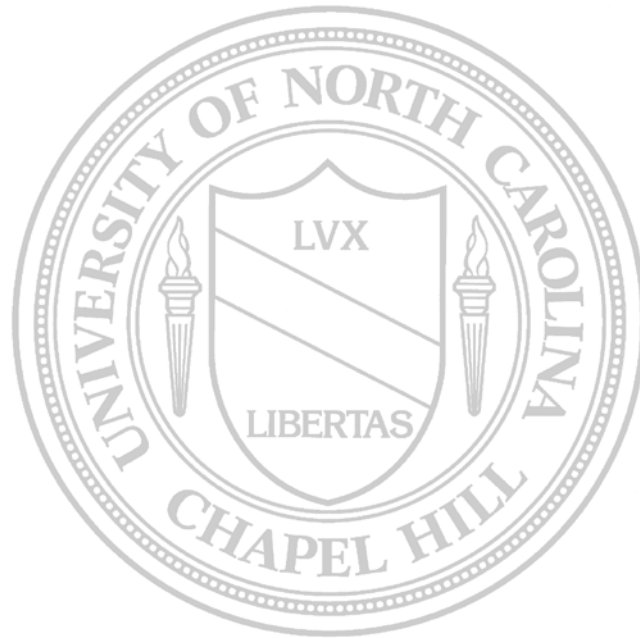


Development Plan

Transportation Impact Analysis Update

December 2017

The University of North Carolina at Chapel Hill



Development Plan

Transportation Impact Analysis Update

December 2017

Prepared by

VHB Engineering NC, PC

EXECUTIVE SUMMARY

This is the ninth update of the initial Transportation Impact Analysis submitted in July 2001 for the University of North Carolina at Chapel Hill Development Plan. The updates are being submitted to the Town in accordance with the requirements of the Town of Chapel Hill's Office/Institutional-4 (OI-4) Zoning District regulations. The purpose of this updated analysis is to provide an assessment of the transportation implications of the Development Plan and revise mitigation measures, if needed based on the updated analysis, to address impacts. Transportation elements addressed include automobile traffic, transit, parking, bicycle and pedestrian traffic, and associated air quality issues.

Some new data has now been collected for this update to identify trends and refine recommendations where necessary. New projections of future mode splits (i.e., how commuters may be traveling to Campus in 2022) are included in this update based on results of the commuter survey completed in spring 2017.

The Development Plan projects will add approximately 7.9 million gross square feet (GSF) of new development to Campus, including parking decks and infrastructure. The net increase in new occupied floor area for the Development Plan is approximately 5.6 million square feet, or an estimated 49 percent increase over pre-2001 occupied floor area. The growth projections used to estimate employee and student growth have been extended through 2022. Employee growth is anticipated to be 69 percent (9,871 additional employees) and student growth is anticipated to be 24 percent (5,903 additional students) over the life of the Development Plan.

The increase in Main Campus employee and student parking accompanying the Development Plan is significantly less than current ratios. Therefore, an increase in the use of alternative modes is an essential component of the Development Plan.

The Development Plan will permanently displace 4,061 existing surface spaces, and add 5,640 new spaces to Main Campus. The net parking impact of the proposed Development Plan remains at an increase of 1,579 spaces. Of these, 1,455 are for patients/visitors, 348 are for employees/commuting students, 6 for other users (e.g., service), and there is a net loss of 287 for resident students.

When the growth in employees and students is taken into account, the following Main Campus parking "shortfalls" are projected (approximate numbers) to occur with implementation of the Development Plan (shortfall is defined as the difference between the amount of Main Campus parking that would be required if parking continued to be provided at pre-Development Plan rates, and the amount that actually will be provided):

- 4,572 employee spaces
- 423 commuting student spaces
- 451 resident student spaces
- 2,100 visitors

The amount of traffic that will be generated by the Development Plan is a function of the amount of parking that will be provided, with the improved alternative modes described in the report serving the other employees and students. An integral element of the adopted Main Campus Master Plan is to minimize the increase in Main Campus parking as Campus

grows by promoting and increasing the use of alternative forms of transportation. The parking and transportation initiatives that are inherent in the Development Plan are consistent with the transportation strategy for the Master Plan.

The net increase in parking will generate 11,487 daily vehicular trips. This can be contrasted to the amount of traffic that would be generated by a typical hypothetical development of similar size where no, or very limited, trip reduction strategies apply. Using trip rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition) yields an estimated 34,821 vehicular trips on a typical day. Therefore, the trips associated with the Development Plan are significantly lower compared to a typical development.

An increased proportion of commuters will use alternative means of traveling to Campus. The following alternatives will be improved and/or promoted as part of the University's trip reduction program:

- Chapel Hill Transit (CHT)
- Regional transit
- Park-and-ride
- Ridesharing
- Teleworking
- Cycling
- Walking

Potential future actions include identifying more park-and-ride spaces in the US 15-501 N corridor as needed to serve the Main Campus, continued improvements to CHT, and improvements to regional transit.

Park-and-ride continues to be a popular choice for employees and students, although counts are down as compared to previous years. The Friday Center lot continues to fill, and as in the past, most likely accommodates commuters from the US 15-501 north corridor, which has no park-and-ride options, in addition to commuters from the east. The decrease in park-and-ride as compared to previous years can likely be explained by the introduction of fees for park-and-ride spaces in fall 2013. The currently-estimated net park-and-ride need for the Development Plan (1,338 spaces), has been met with construction of the 871-space Friday Center lot, the 443-space Jones Ferry Road lot, the 278-space Hedrick lot, and the 550-space Chatham lot.

It is important to note that the University has a full-time Transportation Demand Management (TDM) manager. The role of this person is to promote and assist employees in learning about and using alternative modes, as well as managing the Commuter Alternative Program (CAP) which is an incentive program designed to encourage University and Hospital employees and commuter students to use alternative transportation modes.

If it is assumed that the trip reduction measures that are implicit in the Development Plan and needed to address the reduced parking are applied only to new commuters (in reality they will apply to all commuters), then it is projected that new commuters would travel by the following means:

- Drive alone: 117 (1%)
- Chapel Hill Transit: 5,186 (43%)
- Regional transit: 2,317 (19%)
- Ridesharing: 1,226 (passengers and drivers, 11%)
- Bicycle: 588 (5%)
- Walk: 381 (3%)
- Park-and-ride: 1,672 (14%)
- Other: 577 (5%)

Total (adjusted): 12,065 (100%)

The following should be noted:

- The new ratios hypothetically assume that only new commuters would be subjected to the limited parking and trip reduction strategies. In reality, all parking is pooled and there will be no distinction between new and existing commuters. The aggregate mode split for the entire future employee and commuter student populations is shown in Table 3-2.
- The use of alternative modes includes the proportion of commuters who would use those modes based on current mode split (e.g., if the number of employees increases by 31%, then use of CHT by employees can be expected to increase by 31% without expanded trip reduction strategies).

In addition to addressing the commuting needs of employees and students, these strategies will also help reduce traffic congestion on Main Campus and reduce exhaust emissions.

An analysis of roadway intersections on or near Main Campus that may be affected by the Development Plan was also undertaken for existing conditions, and year 2024 with and without the Development Plan (No-Build and Build conditions respectively), per the *Transportation Impact Analysis Guidelines*.

The updated traffic analysis has resulted in changes in the projections for intersection levels of service in comparison to the 2015 update. Most intersections in the study area are operating at acceptable LOS and most will be expected to continue to operate at acceptable LOS in the No-Build (2024) scenario and in the Build (2024) scenario.

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1.0 INTRODUCTION

This is the ninth update of the initial Transportation Impact Analysis submitted in July 2001 for the University of North Carolina at Chapel Hill Development Plan. The updates are being submitted to the Town in accordance with the requirements of the Town of Chapel Hill's Office/Institutional-4 (OI-4) Zoning District regulations. The purpose of this updated analysis is to provide an assessment of the transportation implications of the Development Plan and revise mitigation measures, if needed based on the updated analysis, to address impacts. Transportation elements addressed include automobile traffic, transit, parking, bicycle and pedestrian traffic, and associated air quality issues.

The report is divided into three sections. The first discusses population growth and associated increases in Main Campus parking demand, and details the impact of the plan and population growth on Main Campus parking. This section provides an estimate of the shortfall in Main Campus parking as a result of employee growth, enrollment expansion, and Development Plan construction. This section also describes modifications to the Development Plan, including the elimination of projects and the addition of new projects. These modifications were approved by the Town in June and August 2003, March 2004, and October 2006. In addition, actual parking changes that have occurred as a result of Development Plan projects are shown.

The next section discusses trip generation and trip reduction strategies. As required by the *Transportation Impact Analysis Guidelines*, vehicular trip generation was first calculated assuming the Development Plan was a hypothetical, suburban development where no or very limited trip reduction strategies applied. The impacts of the proposed trip reduction strategies that are integral to the Development Plan are then calculated for comparison purposes. This section also describes the various strategies that are proposed to address the limited employee and student parking increases in the Development Plan. Two crucial components necessary for updating this section are the University's Commuter Survey (undertaken in spring 2017) and the Transportation Management Plan (undertaken in fall 2017).

The final section provides analyses for key intersections in the Development Plan area, and discusses mitigation options where they are warranted.

Extensive data were collected for the first four updates to provide a baseline set of data for monitoring purposes, and to allow conclusions and recommendations to be made. Some new data have now been collected for the ninth update to identify trends and refine recommendations where necessary.

2.0 DEVELOPMENT PLAN

Figure 2-1 and Table 2-1 show and detail University projects planned for construction between 2001 and 2022. The list only includes projects involving new square footage (rehabilitations that add no additional square footage are not included). Changes to the project list were approved by the Town in June and August 2003 (Development Plan Modification No.1), in March 2004 (Development Plan Modification No.2), and in October 2006 (Development Plan Modification No.3).

Development Plan projects (including the modifications) will add approximately 8.0 million gross square feet of new development to the campus, a 58 percent increase over the campus' existing 13.7 million square feet. Some of the new area is required to address current space deficits (i.e., will not result in an increase in employees or students). During this same period, existing buildings totaling approximately 235,000 gross square feet will be demolished. Parking decks account for about 1.95 million square feet of the Plan. Infrastructure projects make up about 300,000 square feet. Therefore, the net increase in new occupiable floor area for the Development Plan is approximately 5.6 million square feet, or an estimated 49 percent increase over the pre-Development Plan occupiable floor area. Projects in the Plan can be separated into the categories listed below. The chart also indicates changes in square footage since the December 2015 update and includes projects approved as part of Modification No.3.

| Classification | Square Footage | Change from 2015 Update |
|-----------------|------------------|----------------------------|
| Academic | 1,818,486 | - |
| Cultural | 140,629 | - |
| Housing | 826,015 | -97,148 |
| Infrastructure | 312,382 | - |
| Office | 460,200 | - |
| Parking | 1,950,700 | - |
| Research | 800,923 | - |
| Student Life | 339,699 | - |
| Athletics | 375,079 | +117,920 |
| UNC Health Care | 1,035,619 | +74,269 |
| Total | 8,059,732 | +95,041 |

Figure 2-1: University of North Carolina at Chapel Hill Development Plan

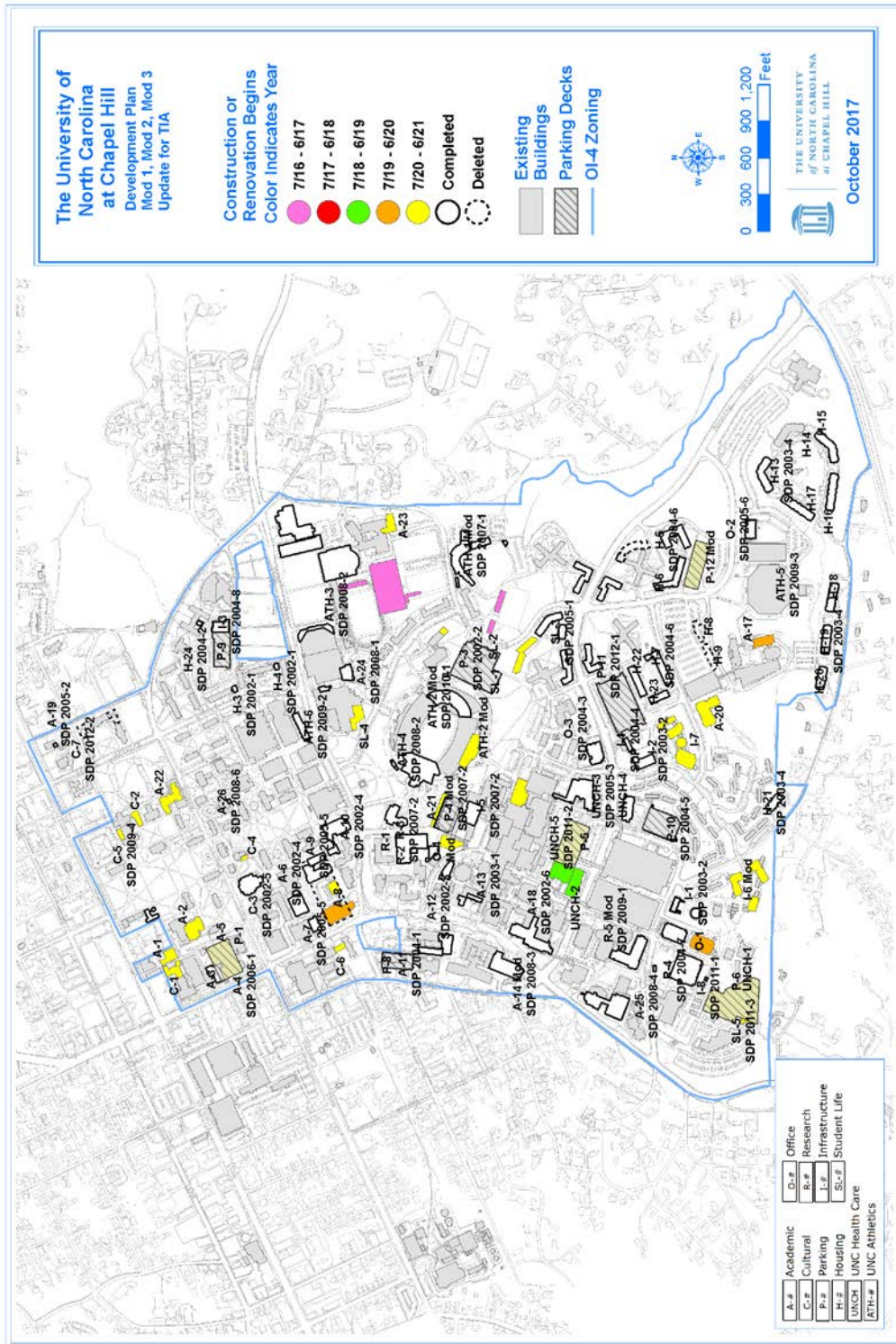


Table 2-1: University of North Carolina at Chapel Hill Development Plan

| Building | Building Type | Gross Square Footage | Anticipated Construction Start Date | Anticipated Construction Completion |
|-----------------|-----------------------|----------------------|-------------------------------------|-------------------------------------|
| A-1 | Academic | 31,800 | 07/20 | 07/22 |
| A-2 | Academic | 73,100 | 07/20 | 07/22 |
| A-3 | Academic | 25,600 | 03/05 | 02/07 |
| A-4 | Academic | 20,000 | 03/05 | 02/07 |
| A-5 | Academic | 55,200 | 07/20 | 07/22 |
| A-6 | Academic | 90,000 | 07/03 | 06/05 |
| A-7 | Academic | 41,000 | 02/06 | 08/08 |
| A-8 | Academic | 154,500 | 07/19 | 07/21 |
| A-9 | Academic | 396,700 | 07/20 | 07/22 |
| A-10 | Academic | 112,500 | 07/03 | 06/05 |
| A-11 | Academic | 82,000 | 03/04 | 02/06 |
| A-12 | Academic | 69,500 | 11/01 | 10/03 |
| A-13 | Academic | 10,200 | 08/02 | 07/04 |
| A-14 Mod | Academic | 259,990 | 06/08 | 05/12 |
| A-15 | Deleted | | | |
| A-16 | Deleted | | | |
| A-17 | Academic | 53,200 | 07/19 | 07/21 |
| A-18 | Academic | 936 | 08/04 | 03/04 |
| A-19 | Academic | 1,600 | 03/05 | 03/06 |
| A-20 * | Academic | 125,000 | 07/20 | 07/22 |
| A-21 | Academic | 80,000 | 07/20 | 07/22 |
| A-22 | Academic | 75,000 | 07/20 | 07/22 |
| A-23 * | Academic | 50,000 | 07/20 | 07/22 |
| A-24 | Academic | 5,580 | 06/08 | 02/10 |
| A-25 | Academic | 3,308 | 10/08 | 01/10 |
| A-26 | Academic | 1,772 | 01/09 | 02/10 |
| | Total Academic | 1,818,486 | | |
| | | | | |
| C-1 | Cultural | 36,000 | 07/20 | 07/22 |
| C-2 | Cultural | 26,400 | 07/20 | 07/22 |
| C-3 | Cultural | 37,325 | 12/01 | 01/03 |
| C-4 | Cultural | 3,000 | 07/20 | 07/22 |
| C-5 Mod | Cultural | 22,904 | 07/20 | 07/22 |
| C-6 | Cultural | 15,000 | 07/20 | 07/22 |
| | Total Cultural | 140,629 | | |
| | | | | |
| H-1 | Housing | Deleted | | |
| H-2 | Housing | Deleted | | |
| H-3 | Housing | 6,656 | 05/02 | 07/03 |
| H-4 | Housing | 6,656 | 05/02 | 07/03 |
| H-5 | Housing | 68,400 | 01/04 | 08/05 |
| H-6 | Housing | 60,000 | 01/04 | 08/05 |
| H-7 | Housing | 74,800 | 01/04 | 08/05 |
| H-8 | Housing | Deleted | | |
| H-9 | Housing | Deleted | | |
| H-10 | Housing | Deleted | | |
| H-11 | Housing | Deleted | | |
| H-12 | Housing | Deleted | | |
| H-13 | Housing | 60,500 | 08/03 | 08/04 |
| H-14 | Housing | 60,500 | 08/03 | 08/04 |
| H-15 | Housing | 58,200 | 08/03 | 08/04 |
| H-16 | Housing | 59,400 | 08/03 | 08/04 |
| H-17 | Housing | 59,400 | 08/03 | 08/04 |
| H-18 | Housing | 44,400 | 08/03 | 08/04 |
| H-19 | Housing | 44,400 | 08/03 | 08/04 |
| H-20 | Housing | 37,600 | 08/03 | 08/04 |
| H-21 | Housing | 30,050 | 08/03 | 08/04 |
| H-22 | Housing | 79,601 | 01/04 | 08/05 |
| H-23 | Housing | 79,600 | 01/04 | 08/05 |
| H-24 | Housing | 7,800 | 01/04 | 08/05 |
| SH PHIII | Housing | 125,000 | 07/20 | 07/22 |
| H | Housing | (136,948) | 05/17 | 05/19 |
| | Total Housing | 826,015 | | |

| Building | Building Type | Gross Square Footage | Anticipated Construction Start Date | Anticipated Construction Completion |
|-------------|-----------------------------|----------------------|-------------------------------------|-------------------------------------|
| I-1 | Infrastructure | 20,000 | 07/03 | 12/04 |
| I-2 | Infrastructure | 115,600 | 08/03 | 07/05 |
| I-3 | Infrastructure | 21,600 | 03/04 | 03/06 |
| I-4 | Infrastructure | 6,382 | 06/04 | 12/05 |
| I-5 Mod | Infrastructure | 100,800 | 01/08 | 07/10 |
| I-6 | Infrastructure | 48,000 | 07/20 | 07/22 |
| I-7 | Infrastructure | N/A | 07/20 | 07/22 |
| | Total Infrastructure | 312,382 | | |
| | | | | |
| O-1 | Office | 133,200 | 07/19 | 07/21 |
| O-2 | Office | 30,000 | 11/02 | 05/06 |
| O-3 | Office | 105,000 | 07/04 | 03/06 |
| O-4 | Office | 180,000 | 07/20 | 07/22 |
| O-5 | Office | 12,000 | 01/20 | 01/22 |
| | Total Office | 460,200 | | |
| | | | | |
| P-1 | Parking | 115,500 | 07/20 | 07/22 |
| P-2 | Parking | Deleted | | |
| P-3 | Parking | 252,600 | 05/02 | 10/04 |
| P-4 Mod | Parking | 225,000 | 03/07 | 08/10 |
| P-5 | Parking | 255,500 | 07/20 | 07/22 |
| P-6 | Parking | 134,400 | 01/20 | 01/22 |
| P-7 | Parking | Deleted | | |
| P-8 | Parking | 42,000 | 03/03 | 07/06 |
| P-9 | Parking | 191,500 | 03/03 | 03/06 |
| P-10 | Parking | 350,000 | 04/04 | 12/05 |
| P-11 | Parking | 288,000 | 09/12 | 06/14 |
| P-12 | Parking | 96,200 | 07/20 | 07/22 |
| | Total Parking | 1,950,700 | | |

*This represents relocation of planned surface parking to spaces beneath the buildings.

| | | | | |
|---------------|------------------------------|------------------|--------------|--------------|
| R-1 | Research | 109,000 | 07/07 | 03/12 |
| R-2 | Research | 49,000 | 07/07 | 03/12 |
| R-3 | Research | 74,400 | 07/07 | 03/12 |
| R-4 | Research | 225,000 | 08/02 | 12/04 |
| R-4 MM | Research | 523 | 09/11 | 12/11 |
| R-5 | Research | 343,000 | 06/09 | 01/14 |
| | Total Research | 800,923 | | |
| | | | | |
| SL-1 | Student Life | 54,400 | 06/02 | 07/04 |
| SL-2 | Student Life | 126,900 | 06/02 | 07/04 |
| SL-3 | Student Life | 126,000 | 06/04 | 08/05 |
| SL-4 | Student Life | 28,000 | 07/20 | 07/22 |
| MM | Student Life | 4,399 | 06/05 | 03/06 |
| | Total Student Life | 339,699 | | |
| | | | | |
| UNCH-1 | UNC Health Care | 196,280 | 07/20 | 07/22 |
| UNCH-2 | UNC Health Care | 343,180 | 07/18 | 07/20 |
| UNCH-3 | UNC Health Care | 291,890 | 03/05 | 02/08 |
| UNCH-4 | UNC Health Care | 130,000 | 03/06 | 07/07 |
| UNCH-5 | UNC Health Care | (53,546) | 12/11 | 06/12 |
| UNCH-6 | UNC Health Care | 1,066 | 01/12 | 03/12 |
| UNCH | UNC Health Care | 126,749 | 07/20 | 07/22 |
| | Total UNC Health Care | 1,035,619 | | |
| | | | | |
| ATH-1 | Athletics | 41,181 | 05/07 | 01/08 |
| ATH-2 | Athletics | 170,189 | 07/20 | 12/22 |
| ATH-3 | Athletics | 15,059 | 05/08 | 02/10 |
| ATH-4 | Athletics | 19,194 | 01/08 | 08/09 |
| ATH-4 MM | Athletics | 1,000 | 06/10 | 08/10 |
| ATH-5 | Athletics | 6,467 | 03/10 | 01/11 |
| ATH-6 | Athletics | 4,069 | 01/10 | 10/10 |
| ATH | Athletics | 123,000 | 05/16 | 08/18 |
| ATH | Athletics | 10,000 | 05/16 | 08/18 |
| ATH | Athletics | (13,417) | 05/17 | 05/19 |
| ATH | Athletics | (1,663) | 05/17 | 05/19 |
| | Total UNC Athletics | 375,079 | | |

Campus Total 8,059,732

2.1 POPULATION GROWTH

Anticipated growth in employees and student enrollment during the course of the Development Plan is shown in Table 2-2 and Table 2-3 below. These growth projections build on those in the previous TIA update by projecting growth out to 2022 instead of 2015 as included in previous updates. These projections reflect the most recent data available, and the University no longer projects enrollment more than two years in the future. The tables show an anticipated increase in employees of 69 percent and student growth of 18 percent overall from 2000 to 2022. The 2022 growth projections were developed to identify a build year for the traffic analysis and may not necessarily reflect a construction schedule for Development Plan projects.

Parking impacts for each of these groups are discussed in the following section.

Table 2-2: Anticipated Employee Growth (2000-2022)

| | 2000 | 2022 | 2000-2022 | Growth Rate |
|----------------------------|--------|--------|-----------|-------------|
| Number of Employees | 14,303 | 24,174 | 9,871 | 69% |
| On Main Campus | 13,016 | 21,219 | 8,203 | 63% |
| Off Main Campus | 1,287 | 2,955 | 1,668 | 130% |

Notes:

1. Permit data were used to estimate the percentage of year 2000 employees who worked (and parked) off-campus, which was approximately 9 percent. It is assumed that the same percentage of employees will work off-campus in 2022.
2. The University no longer estimates population more than two years into the future, therefore the 2022 estimates are unchanged from the 2015 TIA Update.

Table 2-3: Anticipated Student Growth (2000-2022)

| | 2000 | 2022 | 2000-2022 | Growth Rate |
|---------------------------|--------|--------|-----------|-------------|
| Number of Students | 24,872 | 30,775 | 5,903 | 24% |
| Resident Students | 7,244 | 9,285 | 2,041 | 28% |
| Commuting Students | 17,628 | 21,490 | 3,862 | 22% |

Notes:

1. The year 2000 breakout of resident and commuting students was based on the existing number of beds. For year 2022 the breakout was adjusted to account for a forecast increase in resident students of 2,041.
2. All students not accommodated by residence halls or family housing are assumed to be commuting students.
3. In the original Development Plan and subsequent updates, the 2000 Number of Students was erroneously listed as 25,872 instead of 24,872. This also affected the 2000 Commuting Students (18,628 instead of 17,628) and the forecast growth rates. This table shows the corrected data. The data for resident students are unaffected.
4. The University no longer estimates population more than two years into the future, therefore the 2022 estimates are unchanged from the 2015 TIA Update.

2.2 PARKING IMPACTS

2.2.1 Existing Parking

The total number of parking spaces owned by the University in the 2000/2001 academic year was 17,620, of which approximately 14,200 were on Main Campus (excluding motorcycle parking). Of these, approximately 5,450 were in four parking decks on South Campus. Main Campus parking facilities are shown in Figure 2-2. In 2001, and currently, there is not enough parking on Main Campus for all employees wanting to park there. In 2001 there were approximately 8,000 spaces for approximately 13,000 Main Campus employees, or 0.61 spaces per Main Campus employee (because of the oversell ratio which accounts for some people not being on Main Campus on any particular day because of vacation, illness, etc., the number of parking permits issued is higher, 0.77 per employee in 2001).

The rate for students is much lower (less than 10 percent for both resident students and commuting students). Freshmen are not eligible for a parking permit.

2.2.2 Displaced Parking

The Development Plan will permanently displace 4,061 existing surface spaces (excluded from this number are temporary losses due to construction staging and 428 student family spaces which are added back with the construction of new student family units). These anticipated losses are shown by location and user in Table 2-4 and Figure 2-3. It should be cautioned that these are estimates only, and that several factors could affect the actual losses:

- Included are spaces lost to future parking deck construction. The final size and configuration of the deck will determine how many surface spaces, if any, could be retained.
- It has been assumed that some service and disability spaces, as well as some permit spaces at some sites, may be retained. The actual number will depend on the configuration of future buildings, landscaping, etc.

2.2.3 Additional Main Campus Parking

The Development Plan will permanently add 5,640 new spaces to Main Campus (this includes a net increase of 25 spaces for student family housing and 32 employee spaces that have yet to be assigned to a location). Of the remaining 5,583 spaces, 5,425 are being provided in nine new structures (either free-standing decks or on the lower level of buildings) and one expansion (the Craige Deck), and 158 are surface spaces added back where building projects have already been completed. In July of 2013, the Craige Parking Deck Expansion project began. This vertical expansion provided four additional levels and 990 spaces by the project's completion in August of 2015. These Development Plan spaces are shown in Table 2-4 and Figure 2-3. The breakdown of new deck spaces is shown in Table 2-5. As with the losses, these are estimates only.

Figure 2-2: Existing Main Campus Parking Facilities

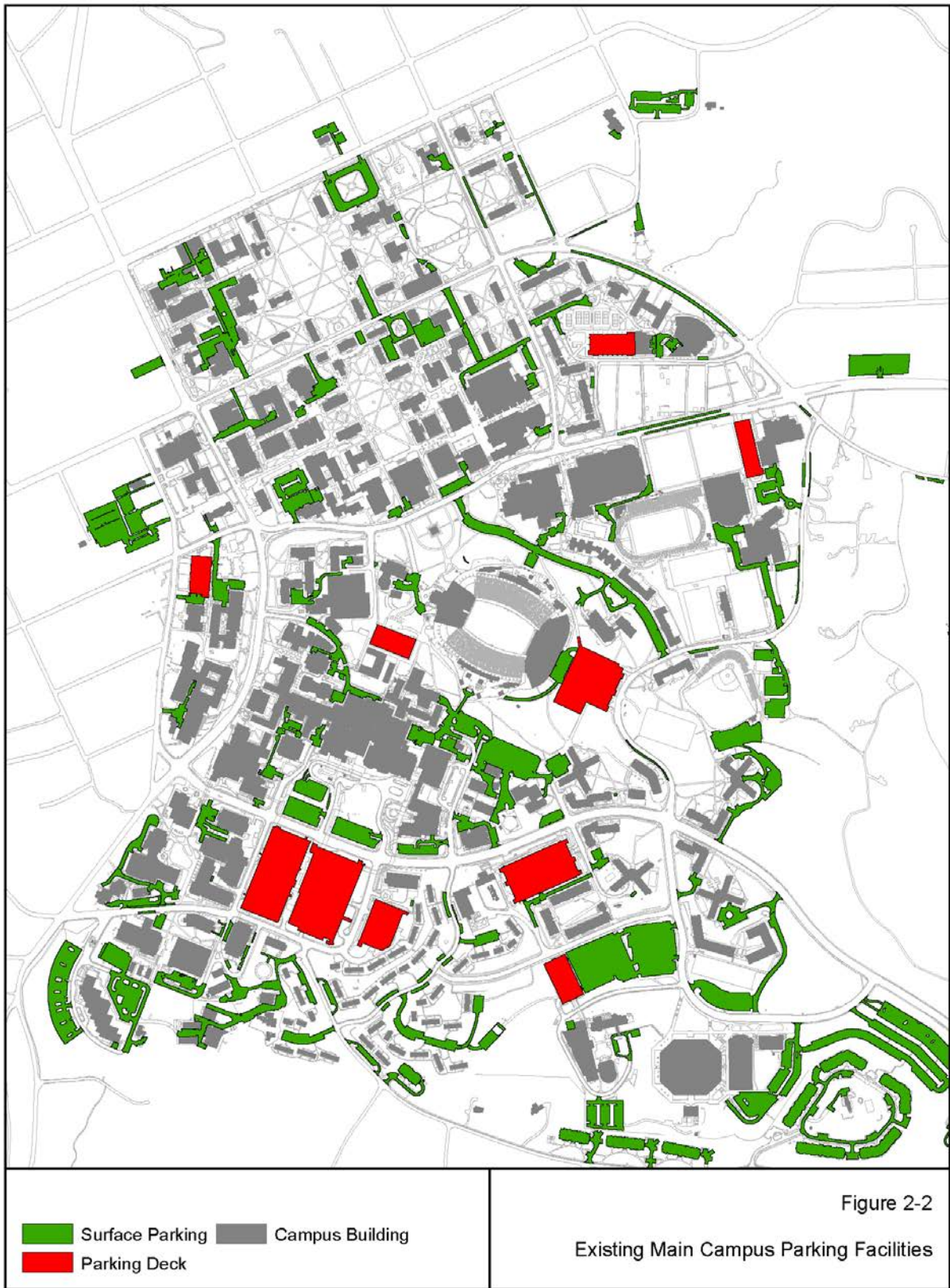


Table 2-4: Parking Impacts of Development Plan

| Lot / Project Name | Number of Spaces ^{1,2} | | | | | | | |
|---|---------------------------------|------------|-------------------|------------------|---------------------------|--------------|----------|--------------|
| | Parking Zone | Employee | Commuting Student | Resident Student | Student in Family Housing | Visitor | Other | Net Change |
| ACC (new structure) | | | | | | 198 | | 198 |
| Bell Tower (new structure) | BG | 124 | | | | | | 124 |
| Bowles | S11 | -471 | -157 | | | | | -628 |
| Cameron/Swain (Arts Common Deck - new structure) | ND1/NG1 | -154 | | | | 270 | | 116 |
| Cobb/Joyner (new structure and surface parking) | | 126 | -33 | | | -6 | -8 | 79 |
| Craige Surface | CD | -212 | | -37 | | | | -249 |
| Craige Deck Expansion | CD | 990 | | | | | | 990 |
| Dental School | S6 | -53 | | | | | | -53 |
| Glaxo / Housing Support / MFM / MRI | S6 | -46 | | | | | | -46 |
| Gravely (NC H&C) (new structure) | CG | -135 | | | | 730 | | 595 |
| Hanes | | | | | | -48 | 16 | -32 |
| Hinton James | M | | | -250 | | | | -250 |
| ITS | | -29 | | | | -2 | 24 | -7 |
| Jackson Deck (new structure) | | 606 | 100 | | -54 | | | 652 |
| Kenan/McColl Visitor Parking | | | | | | -40 | | -40 |
| McCauley Street (Global Education Deck - new structure) | W | -20 | | | | | | -20 |
| Neurosciences | CG | -158 | | | | 50 | | -108 |
| North Medical Drive | | | | | | | -26 | -26 |
| Porthole | N2 | -40 | | | | | | -40 |
| Rams Head (new structure) | S5 | -16 | | | | 303 | | 287 |
| Stadium Drive | S4 | | | | | | | 0 |
| Sitterson | NG2 | -135 | | | | | | -135 |
| South Chiller | S6 | -129 | | | | | | -129 |
| Student Family Housing | MR/MR2 | | | | 79 | | | 79 |
| Tennis Court Deck (new structure) | | 231 | | | | | | 231 |
| Wilson Library | N8 | -41 | | | | | | -41 |
| Subtotal | | 438 | -90 | -287 | 25 | 1,455 | 6 | 1,547 |
| Unassigned spaces ³ | | 32 | | | | | | 32 |
| Total | | | | | | | | 1,579 |

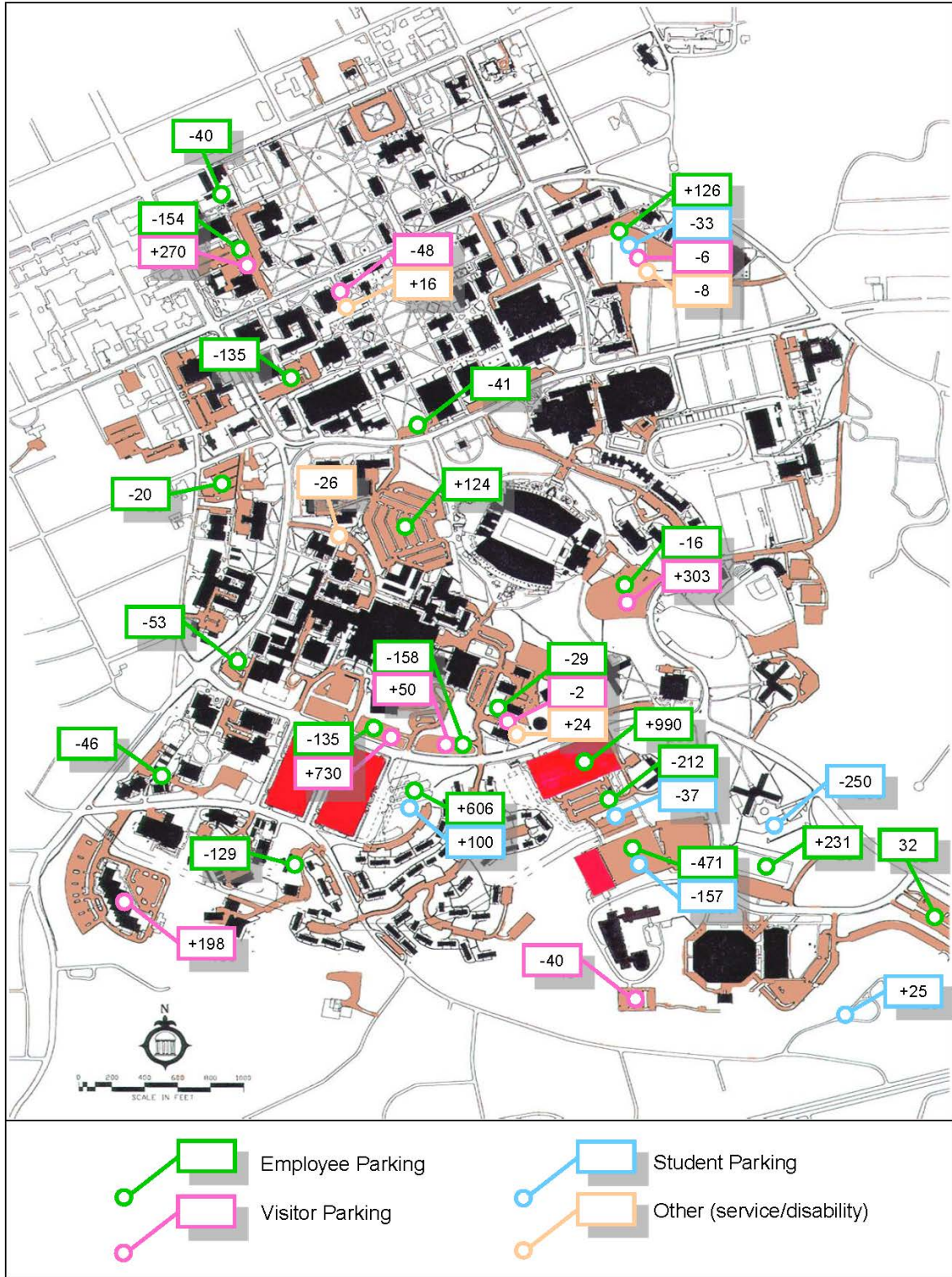
Notes:

1. Numbers are subject to change, depending on the final footprint of each project.
2. These numbers represent net changes only. For example, the Rams Head structure has 700 spaces, but 413 were displaced as a result of its construction. The net impact, which is shown in this table, is 287 spaces.
3. Spaces not assigned to a specific location on the campus and whose location(s) will be determined in future development plan modification request. The total net change in parking is 32 spaces less than the approved 1,579 space increase, but the traffic assessment accounts for the entire 1,579 space net increase.

Table 2-5: Summary of New Parking Decks in Development Plan

| Facility | Spaces |
|------------------------------------|--------------|
| ACC | 350 |
| Bell Tower | 710 |
| Cameron (Arts Common) | 330 |
| Cobb/Joyner | 450 |
| Craige Expansion | 990 |
| Jackson Circle | 800 |
| McCauley (Global Education Center) | 134 |
| NC H&C (Gravely) | 730 |
| Rams Head | 700 |
| Tennis Court | 231 |
| Total | 5,425 |

Figure 2-3: Parking Impacts of Development Plan



Unassigned Spaces

The 32 unassigned spaces mentioned in the previous section indicate the difference between the approved net increase of 1,579 parking spaces and the current number of 1,547. In the February 2006 Update, there were 331 unassigned spaces. In Modification No.3, those 331 spaces were assigned to the new Tennis Court deck and to an expansion of the Craige Deck, leaving no spaces unassigned. The current figure of 32 unassigned spaces reflects the actual parking changes from Development Plan projects that have occurred since the 2006 Update. This is consistent with the 2015 update.

The traffic assessment element of this report must account for the entire approved 1,579 space increase in Development Plan traffic, so the 32 unassigned spaces were added to bring the total to 1,579. For this report, these spaces have been assigned to the former Manning Deck site but it is recognized that this deck will not be constructed during the Development Plan period. The actual locations for these spaces will be included in future Development Plan modification requests.

2.2.4 Actual Parking Space Impacts of Development Plan Projects

Table 2-6 shows the actual parking space impacts of Development Plan projects in 2001/2 through 2015/16, plus the planned impacts in 2016/17, and how these compare to the projected changes shown in previous updates. The major differences are due to changes in project schedules, with the timing of the parking impacts changing accordingly. It is important to note that where projected losses exceed actual ones, the losses still will occur, just not as early as was projected in the previous plan update.

Table 2-6: Actual Parking Impacts of Development Plan Projects (2001/2 – 2016/17)

| User Group | 2001/2 | | 2002/3 | | 2003/4 | | 2004/5 | | 2005/6 | | 2006/7 | | 2007/8 | | 2008/9 | | 2009/10 | |
|---------------------------|----------|------------|-------------|-------------|-------------|-------------|------------|------------|-------------|-------------|------------|------------|-------------|--------------|-------------|-------------|-----------|-----------|
| | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected |
| Employee | 0 | 0 | -258 | -200 | -116 | -307 | -712 | -512 | 198 | -232 | 680 | -34 | -675 | 1,605 | -40 | -40 | 0 | 0 |
| Commuting Student | 0 | 0 | -90 | -298 | 0 | 0 | 57 | 57 | 0 | -57 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Resident Student | 0 | 0 | 0 | 0 | 0 | -56 | -287 | -11 | 0 | -278 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Student in Family Housing | 0 | 0 | 0 | 0 | 0 | -428 | 436 | 456 | -411 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| University Visitor | 0 | -48 | -97 | -154 | -48 | -68 | 392 | 392 | 0 | -80 | 0 | 250 | 0 | 0 | -60 | -60 | 0 | 0 |
| Hospitals Visitor | 0 | 0 | 0 | -152 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 50 |
| Other | 0 | -20 | -49 | -30 | 0 | 0 | 22 | 6 | 0 | 23 | 33 | 27 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | -68 | -494 | -834 | -164 | -859 | -92 | 388 | -213 | -624 | 813 | 243 | -675 | 1,605 | -100 | -100 | 50 | 50 |

| User Group | 2010/11 | | 2011/12 | | 2012/13 | | 2013/14 | | 2014/15 | | 2015/16 | | 2016/17 | |
|---------------------------|------------|------------|----------|-----------|----------|-----------|-------------|-------------|--------------|--------------|----------|-----------|----------|-----------|
| | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Actual | Projected | Planned | Projected |
| Employee | 746 | 746 | 0 | 0 | 0 | 0 | -400 | -400 | 1,390 | 1,390 | 0 | 0 | 0 | 0 |
| Commuting Student | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Resident Student | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Student in Family Housing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| University Visitor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hospitals Visitor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 746 | 746 | 0 | 0 | 0 | 0 | -400 | -400 | 1,390 | 1,390 | 0 | 0 | 0 | 0 |

Notes:

1. Parking changes do not include impacts of non-Development Plan projects.
2. These are net changes, reflecting permanent and temporary space changes.
3. Projected numbers for 2001/2 and 2002/3 are those that were in the 2002 and 2004 updates.
 Projected numbers for 2003/4, 2004/5 and 2005/6 are those that were in the 2004 update.
 Projected numbers for 2006/7 and 2007/8 are those that were in the 2006 update.
 Projected numbers for 2007/8, 2008/9 and 2009/10 are those that were in the 2009 update.
 Projected numbers for 2010/11 are those that were in the 2011 update.

2.2.5 Future Parking Demand

Table 2-7 summarizes the demand for Main Campus parking spaces by user group based on current demand, projected employee growth rates, and parking impacts of the Development Plan. The findings of this table are summarized in this section.

**Table 2-7: 2022 Main Campus Parking Impact Summary
(Commuter and Patient/Visitor only)**

| A. | Employee ¹ | Student | | Total |
|--|-----------------------|--------------|--------------|----------------|
| | | Resident | Commuter | |
| Existing ratio of Main Campus spaces to population ² | 0.61 | 0.08 | 0.09 | |
| Future Population Increases (2001 - 2022) | 8,203 | 2,041 | 3,862 | |
| Future New Main Campus Parking Demand ³ | 5,042 | 164 | 333 | 5,539 |
| Net Parking Provided in Development Plan ⁴ | 470 | (287) | (90) | 93 |
| (Shortage)/Surplus ⁵ | (4,572) | (451) | (423) | (5,446) |
| <i>compared to (Shortage)/Surplus in 2006 Update⁸</i> | <i>(2,250)</i> | <i>(505)</i> | <i>(205)</i> | <i>(2,960)</i> |

| B. | Patient/Visitor | | Total |
|--|-----------------|------------|----------------|
| | Hospitals | University | |
| Existing Demand ⁶ | 1,755 | 920 | 2,675 |
| Future Growth (2001-2022) ⁷ | 1.37 | 0.49 | -- |
| Future New Demand | 2,403 | 448 | 2,850 |
| Net Parking Provided in Development Plan | 978 | 477 | 1,455 |
| Existing Empty Spaces ⁹ | 250 | 0 | 250 |
| (Shortage)/Surplus | (1,175) | 29 | (1,145) |
| <i>compared to (Shortage)/Surplus in 2006 Update</i> | <i>(44)</i> | <i>54</i> | <i>10</i> |

¹ Employees working on Main Campus Only. Parking permits for "prime remote" locations were used to estimate the number of employees working off-campus (9 percent). It is assumed that these employees get parking spaces.

² Assumes that parking is satisfied according to existing (2001/2002) ratio of spaces to population.

³ Calculated by multiplying future increase by existing ratio of spaces to population.

⁴ See Table 2-4. Excludes the changes in student family housing and "other" spaces. Employee figure includes the "unassigned" spaces.

⁵ It is assumed that no additional (net) student parking will be provided on Main Campus. Any unsatisfied demand must be accommodated by use of alternative modes, park-and-ride, or storage lots.

⁶ Existing occupied spaces. Based on Year 2000 data. Corrected figures. The original Development Plan and subsequent updates had incorrectly allocated some spaces to University visitors rather than Hospital patients/visitors.

⁷ Hospitals patient/visitor growth based on 2010 projections. University visitor growth assumed to equal growth in occupiable square footage (approximately 49 percent).

⁸ In the original Development plan and subsequent updates, the employee population increase was listed as the full growth number (5,034) instead of the Main Campus growth (4,581). This also affected the "shortage/surplus" line. This table shows the corrected data in the "compared to (Shortage)/Surplus in 2006 update" line. The current forecast is unaffected.

⁹ An estimated 250 patient/visitor spaces were empty in the Dogwood Deck in 2000. These are not included in the existing demand figure. The empty spaces were erroneously omitted from previous updates.

Employees

University and Hospitals employment on Main Campus is projected to increase by 8,203 employees by 2022, over the twenty-two year timeframe of the Development Plan. If parking were provided at the 2001 ratio of 0.61 Main Campus spaces per employee, approximately 5,042 more spaces would be needed on Main Campus to support the Development Plan. Of the net increase of 1,579 spaces, 470 are allocated to employees. Therefore, by 2022, there would be a net shortage of approximately 4,572 Main Campus parking spaces for employees.

Resident Students

Resident student enrollment is projected to increase by 2,041 students over the twenty-two-year period. If Main Campus parking for resident students were provided at the 2001 ratio of 0.08 Main Campus spaces per resident student, approximately 164 new spaces would be needed to support the increased resident enrollment. Increased parking for resident students is not provided for in the Development Plan, which actually decreases the amount of resident student parking on Main Campus. The total “shortfall” is approximately 451 spaces. These vehicles have been accommodated in the expanded RR lot.

Of the 2,041 increase in resident students, 92 will be in family housing. The Odum Village housing has been replaced with new housing on Baity Hill and along the north side of Mason Farm Road. The new housing has an additional 25 parking spaces.

Commuting Students

Commuter student enrollment is projected to increase by 3,862 students in the same timeframe. Using the same methodology as described for employees and resident students, Table 2-7 indicates an increased demand for Main Campus parking by commuting students of approximately 333 spaces. The net change in parking spaces for commuting students as a result of the Development Plan projects is a decrease of 90 spaces. Therefore, the “shortfall” is approximately 423 spaces.

Patients/Visitors

To forecast the parking demand for Hospitals and University patients and visitors, the 2001 demand (assumed to be the number of spaces occupied by patients/visitors) was projected to grow by the anticipated growth rate in number of patients and visitors for the Hospitals (137 percent) and by the growth rate in occupiable square footage (excludes parking decks) for University visitors (approximately 49 percent).

Hospitals Patients/Visitors. New patient/visitor demand is projected to be 2,403 spaces. At the start of the Development Plan, approximately 250 spaces were empty in the Dogwood Deck, and the Development Plan provides a further increase of 978 patient/visitor spaces, resulting in a projected shortfall of about 1,175 patient/visitor spaces.

University Visitors. Assuming a 49 percent increase in University visitors, there would be an increase in visitor demand for Main Campus spaces of 448 spaces. The Development Plan provides a net increase of 477 visitor spaces. Therefore, there is a projected surplus of about 29 spaces for University visitors.

2.2.6 Year-By-Year Impact

Table 2-8 builds on the information above, to show the impact of the Development Plan on parking spaces, Main Campus growth, and parking needs for each year (2001-2022). The first section of the table shows parking space impacts by year and user, based on Development Plan projects; the second section shows projected new demand by year and user, based on projected growth; and the last section of the table shows the net parking impact (spaces gained/lost minus projected new demand) by year and user.

The year-by-year numbers for spaces gained and lost (and therefore the net impacts) in Table 2-8 are different from earlier updates as a result of changes in project schedules and actual impacts from projects built so far.

The total parking “shortfall” for the 22-year plan is approximately 7,546 spaces. However, this includes about 451 spaces for resident students, whose demand will be accommodated in storage parking lots and will therefore not need to be accommodated by TDM strategies. This leaves a shortfall of about 7,095 spaces for which alternatives will need to be provided, as described in the next section.

Table 2-8: Main Campus Parking Space Analysis by Year and User

| | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | Total | |
|---|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Spaces Gained/Lost¹ | | | | | | | | | | | | | | | | | | | | | | | |
| Employee | 0 | -288 | -116 | -712 | 398 | 690 | -675 | -40 | 0 | 746 | 0 | 0 | -400 | -1,390 | 0 | 0 | 0 | 0 | 0 | -135 | -208 | -470 | |
| Commuting Student | 0 | 40 | 0 | 57 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -157 | -90 | |
| Resident Student | 0 | 0 | 0 | -287 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -287 | |
| Student Family Housing | 0 | 0 | 0 | -436 | -411 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | |
| University Visitor | 0 | 97 | -48 | 392 | 0 | 0 | -60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 477 | |
| Hospital Visitor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -152 | 1,080 | |
| Other ² | 0 | -49 | 0 | 22 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | |
| Total Spaces Gained/Lost | 0 | -484 | -164 | -92 | -213 | 813 | -675 | -100 | 50 | 746 | 0 | 0 | -400 | -1,390 | 0 | 0 | 0 | 0 | 0 | 0 | -287 | 1,005 | 1,579 |
| Projected New Demand | | | | | | | | | | | | | | | | | | | | | | | |
| Employee | | | | | | | | | | | | | | | | | | | | | | | |
| New employees | 453 | 845 | 390 | 504 | 152 | 197 | 294 | 424 | 187 | 147 | 145 | 107 | 95 | 152 | 587 | 587 | 587 | 587 | 587 | 587 | 587 | 8,203 | |
| Existing ratio (spaces to empl.) | 0.61 | | | | | | | | | | | | | | | | | | | | | | |
| Projected new demand | 278 | 519 | 240 | 310 | 93 | 121 | 181 | 261 | 115 | 90 | 89 | 66 | 58 | 93 | 361 | 361 | 361 | 361 | 361 | 361 | 361 | 5,042 | |
| Students | | | | | | | | | | | | | | | | | | | | | | | |
| Commuting Student | | | | | | | | | | | | | | | | | | | | | | | |
| New comm. Students ³ | 592 | 334 | 164 | 511 | 380 | -162 | 3 | 108 | 146 | 112 | 111 | 94 | 68 | 73 | 190 | 190 | 190 | 190 | 190 | 190 | 190 | 3,962 | |
| Existing ratio | 0.09 | | | | | | | | | | | | | | | | | | | | | | |
| Projected new demand | 51 | 29 | 14 | 44 | 33 | 14 | 0 | 9 | 13 | 10 | 10 | 8 | 6 | 6 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 333 | |
| Resident Student | | | | | | | | | | | | | | | | | | | | | | | |
| New res. students | 0 | 230 | 167 | 8 | 18 | 633 | -146 | 344 | 157 | 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,041 | |
| Existing ratio | 0.08 | | | | | | | | | | | | | | | | | | | | | | |
| Projected new demand | 0 | 18 | 13 | 1 | 1 | 48 | 33 | 28 | 13 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 164 | |
| University Visitor | | | | | | | | | | | | | | | | | | | | | | | |
| Existing visitor spaces ⁴ | 920 | | | | | | | | | | | | | | | | | | | | | | |
| Projected annual growth rate | 0.02 | | | | | | | | | | | | | | | | | | | | | | |
| Projected new demand ⁵ | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 448 | |
| Hospital Patient/Visitor | | | | | | | | | | | | | | | | | | | | | | | |
| Existing patient/visitor demands ⁶ | 1,755 | | | | | | | | | | | | | | | | | | | | | | |
| Projected annual growth rate | 0.09 | | | | | | | | | | | | | | | | | | | | | | |
| Projected new demand ⁷ | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 1,377 | |
| Absorbed by existing vacant spaces ⁸ | 156 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 250 | |
| Net new demand | 4 | 68 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 3,114 | |
| Total New Demand | 315 | 654 | 449 | 536 | 309 | 337 | 396 | 479 | 322 | 289 | 280 | 255 | 246 | 281 | 559 | 559 | 559 | 559 | 559 | 559 | 559 | 9,100 | |
| Net Impact | | | | | | | | | | | | | | | | | | | | | | | |
| Employee | -278 | -777 | -356 | -1,022 | 105 | 559 | -856 | -301 | -115 | 656 | -89 | -66 | -458 | -1,297 | -361 | -361 | -361 | -361 | -361 | -361 | -361 | -4,572 | |
| Commuting Student | -51 | -119 | -14 | -13 | -33 | -114 | 0 | -9 | -13 | -10 | -10 | -8 | -6 | -6 | -16 | -16 | -16 | -16 | -16 | -16 | -16 | -423 | |
| Resident Student | 0 | -18 | -13 | -288 | -1 | 48 | -33 | -28 | -13 | -8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -451 | |
| University Visitor | -21 | -118 | -69 | 371 | 21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | -21 | 269 | |
| Hospital Patient/Visitor | -4 | 66 | -160 | -160 | -160 | -160 | -160 | -160 | -110 | -160 | -160 | -160 | -160 | -160 | -160 | -160 | -160 | -160 | -160 | -160 | -160 | -2,156 | |
| Other | 0 | -49 | 0 | 22 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | |
| All Users (annual impact)⁹ | -355 | -1,148 | -613 | -1,064 | -111 | 476 | -1,071 | -579 | -272 | 457 | -280 | -255 | -246 | -281 | -569 | -569 | -569 | -569 | -569 | -569 | -569 | -569 | -7,546 |
| All Users (cumulative impact)¹⁰ | -355 | -1,503 | -2,116 | -3,180 | -3,281 | -2,815 | -3,888 | -4,165 | -4,737 | -4,280 | -4,850 | -4,816 | -5,451 | -6,353 | -6,470 | -6,029 | -6,888 | -7,447 | -7,993 | -7,546 | -7,546 | -7,546 | |
| Annual Impact less res. students | -355 | -1,130 | -569 | -776 | -110 | 524 | -1,037 | -651 | -259 | 464 | -280 | -255 | -246 | -281 | -569 | -569 | -569 | -569 | -569 | -569 | -569 | -7,095 | |

The numbers for section one of the table were derived by calculating the spaces gained or lost, by user group, for each project in the University's Development Plan. The year is the parking permit year or when the effect will be realized. The numbers for section two of the table are the net loss of parking in a particular year and the number reflects a net gain of parking. The last cell in this section shows that there is an overall net gain of 1,579 parking spaces over the course of the Development Plan.

For each subcategory under "Projected New Demand," Row 1 shows the population by user group for each year of the Development Plan. Row 2 is the existing ratio at which a particular user group currently is assigned parking spaces on Main Campus (e.g., in 2000 there was 0.61 space for each employee, 0.09 space for each commuting student, etc.). Row 3 shows the projected annual growth rate for each user group, assuming the existing parking ratios.

A negative number means the population for a particular user group is expected to decrease in that year and, therefore, the projected annual growth rate is expected to decrease. This only occurs with commuting students in years when new on-campus housing becomes available and some commuting students are expected to become resident students. For visitors and patients, the projected growth rate over the 22-year period was assumed.

The result of this analysis is that over the 15-year Development Plan period, it is projected that there will be new demand for 9100 Main Campus parking spaces.

The net impact reflects the projected new demand plus the spaces gained or lost for each user group on an annual basis. For example, in Year 2002/03, there was a net loss of 288 spaces for employees and an estimated new demand of 519 spaces. Therefore, the net impact for employee parking in 2002/03 was a gain of 231 spaces. The net impact for all users is shown in the last column of the table. Because this parking will be provided in storage lots and will not need to be accommodated by park-and-ride and other TDM strategies.

The overall total indicates that 7095 parking spaces will need to be addressed through alternative modes.

¹ Allocation of granted permit spaces is subject to policy and can change. Negative number implies loss or shortfall.

² The "loss" actually will be a temporary transfer of spaces to employees when students move from the existing family housing site to a new one.

³ Demand for students in family housing is assumed to be satisfied through the provision of 453 spaces in the new family housing site plan. Therefore, the student family housing line item does not appear again in this spreadsheet.

⁴ Includes disability and service spaces. It is assumed that these spaces will be replaced.

⁵ Negative numbers indicate years when it is expected that some commuting students will move onto campus and become residents.

⁶ New demand for university visitors was calculated by applying the forecast average annual employee growth rate to the existing number of university visitor spaces.

⁷ Does not include student family housing spaces.

⁸ Corrected figures. The original Development Plan and subsequent updates had incorrectly allocated some spaces to University visitors rather than Hospital patient/visitor spaces.

⁹ The original Development Plan also reported that 2,500 existing patient/visitor spaces were vacant and would therefore contribute toward meeting new demand. This was omitted from the 2002 Update (in which this table first appeared) and subsequent updates.

3.0 TRIP GENERATION AND REDUCTION STRATEGIES

This section updates trip generation and the proposed trip reduction strategies and their estimated impacts. As required by the *Transportation Impact Analysis Guidelines*, vehicular trip generation was first calculated assuming the Development Plan was a hypothetical, suburban development where no or very limited trip reduction strategies applied. The impacts of the proposed trip reduction strategies that are integral to the Development Plan are then calculated for comparison purposes.

The remainder of this section describes the various strategies that are proposed to address the limited employee and student parking increases in the Development Plan, and their impact on alternative modes. The air quality impacts of these strategies also are estimated.

Updates to this section include assessing:

- The effects of Modifications No.1 - No.3 changes to the Development Plan (which also have changed the year-by-year parking shortfalls and associated park-and-ride needs).
- The results of a Commuter Survey undertaken in spring 2017.
- Changes in current use of park-and-ride with the new park-and-ride fees introduced in fall 2013.
- New transit ridership, bicycle, and pedestrian counts.
- Refinements to the projections of future mode splits (i.e., how many commuters may be traveling to the campus in 2022), based on the results of the spring 2017 University Commuter Survey.
- Population and mode estimates to 2022, not 2015 as in previous updates.

3.1 ESTIMATED VEHICULAR TRIP REDUCTIONS

As required by the *Transportation Impact Analysis Guidelines*, an estimate of the impact of the proposed trip reduction strategies on the amount of vehicular trips that will be generated by the Development Plan has been made by comparing it with a similar, hypothetical development where no, or very limited, trip reduction strategies applied.

3.1.1 Trip Generation Based on the Institute of Transportation Engineers Trip Generation Manual

The amount of vehicular traffic that could be generated by the Development Plan if it were a typical suburban development was estimated using trip rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th Edition). The ITE *Trip Generation Manual* is the standard document used by traffic engineers for estimating the amount of traffic that will be generated by a new development for projects across the U.S, including Chapel Hill.

Trips were estimated for the A.M. and P.M. peak hours, and for a typical weekday (24-hour period) using the following land use categories that are included in the ITE manual:

- University/College (ITE Land Use Code 550) for all academic-related buildings (buildings referred to as Academic, Cultural, Office and Student Life in the Development Plan).
- Research and Development (ITE Land Use Code 760) for all buildings referred to as Research in the Development Plan.
- Hospital (ITE Land Use Code 610) for all buildings referred to as UNC Healthcare in the Development Plan.
- Supermarket (ITE Land Use Code 850) for the convenience store in the Rams Head project (even though almost all customers walk to the store).
- Apartments (ITE Land Use Code 220) for the 398 family housing units and 1,000 beds.

These land uses, the basis for estimating vehicular trips, and the generated trips are shown in Table 3-1. The following should be noted:

- The increase in the number of students is used as the basis for estimating traffic generated by the University/College. (Estimating traffic by taking the difference in traffic generated by the existing enrollment and the future enrollment yields a very similar answer.)
- The store is assumed to be a typical suburban facility for the purpose of determining ITE traffic generation.
- The ITE housing category of apartments is used for all housing by assuming for trip generation purposes that (a) each non-family residential housing unit, which has four beds (for a total of 1,000), is roughly equivalent to two apartments (i.e., a total of 500), and (b) each of the 398 family housing units is equivalent to one apartment.

3.1.2 Reduced Parking

The ITE analysis provides an estimate of the vehicular trips that would be generated in a suburban setting without trip reduction measures. Obviously, the University has for many years been employing trip reduction strategies that would result in the Development Plan generating less traffic than the above analysis. These include limiting parking and supporting the Town's transit and park-and-ride systems. At the inception of the Development Plan, there were only approximately 0.61 spaces on Main Campus for every Main Campus University/Hospitals employee (or a ratio of Main Campus parking spaces to employees of 0.61). In addition, freshmen are not eligible for a permit.

An integral element of the adopted Main Campus Master Plan is to minimize the increase in Main Campus parking as the campus grows, by promoting and increasing the use of alternative forms of transportation. The parking and transportation initiatives that are inherent in the Development Plan are consistent with the transportation strategy for the Master Plan.

Table 3-1: ITE Trip Generation Rates

| ITE Land Use Code | USE | Gsf/Units | ITE MANUAL RATES* | | | |
|------------------------|------------------------|--------------------|-------------------|--------------|--------------|--------------|
| | | | ADT | AM Enter | AM Exit | AM Total |
| 550 | University/College | 5,903 students | 12,059 | 823 | 232 | 1,055 |
| 760 | Research & Dev. Center | 787,400 sf | 5,569 | 649 | 133 | 782 |
| 610 | Hospital | 961,350 sf | 9,567 | 484 | 284 | 767 |
| 850 | Supermarket | 10,000 sf | 2,061 | 21 | 13 | 34 |
| 220 | Apartments | 898 dwelling units | 5,565 | 89 | 355 | 444 |
| LAND USE TOTALS | | | 34,821 | 2,065 | 1,017 | 3,082 |

| ITE Land Use Code | USE | Gsf/Units | ITE MANUAL RATES* | | | |
|------------------------|------------------------|--------------------|-------------------|--------------|--------------|--------------|
| | | | ADT | PM Enter | PM Exit | PM Total |
| 550 | University/College | 5,903 students | 12,059 | 375 | 797 | 1,172 |
| 760 | Research & Dev. Center | 787,400 sf | 5,569 | 110 | 622 | 731 |
| 610 | Hospital | 961,350 sf | 9,567 | 284 | 463 | 747 |
| 850 | Supermarket | 10,000 sf | 2,061 | 72 | 69 | 142 |
| 220 | Apartments | 898 dwelling units | 5,565 | 333 | 179 | 512 |
| LAND USE TOTALS | | | 34,821 | 1,173 | 2,130 | 3,303 |

*Trip Generation Manual, 9th Edition, Institute of Transportation Engineers.

The increase in Main Campus employee and student parking accompanying the Development Plan is significantly less than current ratios. Therefore, an increased proportion of employees and students will need to use alternative modes to commute to campus. The increased use of alternatives is commensurate with the reduced amount of parking.

The estimated parking “shortfalls” are described in Section 2.2.5.

It should be noted that trip reduction strategies apply to students and employees only. The needs of visitors, particularly hospital patients and visitors, will continue to be satisfied.

3.1.3 Vehicular Trip Reduction

The vehicular trips that would have been generated by the “shortfall” spaces (approximately 7,550 spaces, of which 7,100 would have been commuter spaces) represent the reduction in campus traffic compared to providing parking at 2001 ratios, while the employees and students that would have used these spaces represent the required increase in use of alternatives modes. As indicated earlier, the Development Plan results in a net increase of 1,579 spaces on Main Campus (an additional 411 employee/commuter student spaces and 1,455 visitor spaces, and a reduction of 287 resident student spaces). The net changes in parking will generate approximately 11,487 daily vehicular trips (calculated in Section 4.0), or approximately 33 percent of the amount determined using the ITE rates in Table 3-1 (34,821 daily trips).

It should also be noted that the reduced parking ratios and corresponding traffic reductions are not limited to new employees and students. Trip reduction strategies to achieve these reductions are now, and will continue to be, implemented across the entire campus population. For example, the use of alternative modes to compensate for the 7,095-space “shortfall” must entail enticing some current employees to switch from driving alone and parking on Main Campus to transit, ridesharing, or using park-and-ride.

3.2 TRIP REDUCTION STRATEGIES AND IMPACTS

As described earlier, on a typical day there will be a parking “shortfall” of approximately 7,100 commuter spaces on Main Campus. This shortfall must be addressed by alternative means or “trip reduction strategies”.

This section describes the trip reduction strategies, and particularly planned improvements to alternative modes, that will be employed to accommodate the commuting needs of the Development Plan. The projected impacts and use of each alternative mode also are quantified.

3.2.1 Approach to Estimating Use of Alternatives Modes

The December 2017 TIA has been updated based on new population projections, more recent survey data, and counts to refine what modes the Development Plan commuters and the overall commuting population would use (often referred to as the “mode split”). As noted earlier, the trip reduction measures are aimed at the entire commuting population of the campus (existing and future), and not just the new commuters.

The results of the revised mode split analysis are summarized in Table 3-2. The analysis initially, hypothetically, assumes that the trip reduction measures that are implicit in the Development Plan and needed to address the reduced parking apply only to new commuters. In reality they will apply to all commuters since all parking is pooled and there will be no distinction between new and existing commuters. The final columns show the aggregate mode split for all campus commuters. The assumptions and explanations for the calculations are shown in the footnotes to the table.

This table has appeared in all previous updates, and has been adjusted based on the findings of the 2017 Commuter Survey and population projections to 2022. Table 3-3 shows a comparison of mode splits from the 2001, 2004, 2007, 2009, 2011, 2013, 2015, and 2017 surveys, as well as the projected 2022 mode split. The 2017 survey provides a snapshot of progress part way into the Development Plan, which was used to adjust the projected utilization of some of the modes.

Table 3-2: Estimated Mode Splits for New Main Campus Commuters

| Number | New Employees ¹ 8,203 | | | New Commuting Students ¹ 3,862 | | | Total New Commuters ¹ 12,065 | | | Total All Commuters ¹ 21,249 | |
|--|-------------------------------------|--------------------|---------------------|--|--------------------|---------------------|--|-------------|---------------------|--|-------------|
| | Existing (2001) Ratios | Ratio ² | Number ⁴ | Existing (2001) Ratios | Ratio ² | Number ⁴ | Existing Ratios | New Ratios | Number ⁴ | Ratio | Ratios |
| Drive alone ⁵ | 0.72 | 5,882 | 0.01 | 0.19 | 734 | 0.00 | 0 | 0.00 | 117 | 0.01 | 0.45 |
| Drive carpool/vanpool ⁶ | 0.02 | 186 | 0.04 | 0.03 | 103 | 0.03 | 103 | 0.03 | 289 | 0.04 | 0.03 |
| Rideshare (passengers only - carpool & van) ⁶ | 0.04 | 330 | 0.07 | 0.05 | 183 | 0.05 | 183 | 0.05 | 513 | 0.07 | 0.05 |
| CHT ⁷ | 0.05 | 394 | 0.32 | 0.33 | 1,274 | 0.65 | 2,529 | 0.65 | 1,668 | 0.43 | 0.15 |
| Regional Transit ⁸ | 0.01 | 121 | 0.26 | 0.01 | 46 | 0.05 | 196 | 0.05 | 167 | 0.19 | 0.39 |
| Bicycle ⁹ | 0.03 | 262 | 0.04 | 0.09 | 333 | 0.07 | 283 | 0.07 | 595 | 0.05 | 0.03 |
| Walk ⁹ | 0.02 | 150 | 0.02 | 0.12 | 481 | 0.06 | 231 | 0.06 | 631 | 0.03 | 0.02 |
| Park-and-ride ¹⁰ | 0.07 | 541 | 0.19 | 0.12 | 463 | 0.02 | 96 | 0.02 | 1,005 | 0.14 | 0.10 |
| Other ¹¹ | 0.04 | 336 | 0.04 | 0.06 | 241 | 0.06 | 241 | 0.06 | 577 | 0.05 | 0.06 |
| TOTAL | 1.00 | 8,203 | 1.00 | 1.00 | 3,858 | 1.00 | 3,862 | 1.00 | 12,061 | 1.00 | 1.00 |

Notes:

- Ratios for new commuters hypothetically assume all additional diversion to alternatives is by new commuters only. In reality, new commuters will be treated no differently than existing commuters. More existing commuters will also be required to switch to other modes of travel. Last two columns in table show final impact for all commuters. Assuming strategies apply to new commuters only also distorts needs, e.g., almost all diversion must be for employees since (a) the proportional growth in employees is much higher than students (31% versus 14%), and (b) students already use alternative modes more.
- Existing ratios are for pre-Development Plan and based on a November 2001 commuter survey.
- New ratios are derived from numbers in next column (i.e., projected users of a particular mode calculated first), and have been adjusted based on 2017 Commuter Survey.
- Note that numbers are for all new commuters, and not just for number of commuters on a typical day (which is approximately 20% lower).
- Numbers should be divided to calculate users on a particular day by - 1.25
 Numbers for New Ratios include (a) growth in use of alternatives modes based on current mode split, (b) increased use resulting from strategies (adjusted for 2017 Commuter Survey).
 Current (2001) main campus employment = 13,016
 Employee growth in Development Plan = 63%
 Current (2001) commuter students = 17,628
 Commuter student growth in Development Plan = 22%
 Current drive alone ratio includes permit parking and parking in private and Town lots.
- 2001 Commuter Survey drive alone ratio for commuting students (0.33) used in previous updates exceeded permit allocation. Reduced to 0.25 and CHT increased from 0.20 to 0.28 based on 2004 Survey. The existing drive alone ratio was further reduced to 0.19 based on the 2011 Survey, and the CHT ratio was increased to 0.33.
 New ratio for commuting students assumes zero parking added for them. In fact, Development Plan results in net loss of 90 spaces for commuting students.
 Commuters survey indicates average vehicle occupancy for carpools and vanpools = 3.0 Assume additional 2% of employees rideshare = 424 employees. Applying avg. veh. occupancy, this is equivalent to 141 additional rideshare vehicles (or drivers)
 Increase in ridesharing rate assumed for employees only. Therefore total new employees who rideshare are sum of (a) using existing ratios = 186 drivers, 330 passengers and (b) additional 141 drivers and 283 passengers (using avg. vehicle occupancy).
 Additional 438 empl spaces is equivalent to 548 permit holders, used accordingly:
 (Table 2-4)
 - existing growth ratio for rideshare drivers 186
 - (additional rideshare vehicle drivers) 141
 - (additional student rideshare drivers) 103
 Therefore 117 - permits available for drive alone employees.
 Employee transit users for new ratio equals 117
- 3,518 increase in local transit use for new ratio = 2,263 employees and 1,255 students. Similar calculation for students.
- users with existing ratio (394) plus 2,263 X 1.25 = 3,222 new persons. Similar calculation for students.
- Additional regional transit users (2,150) assumed to be employees (2,000) and commuting students (150). Employee users for new ratio equals users with existing ratio (121) plus 2,000 additional daily riders (or 2,000 X 1.25 = 2,621 persons). Similar calculation for students.
- No change in ratios is assumed in for walking and "other" for employees (worst-case assumption to ensure adequate transit and park-and-ride provided). Bike usage did not change in 2017 survey; no change in target was assumed.
- Park-and-ride estimates based on what remains after other modes addressed (i.e., for employees to total 8,203 and students to total 3,862). This is equivalent to 667 users over and above the growth based on existing ratios, or 534 spaces.
 Total park-and-ride requirement is for 1,672 users, or 1,338 spaces, of which 804 represent "natural" growth.
- Other includes dropped off, motorcycle, etc.
- Population projections were updated in 2015 to extend to 2022.

Table 3-3: Existing and Target Mode Splits

| Mode | Employees | | | | | | | | New Projections |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------------|
| | 2001 Ratio | 2004 Ratio | 2007 Ratio | 2009 Ratio | 2011 Ratio | 2013 Ratio | 2015 Ratio | 2017 Ratio | |
| Drive alone | 0.72 | 0.61 | 0.56 | 0.49 | 0.57 | 0.51 | 0.61 | 0.64 | 0.45 |
| Carpool/vanpool | 0.06 | 0.05 | 0.06 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.08 |
| Bus | 0.06 | 0.08 | 0.10 | 0.13 | 0.10 | 0.15 | 0.16 | 0.15 | 0.26 |
| Bicycle | 0.03 | 0.02 | 0.03 | 0.04 | 0.02 | 0.04 | 0.05 | 0.04 | 0.03 |
| Walk | 0.02 | 0.02 | 0.03 | 0.03 | 0.02 | 0.03 | 0.01 | 0.02 | 0.02 |
| Park-and-ride | 0.07 | 0.15 | 0.16 | 0.17 | 0.18 | 0.16 | 0.07 | 0.05 | 0.11 |
| Other | 0.04 | 0.06 | 0.07 | 0.07 | 0.05 | 0.07 | 0.05 | 0.04 | 0.04 |

| Mode | Commuting Students | | | | | | | | New Projections |
|-----------------|--------------------|------------|------------|------------|------------|------------|------------|------------|-----------------|
| | 2001 Ratio | 2004 Ratio | 2007 Ratio | 2009 Ratio | 2011 Ratio | 2013 Ratio | 2015 Ratio | 2017 Ratio | |
| Drive alone | 0.33 | 0.19 | 0.18 | 0.17 | 0.14 | 0.16 | 0.18 | 0.25 | 0.16 |
| Carpool/vanpool | 0.08 | 0.07 | 0.08 | 0.03 | 0.04 | 0.04 | 0.03 | 0.02 | 0.08 |
| Bus | 0.21 | 0.34 | 0.35 | 0.39 | 0.42 | 0.37 | 0.51 | 0.39 | 0.41 |
| Bicycle | 0.09 | 0.05 | 0.06 | 0.11 | 0.10 | 0.08 | 0.13 | 0.13 | 0.08 |
| Walk | 0.12 | 0.14 | 0.14 | 0.12 | 0.11 | 0.15 | 0.05 | 0.09 | 0.11 |
| Park-and-ride | 0.12 | 0.16 | 0.10 | 0.14 | 0.15 | 0.12 | 0.06 | 0.06 | 0.10 |
| Other | 0.06 | 0.06 | 0.09 | 0.05 | 0.05 | 0.08 | 0.04 | 0.06 | 0.06 |

Notes

1. "Carpool/vanpool" includes drivers and passengers.
2. "Bus" includes Chapel Hill Transit and Regional Transit.
3. "Other" includes motorcycles, dropped off, work from home, etc.
4. Existing ratios are based on Tuesday data from the Commuter Survey

The following notes apply to updated Table 3-3:

- The use of alternative modes, in most cases, includes the proportion of commuters who would use those modes based on current mode split (e.g., if the number of employees increases by 31%, then use of CHT by employees can be expected to increase by 31% without expanded trip reduction strategies).
- The numbers represent all new commuters (employees and students). Using the parking oversell ratio (1.25 permits sold for every commuter space) as a guide to the number of commuters who are on campus on typical day, on a typical day approximately 20% of commuters do not come to the campus (i.e., 100 parking spaces can accommodate 125 commuters who drive and hold a permit).

Following are highlights and conclusions for the updated table:

- Drive alone continues to be well below 2001 levels for both employees and students. This can be explained by (a) a reduction in permit parking availability on Main Campus, (b) an increase in the employee and student populations in the same period, and (c) improvements to alternative modes of travel (specifically Chapel Hill Transit, fare free programs with GoTriangle and other regional transit providers, and park-and-ride).
- The survey reveals that the proportion of commuting students driving alone to campus (excluding park-and-ride) has dropped from 33% in 2001 to 18% in 2015, with an increase in 2017 to 25%, while the original projected target was 30% (only a small

decrease was anticipated since the amount of commuting student parking on campus, and the projected increase in students, are both relatively low). The amount of parking available for commuting students on Main Campus, as well as the number of commuting students, has not changed significantly since the beginning of the Development Plan to explain this drop. This suggests that the 33% derived from the 2001 survey was an over-estimate (supported by the small number of permits actually available to students in 2001, the limited amount of commuter student parking in 2001, and the 2004 commuter survey), and has been reduced to 0.19 for developing the new projections. Use of CHT was increased from 0.28 to 0.33 to balance the mode split.

- CHT ridership has increased dramatically since 2001 (refer to Section 3.2.3), for both students and employees. Employee use of transit (CHT and regional transit) has risen from approximately six percent to approximately 15 percent. This now exceeds the target of 13 percent. Since the 2013 Survey, student use has increased from 37 percent to 51 percent, and recently dropped back to 39%.
- The higher than expected shift of students to transit suggests a reduced demand for park-and-ride for these users. This is reflected in the table.
- Carpooling and vanpooling has remained relatively constant since 2001, even with reduced parking on Main Campus. Over time, this mode can be expected to become more popular as gasoline prices increase and more employees live outside of Chapel Hill.
- No increase is assumed in walking and "other" split for employees (worst-case assumption to ensure adequate transit and park-and-ride provided). For students, no increase in cycling and walking is assumed based on the fact that there are limited opportunities for additional student housing within close distance of the campus. Again, the purpose of these worst-case assumptions is to ensure that park-and-ride is not undersupplied.

Key changes in travel projections from this updated analysis include:

- With the inclusion of population projections out to 2022, the number of commuters has increased without a corresponding increase in the number of on-campus spaces available. This has led to an increased need for travel by alternative modes, particularly transit.
- The drive alone share for pre and post-Development Plan students is substantially reduced (for reasons explained above).
- The projected use of CHT and regional transit by employees has been changed to ratios of 0.15 and 0.11 respectively.
- Park-and-ride use by employees has been decreased from 0.14 in the 2011 Update to 0.11 to reflect a drop in demand for park-and-ride (possibly due to introduction of a parking fee for park-and-ride permits).
- The total park-and-ride need for the Development Plan has increased slightly from 1,277 to 1,338 spaces (see Note 10 in Table 3-2).

The remainder of this section provides more detail on the alternatives.

3.2.2 Overview of Transportation Strategies

The transportation strategies that are inherent in the Development Plan are consistent with the overall transportation strategy that guided the preparation of the 2001 Main Campus Master Plan. These, in turn, reflect the objectives and recommendations that were developed in 1997/98 by a Parking and Transit Task Force. A clear theme of the Task Force was that the University should promote alternative modes of transportation and other initiatives such as teleworking to reduce the impact of traffic and parking on the campus. Key objectives established by the Task Force included:

- To encourage a campus and Town environment that is supportive of pedestrians and other alternative modes of transportation.
- To offer affordable, flexible, and convenient transportation options that will serve the diverse lifestyles of the campus community.
- To reduce the demand for parking on Main Campus while maintaining an adequate supply for visitors.
- To develop an efficient, comprehensive transportation system to better serve the entire University community.

Key recommendations from the Task Force were to:

- Minimize traffic on Main Campus
- Create a pedestrian-oriented environment
- Minimize new parking
- Focus on alternatives:
 - transit
 - bicycles
 - ridesharing
 - park-and-ride
 - off-campus vehicle storage
 - flexible work hours
 - teleworking

Many of the transportation strategies needed to support the Master Plan and Development Plan are not new to the University. A substantial number of employees and students now use alternative forms of transportation to travel to the campus. The University is a major financial supporter of Chapel Hill Transit (CHT). The Master Plan also allows for fixed guideway transit to ultimately serve the campus. The University has participated in the development of park-and-ride lots, and, in conjunction with the Town, cycling is being promoted and improvements are being made (included in the Master Plan).

The University has a fulltime Transportation Demand Management (TDM) manager to assist in implementing the needed strategies. This person is responsible for the Commuter Alternatives Program (CAP), an incentive program designed to encourage

University and Hospital employees and commuter students to use alternative transportation modes. Employees and students registered for CAP receive:

- Access to one-day occasional parker permits (permanent employees; one per month)
- Access to emergency ride home program
- Vanpool subsidies
- Free annual membership for Zipcar, the University's car sharing program
- Eligibility for all contests and item give-away programs
- Entry in drawings for tickets and gift certificate giveaways
- Annual GoTriangle GoPass good for fare free transit on all GoTriangle transit routes (as of 2015, temporary employees paid by the University or Hospitals are eligible to receive a GoPass); alternatively, CAP members can choose a Chatham Transit Express Pass or use the GoPass on PART routes from Guilford and Alamance counties.
- CAP email updates through the Commuter News publication

The University also prepares, on a regular basis, a Transportation Management Plan (TMP). The purpose of this plan is to develop and establish policies, procedures, and operating programs designed to minimize the number of single occupancy vehicle (SOV) trips to and from campus, and the traffic generated by these SOV trips, by increasing the alternative forms of transportation available to University employees and students. An update to the TMP was undertaken in fall 2017.

The following key strategies and, where applicable, their projected impacts, are described below for:

- Chapel Hill Transit
- Regional transit
- Ridesharing
- Teleworking
- Cycling
- Walking
- Park-and-ride

UNC uses the Zipcar car sharing program to provide employees and students with an easy, effective form of transportation when they reach campus. Zipcar is a web-based program. Cars are reserved online and the Zipcar membership card affords entry to the vehicle during the reserved period. Once inside, the member finds the key to the vehicle and a fuel card. Zipcar picks up all fuel costs, insurance fees and 180 complimentary miles per day. These vehicles are used for both hourly and multi-day rentals. Currently, the hourly cost is \$7.50 Monday-Thursday and \$8.50 per hour Friday-Sunday. There is a \$10 annual fee. Zipcar offers both personal and departmental memberships. Many departments that have relatively low mileage on

their departmental vehicles find that Zipcar provides a cost-effective alternative to leasing or purchasing vehicles through the State system.

While not strictly a strategy, one disincentive for parking on Main Campus will be the inevitable increase in parking fees that will be necessary to cover the cost of building, and operating and maintaining new parking decks. These fee increases will discourage drive-alone commuting.

3.2.3 Chapel Hill Transit

In 2001 Chapel Hill Transit (CHT) carried less than 11,000 riders on a typical weekday. Ridership has significantly increased since CHT became entirely fare-free in early 2002. Table 3-4 shows the number of daily boardings (Board) and alightings (Exit) at Main Campus stops in 1998, 2001, 2003, 2005, 2006, 2008, 2009, 2011, 2013, 2015, and 2017. The number of daily passengers (fall) are more than 26,000, a slight decrease from prior years but a large increase over 2001 ridership.

A survey of University commuters undertaken in spring 2017 found that, among respondents, more commuters are using CHT, up from five percent of employees to nine percent, and from 33 to 35 percent for students (refer to the previous section for a revised estimate of 2001 CHT use by students). Survey respondents were allowed to leave some questions unanswered, which have influenced the reported percentages below. For example, 131 students indicated that they live in Chapel Hill or Carrboro out of 177 students that answered this question (74%), however a total of 328 student surveys were submitted, suggesting that 151 students did not answer this question. Percentages reported below are representative of those who responded and not necessarily representative of the entire campus population.

The 2017 commuter survey continues to show potential for increased CHT ridership among University employees and students. Travel statistics from the survey reveal that for University employees:

- 34 percent of respondents live in Chapel Hill/Carrboro, but only 15 percent of all commuting employees use the bus to get to work directly from home
- 36 percent live within five miles of work
- 66 percent drive alone to work everyday
- 46 percent who live less than two miles from campus drive alone at least one day a week

Similar statistics for commuting student respondents show:

- 74 percent of survey respondents live in Chapel Hill/Carrboro (ignores unanswered questions)
- 28 percent of students use the bus to get to campus directly from home
- 75 percent live less than five miles from campus

Geocoding of employee and student home addresses confirmed that there are still many employees, and to lesser degree, students residing within ¼ mile of a bus route still driving to campus, as indicated in Table 3-5. Figure 3-1 and Figure 3-2, respectively, show the location of residences and the population within a quarter mile of a bus route. The conclusion is that with continued improvements and marketing there is potential for many more employees, and to some degree students, to use CHT to travel to the campus.

Table 3-4: Chapel Hill Transit Daily Boardings and Alightings

| Stop Location | 1998 | | 2001 | | 2003 | | 2005 | | 2006 | | 2009 | | 2011 | | 2013 | | 2015 | | 2017 | |
|--|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|
| | Board | Exit | Board | Exit | Board | Exit | Board | Exit | Board | Exit | Board | Exit | Board | Exit | Board | Exit | Board | Exit | Board | Exit |
| Bowles Dr @ Craige Dorm | 4 | 35 | 53 | 109 | 2 | 171 | 18 | 44 | 14 | 69 | 19 | 133 | 8 | 84 | 7 | 54 | 19 | 72 | 63 | 208 |
| Bowles Dr @ F Parking Lot driveway | | | 31 | 43 | 108 | 64 | 220 | 241 | 172 | 74 | 195 | 82 | 111 | 50 | 151 | 98 | 184 | 114 | 153 | 104 |
| Bowles Dr @ Hinton James Tennis Courts | 15 | 0 | 312 | 310 | 670 | 368 | 348 | 223 | 608 | 59 | 619 | 118 | 637 | 89 | 677 | 93 | 801 | 128 | 667 | 122 |
| Bowles Dr @ Kenan-Flagler Parking Lot | | | 105 | 219 | 0 | 115 | 9 | 126 | 2 | 96 | 5 | 123 | 3 | 110 | 3 | 93 | 2 | 79 | 3 | 86 |
| Bowles Dr @ Smith Center | 473 | 493 | 437 | 357 | 292 | 227 | 309 | 103 | 316 | 239 | 384 | 381 | 241 | 292 | 240 | 311 | 156 | 223 | 225 | 246 |
| Cameron Av @ Davie Hall/New East | 100 | 165 | 117 | 168 | | | 8 | 66 | 94 | 88 | 59 | 78 | 21 | 5 | 0 | 13 | 2 | 9 | 16 | 14 |
| Cameron Av @ Pittsboro St | 5 | 74 | 0 | 61 | 1 | 72 | 0 | 46 | 0 | 46 | 2 | 97 | 3 | 137 | 3 | 88 | 0 | 57 | 0 | 44 |
| Cameron Av @ Swain Hall | 243 | 247 | 292 | 265 | 182 | 166 | 32 | 71 | 184 | 228 | 252 | 322 | 206 | 304 | 150 | 221 | 183 | 326 | 222 | 326 |
| E Franklin St @ Coffee Shop | 718 | 424 | 514 | 338 | 820 | 454 | 756 | 409 | 736 | 581 | 757 | 481 | 655 | 426 | 692 | 413 | 638 | 392 | 381 | 172 |
| E Franklin St @ Henderson St | | | 9 | 37 | 20 | 166 | 8 | 92 | 8 | 72 | 20 | 149 | 25 | 143 | 14 | 123 | 13 | 112 | 7 | 95 |
| E Franklin St @ Planetarium | 98 | 39 | 169 | 89 | 157 | 210 | 17 | 95 | 131 | 160 | 131 | 217 | 150 | 214 | 162 | 158 | 145 | 142 | 109 | 107 |
| E Franklin St @ Raleigh St | | | 21 | 10 | 16 | 4 | 30 | 18 | 19 | 16 | 20 | 9 | 18 | 4 | 18 | 1 | 24 | 2 | 15 | 3 |
| E Franklin St @ Varsity Theatre | | | 55 | 130 | 150 | 283 | 126 | 274 | 129 | 273 | 120 | 86 | 168 | 390 | 213 | 448 | 182 | 382 | 66 | 188 |
| East Dr @ Jackson Cir | | | 6 | 30 | 2 | 10 | 79 | 100 | 16 | 19 | 160 | 79 | 53 | 92 | 57 | 101 | 33 | 84 | 24 | 66 |
| F Parking Lot - Family Practice Bldg | 31 | 80 | 22 | 42 | 21 | 74 | 183 | 32 | 44 | 128 | 48 | 79 | 34 | 76 | 36 | 96 | 54 | 99 | 73 | 87 |
| F Parking Lot - midway back to street | | | 32 | 72 | 60 | 1 | 172 | 12 | 117 | 6 | 126 | 101 | 107 | 48 | 134 | 56 | 141 | 66 | 159 | 100 |
| Manning Dr @ Craige Dorm | 1 | 2 | 130 | 337 | 25 | 139 | 317 | 324 | 49 | 66 | 119 | 148 | 70 | 115 | 44 | 91 | 37 | 119 | 234 | 180 |
| Manning Dr @ Hibbard Dr | 34 | 65 | 171 | 211 | 81 | 106 | 132 | 195 | 92 | 126 | 244 | 273 | 243 | 203 | 348 | 139 | 271 | 85 | 270 | |
| Manning Dr @ Hinton James Dorm | 354 | 835 | 0 | 2 | 54 | 389 | 60 | 211 | 133 | 350 | 158 | 463 | 128 | 423 | 141 | 437 | 216 | 520 | 137 | 368 |
| Manning Dr @ Hospital Parking Deck | | | 76 | 67 | 31 | 118 | 98 | 159 | 97 | 121 | 136 | 310 | 487 | 416 | 495 | 402 | 408 | 366 | 421 | 340 |
| Manning Dr @ Public Safety | | | | | | | | | 363 | 277 | 440 | 292 | 625 | 395 | 352 | 605 | 369 | 585 | 361 | |
| Manning Dr @ West Dr (Hospital) | | | 339 | 241 | 702 | 714 | 1102 | 755 | 1057 | 1052 | 1182 | 647 | 1298 | 1067 | 1325 | 1069 | 1082 | 961 | 889 | 813 |
| Mason Farm Rd @ Ambul Care Center | 17 | 36 | 22 | 53 | 67 | 127 | 116 | 143 | 81 | 162 | 72 | 107 | 308 | 412 | 302 | 457 | 334 | 455 | 447 | 555 |
| Mason Farm Rd @ Odum Village | | | 4 | 9 | 11 | 38 | 32 | 78 | 68 | 59 | 82 | 50 | 72 | 49 | 70 | 77 | 85 | 57 | 45 | 68 |
| N Columbia St @ W Franklin St | | | 55 | 172 | 107 | 480 | 160 | 485 | 123 | 479 | 118 | 483 | 164 | 678 | 162 | 764 | 140 | 614 | 120 | 563 |
| Pittsboro St @ Credit Union | 450 | 424 | 314 | 494 | 531 | 906 | 451 | 723 | 520 | 770 | 685 | 1003 | 784 | 1097 | 578 | 989 | 567 | 1000 | 412 | 856 |
| Pittsboro St @ Newman Center | 224 | 137 | 268 | 330 | 239 | 208 | 308 | 266 | 188 | 158 | 239 | 282 | 107 | 91 | 172 | 234 | 220 | 278 | 196 | 273 |
| Pittsboro St @ University Dr | 86 | 71 | 94 | 160 | 87 | 198 | 147 | 270 | 105 | 178 | 126 | 335 | 157 | 210 | 132 | 269 | 174 | 234 | 193 | 217 |
| Raleigh St @ Alderman Dorm | 19 | 2 | 24 | 5 | 6 | 1 | 18 | 22 | 3 | 0 | 3 | 0 | 12 | 6 | 9 | 6 | 13 | 7 | 11 | 6 |
| Raleigh St @ Connor Dorm | 71 | 30 | 244 | 607 | 83 | 525 | 57 | 221 | 44 | 113 | 30 | 43 | 24 | 8 | 26 | 7 | 37 | 42 | 73 | 14 |
| Raleigh St @ Davis Library | 125 | 132 | 488 | 146 | 51 | 127 | 65 | 137 | 40 | 69 | 80 | 25 | 15 | 28 | 5 | 1 | 9 | 7 | 3 | 22 |
| Raleigh St @ Lewis Dorm | 125 | 80 | 94 | 111 | 73 | 60 | 65 | 145 | 38 | 45 | 162 | 232 | 147 | 190 | 133 | 172 | 126 | 203 | 153 | 225 |
| Raleigh St @ Mangum Dorm | 99 | 140 | 86 | 67 | 35 | 127 | 46 | 101 | 55 | 90 | 60 | 134 | 60 | 156 | 73 | 180 | 58 | 169 | 58 | 210 |
| Raleigh St @ Spencer Dorm | 34 | 42 | 38 | 54 | 33 | 62 | 67 | 83 | 36 | 57 | 72 | 60 | 35 | 40 | 40 | 63 | 54 | 47 | 44 | 72 |
| Ridge Rd @ Avery Dorm/Law School | 10 | 1 | | | | | 30 | 47 | 13 | 10 | 12 | 64 | 16 | 21 | 20 | 19 | 22 | 31 | 23 | 20 |
| Ridge Rd @ Ehringhaus Dorm | 1115 | 26 | 556 | 39 | 559 | 15 | 366 | 182 | 423 | 8 | 618 | 52 | 582 | 43 | 400 | 25 | 508 | 33 | 552 | 57 |
| Ridge Rd @ Rams Head Center | | | | | | | | | | 35 | 69 | 46 | 151 | 33 | 88 | 39 | 79 | 48 | 114 | 38 |
| Ridge Rd @ Stadium Dr | 24 | 38 | 41 | 53 | 11 | 15 | 49 | 85 | 12 | 12 | 40 | 47 | 47 | 50 | 48 | 46 | 49 | 44 | 69 | 78 |
| S Columbia St @ Abernethy Hall | 275 | 351 | 153 | 273 | 522 | 418 | 441 | 247 | 387 | 330 | 427 | 312 | 531 | 432 | 538 | 437 | 560 | 466 | 547 | 405 |
| S Columbia St @ Carrington Hall | 553 | 422 | 452 | 454 | 1264 | 789 | 882 | 617 | 941 | 597 | 633 | 329 | 712 | 502 | 1008 | 432 | 817 | 402 | 720 | 335 |
| S Columbia St @ Frat Court | 365 | 392 | 204 | 374 | 369 | 783 | 417 | 580 | 342 | 588 | 393 | 765 | 416 | 1002 | 378 | 1009 | 329 | 1055 | 237 | 959 |
| S Columbia St @ Health Science Library | 594 | 496 | 587 | 518 | 868 | 688 | 1132 | 781 | 1067 | 813 | 1305 | 992 | 1393 | 1429 | 1083 | 1157 | 1408 | 1195 | 1259 | 1116 |
| S Columbia St @ Mason Farm Rd | 5 | 24 | 13 | 29 | 42 | 190 | 24 | 137 | 33 | 105 | 44 | 189 | 45 | 236 | 39 | 180 | 56 | 199 | 55 | 195 |
| S Columbia St @ Sitterson Hall | 424 | 766 | 424 | 912 | 618 | 1033 | 673 | 712 | 635 | 823 | 797 | 1054 | 1023 | 1100 | 1140 | 1010 | 1183 | 1110 | 1164 | 862 |
| S Columbia St @ Westwood Dr | 3 | 0 | 7 | 26 | 74 | 46 | 54 | 53 | 86 | 45 | 144 | 44 | 158 | 141 | 6 | 3 | 11 | 8 | 12 | 11 |
| South Rd @ Coker Hall | 82 | 27 | 80 | 76 | 208 | 73 | 235 | 56 | 120 | 55 | 156 | 23 | 144 | 217 | 115 | 161 | 85 | 115 | 93 | 92 |
| South Rd @ Country Club Rd | | | 104 | 155 | 65 | 56 | 104 | 210 | 185 | 245 | 191 | 264 | 185 | 223 | 170 | 261 | 146 | 241 | 119 | 205 |
| South Rd @ Fetzer Gym | 336 | 186 | 27 | 204 | 876 | 268 | 502 | 136 | 625 | 232 | 616 | 301 | 588 | 448 | 574 | 385 | 489 | 350 | 393 | 333 |
| South Rd @ Kenan Labs | 2 | 192 | 28 | 150 | 20 | 201 | 13 | 205 | 15 | 203 | 6 | 172 | 30 | 71 | 5 | 37 | 5 | 39 | 9 | 32 |
| South Rd @ Raleigh St | 2 | 14 | 41 | 89 | 45 | 305 | 51 | 229 | 48 | 657 | 137 | 737 | 80 | 576 | 69 | 511 | 90 | 606 | 109 | 609 |
| South Rd @ Student Stores | 945 | 448 | 189 | 124 | 1250 | 889 | 814 | 599 | 988 | 832 | 1120 | 991 | 938 | 483 | 1009 | 628 | 1166 | 649 | 1005 | 527 |
| South Rd @ Woollen Gym | | | 48 | 41 | 31 | 6 | 46 | 19 | 50 | 9 | 8 | 6 | 13 | 41 | 8 | 15 | 6 | 8 | 9 | 14 |
| Stadium Dr @ Carmichael Dorm | | | 5 | 3 | | | 60 | 13 | 7 | 2 | 4 | 3 | 9 | 13 | 7 | 3 | 4 | 8 | 3 | 3 |
| Stadium Dr @ Ridge Rd | 41 | 98 | 24 | 87 | 53 | 94 | 52 | 100 | 48 | 87 | 26 | 73 | 37 | 64 | 43 | 59 | 44 | 78 | 37 | 72 |
| Stadium Dr @ Stadium Gate 2 | 43 | 34 | 29 | 34 | 19 | 42 | 41 | 48 | 24 | 43 | 28 | 53 | 34 | 55 | 31 | 48 | 33 | 51 | 23 | 36 |
| West Dr @ Mason Farm Rd | 2 | 1 | 15 | 16 | 43 | 27 | 71 | 60 | 53 | 45 | 114 | 272 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 8,147 | 7,069 | 7,708 | 9,045 | 11,654 | 12,316 | 11,613 | 11,386 | 11,819 | 12,136 | 13,788 | 14,312 | 14,170 | 15,401 | 13,740 | 14,790 | 14,808 | 12,765 | 13,452 | 0 |

Table 3-5: Potential Commuter Ridership for Chapel Hill Transit

| | Total Population in Chapel Hill/Carrboro ¹ | Residence Within 1/4 Mile of Bus Route, and | | | Residence Outside 1/4 Mile of Bus Route, and | |
|--|---|---|--|--|--|--|
| | | Within 0.5 Mile Radius from Bell Tower | Within 0.5 - 2.0 Mile Radius from Bell Tower | Within 2.0 - 5.0 Mile Radius from Bell Tower | Within 0.5 - 2.0 Mile Radius from Bell Tower | Within 2.0 - 5.0 Mile Radius from Bell Tower |
| STUDENTS | | | | | | |
| Population | 3,954 | 101 | 2,219 | 1,511 | 82 | 509 |
| Transit use based on 2017 survey: | | | | | | |
| - percent | | | 46.15% | 50.00% | | |
| - number of students | | | 1,071 | 756 | | |
| Drive alone based on 2017 survey: | | | | | | |
| - percent | | | 5.49% | 32.69% | | |
| - number of students | | | 127 | 494 | | |
| Potential New Transit Riders based on Drive Alone (50%)² | | | <i>0 since not eligible for permit</i> | 247 | | |
| EMPLOYEES | | | | | | |
| Population: | | | | | | |
| - Hospitals | 1,048 | 5 | 394 | 539 | 24 | 549 |
| - University | 4,904 | 38 | 1,973 | 1,941 | 271 | 1,970 |
| Total | 5,952 | 43 | 2,367 | 2,480 | 295 | 2,519 |
| Transit use based on 2017 survey: | | | | | | |
| - percent | | | 27.54% | 23.08% | | |
| - number of employees | | | 664 | 572 | | |
| Drive alone based on 2017 survey: | | | | | | |
| - percent | | | 36.23% | 55.68% | | |
| - number of employees | | | 873 | 1,381 | | |
| Potential New Transit Riders based on Drive Alone (40%)² | | | 349 | 552 | | |

Notes:

- Population and residence data are for 2017. Address location based on geocoding in GIS. Chapel Hill/Carrboro population represents addresses within the two town limits.
- Percent transit riders in 0.5 to 2 mile radius includes 0 to 1/2 mile in 2017 University commuter survey. Population in 0 to 0.5 mile are subtracted since these people are unlikely to use transit.
Potential new riders assumes drive alone commuters drive alone at least 50% of days.
New ridership assumes 50% of eligible drive-alone students and 40% of drive-alone employees are diverted to transit with fare free and service improvements.
Ridership would be higher if employee and student growth were considered (assuming similar proportion live in Chapel Hill/Carrboro).
- Low student sample size and omitted responses in the 2017 commuter survey may negatively affect estimated transit ridership.

Figure 3-1: Distribution of Employee and Commuting Student Home Addresses in Chapel Hill and Carrboro

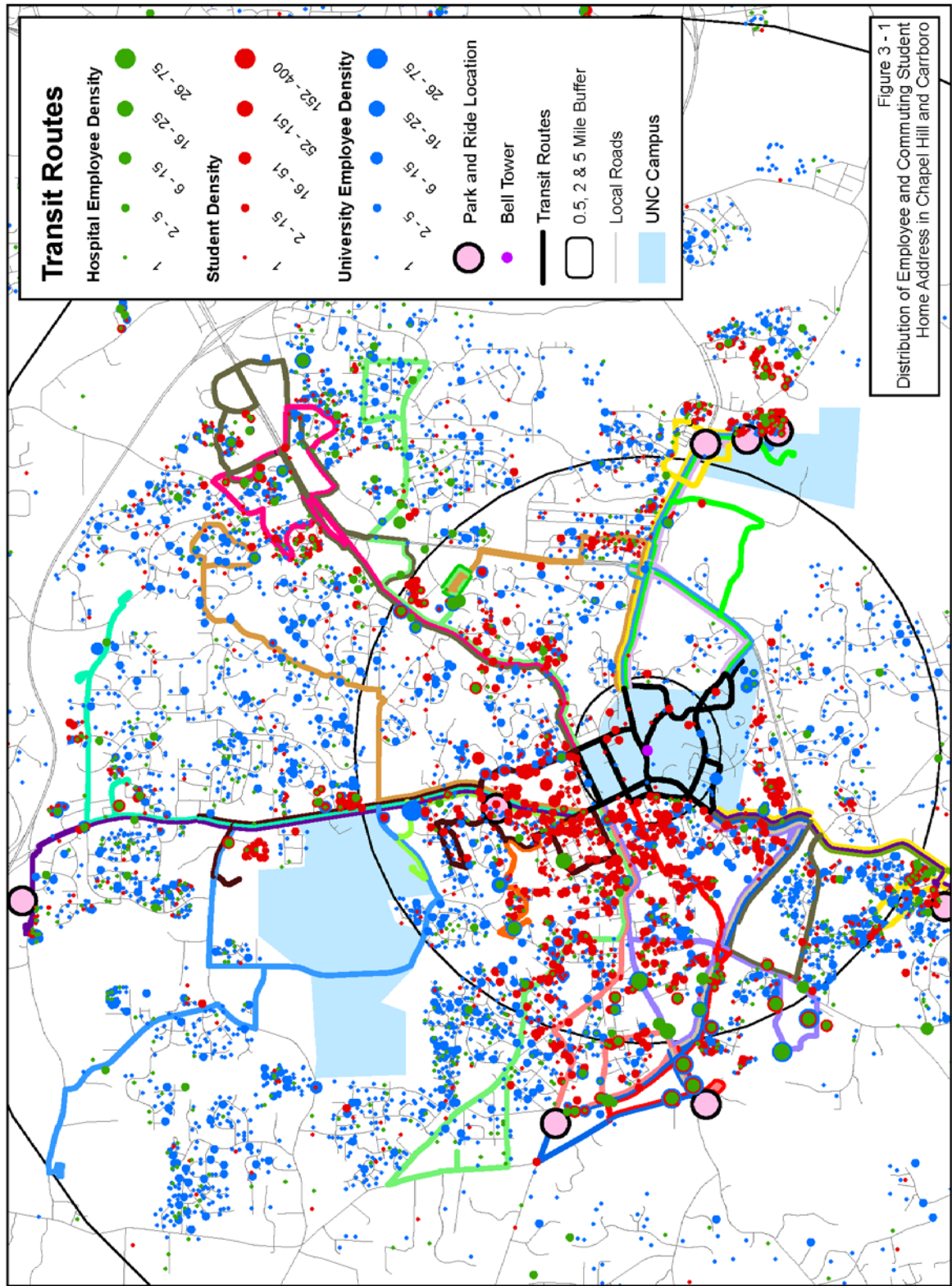
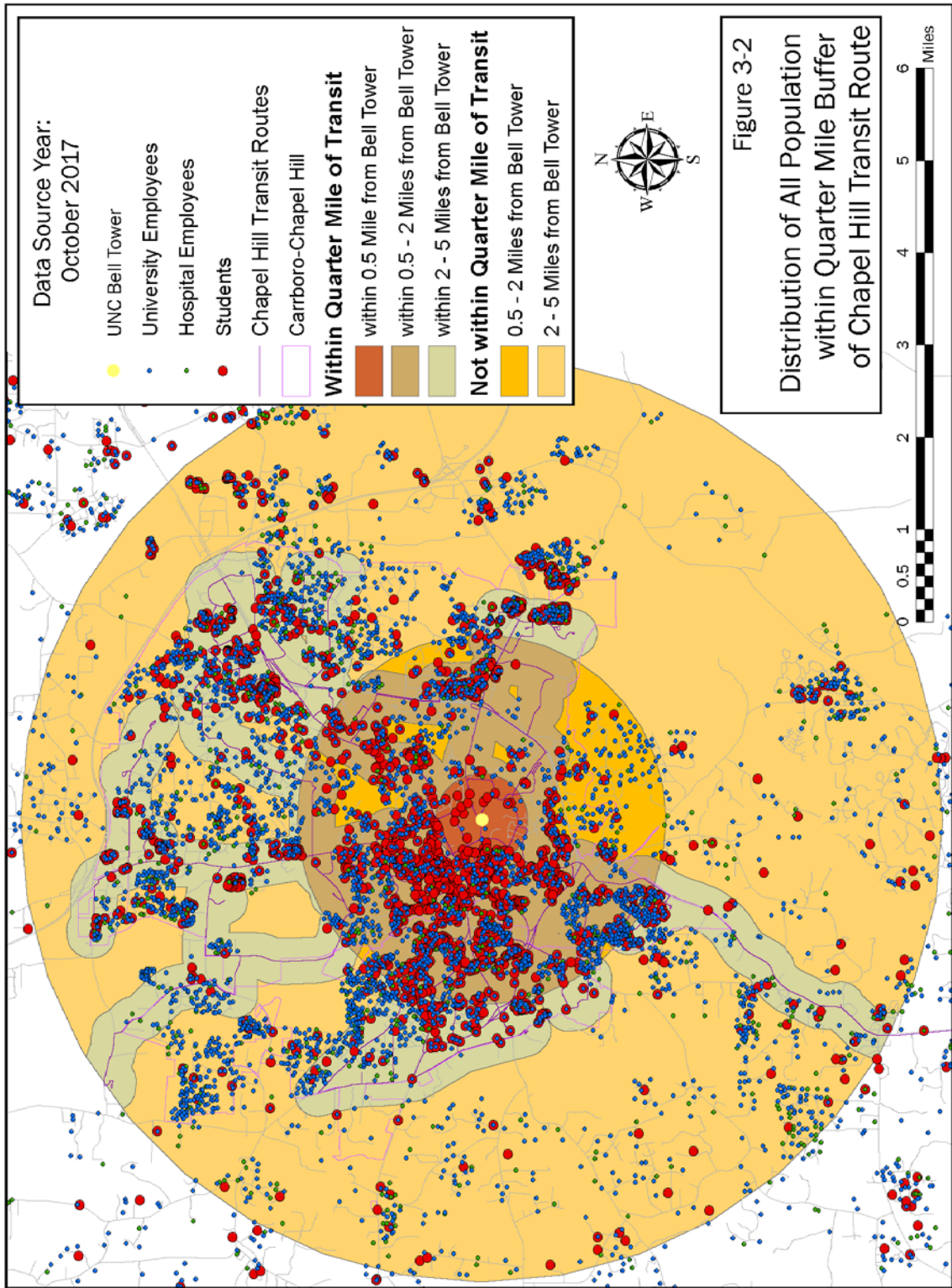


Figure 3 - 1
Distribution of Employee and Commuting Student Home Address in Chapel Hill and Carrboro

Figure 3-2: Distribution of All Population in Quarter Mile Buffer of CHT Bus Route



Chapel Hill Transit has installed global positioning systems on all vehicles, utilizing the Next Bus company's patented technology. Now riders can look on the internet or at signs installed at several bus stops, to see predicted bus arrival times in real time for the next few vehicles coming to their stop. Future improvements will be implemented as additional campus needs are identified, and in conjunction with the Towns of Chapel Hill and Carrboro. The University is committed to work with the towns in progressively moving forward with additional transit improvements such as extended hours and improved frequency. With the introduction of fare-free transit in 2002, the University has now increased its contribution to CHT to approximately \$7.7 million a year.

The University also continues to support Town of Chapel Hill initiatives to improve bus running times. This can include traffic signal priority (where equipment on the bus is used to electronically transmit a message to the signal as the bus approaches to give that direction the next green light), queue jump lanes at congested intersections, and busway lanes or treatments. Also, the University supports the purchase of state-of-the-art technology buses as the CHT fleet is replaced or expanded. New innovations include low floor vehicles and hybrid (electric-diesel) propulsion that allows buses to operate on quiet, pollution-free electric motors in areas where there are a lot of people.

As indicated above, CHT use by University commuters has already increased significantly. However, based on the 2017 commuter survey and geocoding of home addresses, Table 3-5 shows that, as of this most recent survey date, there are more employees and students who could use it. The greatest potential is with employees, as evidenced by the continuing trend of employees driving less and using transit and park and ride more.

3.2.4 Regional Transit

GoTriangle now operates 27 routes (including the RTP shuttles and the newly merged Robertson Scholars Express [RSX]) serving Chapel Hill, Durham, Raleigh, Hillsborough, Cary, Apex, Garner, Wake Forest, Knightdale, Wendell, Zebulon, Research Triangle Park (RTP), and RDU Airport. Saturday routes and shuttle services serve Chapel Hill, Durham, RTP, Raleigh, Cary, and RDU Airport. There is direct service to the campus from Durham, Raleigh (CRX), and Hillsborough (Route 420, operated by CHT). Most buses run every 30 minutes during the peak period in Chapel Hill, Durham, RTP, and Raleigh. Route 800 increased peak frequency in 2013 to roughly every 15 minutes. GoTriangle maintains online trip planners at gotriangle.org/ and through Google Transit at transit.google.com. Other improvements planned by GoTriangle include better timing of routes with local services and continued investigation of regional transit improvements to meet future regional needs.

In fall 2015 the University expanded regional transit opportunities for its commuters. The PX route, formerly operated by Chapel Hill Transit, is now operated by Chatham Transit Network (CTN). As with CHT, the University and Chatham County subsidize fares so commuters ride to UNC at no cost. Transit passes are also available to University employees, faculty, and students for CTN's CT Express route. The University entered into agreement with Piedmont Authority for Regional Transit (PART) to accept GoPasses for UNC commuters traveling from Guilford and Alamance counties to campus.

Counts provided by GoTriangle show that an estimated 250 commuters used GoTriangle in 2001. Over 2,500 University employees, faculty, and students held a GoPass in 2017.

3.2.5 Ridesharing

The 2017 commuter survey showed similar rates of ridesharing for both employees and students (see Table 3-3).

The University introduced a number of measures to encourage ridesharing (car/vanpooling), including preferential parking and emergency rides home or to park-and-ride lots. A major focus of the TDM manager is to increase ridesharing. Ridesharing is included as part of the Commuter Alternative Program (CAP) and so people who register to car or vanpool to work receive all of the incentives included in CAP. Vanpoolers get a reserved space and a \$20 subsidy toward the monthly cost of vanpooling. As of 2015, temporary employees paid by the University or Hospitals are also eligible for the \$20 monthly vanpool subsidy.

The CAP offers two ridesharing services, SharetheRideNC and Zimride, to allow potential vanpool participants a mechanism to match up with others wishing to commute from the same areas. SharetheRideNC is a free statewide website that was created to help form carpools and vanpools to improve air quality by reducing SOV trips. Zimride is a UNC funded ridesharing service that provides a private UNC-Chapel Hill ridesharing opportunity where students, staff, and faculty may find others within the UNC community to coordinate carpools and vanpools.

The projected ratio for 2017 has been maintained. Over time, this mode can be expected to become more popular as gasoline prices increase and more employees live outside of Chapel Hill. Therefore the projections from previous Updates have been retained, with additional 613 employees and 183 students on a typical day using this mode.

3.2.6 Teleworking

Title 25 of the North Carolina Administrative Code (25 NCAC 1c.0801-.0813) provides guidelines and requirements for State teleworking programs. It was adopted by the State Legislature effective April 1, 2001. The goal is to replace 20 percent of state employees' commuting miles with telework, without reducing hours worked or productivity. In addition to the environmental and traffic congestion benefits, an explicit objective of the program is to assist in recruiting and retaining employees. The state has appointed a full-time teleworking coordinator to manage the program and assist state agencies in establishing programs.

Some University employees already telework. The University supports teleworking as a trip and parking reduction strategy, and it is an element of its Transportation Demand Management (TDM) program. However, for the purpose of this study, no increase in teleworking is assumed.

3.2.7 Cycling

Bicycles are an important means of travel on and to the Main Campus. The climate, topography for parts of the campus and surrounding areas, and relatively short trips make cycling a viable travel option for many students and employees.

The 2017 Commuter Survey shows that cycling as the primary way to commute to campus has remained steady for employees (between 5 and 4 percent) and commuting students (13 percent) since 2015. Both levels are some of the highest observed during the lifetime of the commuter survey.

Bicycle (and pedestrian) counts were undertaken in November 2017 at the same locations and same day of the week as for previous TIAs. The locations are identified in Figure 3-3, and the counts summarized in Table 3-6. Counts were taken between 7:00 A.M. and 7:00 P.M. on a Tuesday, Wednesday or Thursday. The counts included cyclists crossing the street in the general area, or using the sidewalks.

A comparison of the 2001 and 2017 counts is included in the lower portion of Table 3-6. The counts run against the commuter survey results, with decreased counts in many locations, but some locations with significant increases.

There are a number of existing bicycle lanes (or wide outside lanes or shared lane markings) or paths on and around Main Campus, including:

- Cameron Avenue (Pittsboro Street to Merritt Mill Road)
- Pittsboro Street between Cameron Street and Manning Drive (one-way southbound)
- Country Club Road
- Raleigh Road (Bypass to Country Club Road)
- Martin Luther King Jr Boulevard
- South Columbia Street
- Skipper Bowles Drive
- Ridge Road

Chapel Hill, Carrboro, and the University strongly support cycling. Adopted plans for both towns include new bicycle facilities to be implemented as funding becomes available. The purpose is to ultimately develop a network of interconnected bike routes and paths, including improved access to the Main Campus and downtowns. The Town of Chapel Hill also has published a bicycle plan, based on the goal of promoting and encouraging bicycling as an alternative means of transportation to lessen traffic congestion, air pollution, and the demand for expanded parking and roadways. In 2014 UNC developed a Campus Bicycle Master Plan at the same time the Town of Chapel Hill was developing its Bicycle Master Plan. The University was subsequently awarded the Silver designation as a Bicycle Friendly University by the League of American Bicyclists for its work to improve bicycling on campus. In addition, the University launched its Tar Heel Bikes bikeshare program in fall 2017, with 100 bikes and 18 hubs across campus. The program has been extremely successful and opportunities for future growth of the program are being investigated.

As part of the Master Plan development, a bicycle plan advisory group consisting of representatives from the University and the towns was convened to discuss campus needs, and to identify potential bike routes. The group formulated the following Main Campus biking mission:

To design efficient bicycle transit routes which are safe for bicyclists and pedestrians; to develop adequate bicycle parking facilities, educational programs, and enforcement; to implement policies and incentives to support transportation by bicycle; and to develop architectural guidelines for buildings which include attention to showers and clothing storage for bicycle commuters.

The overall goal is to encourage more cycling, to improve safety for cyclists, and in particular, to cater to the inexperienced or uninitiated cyclist.

Figure 3-3: Bicycle and Pedestrian Count Locations

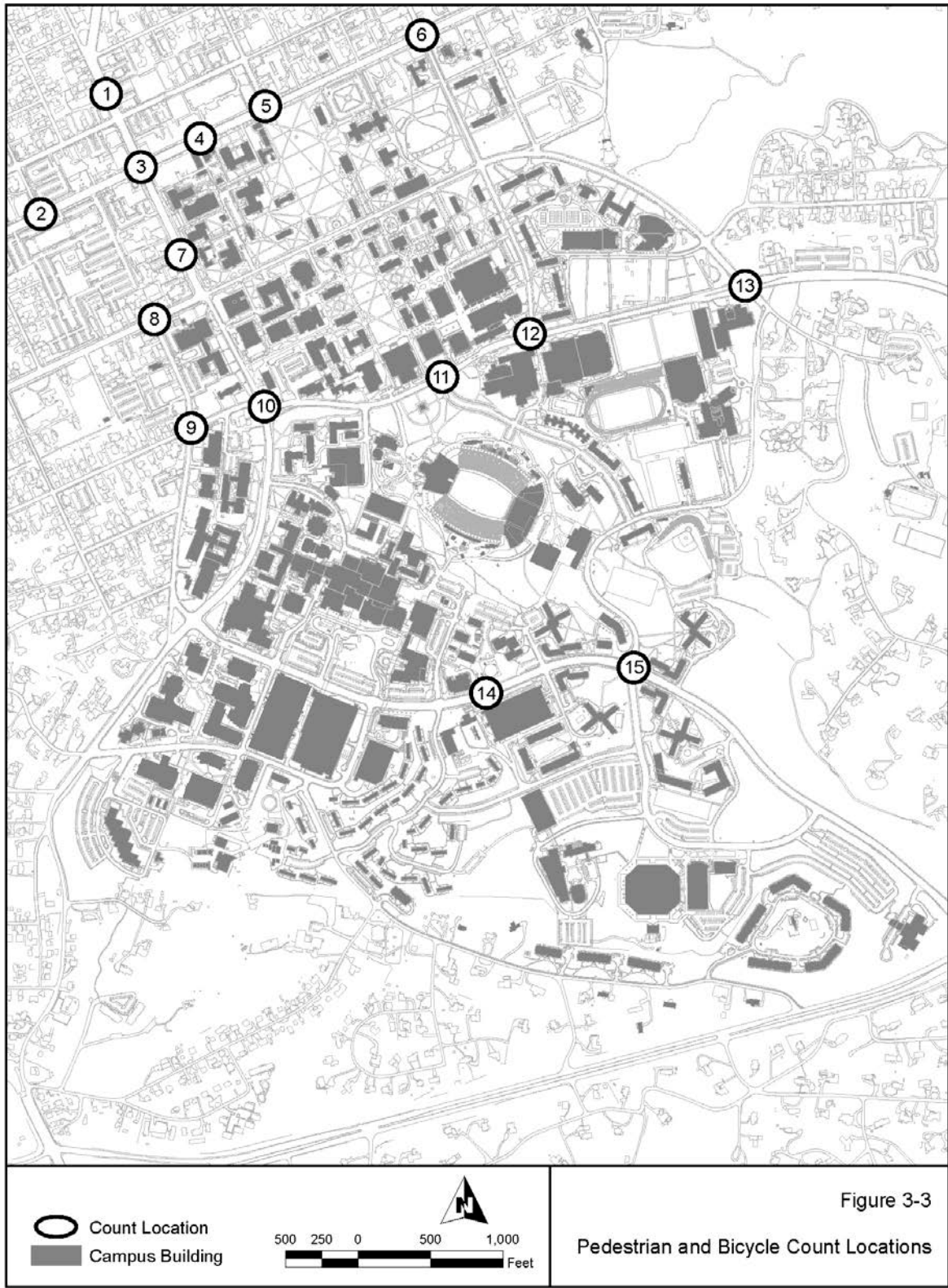


Table 3-6: Bicycle Counts

| Location | 2001 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 31 | 25 | 318 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 7 | 13 | 44 | 10 | 23 | 231 | 3 | 5 | 44 |
| 3. Franklin Street and North Columbia Street | 40 | 20 | 358 | 16 | 20 | 360 | 11 | 6 | 80 |
| 4. Franklin Street at Coffee Shop | 4 | 9 | 66 | 14 | 14 | 181 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 7 | 11 | 117 | 7 | 11 | 96 | 3 | 2 | 22 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 9 | 9 | 119 | 6 | 8 | 80 | 5 | 5 | 43 |
| 7. Columbia Street at Fraternity Court | 25 | 19 | 336 | 6 | 10 | 106 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 2 | 5 | 32 | 69 | 53 | 872 | 9 | 4 | 62 |
| 9. McCauley Street and Pittsboro Street | 18 | 10 | 134 | 30 | 22 | 239 | 9 | 20 | 148 |
| 10. McCauley Street/South Road and Columbia Street | 19 | 23 | 272 | 26 | 20 | 251 | 8 | 17 | 179 |
| 11. South Road at Bell Tower/Stadium Drive | 35 | 30 | 502 | 19 | 25 | 360 | 6 | 5 | 42 |
| 12. Raleigh Street and South Road | 13 | 11 | 177 | 16 | 14 | 209 | 11 | 11 | 139 |
| 13. Country Club Road and South Road | 4 | 5 | 56 | 6 | 9 | 67 | 8 | 7 | 102 |
| 14. Manning Drive at Craige Deck | 9 | 9 | 91 | 6 | 4 | 45 | 2 | 8 | 24 |
| 15. Manning Drive and Ridge Road | 25 | 28 | 293 | 5 | 9 | 63 | 3 | 4 | 37 |

| Location | 2003 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 24 | 25 | 206 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 2 | 1 | 9 | 18 | 27 | 195 | 5 | 11 | 75 |
| 3. Franklin Street and North Columbia Street | 13 | 24 | 169 | 18 | 23 | 181 | 6 | 9 | 67 |
| 4. Franklin Street at Coffee Shop | 6 | 9 | 57 | 13 | 21 | 166 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 8 | 5 | 45 | 9 | 8 | 60 | 5 | 5 | 37 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 14 | 13 | 92 | 7 | 10 | 70 | 5 | 5 | 38 |
| 7. Columbia Street at Fraternity Court | 35 | 41 | 303 | 12 | 13 | 113 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 0 | 0 | 0 | 64 | 50 | 539 | 17 | 11 | 116 |
| 9. McCauley Street and Pittsboro Street | 19 | 15 | 54 | 4 | 11 | 83 | 14 | 9 | 80 |
| 10. McCauley Street/South Road and Columbia Street | 16 | 18 | 123 | 18 | 19 | 143 | 10 | 22 | 131 |
| 11. South Road at Bell Tower/Stadium Drive | 18 | 16 | 138 | 19 | 22 | 152 | 14 | 16 | 100 |
| 12. Raleigh Street and South Road | 10 | 12 | 61 | 29 | 15 | 130 | 12 | 13 | 104 |
| 13. Country Club Road and South Road | 3 | 9 | 42 | 6 | 7 | 40 | 26 | 5 | 83 |
| 14. Manning Drive at Craige Deck | 5 | 6 | 29 | 7 | 6 | 33 | 3 | 2 | 12 |
| 15. Manning Drive and Ridge Road | 14 | 17 | 102 | 4 | 11 | 58 | 2 | 3 | 19 |

| Location | 2005 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 30 | 29 | 218 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 1 | 5 | 16 | 19 | 32 | 196 | 11 | 14 | 82 |
| 3. Franklin Street and North Columbia Street | 26 | 30 | 198 | 18 | 26 | 168 | 10 | 14 | 93 |
| 4. Franklin Street at Coffee Shop | 5 | 12 | 58 | 12 | 21 | 134 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 12 | 10 | 63 | 6 | 12 | 57 | 2 | 4 | 14 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 13 | 10 | 63 | 10 | 6 | 38 | 5 | 4 | 18 |
| 7. Columbia Street at Fraternity Court | 37 | 43 | 296 | 7 | 5 | 29 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 0 | 0 | 0 | 49 | 95 | 460 | 24 | 17 | 118 |
| 9. McCauley Street and Pittsboro Street | 15 | 13 | 82 | 19 | 16 | 135 | 13 | 12 | 81 |
| 10. McCauley Street/South Road and Columbia Street | 10 | 20 | 108 | 23 | 15 | 131 | 15 | 22 | 154 |
| 11. South Road at Bell Tower/Stadium Drive | 0 | 2 | 2 | 14 | 10 | 86 | 1 | 0 | 1 |
| 12. Raleigh Street and South Road | 18 | 15 | 114 | 9 | 15 | 65 | 10 | 11 | 62 |
| 13. Country Club Road and South Road | 5 | 10 | 38 | 11 | 10 | 50 | 10 | 13 | 62 |
| 14. Manning Drive at Craige Deck | 9 | 9 | 69 | 6 | 6 | 30 | 2 | 8 | 27 |
| 15. Manning Drive and Ridge Road | 21 | 28 | 182 | 19 | 19 | 145 | 9 | 4 | 36 |

| Location | 2007 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 27 | 33 | 197 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 4 | 9 | 51 | 21 | 26 | 181 | 11 | 13 | 85 |
| 3. Franklin Street and North Columbia Street | 40 | 34 | 254 | 22 | 27 | 220 | 15 | 13 | 106 |
| 4. Franklin Street at Coffee Shop | 10 | 15 | 96 | 0 | 11 | 45 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 2 | 3 | 24 | 13 | 32 | 138 | 3 | 3 | 19 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 14 | 9 | 101 | 4 | 19 | 78 | 7 | 7 | 42 |
| 7. Columbia Street at Fraternity Court | 27 | 32 | 214 | 1 | 1 | 5 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 0 | 3 | 11 | 105 | 122 | 768 | 27 | 15 | 173 |
| 9. McCauley Street and Pittsboro Street | 21 | 17 | 125 | 32 | 26 | 214 | 29 | 19 | 120 |
| 10. McCauley Street/South Road and Columbia Street | 11 | 12 | 75 | 2 | 12 | 51 | 12 | 12 | 92 |
| 11. South Road at Bell Tower/Stadium Drive | 65 | 70 | 605 | 27 | 25 | 301 | 46 | 72 | 562 |
| 12. Raleigh Street and South Road | 3 | 27 | 33 | 24 | 5 | 166 | 21 | 25 | 116 |
| 13. Country Club Road and South Road | 4 | 11 | 45 | 11 | 12 | 48 | 11 | 10 | 63 |
| 14. Manning Drive at Craige Deck | 22 | 21 | 171 | 3 | 5 | 38 | 9 | 13 | 84 |
| 15. Manning Drive and Ridge Road | 29 | 29 | 215 | 27 | 31 | 208 | 4 | 4 | 27 |

* Represents cyclists who turned the corner and did not cross the street.

Counts were taken in during the Fall of 2011 while the University was in session. The peaks summarized are the bicycle peak periods and do not necessarily coincide with vehicle peak hours.

Table 3-6: Bicycle Counts (cont.)

| Location | 2009 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 38 | 40 | 221 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 3 | 0 | 15 | 20 | 37 | 209 | 19 | 10 | 102 |
| 3. Franklin Street and North Columbia Street | 42 | 32 | 254 | 23 | 36 | 235 | 27 | 23 | 178 |
| 4. Franklin Street at Coffee Shop | 0 | 2 | 4 | 0 | 0 | 0 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 11 | 21 | 134 | 11 | 9 | 75 | 10 | 2 | 62 |
| 7. Columbia Street at Fraternity Court | 44 | 39 | 339 | 0 | 8 | 12 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 2 | 0 | 12 | 152 | 146 | 1,048 | 69 | 44 | 419 |
| 9. McCauley Street and Pittsboro Street | 79 | 46 | 368 | 10 | 15 | 77 | 47 | 23 | 269 |
| 10. McCauley Street/South Road and Columbia Street | 10 | 34 | 194 | 32 | 21 | 198 | 15 | 24 | 179 |
| 11. South Road at Bell Tower/Stadium Drive | 74 | 93 | 825 | 22 | 32 | 251 | 65 | 17 | 197 |
| 12. Raleigh Street and South Road | 4 | 0 | 9 | 17 | 19 | 136 | 29 | 33 | 270 |
| 13. Country Club Road and South Road | 6 | 12 | 43 | 9 | 6 | 59 | 7 | 19 | 83 |
| 14. Manning Drive at Craige Deck | 14 | 19 | 159 | 11 | 10 | 60 | 14 | 12 | 89 |
| 15. Manning Drive and Ridge Road | 31 | 22 | 181 | 23 | 25 | 219 | 1 | 0 | 26 |

| Location | 2011 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 23 | 32 | 192 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | ** | | | ** | | | ** | | |
| 3. Franklin Street and North Columbia Street | 48 | 43 | 236 | 21 | 26 | 210 | 14 | 27 | 150 |
| 4. Franklin Street at Coffee Shop | 2 | 9 | 57 | 15 | 17 | 104 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 7 | 24 | 141 | 15 | 23 | 147 | 3 | 11 | 55 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 12 | 14 | 93 | 1 | 16 | 70 | 6 | 13 | 53 |
| 7. Columbia Street at Fraternity Court | 32 | 44 | 309 | 5 | 9 | 77 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 0 | 1 | 2 | 151 | 95 | 851 | 10 | 8 | 111 |
| 9. McCauley Street and Pittsboro Street | 19 | 13 | 134 | 49 | 41 | 251 | 26 | 28 | 189 |
| 10. McCauley Street/South Road and Columbia Street | 22 | 26 | 195 | 31 | 22 | 189 | 16 | 14 | 121 |
| 11. South Road at Bell Tower/Stadium Drive | 3 | 50 | 109 | 22 | 14 | 222 | 11 | 0 | 50 |
| 12. Raleigh Street and South Road | 31 | 15 | 186 | 13 | 18 | 149 | 31 | 36 | 310 |
| 13. Country Club Road and South Road | 0 | 5 | 17 | 4 | 6 | 34 | 7 | 5 | 36 |
| 14. Manning Drive at Craige Deck | 26 | 16 | 137 | 4 | 5 | 20 | 5 | 5 | 43 |
| 15. Manning Drive and Ridge Road | 26 | 31 | 222 | 36 | 24 | 225 | 0 | 1 | 8 |

| Location | 2013 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 29 | 26 | 186 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 11 | 4 | 45 | 8 | 14 | 134 | 18 | 15 | 92 |
| 3. Franklin Street and North Columbia Street | 39 | 23 | 186 | 13 | 15 | 129 | 16 | 12 | 129 |
| 4. Franklin Street at Coffee Shop | 10 | 9 | 65 | 7 | 10 | 88 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 4 | 10 | 49 | 7 | 13 | 64 | 3 | 3 | 24 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 12 | 10 | 91 | 7 | 9 | 56 | 5 | 6 | 42 |
| 7. Columbia Street at Fraternity Court | 43 | 63 | 446 | 4 | 8 | 51 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 7 | 7 | 70 | 130 | 28 | 492 | 27 | 90 | 418 |
| 9. McCauley Street and Pittsboro Street | 10 | 6 | 89 | 36 | 38 | 285 | 39 | 29 | 256 |
| 10. McCauley Street/South Road and Columbia Street | 13 | 34 | 161 | 34 | 19 | 267 | 36 | 23 | 263 |
| 11. South Road at Bell Tower/Stadium Drive | 59 | 67 | 405 | 31 | 21 | 289 | 33 | 27 | 364 |
| 12. Raleigh Street and South Road | 7 | 7 | 49 | 38 | 34 | 279 | 22 | 21 | 177 |
| 13. Country Club Road and South Road | 4 | 7 | 27 | 5 | 7 | 34 | 7 | 3 | 30 |
| 14. Manning Drive at Craige Deck | 23 | 17 | 126 | 10 | 3 | 37 | 2 | 3 | 25 |
| 15. Manning Drive and Ridge Road | 32 | 25 | 221 | 38 | 30 | 256 | 3 | 9 | 39 |

| Location | 2015 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 19 | 20 | 140 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 0 | 1 | 8 | 8 | 18 | 141 | 14 | 8 | 89 |
| 3. Franklin Street and North Columbia Street | 19 | 17 | 151 | 18 | 16 | 123 | 17 | 12 | 97 |
| 4. Franklin Street at Coffee Shop | 4 | 12 | 63 | 8 | 5 | 36 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 12 | 8 | 73 | 5 | 9 | 56 | 3 | 2 | 18 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 13 | 9 | 65 | 12 | 6 | 51 | 4 | 0 | 11 |
| 7. Columbia Street at Fraternity Court | 34 | 31 | 302 | 6 | 25 | 89 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 0 | 1 | 3 | 111 | 72 | 589 | 25 | 5 | 91 |
| 9. McCauley Street and Pittsboro Street | 15 | 6 | 70 | 41 | 33 | 276 | 37 | 9 | 148 |
| 10. McCauley Street/South Road and Columbia Street | 39 | 39 | 299 | 18 | 22 | 168 | 12 | 15 | 101 |
| 11. South Road at Bell Tower/Stadium Drive | 53 | 1 | 265 | 28 | 37 | 253 | 25 | 36 | 298 |
| 12. Raleigh Street and South Road | 14 | 12 | 129 | 18 | 16 | 158 | 10 | 3 | 23 |
| 13. Country Club Road and South Road | 4 | 6 | 26 | 9 | 10 | 52 | 4 | 5 | 44 |
| 14. Manning Drive at Craige Deck | 18 | 13 | 123 | 9 | 5 | 45 | 4 | 1 | 14 |
| 15. Manning Drive and Ridge Road | 27 | 26 | 194 | 26 | 24 | 198 | 3 | 3 | 19 |

Table 3-6: Bicycle Counts (cont.)

| Location | 2017 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 15 | 32 | 174 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 2 | 1 | 5 | 2 | 5 | 15 | 2 | 9 | 21 |
| 3. Franklin Street and North Columbia Street | 54 | 26 | 181 | 21 | 54 | 288 | 22 | 18 | 174 |
| 4. Franklin Street at Coffee Shop | 7 | 15 | 63 | 20 | 20 | 88 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 6 | 7 | 51 | 5 | 5 | 27 | 2 | 2 | 13 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 13 | 5 | 65 | 4 | 8 | 32 | 2 | 7 | 35 |
| 7. Columbia Street at Fraternity Court | 5 | 3 | 15 | 29 | 37 | 226 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 1 | 2 | 8 | 135 | 84 | 605 | 20 | 12 | 107 |
| 9. McCauley Street and Pittsboro Street | 19 | 12 | 110 | 47 | 35 | 267 | 26 | 22 | 197 |
| 10. McCauley Street/South Road and Columbia Street | 10 | 14 | 81 | 25 | 32 | 190 | 10 | 13 | 78 |
| 11. South Road at Bell Tower/Stadium Drive | 50 | 53 | 461 | 28 | 30 | 257 | 59 | 63 | 500 |
| 12. Raleigh Street and South Road | 12 | 8 | 125 | 14 | 16 | 150 | 8 | 13 | 32 |
| 13. Country Club Road and South Road | 5 | 5 | 25 | 2 | 3 | 12 | 3 | 4 | 21 |
| 14. Manning Drive at Craige Deck | 9 | 5 | 37 | 1 | 3 | 13 | 1 | 2 | 7 |
| 15. Manning Drive and Ridge Road | 14 | 15 | 108 | 23 | 26 | 184 | 1 | 4 | 10 |

| Location | 2001-2017 Percent Change | | | | | | | | |
|---|--------------------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | | | | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | -71% | -92% | -89% | -80% | -78% | -94% | -33% | 80% | -52% |
| 3. Franklin Street and North Columbia Street | 35% | 30% | -49% | 31% | 170% | -20% | 100% | 200% | 118% |
| 4. Franklin Street at Coffee Shop | 75% | 67% | -5% | 43% | 43% | -51% | Not applicable | | |
| 5. Franklin Street and Henderson Street | -14% | -36% | -56% | -29% | -55% | -72% | -33% | 0% | -41% |
| 6. Franklin Street and Hillsborough-Raleigh Street | 44% | -44% | -45% | -33% | 0% | -60% | -60% | 40% | -19% |
| 7. Columbia Street at Fraternity Court | -80% | -84% | -96% | 383% | 270% | 113% | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | -50% | -60% | -75% | 96% | 58% | -31% | 122% | 200% | 73% |
| 9. McCauley Street and Pittsboro Street | 6% | 20% | -18% | 57% | 59% | 12% | 189% | 10% | 33% |
| 10. McCauley Street/South Road and Columbia Street | -47% | -39% | -70% | -4% | 60% | -24% | 25% | -24% | -56% |
| 11. South Road at Bell Tower/Stadium Drive | 43% | 77% | -8% | 47% | 20% | -29% | 883% | 1160% | 1090% |
| 12. Raleigh Street and South Road | -8% | -27% | -29% | -13% | 14% | -28% | -27% | 18% | -77% |
| 13. Country Club Road and South Road | 25% | 0% | -55% | -67% | -67% | -82% | -63% | -43% | -79% |
| 14. Manning Drive at Craige Deck | 0% | -44% | -59% | -83% | -25% | -71% | -50% | -75% | -71% |
| 15. Manning Drive and Ridge Road | -44% | -46% | -63% | 360% | 189% | 192% | -67% | 0% | -73% |

* Represents cyclists who turned the corner and did not cross the street.

** Location not counted in 2011 to due to construction.

Counts were taken in during the Fall while the University was in session. The peaks summarized are the bicycle peak periods and do not necessarily coincide with vehicle peak hours.

Table 3-7: Pedestrian Counts

| Location | 2001 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 95 | 78 | 1,139 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 50 | 96 | 647 | 90 | 158 | 2,313 | 9 | 10 | 108 |
| 3. Franklin Street and North Columbia Street | 217 | 337 | 4,101 | 236 | 437 | 5,534 | 57 | 70 | 830 |
| 4. Franklin Street at Coffee Shop | 247 | 439 | 4,422 | 272 | 280 | 4,468 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 244 | 440 | 4,389 | 130 | 166 | 2,281 | 31 | 49 | 472 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 54 | 87 | 948 | 26 | 28 | 420 | 19 | 31 | 387 |
| 7. Columbia Street at Fraternity Court | 131 | 311 | 2,914 | 403 | 454 | 4,126 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 14 | 29 | 344 | 216 | 274 | 2,741 | 23 | 12 | 211 |
| 9. McCauley Street and Pittsboro Street | 37 | 56 | 754 | 90 | 108 | 1,524 | 28 | 40 | 450 |
| 10. McCauley Street/South Road and Columbia Street | 139 | 242 | 2,124 | 47 | 78 | 971 | 71 | 60 | 838 |
| 11. South Road at Bell Tower/Stadium Drive | 784 | 708 | 10,064 | 187 | 200 | 2,701 | 73 | 50 | 496 |
| 12. Raleigh Street and South Road | 334 | 331 | 4,197 | 121 | 105 | 1,448 | 75 | 41 | 646 |
| 13. Country Club Road and South Road | 23 | 64 | 537 | 33 | 46 | 495 | 115 | 75 | 1,238 |
| 14. Manning Drive at Craige Deck | 65 | 61 | 964 | 12 | 53 | 332 | 20 | 20 | 191 |
| 15. Manning Drive and Ridge Road | 293 | 423 | 4,963 | 79 | 192 | 2,020 | 20 | 18 | 288 |

| Location | 2003 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 115 | 141 | 1,083 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 26 | 50 | 313 | 178 | 277 | 2,069 | 18 | 51 | 275 |
| 3. Franklin Street and North Columbia Street | 329 | 606 | 4,088 | 407 | 747 | 5,145 | 107 | 107 | 890 |
| 4. Franklin Street at Coffee Shop | 336 | 638 | 3,818 | 472 | 849 | 5,891 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 386 | 719 | 4,263 | 139 | 346 | 2,118 | 85 | 93 | 797 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 96 | 131 | 984 | 40 | 66 | 499 | 24 | 55 | 382 |
| 7. Columbia Street at Fraternity Court | 343 | 503 | 3,369 | 731 | 590 | 4,907 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 15 | 27 | 131 | 257 | 313 | 2,357 | 45 | 87 | 601 |
| 9. McCauley Street and Pittsboro Street | 86 | 86 | 627 | 79 | 108 | 801 | 53 | 66 | 552 |
| 10. McCauley Street/South Road and Columbia Street | 336 | 367 | 2,485 | 77 | 97 | 807 | 117 | 143 | 1,169 |
| 11. South Road at Bell Tower/Stadium Drive | 1,550 | 1,872 | 17,216 | 220 | 264 | 2,417 | 728 | 386 | 4,573 |
| 12. Raleigh Street and South Road | 157 | 288 | 1,761 | 284 | 281 | 2,373 | 51 | 68 | 548 |
| 13. Country Club Road and South Road | 23 | 58 | 330 | 65 | 85 | 563 | 55 | 99 | 591 |
| 14. Manning Drive at Craige Deck | 318 | 311 | 2,473 | 94 | 166 | 1,090 | 47 | 62 | 366 |
| 15. Manning Drive and Ridge Road | 410 | 580 | 4,171 | 216 | 311 | 2,490 | 35 | 23 | 196 |

| Location | 2005 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 158 | 125 | 1,125 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 38 | 51 | 411 | 155 | 257 | 1,752 | 24 | 16 | 131 |
| 3. Franklin Street and North Columbia Street | 353 | 724 | 4,389 | 431 | 769 | 5,317 | 128 | 248 | 1,226 |
| 4. Franklin Street at Coffee Shop | 392 | 708 | 4,232 | 526 | 802 | 5,471 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 398 | 718 | 3,868 | 98 | 211 | 1,089 | 48 | 93 | 485 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 81 | 114 | 866 | 32 | 75 | 359 | 28 | 5 | 95 |
| 7. Columbia Street at Fraternity Court | 419 | 812 | 4,432 | 666 | 715 | 5,214 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 5 | 15 | 61 | 316 | 327 | 2,445 | 47 | 86 | 519 |
| 9. McCauley Street and Pittsboro Street | 70 | 107 | 763 | 97 | 115 | 897 | 40 | 50 | 286 |
| 10. McCauley Street/South Road and Columbia Street | 276 | 347 | 2,173 | 83 | 151 | 1,001 | 177 | 267 | 2,030 |
| 11. South Road at Bell Tower/Stadium Drive | 1,169 | 1,679 | 13,457 | 248 | 345 | 2,318 | 539 | 628 | 3,390 |
| 12. Raleigh Street and South Road | 420 | 542 | 3,602 | 271 | 309 | 1,907 | 20 | 21 | 123 |
| 13. Country Club Road and South Road | 30 | 88 | 316 | 56 | 78 | 447 | 89 | 137 | 873 |
| 14. Manning Drive at Craige Deck | 327 | 317 | 2,696 | 32 | 83 | 469 | 29 | 78 | 396 |
| 15. Manning Drive and Ridge Road | 407 | 519 | 4,094 | 300 | 333 | 2,783 | 126 | 47 | 433 |

| Location | 2007 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 139 | 119 | 874 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 48 | 125 | 754 | 132 | 279 | 2,073 | 22 | 39 | 188 |
| 3. Franklin Street and North Columbia Street | 407 | 606 | 4,107 | 376 | 687 | 5,190 | 67 | 87 | 1,068 |
| 4. Franklin Street at Coffee Shop | 291 | 716 | 3,876 | 202 | 243 | 1,832 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 372 | 721 | 3,919 | 82 | 229 | 1,407 | 145 | 140 | 1,232 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 128 | 191 | 1,089 | 22 | 61 | 413 | 26 | 21 | 235 |
| 7. Columbia Street at Fraternity Court | 325 | 271 | 2,476 | 869 | 840 | 5,285 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 26 | 39 | 258 | 373 | 368 | 2,985 | 42 | 82 | 523 |
| 9. McCauley Street and Pittsboro Street | 102 | 162 | 1,132 | 138 | 146 | 1,156 | 47 | 38 | 475 |
| 10. McCauley Street/South Road and Columbia Street | 327 | 296 | 2,142 | 293 | 384 | 2,294 | 463 | 430 | 3,480 |
| 11. South Road at Bell Tower/Stadium Drive | 1,586 | 1,765 | 15,913 | 303 | 531 | 3,869 | 778 | 667 | 3,670 |
| 12. Raleigh Street and South Road | 340 | 331 | 2,622 | 425 | 386 | 3,549 | 46 | 51 | 533 |
| 13. Country Club Road and South Road | 33 | 79 | 339 | 60 | 90 | 435 | 56 | 88 | 408 |
| 14. Manning Drive at Craige Deck | 545 | 759 | 5,406 | 86 | 114 | 956 | 55 | 93 | 629 |
| 15. Manning Drive and Ridge Road | 405 | 374 | 3,433 | 361 | 430 | 3,435 | 33 | 41 | 339 |

* Represents pedestrians who remained on the sidewalk and turned the corner rather than cross the street. Counts were taken in the Fall of 2011 while the University was in session. The peaks summarized are the pedestrian peak periods and do not necessarily coincide with vehicle peak hours.

Table 3-7: Pedestrian Counts (cont.)

| Location | 2009 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 141 | 145 | 1,057 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 67 | 99 | 714 | 135 | 332 | 2,235 | 11 | 11 | 122 |
| 3. Franklin Street and North Columbia Street | 349 | 585 | 3,927 | 340 | 684 | 5,157 | 44 | 111 | 805 |
| 4. Franklin Street at Coffee Shop | 315 | 567 | 3,392 | 260 | 618 | 3,703 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 121 | 313 | 1,650 | 111 | 201 | 1,663 | 320 | 409 | 3,427 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 102 | 175 | 1,138 | 27 | 47 | 400 | 60 | 45 | 448 |
| 7. Columbia Street at Fraternity Court | 678 | 562 | 5,014 | 16 | 17 | 112 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 55 | 51 | 330 | 248 | 283 | 2,504 | 57 | 93 | 694 |
| 9. McCauley Street and Pittsboro Street | 91 | 188 | 1,008 | 78 | 55 | 526 | 124 | 123 | 1,167 |
| 10. McCauley Street/South Road and Columbia Street | 320 | 539 | 2,543 | 486 | 343 | 2,880 | 100 | 152 | 1,155 |
| 11. South Road at Bell Tower/Stadium Drive | 1,774 | 1,981 | 17,097 | 432 | 436 | 3,809 | 106 | 109 | 1,251 |
| 12. Raleigh Street and South Road | 249 | 281 | 2,470 | 389 | 408 | 3,578 | 0 | 5 | 139 |
| 13. Country Club Road and South Road | 18 | 61 | 290 | 47 | 45 | 311 | 21 | 53 | 294 |
| 14. Manning Drive at Craige Deck | 438 | 559 | 4,045 | 38 | 117 | 799 | 38 | 72 | 570 |
| 15. Manning Drive and Ridge Road | 493 | 673 | 4,691 | 351 | 630 | 3,855 | 0 | 1 | 19 |

| Location | 2011 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 100 | 158 | 977 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | | ** | | ** | | | ** | | |
| 3. Franklin Street and North Columbia Street | 382 | 690 | 5,619 | 586 | 760 | 6,640 | 49 | 117 | 870 |
| 4. Franklin Street at Coffee Shop | 397 | 578 | 3,951 | 247 | 559 | 3,649 | Not Applicable | | |
| 5. Franklin Street and Henderson Street | 355 | 626 | 4,153 | 135 | 250 | 1,895 | 126 | 130 | 874 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 110 | 149 | 947 | 33 | 116 | 526 | 19 | 36 | 262 |
| 7. Columbia Street at Fraternity Court | 259 | 470 | 3,451 | 919 | 705 | 5,930 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 49 | 84 | 592 | 418 | 376 | 3,003 | 20 | 32 | 273 |
| 9. McCauley Street and Pittsboro Street | 78 | 140 | 953 | 176 | 229 | 1,612 | 54 | 50 | 428 |
| 10. McCauley Street/South Road and Columbia Street | 387 | 603 | 2,884 | 239 | 303 | 1,856 | 85 | 61 | 592 |
| 11. South Road at Bell Tower/Stadium Drive | 1,359 | 1,577 | 11,608 | 262 | 286 | 2,760 | 56 | 98 | 871 |
| 12. Raleigh Street and South Road | 496 | 495 | 3,611 | 467 | 536 | 3,722 | 101 | 46 | 531 |
| 13. Country Club Road and South Road | 16 | 36 | 205 | 22 | 26 | 218 | 22 | 39 | 251 |
| 14. Manning Drive at Craige Deck | 438 | 507 | 4,068 | 61 | 95 | 670 | 69 | 89 | 637 |
| 15. Manning Drive and Ridge Road | 539 | 772 | 4,106 | 362 | 518 | 3,257 | 9 | 13 | 76 |

| Location | 2013 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 132 | 138 | 1,088 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 147 | 208 | 1,526 | 152 | 312 | 2,476 | 34 | 49 | 395 |
| 3. Franklin Street and North Columbia Street | 451 | 622 | 5,026 | 413 | 577 | 5,785 | 296 | 519 | 3,454 |
| 4. Franklin Street at Coffee Shop | 515 | 679 | 5,350 | 551 | 673 | 5,625 | Not Applicable | | |
| 5. Franklin Street and Henderson Street | 268 | 552 | 3,517 | 81 | 162 | 1,329 | 68 | 162 | 921 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 137 | 139 | 1,171 | 67 | 73 | 632 | 38 | 80 | 425 |
| 7. Columbia Street at Fraternity Court | 769 | 718 | 6,025 | 1,125 | 646 | 5,858 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 45 | 62 | 411 | 376 | 429 | 3,179 | 54 | 62 | 516 |
| 9. McCauley Street and Pittsboro Street | 103 | 124 | 1,035 | 133 | 172 | 1,335 | 138 | 155 | 1,201 |
| 10. McCauley Street/South Road and Columbia Street | 325 | 381 | 2,454 | 444 | 416 | 2,525 | 693 | 289 | 2,547 |
| 11. South Road at Bell Tower/Stadium Drive | 721 | 746 | 7,001 | 226 | 283 | 2,324 | 520 | 470 | 4,940 |
| 12. Raleigh Street and South Road | 409 | 494 | 4,004 | 651 | 714 | 5,995 | 15 | 63 | 451 |
| 13. Country Club Road and South Road | 43 | 22 | 191 | 26 | 31 | 244 | 61 | 72 | 593 |
| 14. Manning Drive at Craige Deck | 453 | 455 | 3,954 | 60 | 83 | 749 | 45 | 65 | 449 |
| 15. Manning Drive and Ridge Road | 525 | 582 | 4,458 | 460 | 501 | 4,007 | 36 | 70 | 422 |

| Location | 2015 | | | | | | | | |
|---|-------------|---------|-------------|----------------|---------|-------------|------------------------|---------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| 1. Columbia Street between Rosemary Street and Airport Road | 108 | 130 | 1,019 | Not applicable | | | Not applicable | | |
| 2. Franklin Street and Church Street | 15 | 37 | 265 | 206 | 395 | 2,899 | 98 | 34 | 543 |
| 3. Franklin Street and North Columbia Street | 172 | 493 | 3,560 | 262 | 621 | 4,834 | 42 | 62 | 462 |
| 4. Franklin Street at Coffee Shop | 271 | 468 | 4,033 | 141 | 233 | 2,063 | Not Applicable | | |
| 5. Franklin Street and Henderson Street | 284 | 391 | 3,817 | 67 | 229 | 1,351 | 27 | 17 | 159 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 112 | 144 | 1,150 | 54 | 66 | 565 | 12 | 21 | 162 |
| 7. Columbia Street at Fraternity Court | 274 | 331 | 3,916 | 592 | 374 | 4,568 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 38 | 53 | 504 | 574 | 482 | 4,114 | 38 | 40 | 467 |
| 9. McCauley Street and Pittsboro Street | 136 | 147 | 1,356 | 195 | 189 | 1,515 | 32 | 31 | 297 |
| 10. McCauley Street/South Road and Columbia Street | 315 | 341 | 2,941 | 302 | 345 | 2,878 | 124 | 139 | 1,022 |
| 11. South Road at Bell Tower/Stadium Drive | 374 | 5 | 3,258 | 351 | 379 | 4,262 | 420 | 327 | 3,552 |
| 12. Raleigh Street and South Road | 260 | 376 | 3,234 | 448 | 385 | 4,477 | 96 | 30 | 332 |
| 13. Country Club Road and South Road | 63 | 53 | 365 | 34 | 36 | 252 | 29 | 31 | 303 |
| 14. Manning Drive at Craige Deck | 408 | 435 | 3,909 | 56 | 110 | 711 | 33 | 66 | 338 |
| 15. Manning Drive and Ridge Road | 417 | 571 | 4,039 | 386 | 516 | 3,494 | 5 | 9 | 41 |

Table 3-7: Pedestrian Counts (cont.)

| Location | 2017 | | | | | | | | |
|--|---|---------|-------------|-----------|----------------|-------------|------------------------|----------------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| | 1. Columbia Street between Rosemary Street and Airport Road | 110 | 136 | 967 | Not applicable | | | Not applicable | |
| 2. Franklin Street and Church Street | 102 | 159 | 925 | 45 | 52 | 475 | 12 | 54 | 95 |
| 3. Franklin Street and North Columbia Street | 320 | 441 | 4,085 | 485 | 712 | 5,111 | 30 | 48 | 444 |
| 4. Franklin Street at Coffee Shop | 315 | 374 | 2,709 | 620 | 833 | 6,177 | Not applicable | | |
| 5. Franklin Street and Henderson Street | 414 | 531 | 3,947 | 140 | 179 | 1,061 | 43 | 19 | 154 |
| 6. Franklin Street and Hillsborough-Raleigh Street | 106 | 109 | 1,005 | 36 | 90 | 521 | 22 | 46 | 308 |
| 7. Columbia Street at Fraternity Court | 828 | 987 | 7,237 | 583 | 532 | 4,196 | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 59 | 113 | 648 | 682 | 665 | 5,156 | 63 | 66 | 480 |
| 9. McCauley Street and Pittsboro Street | 104 | 159 | 1,100 | 194 | 226 | 1,523 | 27 | 45 | 131 |
| 10. McCauley Street/South Road and Columbia Street | 263 | 304 | 1,976 | 278 | 382 | 2,178 | 85 | 125 | 811 |
| 11. South Road at Bell Tower/Stadium Drive | 779 | 644 | 6,101 | 237 | 294 | 2,180 | 608 | 468 | 4,696 |
| 12. Raleigh Street and South Road | 460 | 553 | 3,515 | 386 | 617 | 3,547 | 19 | 40 | 303 |
| 13. Country Club Road and South Road | 15 | 36 | 202 | 26 | 25 | 178 | 42 | 33 | 264 |
| 14. Manning Drive at Craige Deck | 336 | 388 | 3,002 | 22 | 40 | 228 | 12 | 18 | 118 |
| 15. Manning Drive and Ridge Road | 838 | 402 | 4,327 | 524 | 492 | 3,867 | 23 | 15 | 118 |

| Location | 2001-2017 Percent Change | | | | | | | | |
|--|---|---------|-------------|-----------|----------------|-------------|------------------------|----------------|-------------|
| | North-South | | | East-West | | | North-South/East-West* | | |
| | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total | AM Peak | PM Peak | Daily Total |
| | 1. Columbia Street between Rosemary Street and Airport Road | 16% | 74% | -15% | Not applicable | | | Not applicable | |
| 2. Franklin Street and Church Street | 104% | 66% | 43% | -50% | -67% | -79% | 33% | 440% | -12% |
| 3. Franklin Street and North Columbia Street | 47% | 31% | 0% | 106% | 63% | -8% | -47% | -31% | -47% |
| 4. Franklin Street at Coffee Shop | 28% | -15% | -39% | 128% | 198% | 38% | Not applicable | | |
| 5. Franklin Street and Henderson Street | 70% | 21% | -10% | 8% | 8% | -53% | 39% | -61% | -67% |
| 6. Franklin Street and Hillsborough-Raleigh Street | 96% | 25% | 6% | 38% | 221% | 24% | 16% | 48% | -20% |
| 7. Columbia Street at Fraternity Court | 532% | 217% | 148% | 45% | 17% | 2% | Not applicable | | |
| 8. Cameron Avenue and Pittsboro Street | 321% | 290% | 88% | 216% | 143% | 88% | 174% | 450% | 127% |
| 9. McCauley Street and Pittsboro Street | 181% | 184% | 46% | 116% | 109% | 0% | -4% | 13% | -71% |
| 10. McCauley Street/South Road and Columbia Street | 89% | 26% | -7% | 491% | 390% | 124% | 20% | 108% | -3% |
| 11. South Road at Bell Tower/Stadium Drive | -1% | -9% | -39% | 27% | 47% | -19% | 733% | 836% | 847% |
| 12. Raleigh Street and South Road | 38% | 67% | -16% | 219% | 488% | 145% | -75% | -2% | -53% |
| 13. Country Club Road and South Road | -35% | -44% | -62% | -21% | -46% | -64% | -63% | -56% | -79% |
| 14. Manning Drive at Craige Deck | 417% | 536% | 211% | 83% | -25% | -31% | -40% | -10% | -38% |
| 15. Manning Drive and Ridge Road | 186% | -5% | -13% | 563% | 156% | 91% | 15% | -17% | -59% |

* Represents pedestrians who remained on the sidewalk and turned the corner rather than cross the street.

** Location not counted in 2011 to due to construction.

Counts were taken in the Fall while the University was in session. The peaks summarized are the pedestrian peak periods and do not necessarily coincide with vehicle peak hours.

A number of improvements were identified and included in the Master Plan. While these do not provide a complete network of bicycle routes on Main Campus, they enhance connectivity and safety at a reasonable cost, and with minimal adverse impacts. Recommended improvements include education, encouragement and enforcement programs that do not involve roadway infrastructure changes. These recommendations are described in Chapter 5 of the Bicycle Master Plan. These improvements are in addition to a commitment to control traffic speeds on campus streets and to improve safety for cyclists and pedestrians, particularly through active construction areas. Specific improvements to encourage cycling include:

- Bicycle Ambassador Program to perform outreach.
- Marketing campaign to promote mutual respect between cyclists and motorists.
- Bicycle education classes through Campus Recreation.
- New student orientation that includes bicycle safety components.
- Improved bicycle registration and safety outreach.
- Employee training on multi-modal travel, including staff who operate UNC-owned vehicles on campus.
- Annual student bike ride event to support the Cyclicious event each fall.
- Pursuit of a Bike Share System in cooperation with the Town of Chapel Hill; the University launched the Tar Heel Bikes bikeshare program in fall 2017.

Other recommendations that emerged from the Master Plan address the importance of supporting facilities and policies, and include:

- Designing all new roads that are included in the Development Plan to safely accommodate cyclists.
- Development of a comprehensive bicycle resources webpage (<https://move.unc.edu/bike/>).
- Updates to the (digital) campus map to include bicycle facilities, amenities, and wayfinding.
- The planning and design of new buildings and facilities to include showers, along with storage for bicycles and cyclists' equipment.

Improvements on Main Campus and within the towns will be implemented over time. The University has been invited to appoint, and has appointed, an employee to serve on the Town of Chapel Hill's Transportation & Connectivity Board. The University is working in similar ways with the Town of Carrboro in its bike planning efforts. The University believes it is appropriate for the University and Towns to jointly undertake these investigations using data that will be collected by the University and Town, GIS data, and other information that may be relevant.

For the purpose of estimating transportation needs for the Development Plan, no increase in cycling is assumed.

3.2.8 Pedestrians

A priority objective of the Master Plan was to create a more pedestrian-friendly and accessible campus. Numerous pedestrian enhancements, including pedestrian bridges, are included in the plan. While the pedestrian environment will be improved, it is unlikely that this alone will divert a significant number of drive-alone commuters.

The 2017 Commuter Survey indicates increases in walking amongst employees (from 1 to 2 percent) and commuting students (from 5 to 9 percent). Mode share for walking has fluctuated in prior years, and it is generally correlated with transit usage (as one goes up the other goes down). Pedestrian counts were undertaken in November, 2017, at the same locations the same day of the week as for the previous TIAs. The locations are identified in Figure 3-3, and the counts summarized in Table 3-7. Counts were taken between 7:00 A.M. and 7:00 P.M. on a Tuesday, Wednesday or Thursday. The counts include pedestrians crossing the street in the general vicinity of the intersection, as well as those on the sidewalks. Identical surveys will be undertaken for subsequent updates of the TIA to monitor changes in pedestrian activity.

A comparison of the 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, and 2017 counts is included in the lower portion of Table 3-7. This indicates that there has been shifts in pedestrian activity since 2001, with some locations seeing big increases and some locations seeing decreases in pedestrian activity.

3.2.9 Park-and-Ride

Park-and-ride continues to be one of the key and most successful strategies for reducing Main Campus parking needs. The intent of the University, in cooperation with the Town, is to offer commuters a well-planned and operated park-and-ride system providing a level of convenience approaching that of peripheral parking lots on Main Campus.

Starting in 2013, fees are now implemented for all UNC Park & Ride lot permits. The permit fee for employees is based on salary, and ranges from \$229 to \$394 per year. The permit fee for students is \$171.95 for the academic year or \$229 for the full year. Temporary permits are available for \$2 per day or \$6 per week. The introduction of park-and-ride fees has been associated with a drop in use, with employee use dropping from 16 percent in the 2013 commuter survey to 7 percent in 2015, and student use declining as well (12 percent in 2013 to 6 percent in 2015). Note the 2013 survey was conducted before the pricing changes. This drop in park-and-ride use is also reflected in the counts of park-and-ride lots (Table 3-8); note that 2015, and 2017 counts were taken after the pricing changes took effect.

Existing park-and-ride lots are identified in Figure 3-4 and summarized in Table 3-8. The Friday Center and Jones Ferry Road lots were opened in 2002, the Chatham Lot was opened in 2005, and the Pittsboro Lowes Lot was opened in 2011. These four additions to the park-and-ride system have increased the total park-and-ride count from 1,988 spaces in 2001 to 3,881 today. Five of the lots (the Friday Center lot, the NC 54 East lot, the Chatham County lot, the Franklin Street lot, and the Hedrick lot at the Friday Center) are exclusively for University users.

Table 3-8 also reports the usage of the lots in 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, and 2017. The Friday Center lot continues to fill, and as in the past, most likely accommodates commuters from the US 15-501 North corridor, which has little park-and-ride, in addition to commuters from the east.

Figure 3-4: Location of Park and Ride Lots



Source: UNC-Chapel Hill Park & Ride map

Table 3-8: Park-and-Ride Inventory and Utilization

| Location | No. of Spaces | Utilization | | | | | | | | | |
|--------------------------|---------------|--------------|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | Fall 2001 | Fall 2002 | Fall 2003 | Fall 2005 | Fall 2007 | Fall 2009 | Fall 2011 | Fall 2013 | Fall 2015 | Fall 2017 |
| NC 54 East | 512 | 550 | 1,285 | 526 | 541 | 508 | 512 | 430 | 204 | 112 | 87 |
| Friday Center | 871 | | Incl. in NC 54 count | 875 | 890 | 882 | 871 | 867 | 842 | 795 | 752 |
| Southern Village | 400 | 280 | 410 | 355 | 376 | 388 | 385 | 379 | 272 | 260 | 325 |
| Jones Ferry Road | 443 | | 245 | 205 | 259 | 252 | 230 | 231 | 132 | 102 | 86 |
| Carboro Plaza | 145 | 155 | Incl. in Jones Ferry Rd. count | 115 | 129 | 136 | 111 | 96 | 52 | 30 | 24 |
| Eubanks Road | 400 | 140 | 270 | 119 | 253 | 234 | 268 | 346 | 185 | 188 | 216 |
| Estes Commuter Lot | | 220 | Incl. in Eubanks Rd. count | 138 | 318 | - | - | - | - | - | - |
| Franklin Street | 67 | 95 | 95 | 95 | 94 | 67 | 67 | 67 | 32 | - | - |
| Hedrick Lot (Friday Ctr) | 278 | 230 | 230 | 230 | 211 | 269 | - | 86 | 72 | 60 | 36 |
| Chatham Lot | 550 | - | - | - | 123 | 150 | 214 | 187 | 144 | 146 | 129 |
| Bible Church Lot | - | - | - | - | - | 79 | - | - | - | - | - |
| MLK Jr Blvd Lot | 40 | - | - | - | - | 39 | 40 | 40 | 39 | 41 | 40 |
| Pittsboro Lowes | 175 | - | - | - | - | - | - | 33 | 33 | 26 | 22 |
| Totals | 3,881 | 1,670 | 2,535 | 2,658 | 3,194 | 3,004 | 2,698 | 2,762 | 2,007 | 1,760 | 1,717 |

Notes:

1. Friday Center and Jones Ferry Road lots opened in 2002, Chatham lot opened fall 2005, Bible Church and MLK Jr Blvd lots opened in 2007.
2. Franklin Street lot is leased lot north of campus.
3. PH/Hedrick lot restricted to Hospitals employees.
4. Lot capacities are current, and some have changed over time.
5. 2003 survey conducted on Tuesday, November 11 between 9:30 and 11:30 A.M.
6. 2005 survey conducted on Tuesday, November 15 between 9:30 and 11:30 A.M.
7. 2007 survey conducted on Tuesday, November 13 between 9:30 and 11:30 A.M.
8. Estes Commuter Lot closed in 2007 for park-and-ride.
9. 2009 survey conducted on Tuesday, November 17 between 9:30 and 11:30 A.M.
10. In 2009, Bible Church Lot and Hedrick Lot no longer used for park and ride.
11. In 2011, Pittsboro Lowes Lot opened.
12. 2011 survey conducted on Tuesday, November 15 between 10:00 A.M. and 1:00 P.M.
13. 2013 survey conducted on Tuesday, November 19 between 10:00 A.M. and 1:00 P.M.
14. 2015 survey conducted on Tuesday, November 17 between 9:30 A.M. and 12:00 P.M.
15. 2017 survey conducted on Tuesday, November 15 between 10:00 A.M. and 1:00 P.M.

New commuters who are not projected to switch to the alternatives described earlier in this section will be accommodated in park-and-ride facilities. The resulting park-and-ride requirement is shown in Table 3-9. The parking “shortfall” at the completion of the Development Plan in 2022 to be addressed by increased park-and-ride has been increased from 1,227 to 1,338 spaces. To date the University, in conjunction with the Town, have added over 2,200 spaces, i.e., more than what is required to satisfy the needs of the Development Plan. Also, note that the increase in the “shortfall” that is to be satisfied by park-and-ride is primarily due to an increase in the population numbers by projecting population growth to 2022, not just 2015.

An analysis was undertaken to determine the amount of additional park-and-ride spaces required in each major approach corridor. This is shown in Table 3-9. Figure 3-5 and Figure 3-6 show the regional distribution of University/Hospitals employees (updated with 2015 addresses) and the proportion of employees by approach corridor for Main Campus. Table 3-10 also summarizes employee addresses by zip code (includes zip codes only in North Carolina that could be geocoded).

Table 3-9 shows that all corridors with the exception of US 15-501 North will have more than enough park-and-ride spaces at the completion of the Development Plan. The University and Town continue to study opportunities to address this need, which in turn will alleviate the current excessive demand for the Friday Center lot.

Table 3-9: Demand for Park-and-Ride by Corridor

| Approach Direction | Current | | % of Total Commuters in Corridor ³ | Theoretical Current Demand ⁴ | Adjusted Current Demand ⁵ | Future Additional Demand ⁶ | Total Demand | Spaces Needed ⁷ |
|-----------------------------------|-------------------------------|--------------------|---|---|--------------------------------------|---------------------------------------|--------------|----------------------------|
| | Number of Spaces ² | Actual Utilization | | | | | | |
| US 15-501 from N ¹ | 67 | - | 25.1% | 432 | 414 | 55 | 470 | 403 |
| NC 54 from E | 1,661 | 875 | 39.7% | 682 | 627 | 84 | 711 | (950) |
| US 15-501 from S | 1,125 | 476 | 11.7% | 200 | 224 | 30 | 253 | (872) |
| NC 54 from W | 588 | 110 | 11.4% | 196 | 197 | 26 | 223 | (365) |
| I-40 from W/NC 86 from N | 440 | 256 | 12.1% | 207 | 271 | 36 | 308 | (132) |
| Total Park-and-Ride Spaces | 3,881 | 1,717 | 100.0% | 1,717 | 1,733 | 231 | 1,964 | (1,917) |

Notes

1. Actual demand is considered to be much higher given the number of commuters in the corridor, but currently there is a only 67-space lot in the corridor. Commuters most likely using NC 54 and Friday Center lots.
2. Refer to Table 3-8 for lot capacities.
3. Based on geocoding of 2017 UNC commuter addresses.
NC 54 from east includes Farrington Road from south.
4. Assumes demand is a function of the percentage of commuters in the corridor based on geocoding of employee home addresses.
5. Determined by adjusting theoretical current demand for actual demand numbers while keeping total constant. For example, it is known that some commuters in corridors where there is no park-and-ride park in facilities in adjacent corridors.
6. Total projected need for additional park-and-ride over life of Development Plan (refer to Table 3-2) = 1,338
Future need accounts for increase in demand to date but subtracts 200 for non-University park-and-ride users (1,107 spaces): 231
7. Numbers assume recently-constructed lots and use of empty spaces in existing park-and-ride lots.

Figure 3-5: Regional Distribution of Employee Home Addresses

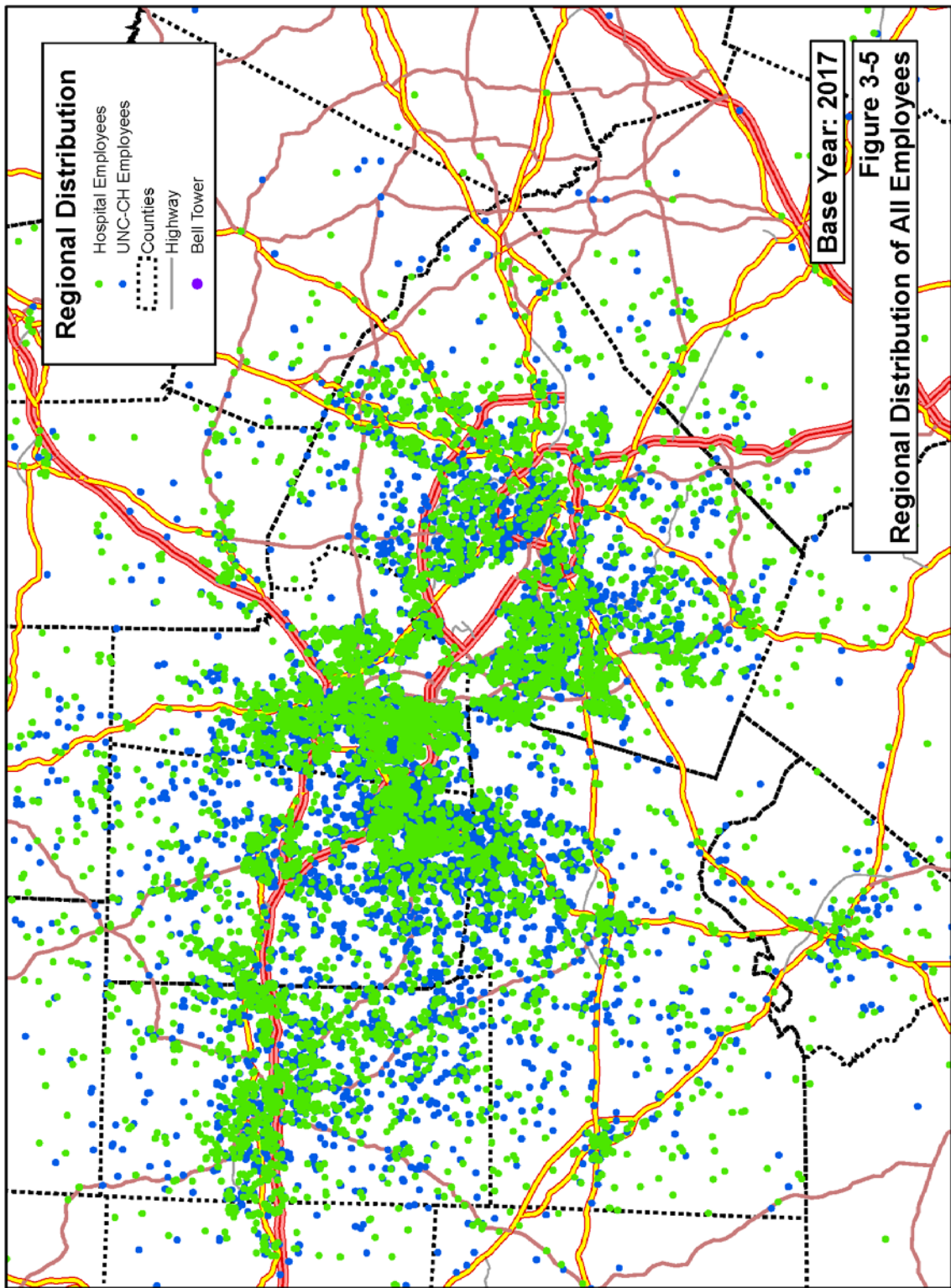


Figure 3-6: Proportion of Employees by Approach Corridor

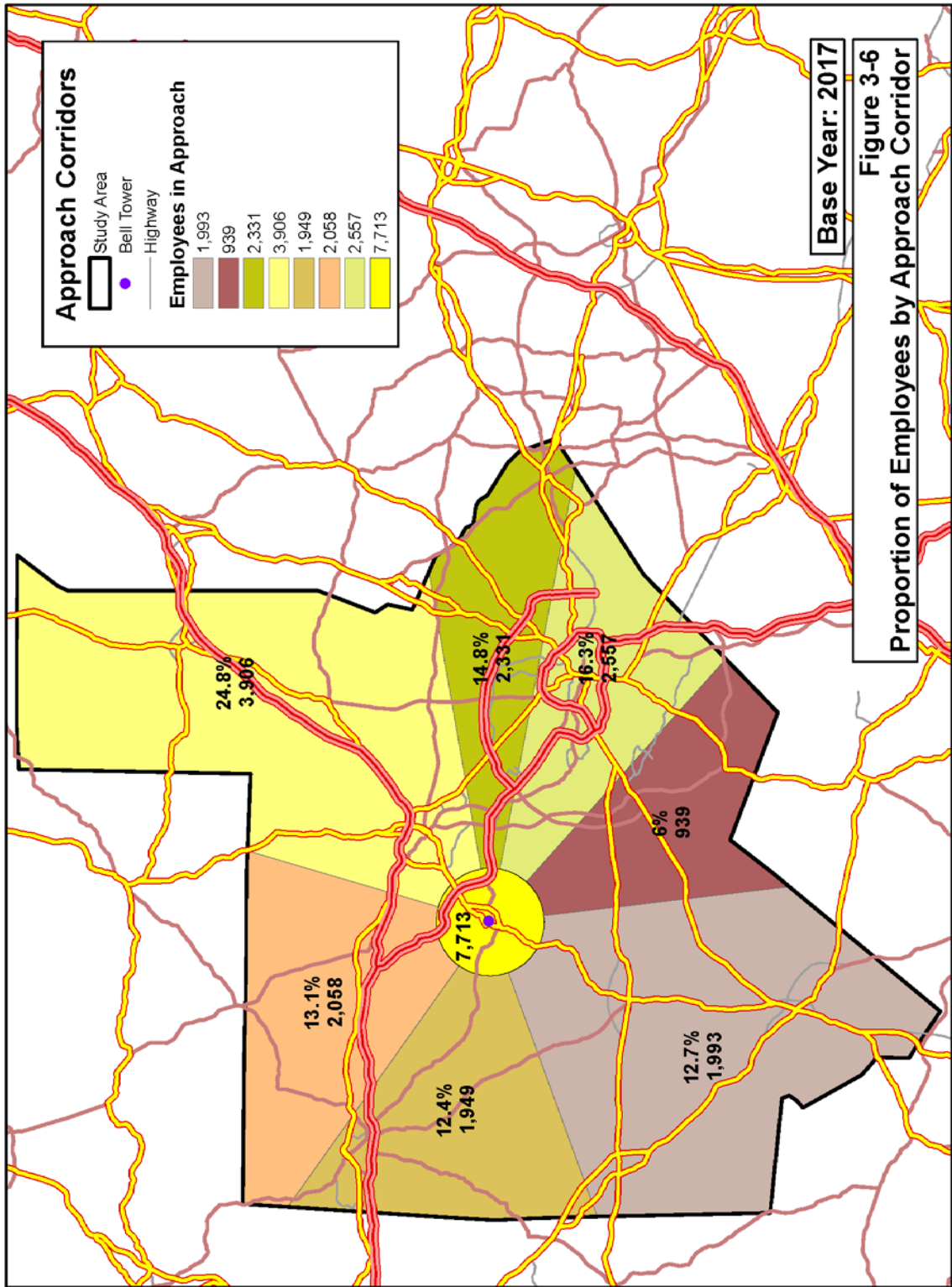


Table 3-10: Summary of Employee Addresses by Zip Code

| Zip Code | # Empl. | Zip Code | # Empl. | Zip Code | # Empl. | Zip Code | # Empl. | Zip Code | # Empl. | Zip Code | # Empl. | Zip Code | # Empl. |
|--|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|
| 27516 | 3,224 | 27523 | 112 | 27601 | 22 | 27702 | 10 | 28512 | 6 | 27505 | 4 | 27263 | 3 |
| 27713 | 1,962 | 27614 | 109 | 27379 | 21 | 28311 | 10 | 27534 | 6 | 28083 | 4 | 28659 | 3 |
| 27514 | 1,860 | 27603 | 106 | 27571 | 20 | 27282 | 10 | 27804 | 6 | 27212 | 4 | 28704 | 3 |
| 27517 | 1,782 | 27609 | 98 | 27252 | 20 | 27537 | 10 | 28451 | 6 | 28215 | 4 | 28202 | 3 |
| 27510 | 1,438 | 27539 | 94 | 27407 | 19 | 28645 | 10 | 28031 | 6 | 28801 | 4 | 27896 | 3 |
| 27707 | 1,107 | 27518 | 93 | 28557 | 18 | 27012 | 9 | 27577 | 6 | 27557 | 4 | 28079 | 3 |
| 27312 | 937 | 27522 | 92 | 28374 | 18 | 28601 | 9 | 28590 | 6 | 28352 | 4 | 27542 | 3 |
| 27302 | 891 | 27599 | 91 | 27408 | 17 | 27208 | 9 | 27291 | 6 | 28075 | 4 | 28607 | 3 |
| 27278 | 845 | 27607 | 89 | 27562 | 17 | 27530 | 9 | 28173 | 6 | 27331 | 4 | 28560 | 3 |
| 27253 | 717 | 27529 | 82 | 27265 | 17 | 27834 | 9 | 28387 | 6 | 27310 | 4 | 27544 | 3 |
| 27703 | 671 | 27545 | 64 | 27596 | 16 | 28078 | 8 | 27358 | 6 | 27103 | 4 | 28394 | 3 |
| 27705 | 618 | 27332 | 62 | 27858 | 16 | 28804 | 8 | 28405 | 5 | 28328 | 4 | 27504 | 3 |
| 27519 | 606 | 27298 | 55 | 27401 | 16 | 28314 | 8 | 28390 | 5 | 28655 | 4 | 27248 | 3 |
| 27704 | 420 | 27207 | 55 | 27314 | 16 | 28806 | 8 | 28602 | 5 | 27213 | 4 | 27823 | 3 |
| 27502 | 352 | 27583 | 54 | 27403 | 16 | 27536 | 8 | 28270 | 5 | 24541 | 4 | 27624 | 3 |
| 27560 | 305 | 27574 | 52 | 27501 | 16 | 28805 | 8 | 27870 | 5 | 24540 | 4 | 27576 | 3 |
| 27215 | 292 | 27231 | 51 | 27717 | 15 | 27893 | 8 | 27343 | 5 | 27317 | 4 | 28334 | 3 |
| 27513 | 286 | 27541 | 50 | 27284 | 15 | 27709 | 8 | 27283 | 5 | 28372 | 3 | 27216 | 3 |
| 27712 | 278 | 27244 | 50 | 27405 | 15 | 28327 | 8 | 27313 | 5 | 27886 | 3 | | |
| 27701 | 277 | 27572 | 48 | 28027 | 15 | 27203 | 8 | 27569 | 5 | 27512 | 3 | | |
| 27613 | 228 | 27249 | 48 | 27549 | 15 | 27409 | 8 | 28580 | 5 | 28207 | 3 | | |
| 27217 | 220 | 27573 | 45 | 27104 | 14 | 28570 | 7 | 28315 | 5 | 28787 | 3 | | |
| 27617 | 216 | 27608 | 43 | 28516 | 14 | 28803 | 7 | 27357 | 5 | 28630 | 3 | | |
| 27344 | 214 | 27377 | 42 | 27581 | 14 | 27715 | 7 | 28306 | 5 | 28144 | 3 | | |
| 27349 | 197 | 27559 | 41 | 27106 | 13 | 28403 | 7 | 27101 | 5 | 27292 | 3 | | |
| 27540 | 180 | 27520 | 41 | 27340 | 13 | 28412 | 7 | 28216 | 5 | 28056 | 3 | | |
| 27612 | 179 | 27410 | 37 | 27205 | 13 | 28036 | 7 | 28117 | 5 | 27023 | 3 | | |
| 27330 | 169 | 27515 | 37 | 27301 | 13 | 28227 | 7 | 28411 | 5 | 27889 | 3 | | |
| 27258 | 166 | 27406 | 35 | 28081 | 12 | 27228 | 7 | 27376 | 5 | 27233 | 3 | | |
| 27587 | 162 | 27565 | 34 | 28409 | 12 | 27214 | 7 | 27803 | 5 | 27627 | 3 | | |
| 27616 | 159 | 27591 | 28 | 28326 | 12 | 27360 | 7 | 28715 | 4 | 27959 | 3 | | |
| 27511 | 158 | 27503 | 28 | 28269 | 11 | 28348 | 6 | 27863 | 4 | 28562 | 3 | | |
| 27610 | 151 | 27525 | 27 | 27355 | 11 | 27524 | 6 | 28226 | 4 | 27127 | 3 | | |
| 27606 | 139 | 27527 | 26 | 28304 | 11 | 28210 | 6 | 28303 | 4 | 27909 | 3 | | |
| 27243 | 133 | 27592 | 25 | 27509 | 11 | 27589 | 6 | 28211 | 4 | 27262 | 3 | | |
| 27615 | 125 | 27597 | 24 | 27320 | 11 | 28025 | 6 | 28504 | 4 | 28472 | 3 | | |
| 27526 | 124 | 27455 | 24 | 27546 | 11 | 28732 | 6 | 28697 | 4 | 28364 | 3 | | |
| 27604 | 122 | 27605 | 23 | 27316 | 10 | 27107 | 6 | 28739 | 4 | 28358 | 3 | | |
| The following ZIP codes have 1 employee living in them: | | | | | | | | | | | | | |
| 01832, 02649, 06405, 06525, 08081, 10992, 11226, 11357, 11558, 11580, 12168, 12213, 12553, 14617, 14701, 14760, 15717, 16214, 17253, 17302, 19083, 19382, 19711, 21076, 21211, 22312, 22380, 22707, 22901, 23113, 23114, 23238, 23834, 23919, 23927, 24055, 24148, 24529, 24586, 24597, 24901, 25273, 25710, 25760, 26554, 27006, 27009, 27011, 27018, 27019, 27021, 27030, 27041, 27053, 27105, 27137, 27150, 27154, 27156, 27201, 27235, 27239, 27259, 27288, 27306, 27315, 27323, 27341, 27359, 27370, 27404, 27419, 27428, 27429, 27450, 27521, 27553, 27582, 27619, 27622, 27626, 27629, 27661, 27708, 27714, 27801, 27806, 27807, 27837, 27840, 27856, 27857, 27864, 27874, 27891, 27892, 27921, 27924, 27927, 27949, 27954, 27965, 28001, 28002, 28012, 28021, 28041, 28054, 28110, 28119, 28124, 28133, 28134, 28147, 28150, 28159, 28166, 28167, 28170, 28203, 28262, 28278, 28307, 28312, 28318, 28320, 28323, 28339, 28340, 28341, 28345, 28355, 28359, 28366, 28371, 28383, 28391, 28404, 28431, 28435, 28444, 28457, 28460, 28462, 28465, 28469, 28501, 28502, 28508, 28510, 28517, 28525, 28528, 28540, 28571, 28582, 28585, 28615, 28621, 28624, 28625, 28626, 28631, 28638, 28640, 28643, 28676, 28681, 28692, 28694, 28701, 28712, 28721, 28731, 28735, 28742, 28778, 28791, 28901, 29016, 29516, 29526, 29572, 29650, 29680, 29706, 30032, 30068, 30168, 30313, 30458, 30542, 31093, 31312, 31419, 32312, 32653, 32765, 32836, 33702, 33916, 34698, 34747, 37909, 39202, 39364, 43140, 44087, 45426, 46204, 48085, 49012, 49504, 52246, 52403, 53168, 57216, 59912, 60048, 60134, 60201, 60526, 60614, 61068, 65203, 72514, 76657, 78633, 78759, 80923, 84101, 86305, 89128, 90024, 90404, 94134, 94928, 95991 | | | | | | | | | | | | | |
| The following ZIP codes have 2 employees living in them: | | | | | | | | | | | | | |
| 27025, 27040, 27048, 27260, 27281, 27295, 27305, 27311, 27325, 27371, 27508, 27563, 27584, 27620, 27722, 27808, 27809, 27816, 27822, 27850, 27882, 27910, 27939, 27948, 28023, 28034, 28043, 28082, 28086, 28092, 28104, 28105, 28115, 28120, 28138, 28139, 28146, 28204, 28205, 28206, 28209, 28212, 28213, 28273, 28277, 28301, 28305, 28333, 28337, 28351, 28357, 28360, 28376, 28377, 28379, 28384, 28401, 28425, 28428, 28443, 28453, 28461, 28532, 28546, 28551, 28584, 28594, 28613, 28677, 28716, 28723, 28734, 28748, 28753, 28756, 28759, 28766, 28779, 33647 | | | | | | | | | | | | | |

3.2.10 Transit Service

In addition to finding appropriate sites for more park-and-ride, the key to a successful park-and-ride system is the ability to run an efficient and quick transit shuttle service to Main Campus. Travel times on the roads can be expected to worsen over time. This is an inconvenience to users, and therefore a disadvantage of park-and-ride as well as adding costs to park-and-ride transit service.

Options for improving bus running times that the University and Town can jointly consider include signal pre-emption, queue bypass lanes, and possibly busway lanes or treatments. These improvements are in addition to more frequent service, more express buses, longer hours, and improved security. Examples of potential busways are described under Chapel Hill Transit improvements.

3.3 SUMMARY OF TRIP DIVERSION

Table 3-2 provides an overview of the how commuters traveled pre-and post-Development Plan. If it is assumed that the trip reduction measures that are implicit in the Development Plan and needed to address the reduced parking are applied only to new commuters (in reality they will apply to all commuters), then it is projected that new commuters would travel by the following means:

- Drive alone: 117 (1%)
- Chapel Hill Transit: 5,186 (43%)
- Regional transit: 2,317 (19%)
- Ridesharing: 1,226 (passengers and drivers, 11%)
- Bicycle: 588 (5%)
- Walk: 381 (3%)
- Park-and-ride: 1,672 (14%)
- Other: 577 (5%)

Total (adjusted): 12,065 (100%)

The following pages provide a summary explanation of these calculations.

Summary Explanation of Permanent Park-and-Ride Requirement

This section summarizes the calculation of park-and-ride needs.

A. Parking Demand and Shortfall

Total new commuters (employees and students) from University growth projections:

$$8,203 \text{ employees} + 3,862 \text{ commuting students} = \underline{12,065} \text{ total new commuters}$$

The Development Plan provides a net addition of 438 parking spaces on Main Campus for commuters. On any particular day not all employees scheduled to work during permitted hours report to work, nor do all commuting students come to campus. This allows more permits than spaces to be sold. Based on current parking oversell ratio statistics (an average of 1.25 permits sold for every space), the 438 spaces can accommodate $438 \times 1.25 = \underline{548}$ of the new employees/commuting students (those driving alone and driving car/vanpools).

Therefore 11,517 of the new commuters must be accommodated by other means.

(It should be noted that in 2001, 77% of employees and 11% of commuting students got on-campus parking permits. Thus, $5,882 \text{ employees} + 734 \text{ students} = 6,616$ total commuters should get permits if existing ratios continued to apply. Based on the current combined oversell ratio for parking spaces of 1.25, $6,616 \text{ commuters} = 5,293$ parking spaces would be needed.) Given that the plan provides a net increase of 438 spaces for commuters, the "shortfall" is approximately 4,855 spaces (this excludes the resident student "shortfall".)

B. Use of Alternative Modes

Based on current campus commuting trends and observations of other universities that have implemented aggressive trip reduction strategies, future use of the various alternative travel modes was estimated as follows (from Table 3-2).

Chapel Hill Transit

- a. Prior to the Development Plan, 5% of employees and 33% of commuting students were estimated to use CHT. If these rates continued to apply for the new population, 394 new employees and 1,274 new commuting students (for a total of 1,668) would use CHT.
- b. It is estimated improvements to CHT (fare free, increased service) will result in an additional 3,518 people switching from driving alone to CHT over the life of the Development Plan (NOTE: many of these are existing employees/students living in Chapel Hill/Carrboro and currently driving to campus, as ascertained by GIS analysis).
- c. Therefore a total of **5,186 additional people** (compared to pre Development Plan) will use CHT (or approximately 4,149 **daily** commuters given that a proportion of the population does come to campus on any particular day). Use will increase to 15% for employees and 39% for students.

Regional Transit

- a. In 2001, approximately almost 1.5% of employees and commuting students used GoTriangle regional transit. If these rates continued to apply for the new population, 167 new employees/commuting students would use regional transit.
- b. Based on service improvements and free GoPasses provided by UNC, it is estimated an additional 2,150 people will use regional transit.
- c. Therefore a total of **2,317 additional people** will use regional transit, (or approximately 1,854 **daily** commuters given that a proportion of the population does come to campus on any particular day).

Rideshare

- a. In 2001, approximately 4% of employees and commuting students were passengers in a rideshare vehicle. If these rates continued to apply for the new population, 513 new employees/commuting students would be passengers.
- b. Based on the University's plan to boost its TDM program, it is estimated an additional 283 people will switch to this mode.
- c. Therefore a total of **797 additional people** will become rideshare passengers (or approximately 638 **daily** commuters given that a proportion of the population does come to campus on any particular day). Total new rideshare commuters (drivers and passengers) will be 1,226 persons.

Other Modes

Use of other modes (excluding park-and-ride for now) has been increased in proportion to current use (i.e., no additional diversion beyond trend line growth has been assumed). Based on current ratios (derived from the 2009 survey), use of these other modes by new employees and commuting students is estimated to be:

| | |
|--|---|
| Bicycle: | 588 persons |
| Walk: | 381 persons |
| Other (dropped off, motorcycle, etc.): | 577 persons |
| Total: | 1,546 additional people (1,237 daily commuters) |

C. Park-and-Ride Need

In summary, the above accounts for 9,845 commuters, i.e.,

| | |
|-------------------|-----------------------|
| CHT: | 5,186 |
| Regional transit: | 2,317 |
| Ridesharing: | 796 (passengers only) |
| Other modes: | 1,546 |

Therefore $11,517 - 9,845 = 1,672$ commuters. Based on the 1.25 oversell ratio, this is equivalent to 1,338 commuters (i.e., spaces) on any one day. These people will be accommodated in park-and-ride.

3.4 INTERIM PARK-AND-RIDE NEEDS

Table 3-11 identifies park-and-ride need by year. It builds on Table 2-8 in Section 2.0 which shows the impact of the Development Plan on parking spaces, and Main Campus growth and parking needs for each year (including temporary needs). The total commuter parking “shortfall” for the Development Plan period is approximately 7,095 spaces (assuming current ratios of spaces to commuters). Based on this and the impact of other trip reduction strategies, Table 3-11 identifies the annual and ultimate park-and-ride needs, originally determined by ensuring the cumulative impact (the final row) remains in the positive range.

The table shows that the park-and-ride built spaces to date will meet the ultimate needs of the Development Plan, but will not meet the interim needs (the interim shortfalls are caused by temporary construction parking space losses and the fact that some of the decks in the Development Plan are not scheduled until towards the end of the Development Plan period). Developing and implementing parking management strategies that will make more efficient use of existing spaces on campus and in park-and-ride lots will minimize the interim need for short term park-and-ride spaces without having to construct new park-and-ride spaces to address short term needs.

Table 3-11: Preliminary Phasing of Trip Reduction Strategies

| | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | Total | |
|--|-------------|------------|------------|-------------|------------|--------------|---------------|-------------|------------|------------|------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|
| Main Campus Parking Shortfall ¹ | -395 | -1,130 | -599 | -776 | -110 | 524 | -1,037 | -551 | -259 | 464 | -280 | -295 | -446 | 1,109 | -559 | -559 | -559 | -559 | -559 | -346 | -446 | -446 | -7,099 | |
| Natural ² Growth in Park-and-Ride Demand ² | 22 | 38 | 59 | 49 | 62 | 33 | 17 | 53 | 50 | 54 | 16 | 17 | 17 | 17 | 48 | 48 | 48 | 50 | 49 | 48 | 48 | 48 | 51 | 804 |
| Total Parking Shortfall | -373 | -1,092 | -540 | -727 | -48 | 497 | -1,020 | -504 | -309 | -410 | -266 | -272 | -429 | 1,092 | -608 | -608 | -608 | -609 | -608 | -895 | -895 | -895 | -7,820 | |
| CHT Transit ^{3,4,5} | 50 | 300 | 275 | 225 | 125 | 50 | 50 | 100 | 50 | 25 | 25 | 25 | 130 | 43 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 133 | 2,814 |
| Fare free (2002) | | | | | | | | | | | | | | | | | | | | | | | | |
| Increased services | | | | | | | | | | | | | | | | | | | | | | | | |
| Regional Transit ⁶ | 15 | 15 | 15 | 10 | 50 | 60 | 70 | 70 | 70 | 60 | 45 | 37 | 200 | 60 | 137 | 137 | 137 | 137 | 137 | 137 | 137 | 137 | 137 | 1,720 |
| Rebussing ⁷ | 10 | 10 | 10 | 20 | 20 | 10 | 10 | 15 | 14 | 10 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 141 |
| Reduction in student walk, ride & park-and-ride ⁷ | | | | | | | | | | | | | | | | | | | | | | | | |
| Temporary Parking ⁸ | | | | | | | | | | | | | | | | | | | | | | | | |
| Chatham Street lot | 95 | | | | | | -28 | | | | | | | | | | | | | | | | | |
| C5 Lot | 125 | | | | | | -125 | | | | | | | | | | | | | | | | | |
| Odum Village | | | | 428 | | | | | | | | | | -428 | | | | | | | | | | |
| Park-and-Ride ⁹ | | 1,306 | 278 | | 550 | 242 | -242 | | | | 175 | | | | | | | | | | | | | 2,309 |
| Parking Management Strategies | | | | | | | | 300 | 350 | | | | | | | | | | | | | | | |
| Net Impact for Year (negative no. is shortfall) | -107 | 463 | -79 | -142 | 583 | 853 | -1,285 | -119 | 175 | 505 | -51 | -210 | -273 | 770 | -285 | -286 | -285 | -286 | -285 | -472 | 100 | 100 | 100 | 2,309 |
| Cumulative Impact⁹ | -107 | 356 | 277 | 135 | 718 | 1,571 | 286 | 166 | 341 | 847 | 796 | 585 | 313 | 1,082 | 798 | 512 | 227 | -59 | -344 | -816 | -816 | -816 | -1 | |

The natural growth in park-and-ride demand represents the increase in demand at the existing ratio of park-and-ride use to University populations (i.e., no diversion or switching to alternative modes). The natural growth is added to the parking shortfall to determine the total shortfall that must be satisfied through trip reduction strategies.

Refer to Table 3-2 (Trip Diversion Calculations) for an explanation of these numbers.

Therefore, the park-and-ride built to date, in aggregate, exceeds the ultimate park-and-ride need. However, spaces are needed in the US 15-501 N corridor, and additional temporary spaces may be needed in the later years of the development plan period.

- Notes:
- Negative number implies loss or shortfall. Shortfalls differ from previous updates because of changes to the Development Plan schedule.
 - Natural growth in park-and-ride demand refers to proportional growth based on current use (unrelated to increased use resulting from proposed trip reduction strategies). This growth in spaces (refer to Table 3-2) is 804.
 - The reductions are not expected to come from new employees and students only since the strategies apply to everyone (existing and new). Impacts of all strategies refers to typical day (i.e., take into account that approximately 20% of persons may not be on campus on any particular day).
 - Reductions in the table address the parking "shortfalls" only. It is assumed that current use of alternative modes will continue to apply without alternatives would in fact be higher than indicated above (refer to Table 3-2 for total numbers).
 - Refer to Table 3-2 for calculations of increased use.
 - Temporary parking refers to reduction in Main Campus vehicles resulting from strategies (refer to Table 3-2).
 - Refer to Table 3-2 for details.
 - Park-and-ride built to date, includes temporary park-and-ride to address interim shortfalls. Results in surplus in all future years. 1,306 in 02/03 is Friday Center and Jones Ferry lots, 278 in 03/04 is Hedrick lot, 550 in 05/06 is Chatham lot, 242 in 06/07 is Bible Church lot (abandoned in 07/08), 175 in 11/12 is Pittsboro Lowes lot.
 - Negative number implies shortfall.

3.5 AIR QUALITY IMPACTS

Based on the diversion of driving commuters to other modes compared to ITE trip rates (as described in Section 3-1), an estimate was prepared of the corresponding reduction in emissions of NO_x, VOC's, and CO. The emissions reductions were calculated as follows:

- The number of daily trips diverted to Chapel Hill Transit in 2017 is assumed to be 2,184.
- The number of daily trips diverted to regional transit or ridesharing in 2017 is assumed to be 1,861.

Updated assumptions and results are summarized in Table 3-12. A number of assumptions were made in preparing this estimate:

- No emissions benefits were assumed for a switch to park-and-ride, since most of the trip would still be made via automobile, and the first few miles of a car trip account for most of the pollution. However, emissions on Main Campus will be reduced.
- Since the diverted auto trips are assumed to be commuter trips, no off-peak emission reductions are considered, only A.M. and P.M. peak periods.
- An average trip length of 4 miles was assumed for all trips diverted to Chapel Hill Transit (CHT). Multiplying by 2,814 trips yields 11,256 vehicle-miles of travel (VMT) eliminated in each peak period.
- An average trip length of 14 miles was assumed for all trips diverted to regional transit or ridesharing. Multiplying by 1,816 trips yields a VMT reduction of 26,054 in each peak period.
- The two VMT totals obtained above were distributed among six functional classes of urban streets, five classes of rural roads, and freeway ramps. In the case of trips served by CHT, no travel was assumed to occur on rural facilities. A larger share of travel was assumed to occur on local, collector, and arterial streets. For regional (GoTriangle and ridesharing) trips, 20 percent of travel was assumed to occur on the corresponding classes of rural facilities.
- Durham and Orange County 2024 emission factors for NO_x and CO from the DCHC MPO 2035 LRTP AQ Conformity Analysis Appendix F were used for analysis. Emission factors for VOC's were obtained from the CMAQ 2012 values for urban areas. Factors vary by the functional classification of the road being traveled (see above), and separate sets of factors were provided for A.M. and P.M. peak periods in the case of NO_x and CO rates.
- A total of 250 workdays were assumed in calculating total annual emission reductions.

Using this methodology, the following emission reductions are estimated for 2017:

- NOx: 18 kg/day (4,399 kg/year)
- VOC: 32 kg/day (7,875 kg/year)
- CO: 583 kg/day (147,769 kg/year)

The University has also moved forward with sustainability efforts for the campus. The *2013 Campus Sustainability Report* details achievements and programs in a variety of areas, including transportation, to enhance campus sustainability. For example, the Report notes the benefits of the Commuter Alternative Program (CAP), the fare-free Chapel Hill Transit system, bicycling, walking, car-sharing, and ridesharing. Further participation in the CAP program and similar initiatives will help improve air quality.

Table 3-12: Estimated Air Quality Impacts

| EMISSION REDUCTIONS: NOx | | | | | EMISSION REDUCTIONS: VOC | | | | | EMISSION REDUCTIONS: CO | | | | |
|--|--------------------|---------------------|-------------------|--------------------|--|--------------------|---------------------|-------------------|--------------------|---------------------------------------|--------------------|---------------------|-------------------|-------------------|
| Functional Classification | 2024 Emission Rate | VMT (Served by CHT) | VMT (Outside CHT) | NOx Emissions (kg) | Functional Classification | 2024 Emission Rate | VMT (Served by CHT) | VMT (Outside CHT) | VOC Emissions (kg) | Functional Classification | 2024 Emission Rate | VMT (Served by CHT) | VMT (Outside CHT) | CO Emissions (kg) |
| AM | | | | | AM | | | | | AM | | | | |
| Interstate | 0.311 | 554 | 4,496 | 1.57 | Interstate | 0.401 | 554 | 4,496 | 2.03 | Interstate | 8.703 | 554 | 4,496 | 43.95 |
| Freeway | 0.238 | 2,440 | 4,854 | 1.74 | Freeway | 0.399 | 2,440 | 4,854 | 2.91 | Freeway | 8.190 | 2,440 | 4,854 | 59.73 |
| Other Princ Art | 0.217 | 2,589 | 3,960 | 1.42 | Other Princ Art | 0.433 | 2,589 | 3,960 | 2.84 | Other Princ Art | 7.571 | 2,589 | 3,960 | 49.58 |
| Minor Arterial | 0.209 | 2,814 | 4,586 | 1.55 | Minor Arterial | 0.433 | 2,814 | 4,586 | 3.20 | Minor Arterial | 7.524 | 2,814 | 4,586 | 55.67 |
| Collector | 0.205 | 1,576 | 2,084 | 0.75 | Collector | 0.446 | 1,576 | 2,084 | 1.63 | Collector | 7.663 | 1,576 | 2,084 | 28.05 |
| Local | 0.236 | 1,238 | 1,667 | 0.68 | Local | 0.443 | 1,238 | 1,667 | 1.29 | Local | 7.557 | 1,238 | 1,667 | 21.96 |
| Interstate | 0.344 | - | 1,124 | 0.39 | Interstate | 0.397 | - | 1,124 | 0.45 | Interstate | 6.932 | - | 1,124 | 7.79 |
| Minor Arterial | 0.245 | - | 990 | 0.24 | Minor Arterial | 0.418 | - | 990 | 0.41 | Minor Arterial | 7.865 | - | 990 | 7.79 |
| Major Collector | 0.235 | - | 1,146 | 0.27 | Major Collector | 0.426 | - | 1,146 | 0.49 | Major Collector | 7.456 | - | 1,146 | 8.55 |
| Minor Collector | 0.220 | - | 521 | 0.11 | Minor Collector | 0.428 | - | 521 | 0.22 | Minor Collector | 7.453 | - | 521 | 3.88 |
| Local | 0.238 | - | 417 | 0.10 | Local | 0.428 | - | 417 | 0.18 | Local | 7.177 | - | 417 | 2.99 |
| Ramps | 0.265 | 45 | 208 | 0.07 | Ramps | 0.412 | 45 | 208 | 0.10 | Ramps | 7.786 | 45 | 208 | 1.97 |
| AM TOTAL | | 11,256 | 26,054 | 8.89 | AM TOTAL | | 11,256 | 26,054 | 15.75 | AM TOTAL | | 11,256 | 26,054 | 291.92 |
| PM | | | | | PM | | | | | PM | | | | |
| Interstate | 0.287 | 554 | 4,496 | 1.45 | Interstate | 0.401 | 554 | 4,496 | 2.03 | Interstate | 8.771 | 554 | 4,496 | 44.30 |
| Freeway | 0.228 | 2,440 | 4,854 | 1.66 | Freeway | 0.399 | 2,440 | 4,854 | 2.91 | Freeway | 8.190 | 2,440 | 4,854 | 59.73 |
| Other Princ Art | 0.222 | 2,589 | 3,960 | 1.45 | Other Princ Art | 0.433 | 2,589 | 3,960 | 2.84 | Other Princ Art | 7.564 | 2,589 | 3,960 | 49.54 |
| Minor Arterial | 0.211 | 2,814 | 4,586 | 1.56 | Minor Arterial | 0.433 | 2,814 | 4,586 | 3.20 | Minor Arterial | 7.473 | 2,814 | 4,586 | 55.30 |
| Collector | 0.203 | 1,576 | 2,084 | 0.74 | Collector | 0.446 | 1,576 | 2,084 | 1.63 | Collector | 7.663 | 1,576 | 2,084 | 28.05 |
| Local | 0.237 | 1,238 | 1,667 | 0.69 | Local | 0.443 | 1,238 | 1,667 | 1.29 | Local | 7.618 | 1,238 | 1,667 | 22.14 |
| Interstate | 0.332 | - | 1,124 | 0.37 | Interstate | 0.397 | - | 1,124 | 0.45 | Interstate | 6.605 | - | 1,124 | 7.42 |
| Minor Arterial | 0.240 | - | 990 | 0.24 | Minor Arterial | 0.418 | - | 990 | 0.41 | Minor Arterial | 7.668 | - | 990 | 7.59 |
| Major Collector | 0.232 | - | 1,146 | 0.27 | Major Collector | 0.426 | - | 1,146 | 0.49 | Major Collector | 7.194 | - | 1,146 | 8.25 |
| Minor Collector | 0.219 | - | 521 | 0.11 | Minor Collector | 0.428 | - | 521 | 0.22 | Minor Collector | 7.453 | - | 521 | 3.88 |
| Local | 0.240 | - | 417 | 0.10 | Local | 0.428 | - | 417 | 0.18 | Local | 7.231 | - | 417 | 3.01 |
| Ramps | 0.257 | 45 | 208 | 0.07 | Ramps | 0.412 | 45 | 208 | 0.10 | Ramps | 7.665 | 45 | 208 | 1.94 |
| PM TOTAL | | 11,256 | 26,054 | 8.71 | PM TOTAL | | 11,256 | 26,054 | 15.75 | PM TOTAL | | 11,256 | 26,054 | 291.15 |
| TOTAL DAILY NOx REDUCTION (kg) | | | | | TOTAL DAILY VOC REDUCTION (kg) | | | | | TOTAL DAILY CO REDUCTION (kg) | | | | |
| 17.60 | | | | | 31.50 | | | | | 583.07 | | | | |
| TOTAL ANNUAL NOx REDUCTION (kg) | | | | | TOTAL ANNUAL VOC REDUCTION (kg) | | | | | TOTAL ANNUAL CO REDUCTION (kg) | | | | |
| 4,399 | | | | | 7,875 | | | | | 145,769 | | | | |

4.0 INTERSECTION IMPACTS AND MITIGATION

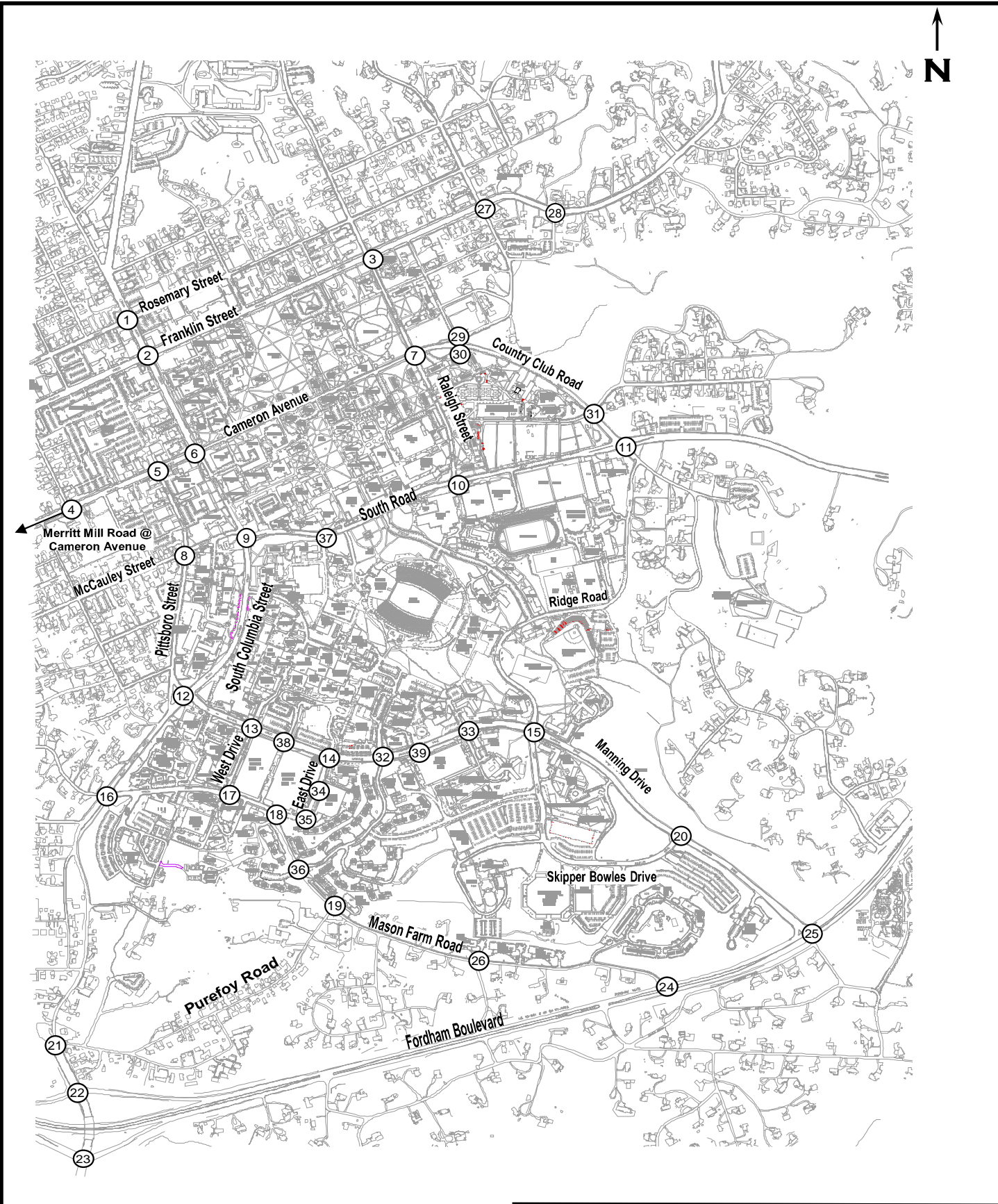
4.1 INTRODUCTION

This section provides an updated analysis of roadway intersections on or near Main Campus that may be impacted by the Development Plan. Intersection level of service analysis was undertaken for existing conditions based on traffic counts collected in the Fall of 2017. Analysis of existing conditions and projections for 2024, with and without the Development Plan (Build and No-Build conditions, respectively), were developed per the *Town of Chapel Hill Guidelines for Transportation Impact Analysis* (adopted on June 11, 2001). The methodology and assumptions are described, including development of background traffic data, trip generation, trip distribution, trip assignment, and level of service analyses. The same techniques, model, and assumptions used in the December 2015 report have been applied.

The basis for determining the impacts is the change in parking supply rather than the building projects contained in the Development Plan, in accordance with the *Transportation Impact Analysis Guidelines*. This is because, unlike a more typical project where the parking needs of the project are satisfied, increases in parking on Main Campus will be limited and will not correspond to growth in occupiable floor area (as discussed in Section 3.0). Furthermore, parking increases on Main Campus are not allocated to specific new buildings, but added to the overall supply for allocation to the entire campus population.

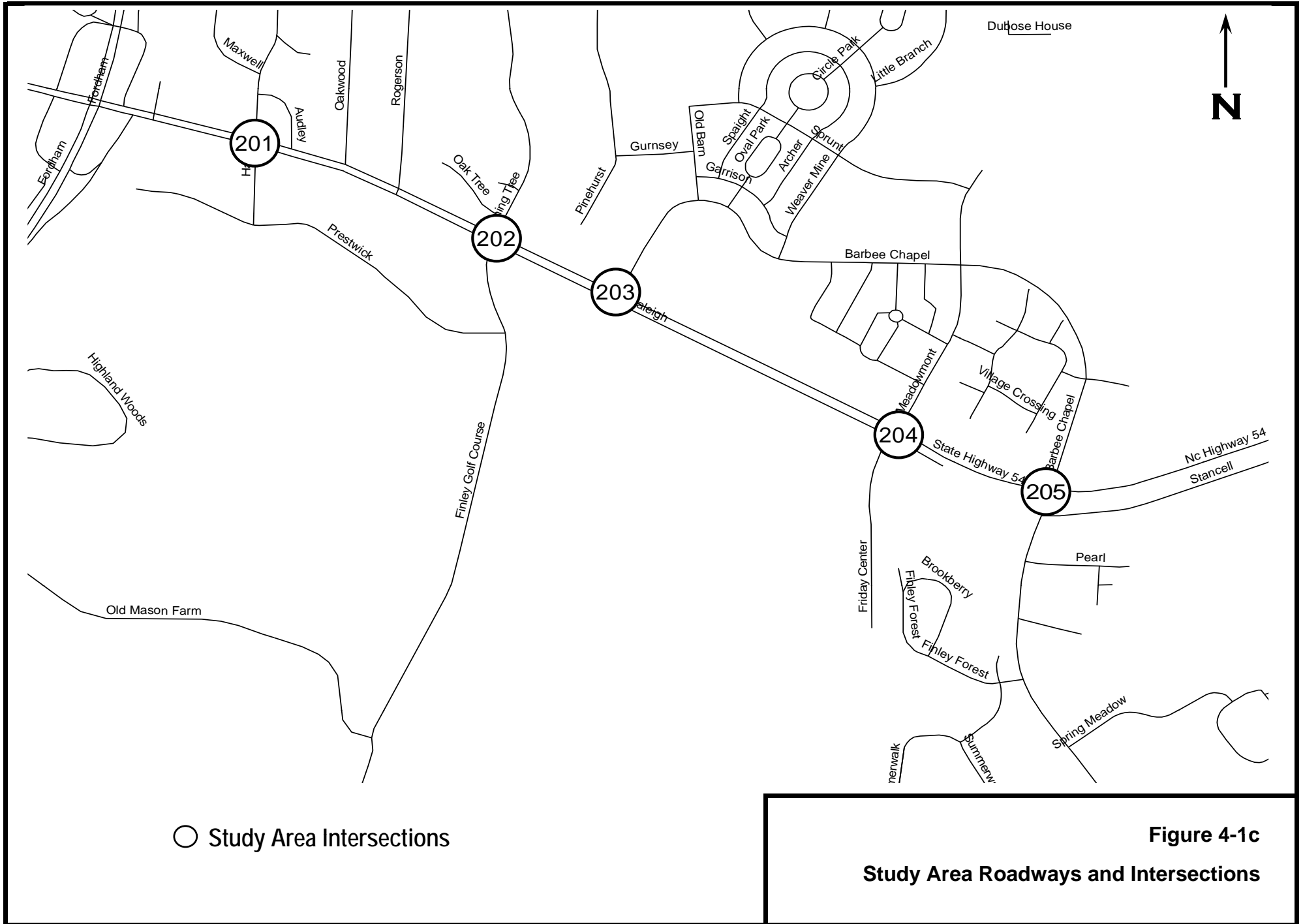
As described in Section 2.0, the approved Development Plan limits the University to a net increase of 1,579 spaces on Main Campus. This comprises 4,061 surface spaces eliminated by projects and 5,640 new spaces, of which 5,425 are in decks. As discussed in Section 2.0, a number of parking changes were proposed as part of Modification No. 3 to the Development Plan. The impact analysis takes into account the location of the losses and gains resulting from those modifications. Since the submission of Modification No. 3, five of the parking facilities identified in the Development Plan have opened for use (Cobb Deck, Jackson Circle Deck, Global Education Deck, Bell Tower Deck, and expansion of the Craige Deck).

The study area network of streets and intersections is displayed in Figure 4-1. In the February 2006 TIA Update, 47 intersections were identified for the analysis. After assessing intersections on NC 54 east of campus, NC 86 north of campus, and US 15-501 south of campus, the University and Town agreed that eight additional intersections satisfied the criteria for inclusion in the analyses for Modification No. 3 of the University Development Plan Traffic Impact Analysis, published in December 2006. All of those same intersections are included in the analysis of this update of the Development Plan and are listed in Section 4.3.



○ Study Area Intersections

Figure 4-1a
Study Area Roadways and Intersections



○ Study Area Intersections

Figure 4-1c
Study Area Roadways and Intersections

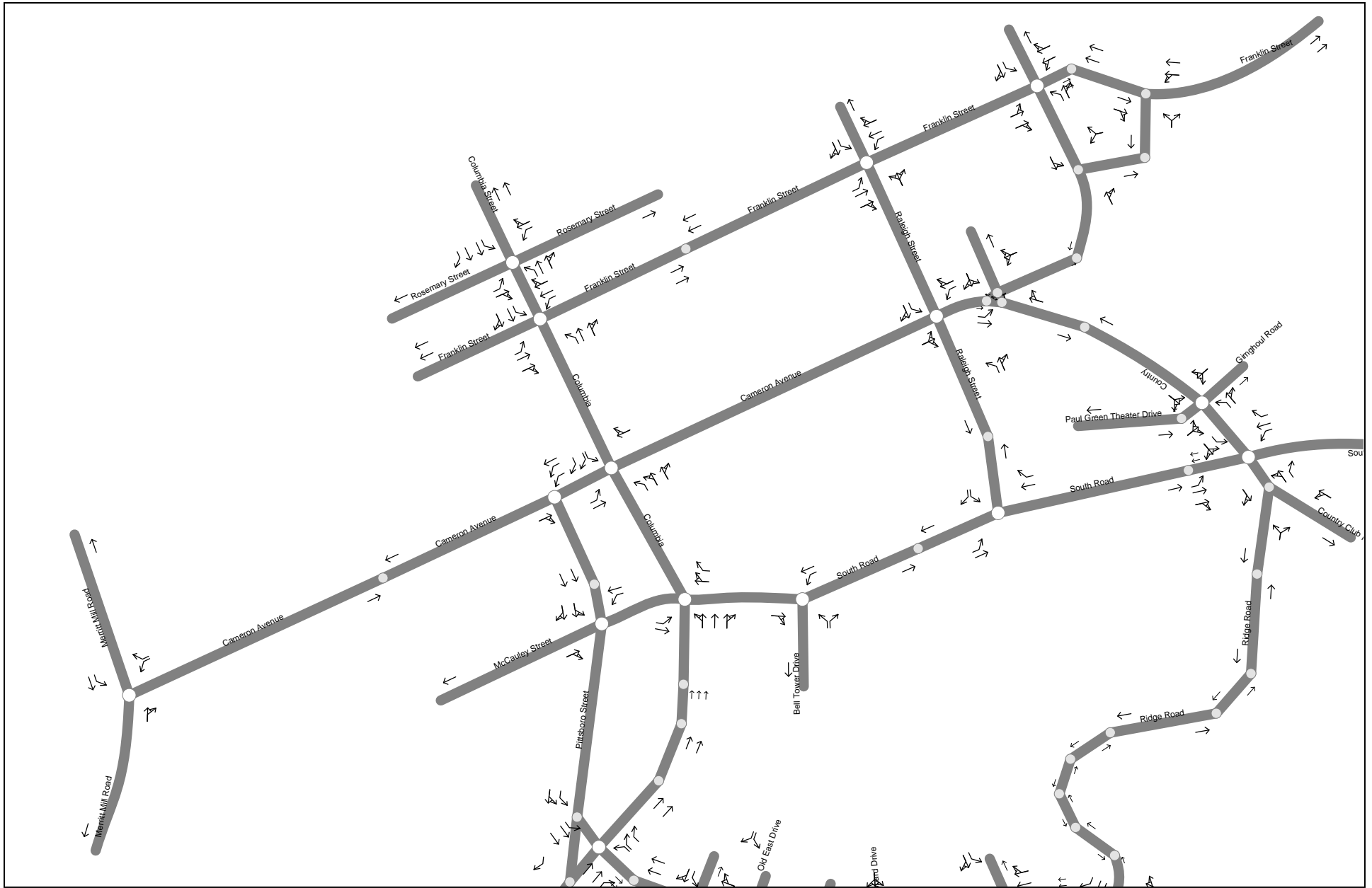


Figure 4-2a
Study Area Intersections and Roadway Graphics



Figure 4-2b
Study Area Intersections and Roadway Graphics

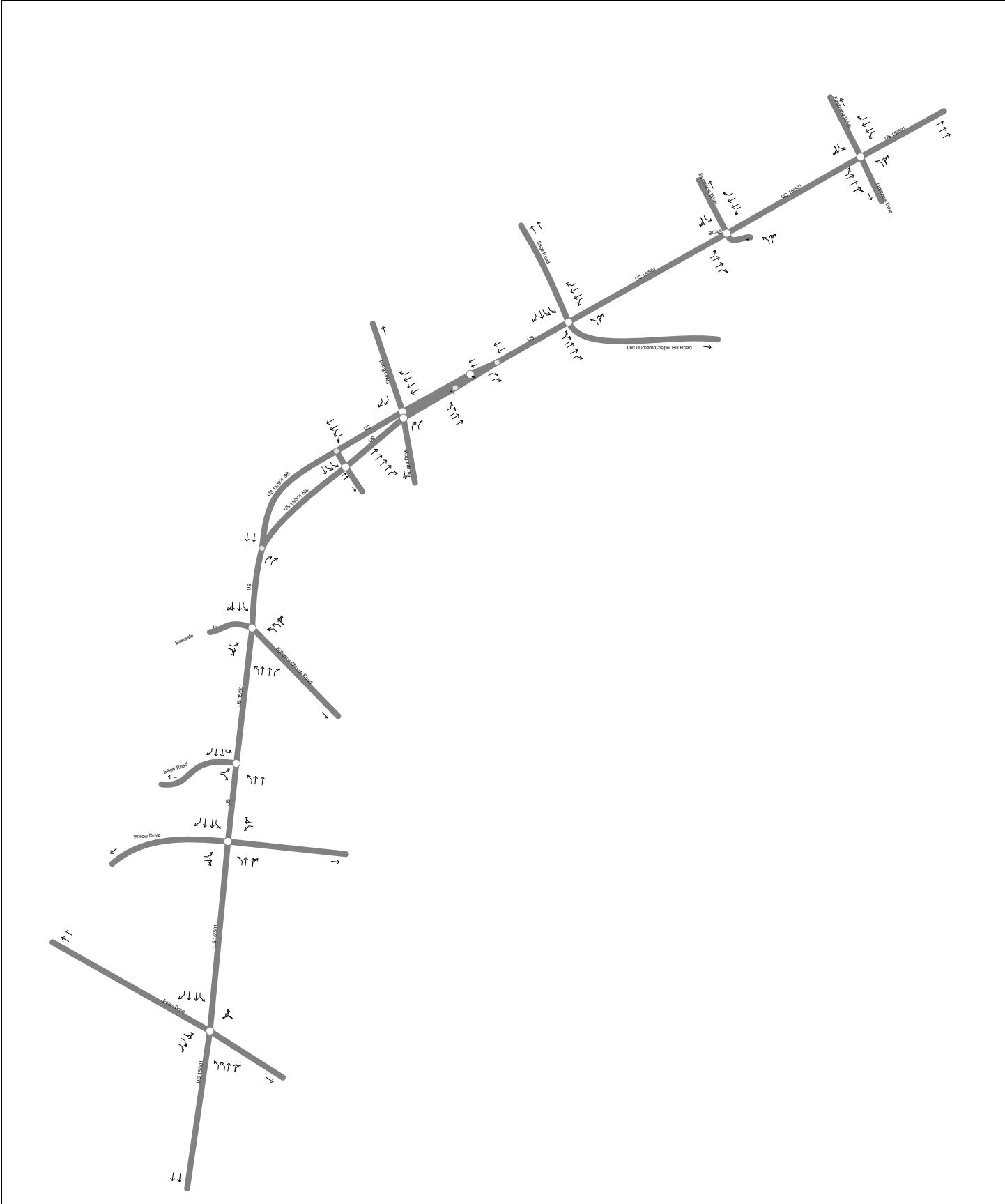


Figure 4-2c
Study Area Intersections and Roadway Graphics

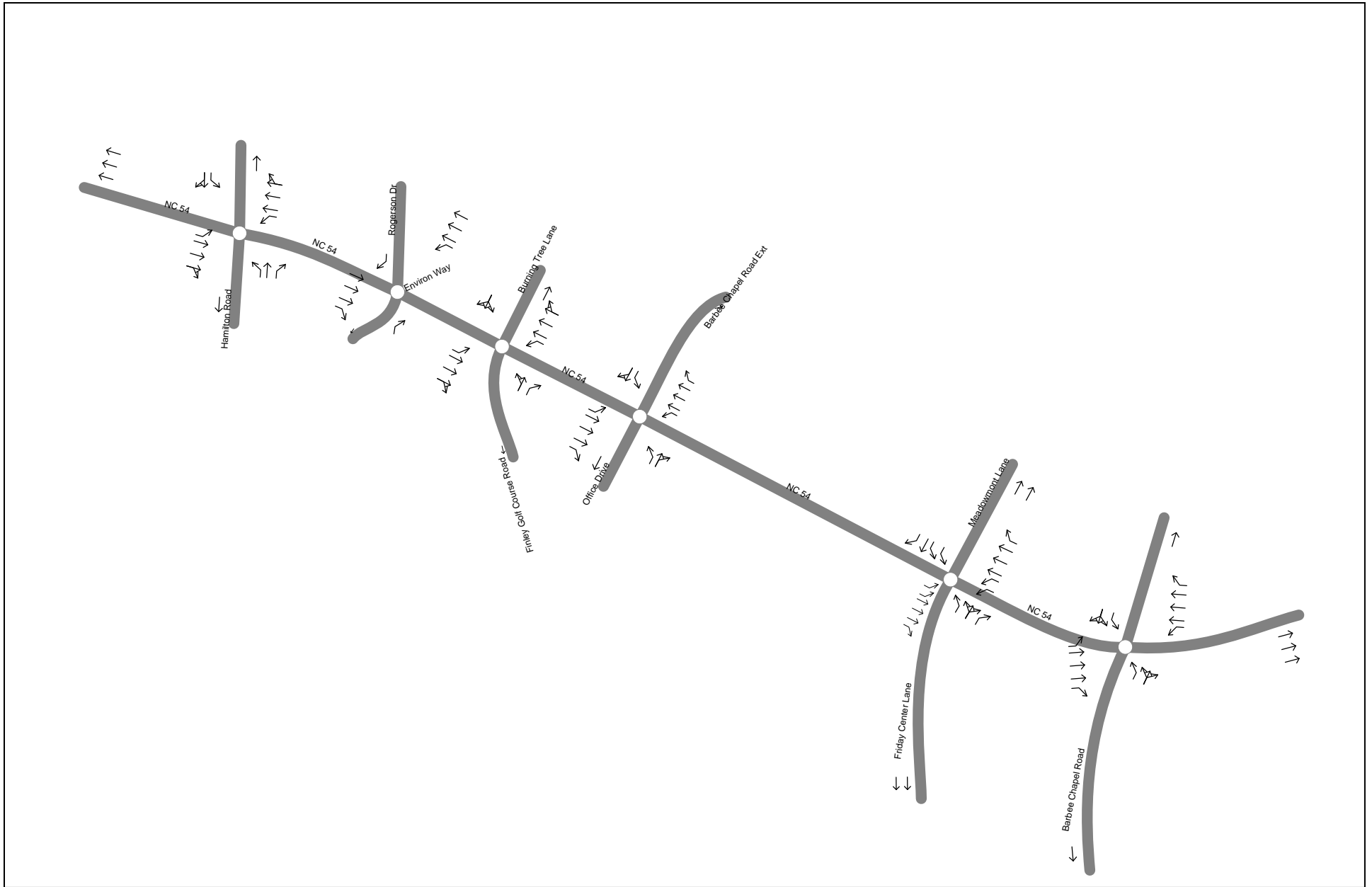


Figure 4-2d
Study Area Intersections and Roadway Graphics

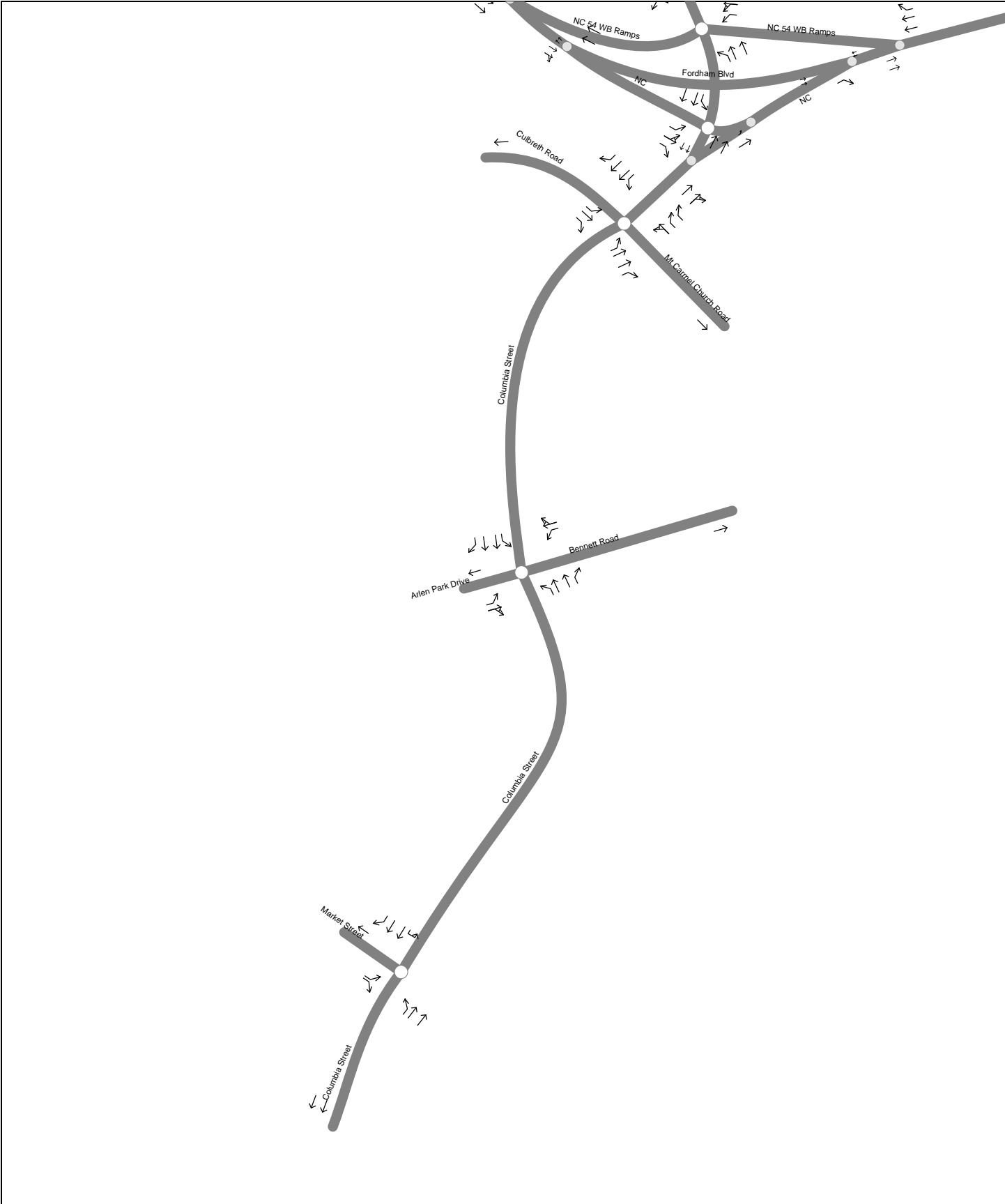


Figure 4-2e
Study Area Intersections and Roadway Graphics

4.2 EXISTING CONDITIONS

4.2.1 Campus Access and Study Area

The study area network of streets and intersections is displayed in Figure 4-1. Roadway and intersection geometric data were collected by field investigations and reviewing traffic signal plans provided by the NCDOT and the Town of Chapel Hill. Figure 4-2 shows the study area and intersection geometrics used in the analysis.

4.2.2 Existing Roads

This section describes the existing streets within the vicinity of Campus. As shown in Figure 4-1, there are several routes into and out of Campus. In addition, there is good interconnectivity of streets within Campus. Regional access to Campus is provided primarily via NC 54 (Raleigh Road from the east and West Franklin Street from the west), US 15-501 (South Columbia Street and Fordham Boulevard from the south and East Franklin Street from the northeast), and NC Route 86 (North Columbia Street/Martin Luther King, Jr. Boulevard from the north).

The major corridors on Campus include South Columbia Street, Raleigh Street, Cameron Avenue (east and west of South Columbia Street), South Road, and Manning Drive. McCauley Street is an essential link from southbound Pittsboro Street to South Road leading east, and from South Road to southbound Pittsboro Street. Similarly, Battle Lane, Boundary Street, and Park Place provide an alternate route to Franklin Street from the east thereby reducing traffic volumes on sections of Raleigh Street.

Country Club Road and Ridge Road are important inter-connecting roads along the eastern edge of Campus. Several other roads including Stadium Drive, West Drive, East Drive and Skipper Bowles Drive are included in the intra-campus circulation network, all providing access to major parking facilities.

Several of these roads also serve as major routes for traffic passing through Campus (including traffic destined for the Central Business District of the Town). South Columbia Street, South Road, and Country Club Road are, by virtue of their location in the regional network, particularly convenient for through traffic.

The majority of the roads are two- and four-lane undivided roads. South Columbia Street is a four-lane roadway north of Cameron Avenue. Between Manning Drive and Cameron Avenue, South Columbia Street is the northbound component of a one-way road pair, which also includes southbound Pittsboro Street. This section of South Columbia Street comprises two to three lanes. Pittsboro Street is a two-lane road along its entire length.

Other multi-lane roadways include Manning Drive (four lanes) and Franklin Street (four lanes). Although South Road serves as a major campus road, it is only a two-lane facility through Campus.

Average Daily Traffic (ADT) counts were collected during the Fall of 2017 for Campus study area roadways. The count stations used were the same as those used in the 2015 TIA Update. Utilizing historical traffic data for the study area, historical growth rate estimates were determined for the study area roadways between the years of 1989 to 2017 (see Table 4-1). The 2017 daily volumes are also shown in Figure 4-3.

UNC Development Plan TIA Update 2017
Daily Traffic Volumes

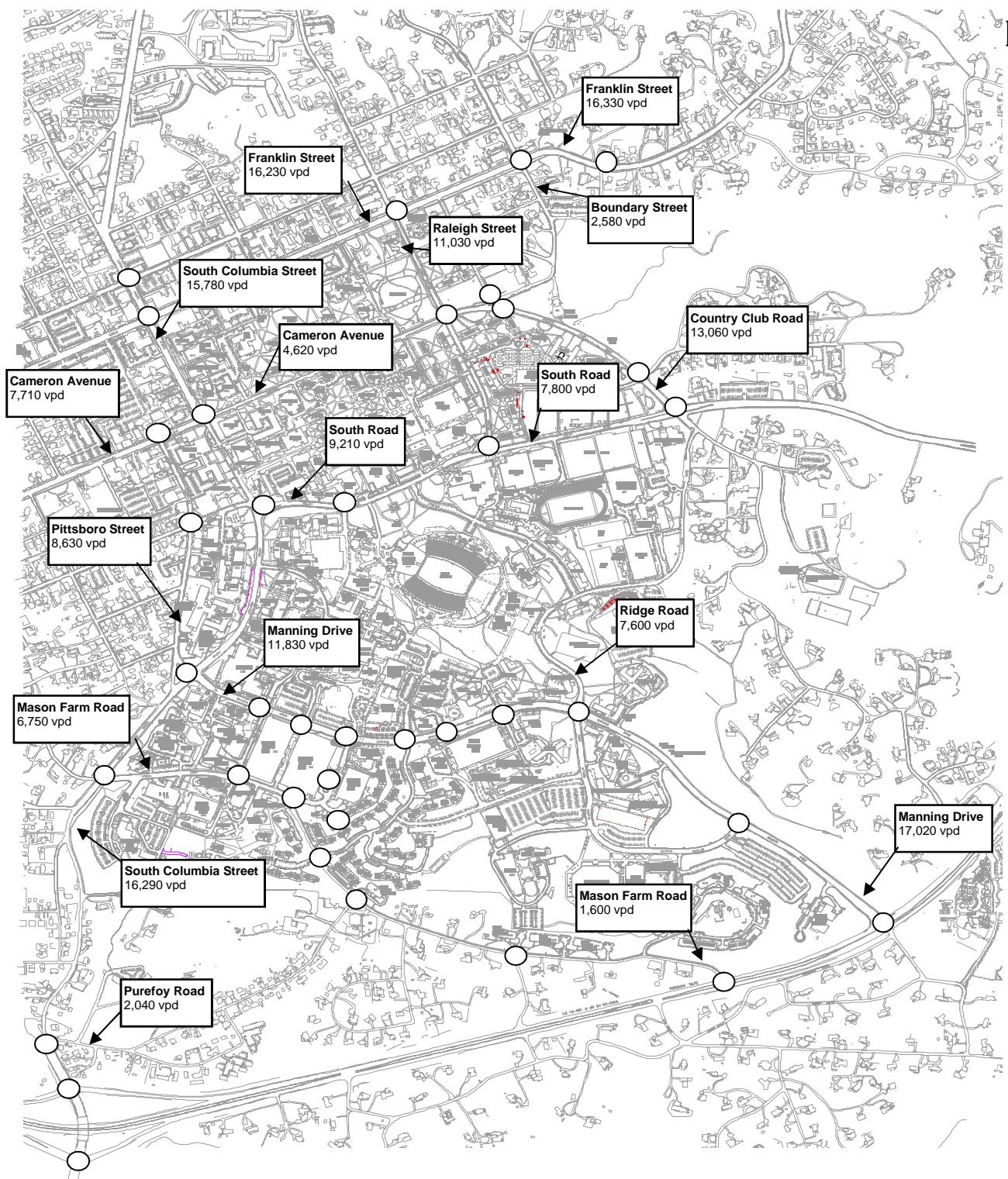
Table 4-1: Historical Average Daily Traffic Volumes

| Link # | Roadway | Average Daily Traffic Volumes (ADT) | | | | | | | | | | | Annual Growth | Annual Growth |
|--------|---|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|---------------|
| | | 1989 | 2001 | 2003 | 2005 | 2006 | 2007 | 2009 | 2011 | 2013 | 2015 | 2017 | 1989 - 2017 | 2001 - 2017 |
| | | | | | | | | | | | | | | |
| 1 | S. Columbia St. (south of Franklin St.) | 15,300 | 20,720 | 19,060 | 17,530 | - | 17,530 | 15,410 | 14,380 | 14,660 | 16,330 | 15,780 | 0.1% | -1.5% |
| 2 | Raleigh St. (south of Franklin St.) | 10,700 | 14,470 | 10,710 | 13,080 | 13,080 | 11,020 | 11,710 | 9,910 | 10,510 | 10,450 | 11,030 | 0.1% | -1.5% |
| 3 | Cameron Ave. (west of Pittsboro St.) | 9,000 | 9,820 | 8,300 | 8,510 | - | 7,630 | 9,260 | 7,220 | 6,690 | 7,560 | 7,710 | -0.5% | -1.3% |
| 4 | Cameron Ave. (east of S. Columbia St.) | 6,100 | 9,070 | 8,330 | 6,430 | 6,430 | 5,270 | 5,540 | 5,910 | 4,680 | 4,880 | 4,620 | -0.9% | -3.1% |
| 5 | Country Club Rd. (north of South Rd.) | 11,500 | 13,470 | 14,080 | 12,200 | 12,200 | 12,990 | 11,960 | 11,260 | 10,730 | 12,530 | 13,060 | 0.5% | -0.2% |
| 6 | South Rd. (east of Columbia St.) | 11,500 | 10,460 | 8,840 | 11,400 | - | 8,400 | 7,430 | 8,370 | 8,590 | 9,650 | 9,210 | -0.7% | -0.7% |
| 7 | South Rd. (east of Raleigh St.) | 8,300 | 9,840 | 10,000 | 12,890 | 12,890 | 7,500 | 7,510 | 7,730 | 7,940 | 7,740 | 7,800 | -0.2% | -1.3% |
| 8 | Pittsboro St. (south of McCauley St.) | 8,500 | 10,960 | 10,070 | 10,920 | - | 9,550 | 9,750 | 8,810 | 8,060 | 8,490 | 8,630 | 0.1% | -1.3% |
| 9 | Manning Dr. (east of Columbia St.) | 10,900 | 14,100 | 13,220 | 12,480 | 12,480 | 11,070 | 11,060 | 10,020 | 10,710 | 11,300 | 11,830 | 0.3% | -1.0% |
| 10 | Ridge Rd. (north of Manning Dr.) | 7,200 | 8,320 | 7,870 | 7,300 | 7,300 | 7,910 | 8,730 | 8,110 | 7,820 | 7,220 | 7,590 | 0.2% | -0.5% |
| 11 | S. Columbia St. (south of Mason Farm Rd.) | 12,300 | 18,470 | 18,250 | 16,190 | - | 16,090 | 15,430 | 14,760 | 13,980 | 15,480 | 16,290 | 1.2% | -0.7% |
| 12 | Manning Dr. (east of Ridge Rd.) | 11,100 | 17,260 | 14,680 | 17,880 | 17,880 | 15,680 | 16,150 | 14,660 | 15,730 | 15,880 | 17,020 | 1.9% | -0.1% |
| 13 | Franklin St. (west of Raleigh St.) | 16,600 | 17,000 | 19,260 | 18,850 | - | 19,320 | 16,250 | 14,370 | 14,610 | 14,900 | 16,230 | -0.1% | -0.3% |
| 14 | Franklin St. (east of Boundary St.) | 22,800 | - | 23,560 | 20,190 | 20,190 | 24,730 | 17,390 | 16,770 | 16,610 | 16,620 | 16,330 | -1.0% | N/A |
| 15 | Boundary St. (south of Franklin St.) | - | - | 3,230 | 2,320 | 2,320 | 2,140 | 2,230 | 2,400 | 2,230 | 2,010 | 2,580 | N/A | N/A |
| 16 | Mason Farm Rd. (east of S. Columbia St.) | 5,700 | 7,700 | 8,230 | 3,400 | 3,400 | 8,390 | 7,330 | 6,910 | 6,310 | 6,760 | 6,750 | 0.7% | -0.8% |
| 17 | Mason Farm Rd. (north of Fordham Blvd.) | - | 1,360 | 770 | 1,830 | - | 1,820 | 1,770 | 1,730 | 1,720 | 1,550 | 1,600 | N/A | 1.1% |
| 18 | Purefoy Rd. (east of Columbia St.)* | - | 970 | 970 | 1,130 | - | 1,360 | 1,450 | 2,070 | 1,710 | 1,750 | 2,040 | N/A | 6.9% |
| 19 | US 15-501 (west of Main St.) | - | - | - | - | - | 17,840 | 17,080 | 16,770 | 19,990 | 20,800 | 22,590 | N/A | N/A |
| 20 | US 15-501 (east of Culbreth Rd.) | - | 30,480 | - | 30,000 | - | 30,310 | 30,570 | 28,390 | 31,870 | 35,430 | 38,240 | N/A | 1.6% |
| 21 | NC 54 (west of Hamilton Rd.) | - | 45,400 | - | 44,000 | - | 47,940 | 43,470 | 41,230 | 41,390 | 48,290 | 51,100 | N/A | 0.8% |
| 22 | NC 54 (east of East Barbee Chapel Hill Rd.) | - | - | - | - | - | 32,100 | 37,390 | 36,320 | 39,970 | 44,170 | 46,880 | N/A | N/A |

NOTES:

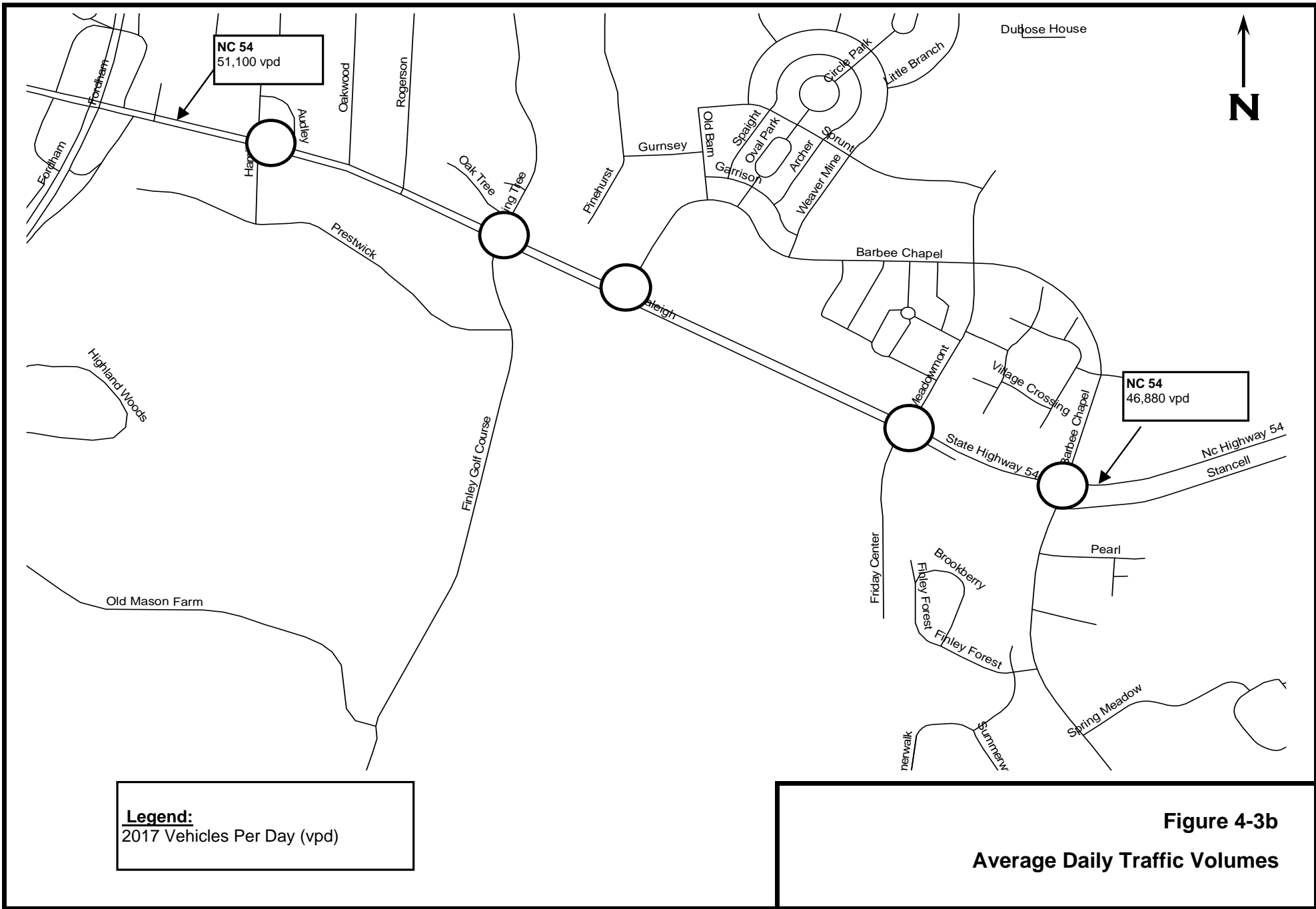
1. All volumes are typical weekday (24-hour). Existing volumes (2003) are based on fall 2003 collected counts.
2. All yearly volumes 1990-1999 from NCDOT. For Links 16-18, year 2001 ADT estimated using calculated 2003 peak to daily ratio (K-factor). Year 1989 volumes taken from June 1990 Parking Decks Study for The University of North Carolina at Chapel Hill.

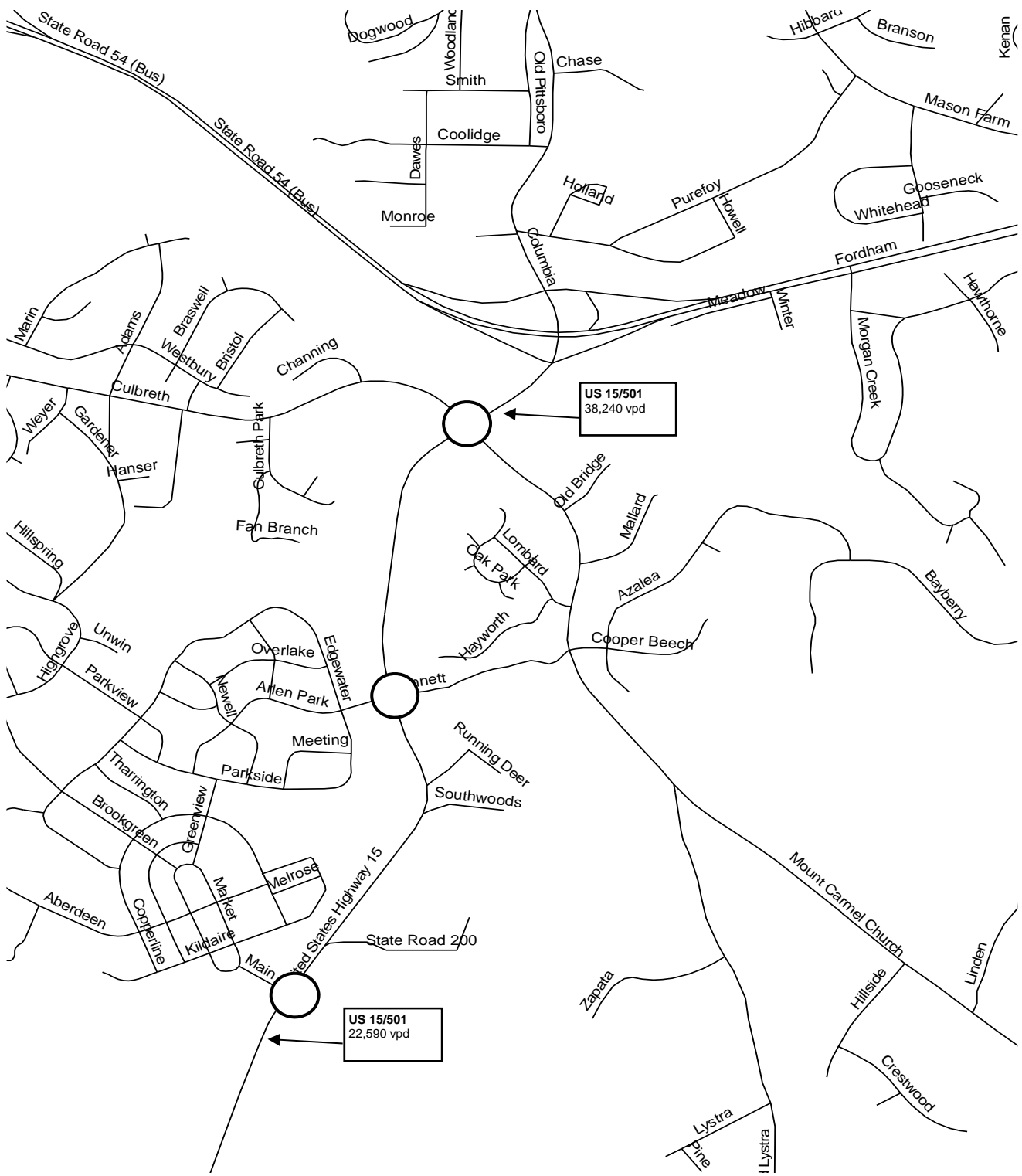
Recounted January 2008



Legend:
2017 Vehicles Per Day (vpd)

Figure 4-3a
Average Daily Traffic Volumes





Legend:
2017 Vehicles Per Day (vpd)

Figure 4-3c
Average Daily Traffic Volumes

4.3 EXISTING INTERSECTION LEVEL OF SERVICE ANALYSIS

Per the *Transportation Impact Analysis Guidelines*, the following intersections were identified for traffic impact and analyzed for the Existing, No-Build (year 2024 conditions without the development), and Build (with the Development Plan implemented) conditions. Since Modification No. 3, the number of intersections included in these analyses was expanded to the 59 intersections listed below:

1. South Columbia Street & Rosemary Street (signalized)
2. South Columbia Street & Franklin Street (signalized)
3. Franklin Street & Raleigh Street (signalized)
4. Merritt Mill Road & Cameron Avenue (signalized)
5. Cameron Avenue & Pittsboro Street (signalized)
6. Cameron Avenue & South Columbia Street (signalized)
7. Cameron Avenue & Raleigh Street (signalized)
8. Pittsboro Street & McCauley Street (signalized)
9. South Columbia Street & South Road (signalized)
10. Raleigh Street & South Road (signalized)
11. Country Club Road & South Road (signalized)
12. South Columbia Street & Manning Drive (signalized)
13. Manning Drive & West Dive (signalized)
14. Manning Drive & East Drive (signalized)
15. Ridge Road & Manning Drive (signalized)
16. Mason Farm Road & South Columbia Street (signalized)
17. Mason Farm Road & West Drive (signalized)
18. Mason Farm Road & New East Drive (signalized)
19. Mason Farm Road & Purefoy Road (unsignalized)
20. Manning Drive & Skipper Bowles Drive (unsignalized)
21. South Columbia Street & Purefoy Road (unsignalized)
22. South Columbia Street & Fordham Boulevard WB Ramps (signalized)
23. South Columbia Street & Fordham Boulevard EB Ramps (signalized)
24. Mason Farm Road & Fordham Boulevard (unsignalized)
25. Manning Drive & Fordham Boulevard (signalized)
26. Mason Farm Road & Oteys Road (unsignalized)
27. Franklin Street & Boundary Street (signalized)
28. Franklin Street & Park Place (unsignalized)
29. Boundary Street & Battle Lane (unsignalized)
30. Country Club Road & Battle Lane (unsignalized)
31. Paul Green Theater Drive & Country Club Road (signalized)
32. Manning Drive & Hibbard Drive (signalized)
33. Manning Drive & Craig Drive (signalized)
34. Dogwood Deck Entrance & New East Drive (unsignalized)
35. Dogwood Deck Exit & New East Drive (unsignalized)
36. Hibbard Drive & Mason Farm Road (unsignalized)
37. South Road & Bell Tower Drive (signalized)
38. Manning Drive & Old East Drive (signalized)
39. Manning Drive & Craige Deck (unsignalized)
101. US 15-501 & Estes Drive (signalized)
102. US 15-501 & Willow Drive (signalized)
103. US 15-501 & Elliott Road (signalized)
104. US 15-501 & Eastgate/Ephesus Church Road (signalized)

- 105. US 15-501 & Erwin Road (signalized)
- 106. US 15-501 & Europa Drive (signalized)
- 107. US 15-501 & Northbound U-turn (signalized)
- 108. US 15-501 & Southbound U-turn (signalized)
- 109. US 15-501 & Sage Road (signalized)
- 110. US 15-501 & Eastowne Drive/BCBS (signalized)
- 111. US 15-501 & Eastowne Drive/Lakeview Drive (signalized)
- 201. Raleigh Road (NC 54) & Hamilton Street (signalized)
- 202. Raleigh Road (NC 54) & Burning Tree Lane (signalized)
- 203. Raleigh Road (NC 54) & West Barbee Chapel Road (signalized)
- 204. Raleigh Road (NC 54) & Meadowmont Lane (signalized)
- 205. Raleigh Road (NC 54) & East Barbee Chapel Road (signalized)
- 301. US 15-501 & Culbreth Road (signalized)
- 302. US 15-501 & Bennett Road (signalized)
- 303. US 15-501 & Main Street (Southern Village) (signalized)
- 307. Country Club Road & Boundary Street (unsignalized)

Existing roadway geometry for all of the above intersections can be found in Figure 4-2.

4.3.1 Count Data

For the analyses included in this update, peak hour turning movement volume counts were collected for Campus study area intersections during the Fall of 2017 on typical weekdays (Tuesday, Wednesday, Thursday) while the University was in session. A summary of the schedule used to obtain the turning movement data is provided in Table 4-2. The AM and PM peak hour turning movement volumes are summarized in Table 4-3 and displayed in Figure 4-4 and Figure 4-5, respectively.

Table 4-2: Weekday Peak Period Turning Movement Schedule

| ID # | Intersection | Day of Week | Date |
|------|---|-------------|----------|
| 1 | Columbia Street/Rosemary Street | Tuesday | 10/3/17 |
| 2 | Columbia Street/Franklin Street | Tuesday | 10/3/17 |
| 3 | Franklin Street/Raleigh Street | Tuesday | 10/3/17 |
| 4 | Merritt Mill Road/Cameron Avenue | Tuesday | 10/3/17 |
| 5 | Cameron Avenue/Pittsboro Street | Thursday | 10/5/17 |
| 6 | Cameron Avenue/Columbia Street | Wednesday | 10/4/17 |
| 7 | Cameron Avenue/Raleigh Street | Wednesday | 10/4/17 |
| 8 | Pittsboro Street/McCauley Street | Wednesday | 10/4/17 |
| 9 | Columbia Street/South Road | Wednesday | 10/4/17 |
| 10 | Raleigh Street/South Road | Wednesday | 10/4/17 |
| 11 | Country Club Road/South Road | Wednesday | 10/4/17 |
| 12 | Columbia Street/Manning Drive | Thursday | 10/5/17 |
| 13 | Manning Drive/West Drive | Thursday | 10/5/17 |
| 14 | Manning Drive/East Drive | Thursday | 10/5/17 |
| 15 | Ridge Road/Manning Drive | Thursday | 10/5/17 |
| 16 | Mason Farm Road/Columbia Street | Tuesday | 10/3/17 |
| 17 | Mason Farm Road/West Drive | Tuesday | 10/3/17 |
| 18 | Mason Farm Road/East Drive | Tuesday | 10/3/17 |
| 19 | Mason Farm Road/Purefoy Road | Tuesday | 10/10/17 |
| 20 | Manning Drive/Skipper Bowles Drive | Tuesday | 10/10/17 |
| 21 | Columbia Street/Purefoy Road | Wednesday | 9/27/17 |
| 22 | Columbia Street/Fordham Boulevard WB Ramps | Wednesday | 9/27/17 |
| 23 | Columbia Street/Fordham Boulevard EB Ramps | Wednesday | 9/27/17 |
| 24 | Mason Farm Road/Fordham Boulevard | Wednesday | 9/27/17 |
| 25 | Manning Drive/Fordham Boulevard | Thursday | 9/28/17 |
| 26 | Mason Farm Road/Oteys Road | Thursday | 10/5/17 |
| 27 | Franklin Street/Boundary Street | Wednesday | 10/4/17 |
| 28 | Franklin Street/Park Place | Wednesday | 10/4/17 |
| 29 | Battle Lane/Boundary Street | Thursday | 10/5/17 |
| 30 | Country Club Road/Battle Lane | Thursday | 10/5/17 |
| 31 | Country Club Road/Gimghoul Road | Wednesday | 10/4/17 |
| 32 | Manning Drive/Hibbard Drive | Tuesday | 10/3/17 |
| 33 | Manning Drive/Craige Drive | Tuesday | 10/3/17 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | Tuesday | 10/3/17 |
| 35 | East Drive/Dogwood Deck Exit | Tuesday | 10/3/17 |
| 36 | Mason Farm Road/Hibbard Drive | Tuesday | 10/3/17 |
| 37 | South Road/Bell Tower Drive | Wednesday | 10/4/17 |
| 38 | Manning Drive/New East Drive | Thursday | 10/5/17 |
| 39 | Manning Drive/Craige Deck | Thursday | 10/5/17 |
| 101 | US 15-501/Estes Drive | Wednesday | 10/4/17 |
| 102 | US 15-501/Willow Drive | Tuesday | 10/10/17 |
| 103 | US 15-501/Elliot Road | Tuesday | 10/10/17 |
| 104 | US 15-501/Ephesus Church Road | Wednesday | 10/4/17 |
| 105 | US 15-501/Erwin Road | Thursday | 10/5/17 |
| 106 | US 15-501/Europa Drive | Thursday | 10/5/17 |
| 107 | US 15-501/Superstreet NB U-Turn | Thursday | 10/5/17 |
| 108 | US 15-501/Superstreet SB U-Turn | Thursday | 10/5/17 |
| 109 | US 15-501/Sage Road | Wednesday | 10/4/17 |
| 110 | US 15-501/Eastowne Drive/BCBS | Tuesday | 10/10/17 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | Tuesday | 10/10/17 |
| 201 | NC 54/Hamilton Road | Tuesday | 10/3/17 |
| 202 | NC 54/Burning Tree Lane | Tuesday | 10/3/17 |
| 203 | NC 54/Barbee Chapel Road Ext | Thursday | 9/28/17 |
| 204 | NC 54/Meadowmont Lane | Tuesday | 9/19/17 |
| 205 | NC 54/Barbee Chapel Road (East) | Thursday | 9/28/17 |
| 206 | NC 54/US 15-501 NB Ramps | Tuesday | 10/3/17 |
| 207 | NC 54/US 15-501 SB Ramps | Tuesday | 10/3/17 |
| 208 | NC 54/Shopping Center/Rogerson Drive | Tuesday | 10/3/17 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | Tuesday | 9/26/17 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | Tuesday | 9/26/17 |
| 303 | US 15-501/Market Street | Tuesday | 9/26/17 |

Table 4-3: Year 2017 Turning Movement Volumes

| AM Peak Hour | | | | | | | | | | | | | | |
|--------------|---|-----|------|-----|-----|------|-----|-----|------|-----|-----|-----|------|-----|
| ID # | Intersection | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
| 1 | Columbia Street/Rosemary Street | 118 | 173 | 22 | 11 | 116 | 57 | 33 | 325 | 33 | 0 | 114 | 546 | 152 |
| 2 | Columbia Street/Franklin Street | 61 | 286 | 47 | 86 | 316 | 71 | 36 | 278 | 81 | 0 | 46 | 506 | 42 |
| 3 | Franklin Street/Raleigh Street | 10 | 274 | 120 | 51 | 443 | 76 | 106 | 153 | 29 | 0 | 48 | 269 | 17 |
| 4 | Merritt Mill Road/Cameron Avenue | 0 | 0 | 0 | 62 | 0 | 32 | 0 | 169 | 439 | 0 | 116 | 92 | 0 |
| 5 | Cameron Avenue/Pittsboro Street | 0 | 118 | 172 | 615 | 131 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Cameron Avenue/Columbia Street | 16 | 91 | 0 | 0 | 113 | 38 | 82 | 339 | 43 | 0 | 70 | 0 | 527 |
| 7 | Cameron Avenue/Raleigh Street | 18 | 86 | 26 | 26 | 174 | 198 | 23 | 46 | 14 | 0 | 318 | 153 | 52 |
| 8 | Pittsboro Street/McCauley Street | 0 | 109 | 31 | 141 | 36 | 0 | 0 | 0 | 0 | 0 | 157 | 557 | 9 |
| 9 | Columbia Street/South Road | 15 | 224 | 0 | 0 | 145 | 93 | 53 | 359 | 210 | 0 | 0 | 0 | 0 |
| 10 | Raleigh Street/South Road | 44 | 200 | 0 | 0 | 323 | 34 | 0 | 0 | 0 | 0 | 36 | 0 | 121 |
| 11 | Country Club Road/South Road | 5 | 153 | 46 | 496 | 392 | 510 | 28 | 35 | 74 | 0 | 294 | 169 | 17 |
| 12 | Columbia Street/Manning Drive | 65 | 400 | 0 | 59 | 0 | 175 | 0 | 394 | 345 | 0 | 0 | 0 | 0 |
| 13 | Manning Drive/West Drive | 68 | 390 | 311 | 210 | 225 | 37 | 0 | 0 | 0 | 0 | 17 | 6 | 16 |
| 14 | Manning Drive/East Drive | 82 | 339 | 120 | 253 | 326 | 92 | 91 | 30 | 270 | 0 | 0 | 0 | 0 |
| 15 | Ridge Road/Manning Drive | 120 | 333 | 71 | 11 | 634 | 50 | 22 | 39 | 6 | 0 | 42 | 113 | 352 |
| 16 | Mason Farm Road/Columbia Street | 7 | 6 | 1 | 142 | 0 | 70 | 6 | 633 | 240 | 0 | 115 | 203 | 5 |
| 17 | Mason Farm Road/West Drive | 0 | 252 | 23 | 10 | 226 | 0 | 0 | 0 | 0 | 0 | 32 | 7 | 30 |
| 18 | Mason Farm Road/East Drive | 58 | 203 | 64 | 14 | 129 | 6 | 57 | 18 | 164 | 0 | 0 | 0 | 0 |
| 19 | Mason Farm Road/Purefoy Road | 196 | 0 | 13 | 0 | 0 | 0 | 13 | 77 | 0 | 0 | 0 | 16 | 15 |
| 20 | Manning Drive/Skipper Bowles Drive | 0 | 339 | 23 | 273 | 611 | 0 | 1 | 0 | 42 | 0 | 0 | 0 | 0 |
| 21 | Columbia Street/Purefoy Road | 0 | 0 | 0 | 24 | 0 | 4 | 0 | 967 | 353 | 0 | 13 | 392 | 0 |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | 0 | 0 | 0 | 515 | 0 | 63 | 243 | 1252 | 0 | 0 | 0 | 281 | 133 |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | 438 | 2 | 394 | 0 | 0 | 0 | 0 | 1040 | 0 | 0 | 56 | 763 | 0 |
| 24 | Mason Farm Road/Fordham Boulevard | 0 | 2251 | 0 | 0 | 1140 | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 25 | Manning Drive/Fordham Boulevard | 212 | 2192 | 4 | 7 | 1174 | 784 | 18 | 7 | 27 | 0 | 225 | 3 | 32 |
| 26 | Mason Farm Road/Oteys Road | 1 | 25 | 11 | 5 | 67 | 1 | 14 | 0 | 0 | 0 | 1 | 0 | 1 |
| 27 | Franklin Street/Boundary Street | 6 | 314 | 8 | 55 | 538 | 70 | 5 | 25 | 26 | 0 | 74 | 18 | 6 |
| 28 | Franklin Street/Park Place | 0 | 408 | 1 | 65 | 676 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 29 | Battle Lane/Boundary Street | 0 | 0 | 0 | 78 | 47 | 2 | 0 | 122 | 73 | 0 | 0 | 45 | 59 |
| 30 | Country Club Road/Battle Lane | 4 | 319 | 0 | 0 | 370 | 118 | 0 | 0 | 0 | 0 | 123 | 0 | 0 |
| 307 | Country Club Road & Boundary Street | 0 | 323 | 0 | 0 | 370 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 106 |
| 31 | Country Club Road/Gimghoul Road | 5 | 1 | 17 | 11 | 1 | 6 | 85 | 520 | 12 | 0 | 5 | 433 | 28 |
| 32 | Manning Drive/Hibbard Drive | 45 | 534 | 16 | 10 | 597 | 38 | 17 | 10 | 51 | 0 | 26 | 4 | 39 |
| 33 | Manning Drive/Craige Drive | 41 | 435 | 20 | 157 | 789 | 36 | 4 | 4 | 14 | 0 | 17 | 3 | 9 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | 0 | 0 | 0 | 0 | 0 | 3 | 19 | 381 | 2 | 0 | 78 | 102 | 210 |
| 35 | East Drive/Dogwood Deck Exit | 208 | 0 | 118 | 0 | 0 | 0 | 0 | 198 | 0 | 0 | 0 | 54 | 0 |
| 36 | Mason Farm Road/Hibbard Drive | 4 | 2 | 1 | 5 | 5 | 18 | 7 | 240 | 178 | 0 | 41 | 38 | 12 |
| 37 | South Road/Bell Tower Drive | 0 | 249 | 150 | 141 | 220 | 0 | 28 | 0 | 53 | 0 | 0 | 0 | 0 |
| 38 | Manning Drive/Old East Drive | 0 | 410 | 0 | 0 | 417 | 0 | 0 | 0 | 0 | 0 | 136 | 0 | 76 |
| 39 | Manning Drive/Craige Deck | 0 | 524 | 127 | 172 | 656 | 0 | 7 | 0 | 13 | 0 | 0 | 0 | 0 |
| 101 | US 15-501/Estes Drive | 66 | 2 | 258 | 1 | 9 | 14 | 353 | 1367 | 4 | 0 | 8 | 1245 | 68 |
| 102 | US 15-501/Willow Drive | 113 | 27 | 7 | 55 | 57 | 18 | 62 | 1374 | 11 | 0 | 16 | 1287 | 269 |
| 103 | US 15-501/Elliott Road | 37 | 0 | 107 | 0 | 0 | 0 | 118 | 1378 | 0 | 5 | 0 | 1476 | 116 |
| 104 | US 15-501/Ephesus Church Road | 26 | 29 | 30 | 222 | 90 | 79 | 52 | 1161 | 210 | 0 | 61 | 1231 | 7 |
| 105 | US 15-501/Erwin Road | 0 | 0 | 0 | 0 | 1890 | 277 | 0 | 0 | 0 | 0 | 0 | 0 | 436 |
| 106 | US 15-501/Europa Drive | 0 | 1872 | 131 | 0 | 0 | 0 | 0 | 0 | 163 | 0 | 0 | 0 | 0 |
| 107 | US 15-501/Superstreet NB U-Turn | 0 | 0 | 0 | 0 | 1858 | 0 | 257 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | US 15-501/Superstreet SB U-Turn | 0 | 1948 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 16 | 0 |
| 109 | US 15-501/Sage Road | 308 | 1429 | 138 | 159 | 1624 | 152 | 145 | 99 | 20 | 0 | 277 | 145 | 131 |
| 110 | US 15-501/Eastowne Drive/BCBS | 78 | 1519 | 8 | 28 | 1913 | 64 | 1 | 6 | 24 | 0 | 47 | 3 | 43 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | 13 | 1533 | 3 | 63 | 1985 | 304 | 12 | 29 | 134 | 0 | 82 | 7 | 2 |
| 201 | NC 54/Hamilton Street | 25 | 1662 | 143 | 76 | 2092 | 28 | 125 | 40 | 117 | 0 | 68 | 47 | 26 |
| 202 | NC 54/Burning Tree Lane | 29 | 1679 | 49 | 150 | 2206 | 21 | 36 | 3 | 139 | 0 | 41 | 12 | 45 |
| 203 | NC 54/Barbee Chapel Road Ext | 152 | 1689 | 91 | 82 | 2224 | 31 | 14 | 1 | 2 | 0 | 7 | 4 | 103 |
| 204 | NC 54/Meadowmont Lane | 174 | 1403 | 111 | 412 | 2255 | 118 | 66 | 3 | 43 | 0 | 65 | 18 | 131 |
| 205 | NC 54/Barbee Chapel Road (East) | 11 | 1329 | 173 | 21 | 2099 | 183 | 560 | 93 | 69 | 0 | 122 | 36 | 22 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | 220 | 86 | 66 | 10 | 126 | 535 | 58 | 1306 | 3 | 0 | 281 | 754 | 128 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | 102 | 21 | 9 | 104 | 14 | 23 | 6 | 1234 | 86 | 0 | 30 | 709 | 91 |
| 303 | US 15-501/Market Street | 251 | 0 | 40 | 0 | 0 | 0 | 164 | 1092 | 0 | 23 | 0 | 456 | 321 |

PM Peak Hour

| ID # | Intersection | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
|------|---|-----|------|-----|------|------|-----|-----|------|-----|-----|-----|------|-----|
| 1 | Columbia Street/Rosemary Street | 188 | 254 | 62 | 34 | 195 | 65 | 40 | 610 | 66 | 0 | 73 | 475 | 236 |
| 2 | Columbia Street/Franklin Street | 111 | 375 | 84 | 120 | 450 | 88 | 82 | 535 | 125 | 0 | 77 | 418 | 95 |
| 3 | Franklin Street/Raleigh Street | 42 | 439 | 215 | 47 | 542 | 170 | 111 | 304 | 25 | 0 | 94 | 317 | 19 |
| 4 | Merritt Mill Road/Cameron Avenue | 0 | 0 | 0 | 366 | 0 | 122 | 0 | 108 | 182 | 0 | 68 | 287 | 0 |
| 5 | Cameron Avenue/Pittsboro Street | 0 | 129 | 126 | 465 | 407 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Cameron Avenue/Columbia Street | 26 | 94 | 0 | 0 | 153 | 45 | 231 | 641 | 48 | 0 | 92 | 0 | 466 |
| 7 | Cameron Avenue/Raleigh Street | 35 | 164 | 49 | 24 | 149 | 274 | 66 | 118 | 57 | 0 | 332 | 172 | 75 |
| 8 | Pittsboro Street/McCauley Street | 0 | 92 | 18 | 200 | 219 | 0 | 0 | 0 | 0 | 0 | 227 | 428 | 36 |
| 9 | Columbia Street/South Road | 67 | 246 | 0 | 0 | 276 | 216 | 125 | 612 | 171 | 0 | 0 | 0 | 0 |
| 10 | Raleigh Street/South Road | 108 | 381 | 0 | 0 | 251 | 55 | 0 | 0 | 0 | 0 | 74 | 0 | 147 |
| 11 | Country Club Road/South Road | 40 | 399 | 30 | 182 | 264 | 465 | 29 | 158 | 383 | 0 | 520 | 73 | 23 |
| 12 | Columbia Street/Manning Drive | 59 | 193 | 0 | 213 | 0 | 477 | 0 | 421 | 56 | 0 | 0 | 0 | 0 |
| 13 | Manning Drive/West Drive | 25 | 202 | 26 | 29 | 629 | 17 | 0 | 0 | 0 | 0 | 9 | 5 | 28 |
| 14 | Manning Drive/East Drive | 32 | 227 | 43 | 73 | 432 | 52 | 168 | 25 | 461 | 0 | 0 | 0 | 0 |
| 15 | Ridge Road/Manning Drive | 218 | 752 | 69 | 19 | 209 | 77 | 101 | 161 | 56 | 0 | 68 | 76 | 113 |
| 16 | Mason Farm Road/Columbia Street | 1 | 2 | 2 | 391 | 0 | 117 | 7 | 338 | 88 | 0 | 55 | 530 | 6 |
| 17 | Mason Farm Road/West Drive | 0 | 132 | 16 | 7 | 421 | 0 | 0 | 0 | 0 | 0 | 20 | 3 | 34 |
| 18 | Mason Farm Road/East Drive | 26 | 252 | 150 | 107 | 203 | 3 | 32 | 0 | 27 | 0 | 0 | 0 | 0 |
| 19 | Mason Farm Road/Purefoy Road | 15 | 0 | 22 | 0 | 0 | 0 | 13 | 38 | 0 | 0 | 0 | 259 | 58 |
| 20 | Manning Drive/Skipper Bowles Drive | 0 | 773 | 11 | 84 | 237 | 0 | 18 | 0 | 243 | 0 | 0 | 0 | 0 |
| 21 | Columbia Street/Purefoy Road | 0 | 0 | 0 | 101 | 0 | 23 | 0 | 421 | 28 | 0 | 9 | 952 | 0 |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | 0 | 0 | 0 | 1190 | 0 | 45 | 309 | 407 | 0 | 0 | 0 | 741 | 287 |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | 136 | 2 | 306 | 0 | 0 | 0 | 0 | 557 | 0 | 0 | 87 | 1788 | 0 |
| 24 | Mason Farm Road/Fordham Boulevard | 0 | 1495 | 0 | 0 | 2166 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 231 |
| 25 | Manning Drive/Fordham Boulevard | 63 | 1483 | 4 | 9 | 1943 | 201 | 10 | 2 | 20 | 0 | 878 | 6 | 276 |
| 26 | Mason Farm Road/Oteys Road | 4 | 115 | 183 | 3 | 39 | 2 | 4 | 1 | 0 | 0 | 3 | 2 | 3 |
| 27 | Franklin Street/Boundary Street | 7 | 606 | 4 | 22 | 582 | 67 | 13 | 63 | 122 | 0 | 108 | 23 | 8 |
| 28 | Franklin Street/Park Place | 0 | 829 | 2 | 24 | 677 | 0 | 1 | 0 | 60 | 0 | 0 | 0 | 0 |
| 29 | Battle Lane/Boundary Street | 0 | 0 | 0 | 50 | 37 | 3 | 0 | 157 | 236 | 0 | 2 | 79 | 81 |
| 30 | Country Club Road/Battle Lane | 15 | 412 | 0 | 0 | 406 | 142 | 0 | 0 | 0 | 0 | 129 | 0 | 0 |
| 307 | Country Club Road & Boundary Street | 0 | 427 | 0 | 0 | 406 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 118 |
| 31 | Country Club Road/Gimghoul Road | 41 | 0 | 87 | 11 | 0 | 11 | 17 | 625 | 12 | 0 | 9 | 528 | 8 |
| 32 | Manning Drive/Hibbard Drive | 35 | 660 | 8 | 30 | 460 | 20 | 24 | 4 | 22 | 0 | 44 | 18 | 65 |
| 33 | Manning Drive/Craige Drive | 28 | 898 | 4 | 19 | 349 | 25 | 31 | 1 | 174 | 0 | 35 | 0 | 15 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | 0 | 0 | 0 | 2 | 0 | 20 | 3 | 655 | 0 | 0 | 1 | 48 | 72 |
| 35 | East Drive/Dogwood Deck Exit | 247 | 0 | 136 | 0 | 0 | 0 | 0 | 274 | 0 | 0 | 0 | 50 | 0 |
| 36 | Mason Farm Road/Hibbard Drive | 4 | 3 | 6 | 158 | 0 | 11 | 0 | 49 | 19 | 0 | 7 | 262 | 1 |
| 37 | South Road/Bell Tower Drive | 0 | 341 | 35 | 38 | 331 | 0 | 161 | 0 | 147 | 0 | 0 | 0 | 0 |
| 38 | Manning Drive/Old East Drive | 0 | 212 | 0 | 0 | 594 | 0 | 0 | 0 | 0 | 0 | 86 | 0 | 93 |
| 39 | Manning Drive/Craige Deck | 0 | 697 | 5 | 5 | 445 | 0 | 96 | 0 | 187 | 0 | 0 | 0 | 0 |
| 101 | US 15-501/Estes Drive | 95 | 10 | 296 | 7 | 15 | 12 | 454 | 1491 | 3 | 0 | 15 | 1341 | 104 |
| 102 | US 15-501/Willow Drive | 274 | 112 | 21 | 27 | 34 | 23 | 34 | 1561 | 38 | 0 | 39 | 1313 | 223 |
| 103 | US 15-501/Elliott Road | 135 | 0 | 259 | 0 | 0 | 0 | 211 | 1627 | 0 | 7 | 0 | 1296 | 186 |
| 104 | US 15-501/Ephesus Church Road | 90 | 88 | 68 | 325 | 128 | 55 | 147 | 1139 | 292 | 0 | 87 | 1125 | 12 |
| 105 | US 15-501/Erwin Road | 0 | 0 | 0 | 0 | 1793 | 377 | 0 | 0 | 0 | 0 | 0 | 0 | 404 |
| 106 | US 15-501/Europa Drive | 0 | 2486 | 84 | 0 | 0 | 0 | 0 | 0 | 218 | 0 | 0 | 0 | 0 |
| 107 | US 15-501/Superstreet NB U-Turn | 0 | 0 | 0 | 0 | 1811 | 0 | 369 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | US 15-501/Superstreet SB U-Turn | 0 | 2460 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 37 | 0 |
| 109 | US 15-501/Sage Road | 329 | 1691 | 198 | 50 | 1495 | 249 | 128 | 87 | 25 | 0 | 233 | 156 | 161 |
| 110 | US 15-501/Eastowne Drive/BCBS | 43 | 1938 | 5 | 31 | 1725 | 58 | 10 | 7 | 46 | 0 | 72 | 1 | 67 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | 2 | 2022 | 4 | 70 | 1836 | 177 | 20 | 16 | 115 | 0 | 243 | 29 | 19 |
| 201 | NC 54/Hamilton Street | 37 | 2006 | 42 | 107 | 2013 | 58 | 107 | 22 | 125 | 0 | 74 | 19 | 40 |
| 202 | NC 54/Burning Tree Lane | 70 | 2110 | 36 | 146 | 2032 | 32 | 69 | 15 | 144 | 0 | 26 | 11 | 47 |
| 203 | NC 54/Barbee Chapel Road Ext | 139 | 2062 | 42 | 9 | 1830 | 13 | 82 | 15 | 60 | 0 | 15 | 0 | 190 |
| 204 | NC 54/Meadowmont Lane | 125 | 2013 | 89 | 102 | 1660 | 98 | 113 | 24 | 426 | 0 | 161 | 11 | 176 |
| 205 | NC 54/Barbee Chapel Road (East) | 9 | 1840 | 713 | 110 | 1515 | 182 | 224 | 55 | 45 | 0 | 123 | 88 | 16 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | 120 | 62 | 66 | 13 | 82 | 311 | 56 | 812 | 17 | 0 | 576 | 1289 | 179 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | 113 | 14 | 6 | 75 | 22 | 1 | 5 | 782 | 107 | 0 | 23 | 1246 | 113 |
| 303 | US 15-501/Market Street | 325 | 0 | 117 | 0 | 0 | 0 | 117 | 563 | 0 | 8 | 0 | 1110 | 231 |



Figure 4-4a
Year 2017 A.M. Peak Hour Turning Movement Volumes

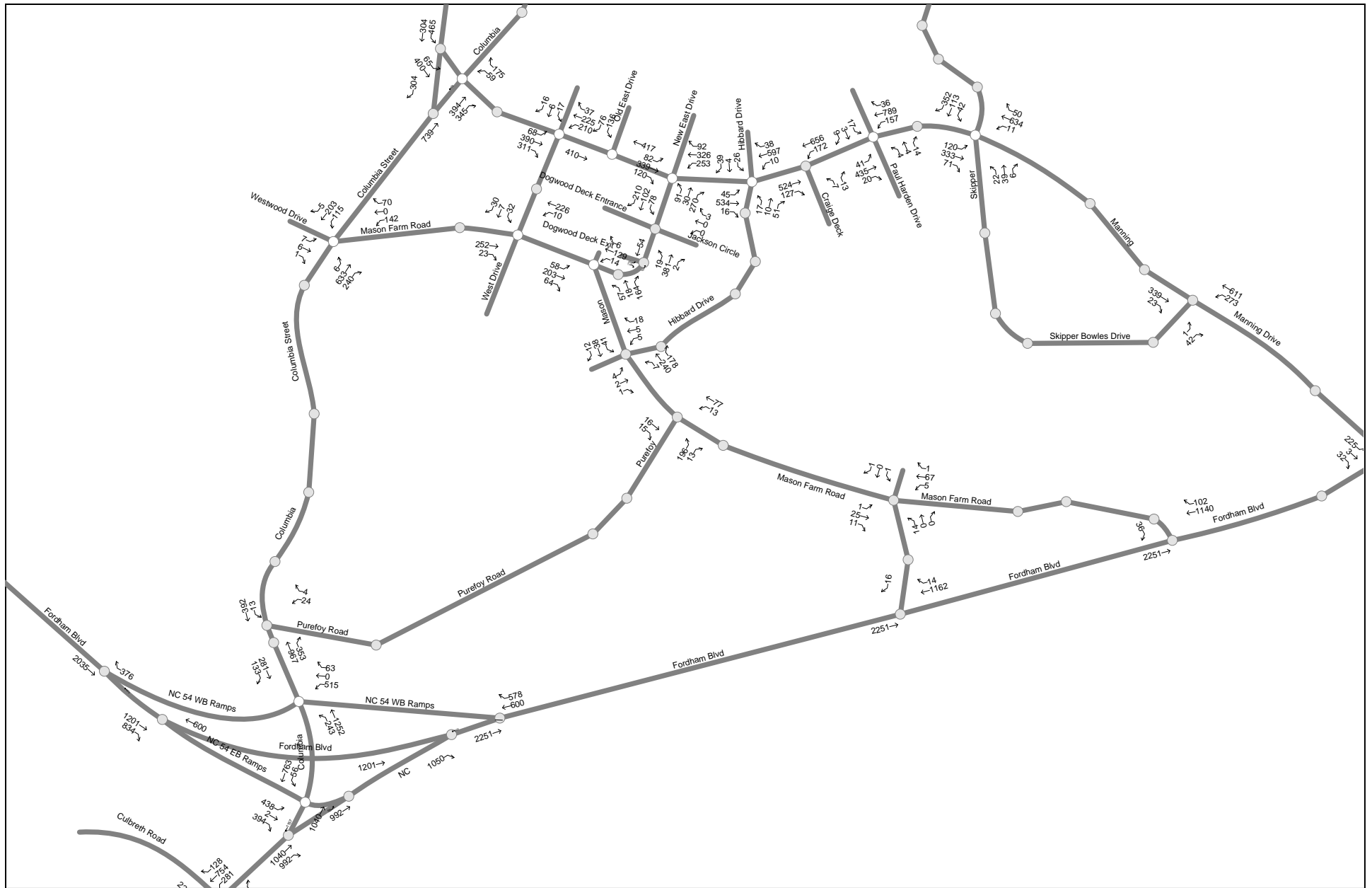


Figure 4-4b
Year 2017 A.M. Peak Hour Turning Movement Volumes

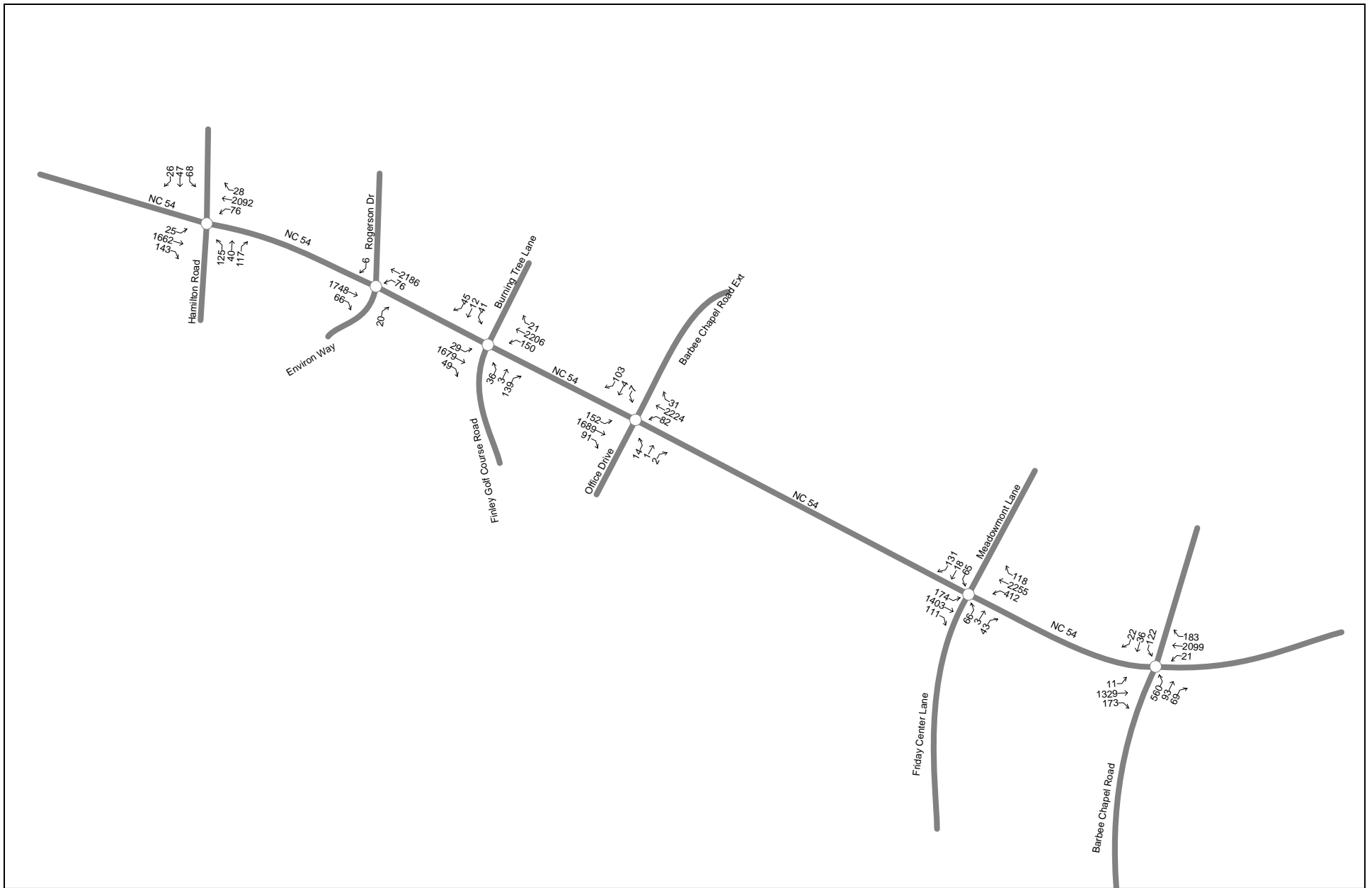


Figure 4-4d
Year 2017 A.M. Peak Hour Turning Movement Volumes

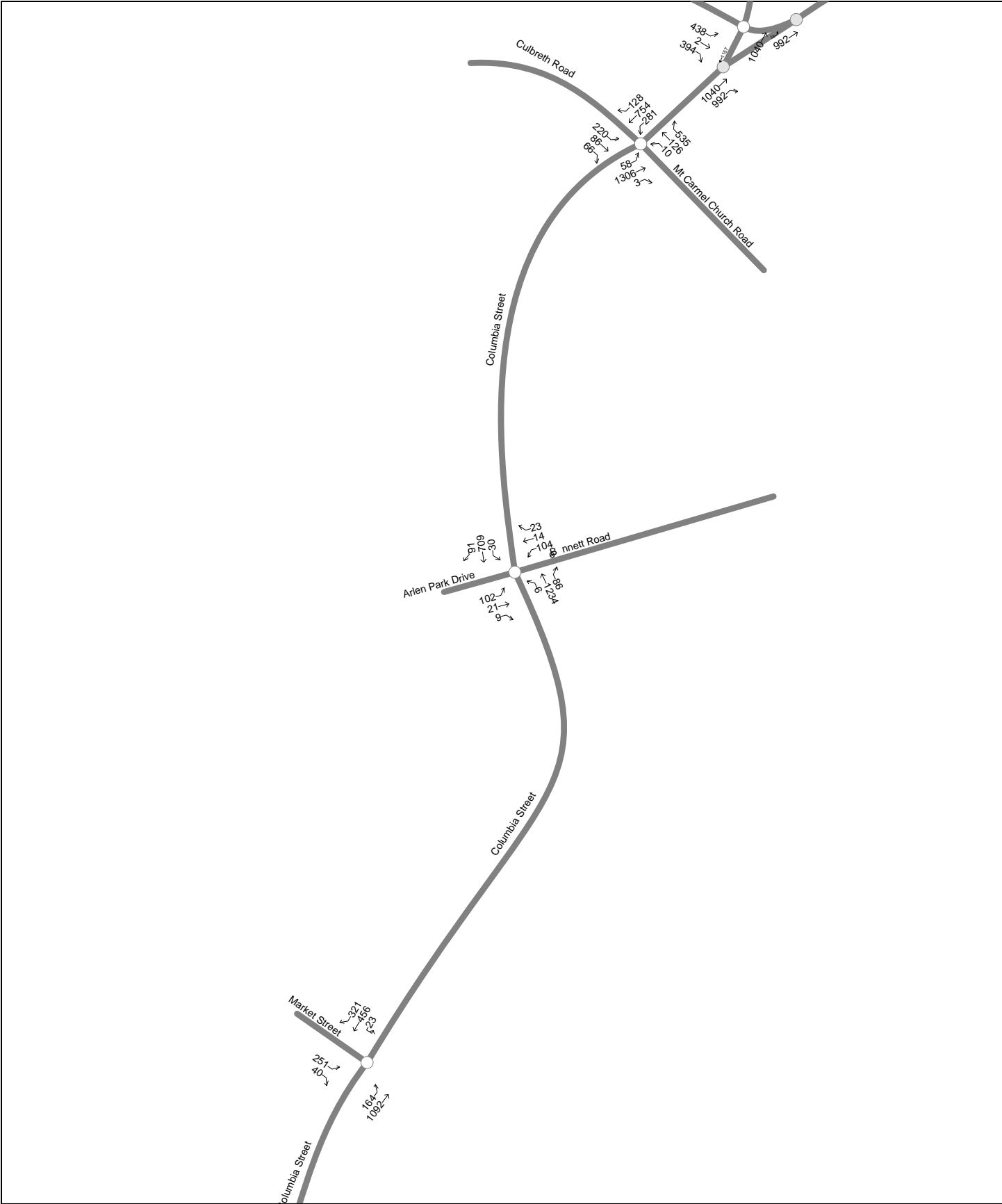


Figure 4-4e
Year 2017 A.M. Peak Hour Turning Movement Volumes

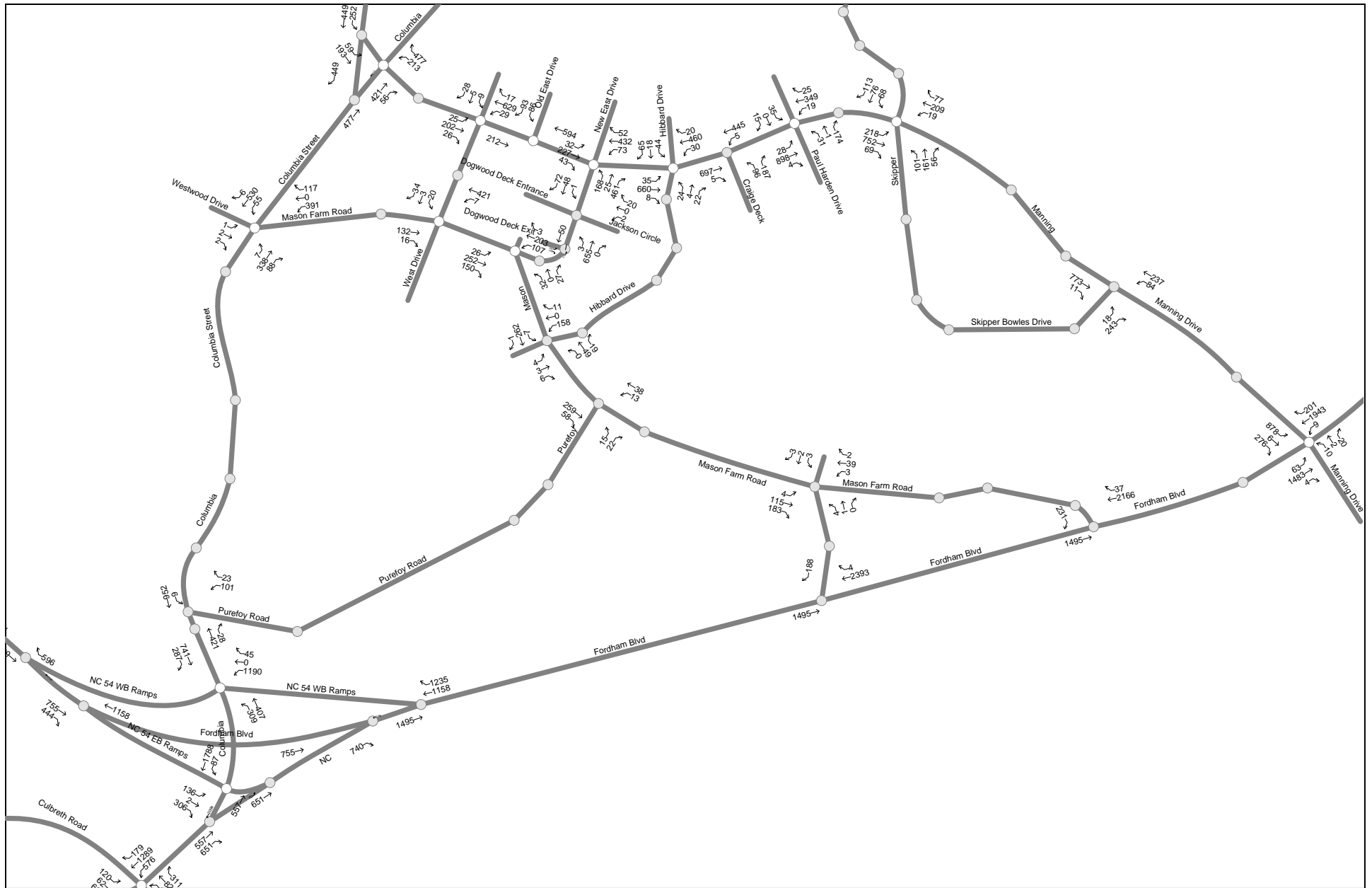


Figure 4-5b
Year 2017 P.M. Peak Hour Turning Movement Volumes

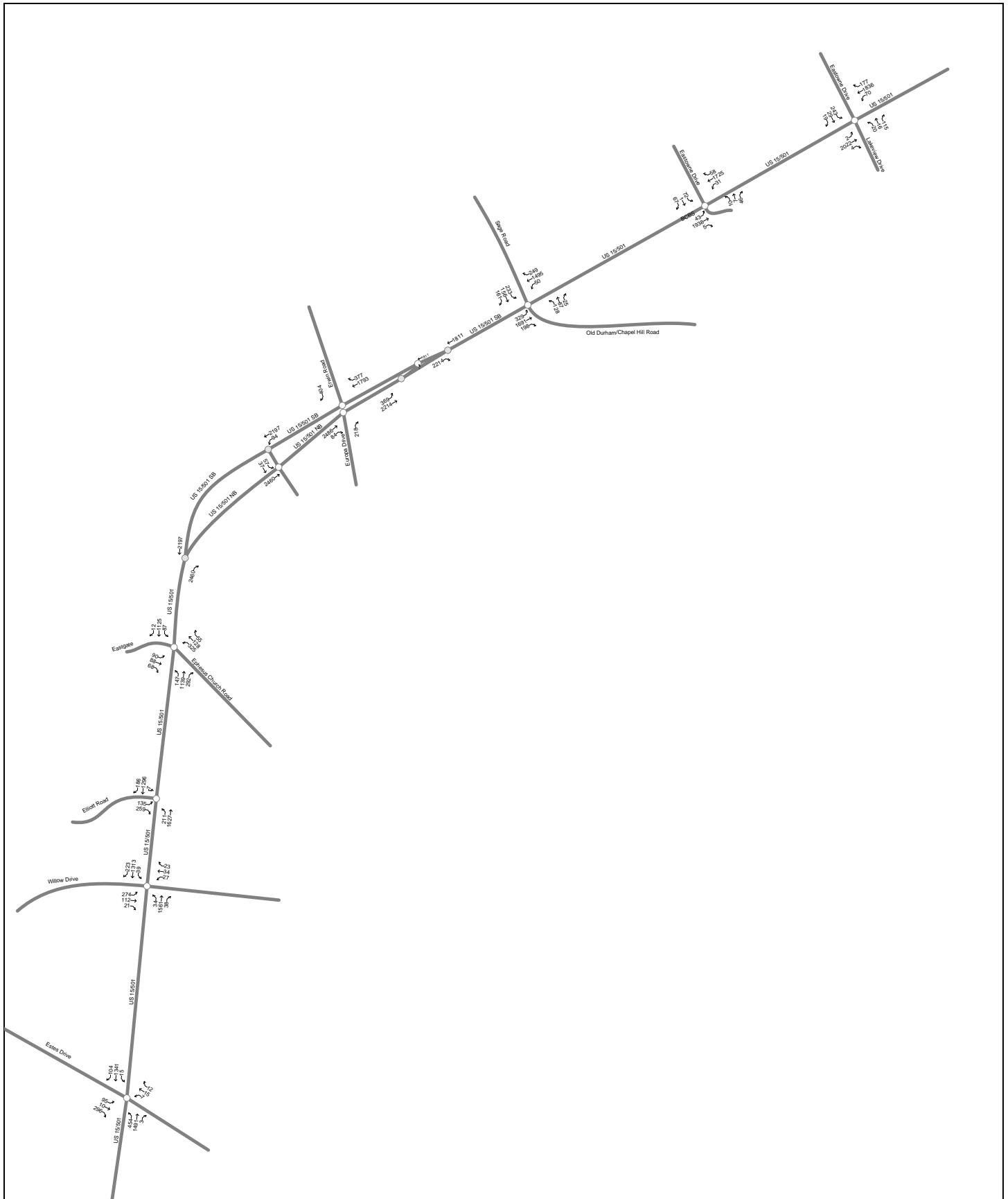


Figure 4-5c
Year 2017 P.M. Peak Hour Turning Movement Volumes

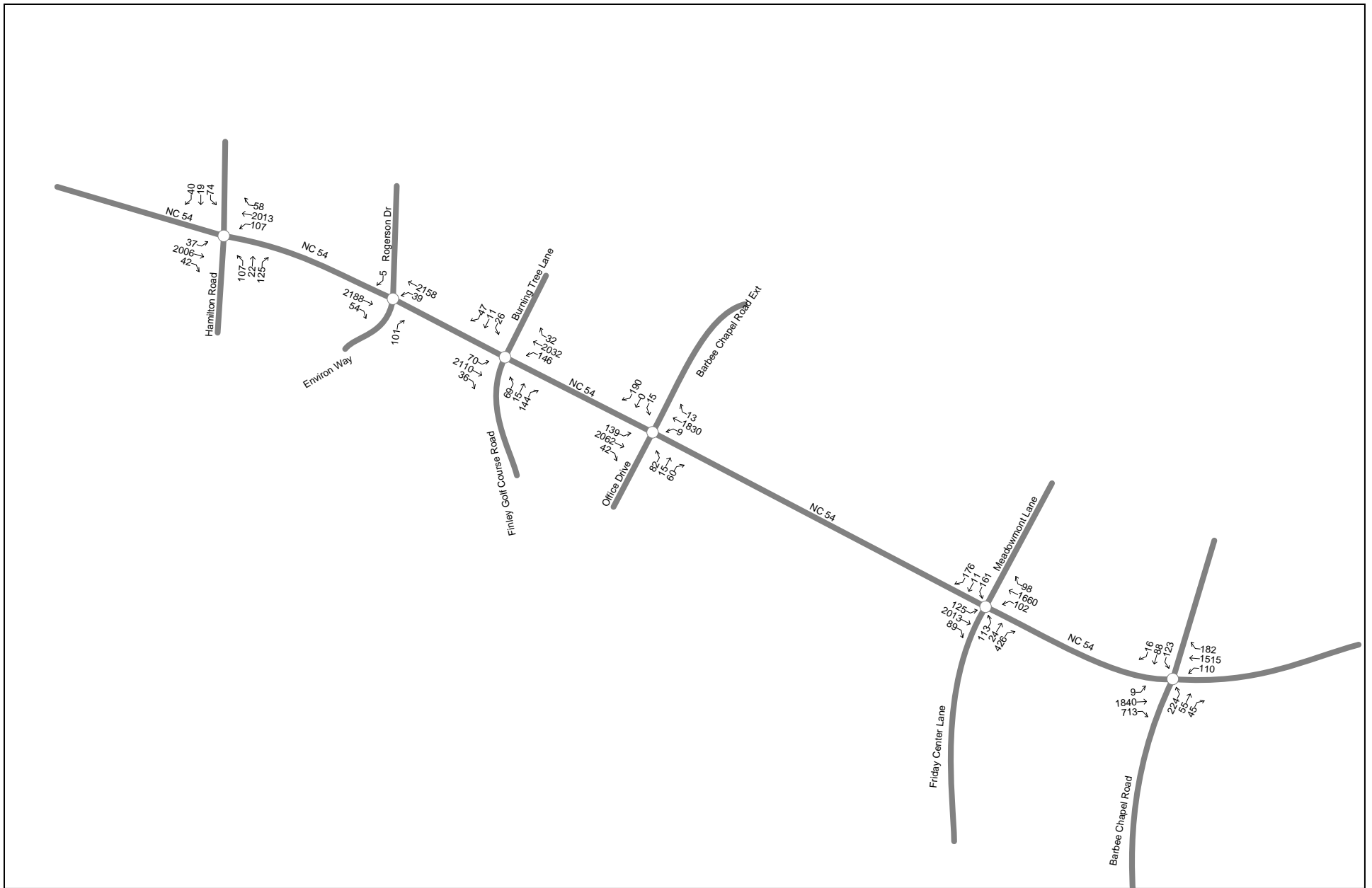


Figure 4-5d
Year 2017 P.M. Peak Hour Turning Movement Volumes

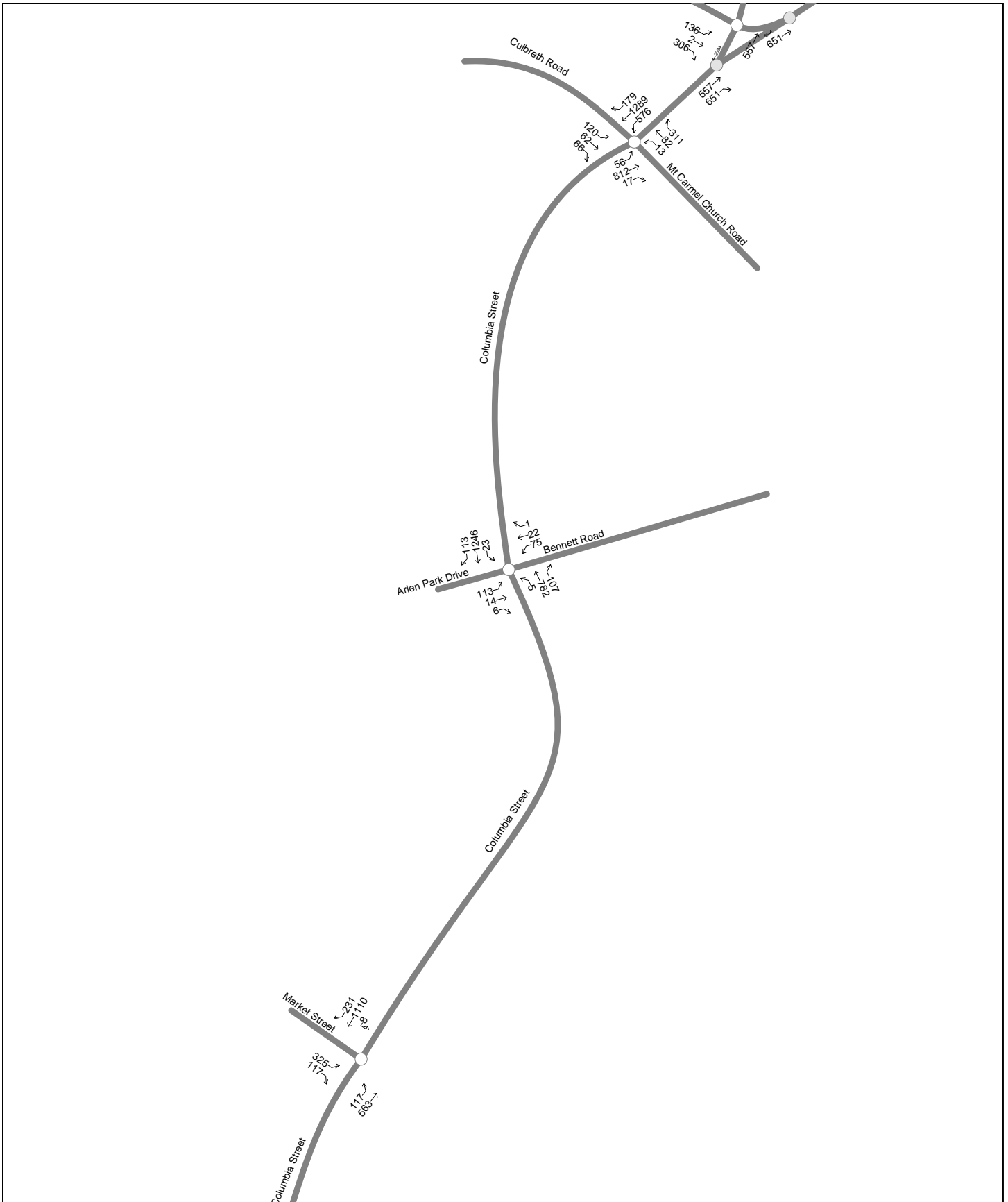


Figure 4-5e
Year 2017 P.M. Peak Hour Turning Movement Volumes

4.3.2 Level of Service Criteria

Peak hour level of service (LOS) measures the adequacy of the intersection geometrics and traffic controls of a particular intersection or approach for the given turning movement volumes. Levels of service range from A through F, based on the average control delay experienced by vehicles traveling through the intersection during the peak hour. Control delay represents the portion of total delay attributed to traffic control devices (e.g., signals or stop signs). The engineering profession generally accepts level of service D as an acceptable operating condition for signalized intersections in urban areas and level of service C for rural areas.

At unsignalized intersections, a level of service E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets sometimes function at level of service F during peak traffic periods, because the traffic volumes often do not warrant a traffic signal to assist side street traffic. Table 4-4 below provides a general description of the various LOS categories and delay ranges.

Table 4-4: Level of Service Descriptions for Intersections

| Level of Service | Description | Signalized Intersection | Unsignalized Intersection |
|------------------|-------------------------|-------------------------|---------------------------|
| A | Little or no delay | <= 10 sec. | <= 10 sec. |
| B | Short traffic delay | 10-20 sec. | 10-15 sec. |
| C | Average traffic delay | 20-35 sec. | 15-25 sec. |
| D | Long traffic delay | 35-55 sec. | 25-35 sec. |
| E | Very long traffic delay | 55-80 sec. | 35-50 sec. |
| F | Unacceptable delay | > 80 sec. | > 50 sec. |

4.3.3 Analysis Results

Capacity analysis for the existing roadway geometrics and traffic volumes were performed for both morning and afternoon peak hour periods using *Synchro Professional Version 9* and *Highway Capacity Software (HCS+)* software packages. A network outlining the study area was created in *Synchro* using existing geometric and timing/phasing data. Signalized intersections were grouped according to the Town of Chapel Hill's signal system zones, and timing splits were optimized within these zones using cycle length's based on signal timings provided by the Town. Lane widths, grades, pedestrian volumes, etc., were included in the analysis when available.

Table 4-5 summarizes the existing intersection levels of service. In Table 4-5, the overall intersection level of service and worst movement level of service are provided. The Appendix contains the output obtained from *Synchro*, which summarizes the peak period levels of service. Table 4-5 shows that the overall intersection level of service for the majority of Campus study area intersections is LOS D or better, while some minor street approaches are suffering longer delays (worse than LOS D). Delays and queues are typically experienced on the southbound approach of Manning Drive at the intersection with Fordham Boulevard during the AM and PM peak hours of traffic. While the overall level of service during the PM peak hour is indicated at LOS E, the southbound approach is operating at LOS F with queues that typically extend north toward Skipper Bowles Drive.

The following intersections were reported to be operating at LOS D or better in either the AM or PM peak hour in the 2015 TIA update but are reported to be operating at LOS E or worse in this update of the TIA: Columbia Street at Rosemary Street, Columbia Street at Franklin Street, Cameron Avenue at Columbia Street, and Manning Drive at Fordham Boulevard.

The degraded LOS can be attributed to increased peak hour traffic volumes, since the signal phasing was unchanged from the 2015 TIA with minor differences in split times.

As indicated in Table 4-5, a number of intersections operate at LOS D or better for the overall intersection operations, but report LOS E or F on some approaches at the same intersection. Many of the intersections along NC 54 and US 15-501 are examples. In these instances, the major street approaches are given priority over the minor side street approaches in order to coordinate the traffic flow along the major corridor.

As stated in the past updates of the Development Plan Impact Analysis reports, the US 15-501 Major Investment Study concluded that while some minor improvements could be made at intersections along this corridor, the magnitude of the delays being experienced requires a large-scale integrated, multimodal solution. It is anticipated that this corridor will undergo significant highway and transit improvements in the future. These improvements will help relieve congestion along this heavily traveled roadway. The section of US 15-501 at the intersection with Europa Drive and Erwin Road has been converted to a superstreet facility. All of the intersections in the superstreet section of US 15-501 are operating at LOS D or better in both the AM peak hour and the PM peak hour.

Some unsignalized intersections are experiencing long delays on their stop-controlled approaches. These intersections include Purefoy Road at Columbia Street, Mason Farm Road at Fordham Boulevard, and Battle Lane at Country Club Road. All are registering long delays on the side street approaches but still maintaining acceptable overall levels of service; however as previously required by the Town of Chapel Hill, traffic signal warrants analyses were performed for the unsignalized intersections of Skipper Bowles Drive at Manning Drive, Mason Farm Road at Purefoy Road, and Mason Farm Road at Oteys Road. Those analyses are described in further detail in section 4.8.

Table 4-5: Existing (2017) Intersection Levels of Service

| ID # | Intersection | Control | Existing (2017) | |
|------|---|--------------|-----------------|----------|
| | | | AM | PM |
| 1 | Columbia Street/Rosemary Street | Signalized | C (WB-D) | E (NB-F) |
| 2 | Columbia Street/Franklin Street | Signalized | C (SB-D) | E (EB-E) |
| 3 | Franklin Street/Raleigh Street | Signalized | B (NB-D) | B (NB-C) |
| 4 | Merritt Mill Road/Cameron Avenue | Signalized | B (WB-D) | C (WB-C) |
| 5 | Cameron Avenue/Pittsboro Street | Signalized | B (EB-C) | B (EB-E) |
| 6 | Cameron Avenue/Columbia Street | Signalized | D (WB-E) | E (EB-F) |
| 7 | Cameron Avenue/Raleigh Street | Signalized | C (NB-E) | D (NB-E) |
| 8 | Pittsboro Street/McCauley Street | Signalized | B (WB-C) | B (WB-C) |
| 9 | Columbia Street/South Road | Signalized | B (EB-C) | C (EB-D) |
| 10 | Raleigh Street/South Road | Signalized | A (SB-C) | A (SB-B) |
| 11 | Country Club Road/South Road | Signalized | C (SB-D) | C (EB-D) |
| 12 | Columbia Street/Manning Drive | Signalized | C (EB-E) | C (EB-E) |
| 13 | Manning Drive/West Drive | Signalized | A (SB-D) | A (SB-B) |
| 14 | Manning Drive/East Drive | Signalized | B (NB-C) | C (NB-E) |
| 15 | Ridge Road/Manning Drive | Signalized | C (NB-D) | C (NB-D) |
| 16 | Mason Farm Road/Columbia Street | Signalized | B (EB-D) | C (EB-D) |
| 17 | Mason Farm Road/West Drive | Signalized | A (SB-C) | A (SB-C) |
| 18 | Mason Farm Road/East Drive | Signalized | B (NB-B) | A (EB-A) |
| 19 | Mason Farm Road/Purefoy Road | Unsignalized | A (EB-A) | A (SB-A) |
| 20 | Manning Drive/Skipper Bowles Drive | Unsignalized | A (NB-B) | A (NB-C) |
| 21 | Columbia Street/Purefoy Road | Unsignalized | A (WB-E) | B (WB-F) |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | Signalized | C (WB-E) | D (WB-E) |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | Signalized | C (EB-E) | B (EB-E) |
| 24 | Mason Farm Road/Fordham Boulevard | Unsignalized | A (SB-C) | C (SB-F) |
| 25 | Manning Drive/Fordham Boulevard | Signalized | C (SB-E) | E (SB-F) |
| 26 | Mason Farm Road/Oteys Road | Unsignalized | A (NB-A) | A (EB-A) |
| 27 | Franklin Street/Boundary Street | Signalized | A (SB-C) | A (SB-C) |
| 28 | Franklin Street/Park Place | Unsignalized | A (NB-A) | A (NB-B) |
| 29 | Battle Lane/Boundary Street | Unsignalized | A (WB-A) | A (NB-B) |
| 30 | Country Club Road/Battle Lane | Unsignalized | A (SB-C) | A (SB-E) |
| 307 | Country Club Road & Boundary Street | Unsignalized | A (SB-B) | A (SB-B) |
| 31 | Country Club Road/Ginghoul Road | Signalized | A (WB-C) | A (EB-B) |
| 32 | Manning Drive/Hibbard Drive | Signalized | A (SB-D) | B (SB-E) |
| 33 | Manning Drive/Craige Drive | Signalized | A (SB-D) | B (SB-F) |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | Unsignalized | A (WB-B) | A (WB-B) |
| 35 | East Drive/Dogwood Deck Exit | Unsignalized | A (EB-B) | A (EB-B) |
| 36 | Mason Farm Road/Hibbard Drive | Unsignalized | A (EB-B) | A (WB-C) |
| 37 | South Road/Bell Tower Drive | Signalized | A (NB-C) | C (NB-C) |
| 38 | Manning Drive/Old East Drive | Signalized | B (SB-D) | A (SB-C) |
| 39 | Manning Drive/Craige Deck | Unsignalized | A (NB-C) | A (NB-D) |
| 101 | US 15-501/Estes Drive | Signalized | C (WB-D) | C (WB-E) |
| 102 | US 15-501/Willow Drive | Signalized | B (WB-E) | C (EB-E) |
| 103 | US 15-501/Elliot Road | Signalized | A (EB-E) | C (EB-E) |
| 104 | US 15-501/Ephesus Church Road | Signalized | C (WB-F) | D (EB-F) |
| 105 | US 15-501/Erwin Road | Signalized | A (WB-A) | A (WB-A) |
| 106 | US 15-501/Europa Drive | Signalized | A (NB-E) | A (NB-E) |
| 107 | US 15-501/Superstreet NB U-Turn | Signalized | C (NB-E) | C (NB-E) |
| 108 | US 15-501/Superstreet SB U-Turn | Signalized | A (SB-E) | B (SB-E) |
| 109 | US 15-501/Sage Road | Signalized | E (NB-F) | D (NB-F) |
| 110 | US 15-501/Eastowne Drive/BCBS | Signalized | C (SB-E) | B (SB-E) |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | Signalized | C (SB-F) | C (SB-F) |
| 201 | NC 54/Hamilton Street | Signalized | B (NB-E) | B (NB-E) |
| 202 | NC 54/Burning Tree Lane | Signalized | B (SB-E) | B (NB-E) |
| 203 | NC 54/Barbee Chapel Road Ext | Signalized | A (NB-E) | B (NB-F) |
| 204 | NC 54/Meadowmont Lane | Signalized | C (NB-D) | C (NB-D) |
| 205 | NC 54/Barbee Chapel Road (East) | Signalized | D (NB-F) | C (SB-F) |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | Signalized | C (EB-E) | C (EB-D) |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | Signalized | B (EB-E) | B (EB-E) |
| 303 | US 15-501/Market Street | Signalized | B (EB-C) | B (EB-C) |

Legend: X = Overall intersection level of service; (X) = worst movement level of service.

4.4 TRIP GENERATION

To determine the impact of the future development on Campus, parking was determined to be the best indicator of additional trips on the study area network. By 2024, the overall additional parking on campus will increase by approximately 1,579 spaces in comparison to the number of spaces present in 2001. In some areas of campus, parking will decrease, while in other areas parking will increase. The objective of the future analysis is to determine the impact of these changes on surrounding intersections. To accomplish this, the parking was converted into peak hour vehicle trips and then distributed to the study area network, as described below.

4.4.1 Parking Generation Rates

Parking generation rates (the number of vehicular trips generated per parking space) were applied to the parking sites which lost or gained spaces. These rates were developed for five types of users: employees, commuter students, resident students, hospital visitor/patients, and University visitors. The rates are shown in Table 4-6 and were developed using traffic counts undertaken at the entry and exit points of selected parking facilities during the fall of 2001, data from card readers at entrances to gated facilities, and visitor counts from various University and UNC Health Care parking areas.

Table 4-6: Trip Generation Rates (Vehicle Trips per Space)

| User Type | Trip Rates (Trips per Space) | | | | |
|--------------------|------------------------------|-------|--------|-------|--------|
| | Weekday | AM In | AM Out | PM In | PM Out |
| Hospital Visitor | 8.2 | 0.62 | 0.19 | 0.17 | 0.44 |
| University Visitor | 7.6 | 0.41 | 0.13 | 0.71 | 0.59 |
| Employee | 3.6 | 0.36 | 0.07 | 0.13 | 0.30 |
| Resident Student | 7.2 | 0.22 | 0.17 | 0.25 | 0.28 |
| Commuter Student | 3.6 | 0.33 | 0.05 | 0.27 | 0.34 |

4.4.2 Campus Parking Areas and Distribution

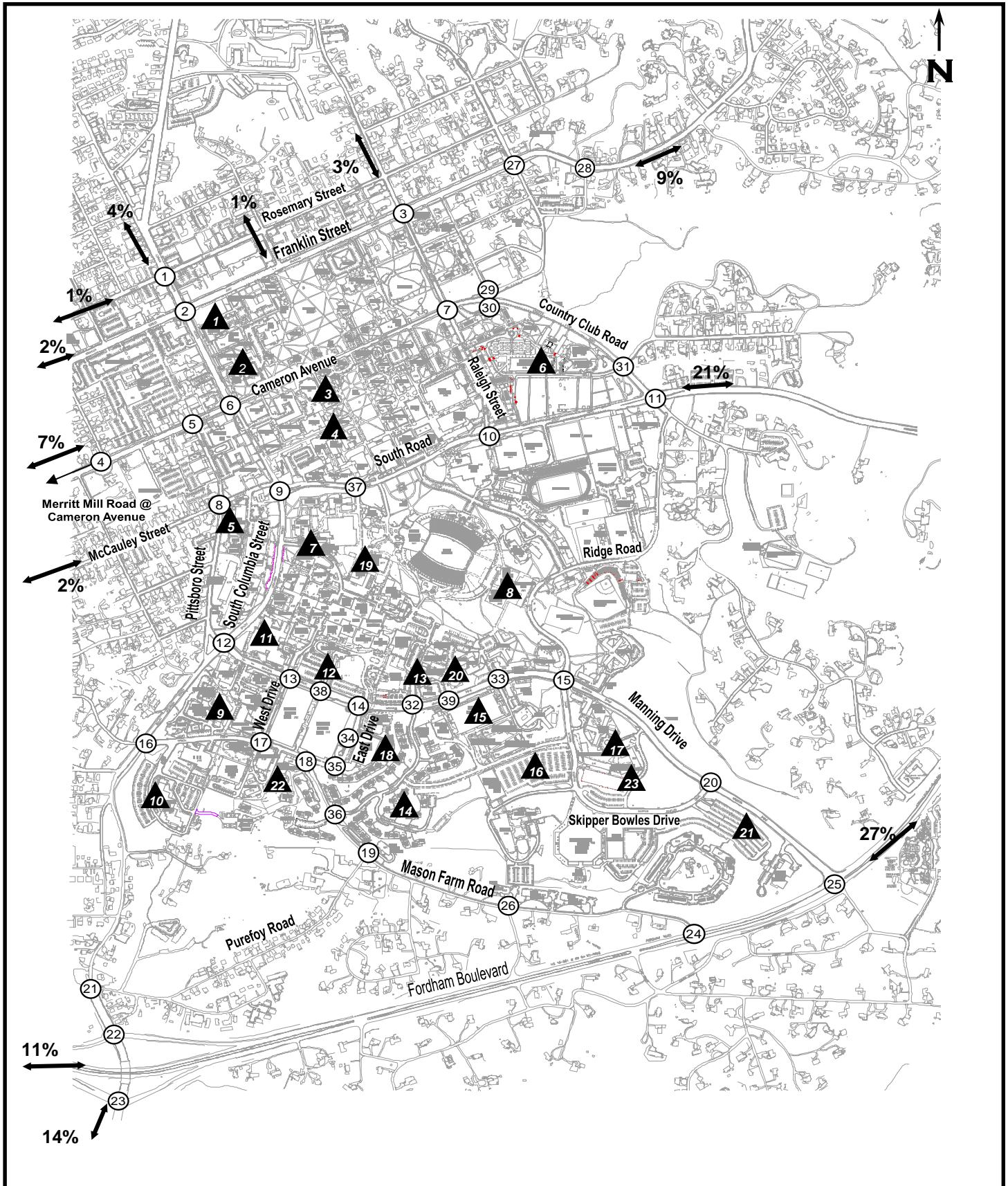
In total there are nearly 30 parking lots on Campus that will be affected by the Development Plan. These parking lots were divided into 24 geographical areas in the analysis. Within each area, the resulting net change in trips was distributed over the study area network, based on an overall regional distribution of traffic and an understanding of how traffic uses the intra-campus road network. The regional distribution of traffic was determined from employee and hospital patient home address data. Intra-campus traffic distribution was based on the existing AM and PM traffic counts (see Figure 4-4 and Figure 4-5).

Table 4-7 summarizes the trip generation by campus parking area. The parking areas and overall directional distribution of traffic per area are shown in Figure 4-6.

Table 4-7: Trip Generation by Campus Parking Area

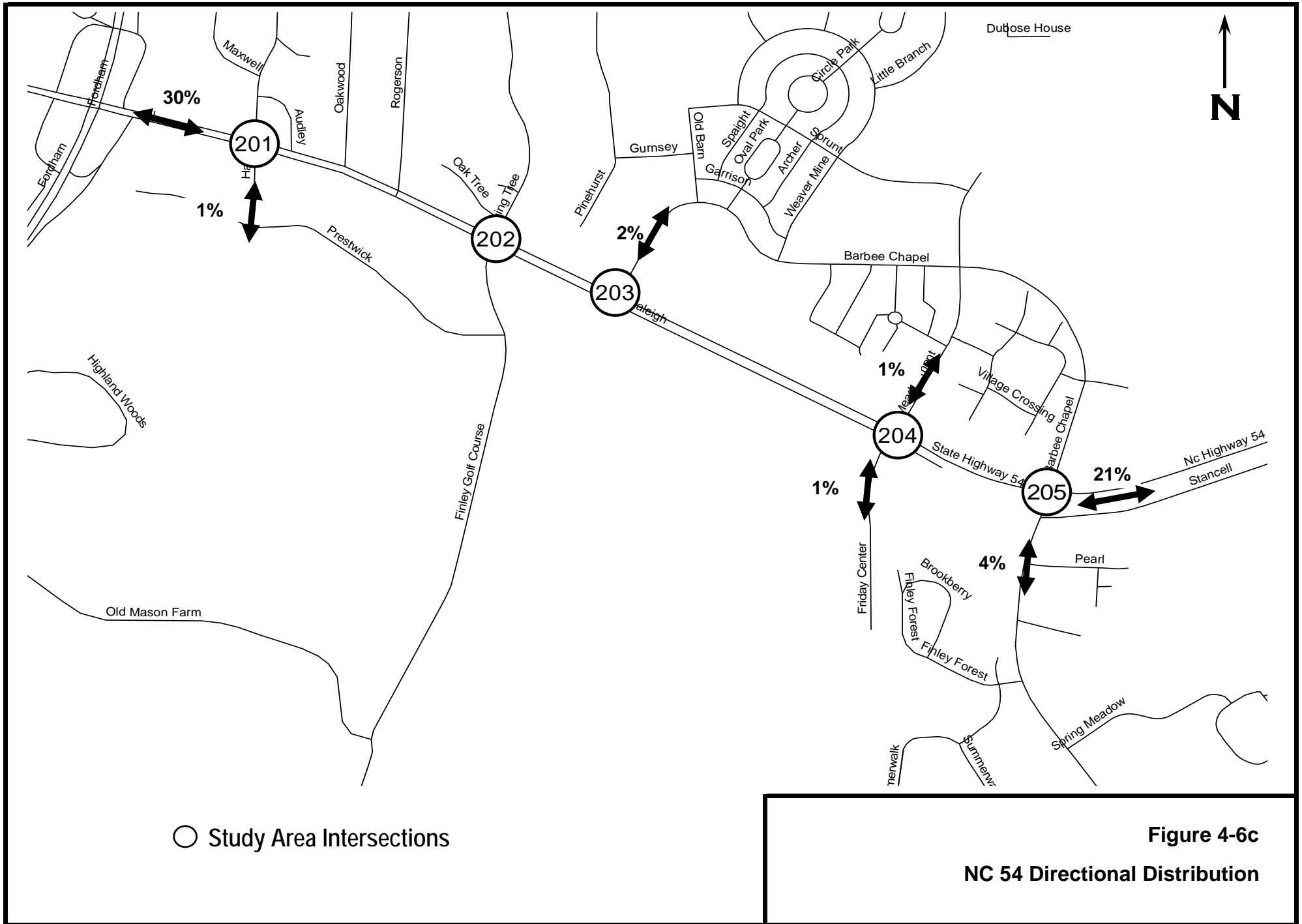
| Campus Parking Area* | Lot Name | Parking Zone | Parking Designation | Change In Parking Totals (spaces) | Change In AM In (trips) | Change In AM Out (trips) | Change In PM In (trips) | Change In PM Out (trips) | Change In Daily Trips (ADT) |
|----------------------|------------------------------|--------------|---------------------|-----------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-----------------------------|
| 1 | Porthole | N2 | Employee | -40 | -15 | -3 | -5 | -12 | -144 |
| | | | Area 1 Totals | -40 | -15 | -3 | -5 | -12 | -144 |
| 2 | Cameron Deck | ND1 | Visitor | 330 | 136 | 44 | 236 | 195 | 2500 |
| 2 | Swain | NG1 | Net Change | -214 | -81 | -19 | -63 | -82 | -1009 |
| | | | Area 2 Totals | 116 | 55 | 25 | 173 | 113 | 1491 |
| 3 | Hanes | | Visitor | -32 | -13 | -4 | -23 | -19 | -342 |
| | | | Area 3 Totals | -32 | -13 | -4 | -23 | -19 | -342 |
| 4 | Silterson | NG2 | Employee | -135 | -49 | -9 | -18 | -41 | -485 |
| 4 | Venable Deck | ND2 | Employee | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Wilson Library | N8 | Employee | -41 | -15 | -3 | -5 | -12 | -148 |
| | | | Area 4 Totals | -176 | -64 | -12 | -23 | -53 | -634 |
| 5 | McCaulley Street | W | Employee/Student | -20 | -26 | 12 | 13 | -9 | 409 |
| | | | Area 5 Totals | -20 | -26 | 12 | 13 | -9 | 409 |
| 6 | Conner/Cobb/Joyner | N4 | Employee | 126 | 46 | 18 | 25 | 44 | 454 |
| 6 | Conner/Cobb/Joyner | N4 | Visitor | -6 | 0 | 0 | 0 | 0 | 0 |
| 6 | Conner/Cobb/Joyner | N4 | Student | -33 | -11 | -2 | -9 | -11 | -119 |
| 6 | Conner/Cobb/Joyner | N4 | Service | -8 | 3 | 1 | 1 | 2 | 29 |
| | | | Area 6 Totals | 79 | 38 | 17 | 17 | 35 | 364 |
| 7 | North Medical Drive | | Service | -26 | -9 | -2 | -3 | -8 | -94 |
| | | | Area 7 Totals | -26 | -9 | -2 | -3 | -8 | -94 |
| 8 | Rams Head | S5 | Net Change | 303 | 125 | 40 | 217 | 179 | 2296 |
| 8 | Ridge Road | S1 | Net Change | -16 | -5 | -2 | -3 | -5 | -79 |
| | | | Area 8 Totals | 287 | 120 | 38 | 214 | 174 | 2217 |
| 9 | Glaxo/HousingSupport/MPM/MRI | S6 | Employee | -46 | -17 | -3 | -6 | -14 | -166 |
| | | | Area 9 Totals | -46 | -17 | -3 | -6 | -14 | -166 |
| 10 | ACC | | Visitor | 198 | 122 | 37 | 33 | 87 | 1621 |
| | | | Area 10 Totals | 198 | 122 | 37 | 33 | 87 | 1621 |
| 11 | Dental School | S6 | Employee | -53 | -19 | -4 | -7 | -16 | -191 |
| | | | Area 11 Totals | -53 | -19 | -4 | -7 | -16 | -191 |
| 12 | Gravelly | CG | Net Change | 595 | 401 | 127 | 105 | 280 | 5491 |
| | | | Area 12 Totals | 595 | 401 | 127 | 105 | 280 | 5491 |
| 13 | Neurosciences | CG | Employee | -108 | -39 | -7 | -14 | -33 | -389 |
| | | | Area 13 Totals | -108 | -39 | -7 | -14 | -33 | -389 |
| 14 | Student Family Housing | MR/MR2 | Student | 79 | 18 | 14 | 19 | 22 | 568 |
| | | | Area 14 Totals | 79 | 18 | 14 | 19 | 22 | 568 |
| 15 | Craig Surface/Deck | GD | Net Change | 741 | 274 | 47 | 93 | 224 | 2536 |
| | | | Area 15 Totals | 741 | 274 | 47 | 93 | 224 | 2536 |
| 16 | Bowles | S11 | Net Change | -628 | -223 | -40 | -104 | -195 | -2262 |
| 16 | Kenan/McCoi Visitor Parking | | Visitor | -40 | -16 | -5 | -29 | -24 | -303 |
| | | | Area 16 Totals | -668 | -240 | -45 | -132 | -219 | -2565 |
| 17 | Hinton James | M | Student | -250 | -56 | -43 | -61 | -70 | -1797 |
| | | | Area 17 Totals | -250 | -56 | -43 | -61 | -70 | -1797 |
| 18 | Jackson Circle | | Employee | 606 | 220 | 42 | 80 | 183 | 2182 |
| 18 | Jackson Circle | | Student | 100 | 33 | 5 | 27 | 34 | 360 |
| 18 | Jackson Circle | | Visitor | -54 | -12 | -9 | -13 | -15 | -442 |
| | | | Area 18 Totals | 652 | 241 | 37 | 93 | 201 | 2100 |
| 19 | Bell Tower North Access | BG | Employee | 124 | 45 | 9 | 16 | 37 | 447 |
| | | | Area 19 Totals | 124 | 45 | 9 | 16 | 37 | 447 |
| 20 | ITS | S2 | Service | 24 | 9 | 2 | 3 | 7 | 86 |
| 20 | ITS | S2 | Visitor | -2 | 0 | 0 | 0 | 0 | 0 |
| 20 | ITS | S2 | Employee | -29 | -11 | -2 | -4 | -9 | -104 |
| | | | Area 20 Totals | -7 | -2 | 0 | -1 | -2 | -18 |
| 21 | Unassigned Spaces | S11 | Employee | 32 | 12 | 2 | 4 | 10 | 115 |
| | | | Area 21 Totals | 32 | 12 | 2 | 4 | 10 | 115 |
| 22 | South Chiller | S6 | Employee | -129 | -47 | -9 | -17 | -39 | -465 |
| | | | Area 22 Totals | -129 | -47 | -9 | -17 | -39 | -465 |
| 23 | Tennis Deck | P12 | Employee | 231 | 84 | 16 | 30 | 70 | 832 |
| | | | Area 23 Totals | 231 | 84 | 16 | 30 | 70 | 832 |
| | | | | Parking Totals (spaces) | AM In (trips) | AM Out (trips) | PM In (trips) | PM Out (trips) | Daily Trips (ADT) |
| Campus-Wide Totals | | | | 1,679 | 883 | 248 | 618 | 781 | 11,487 |

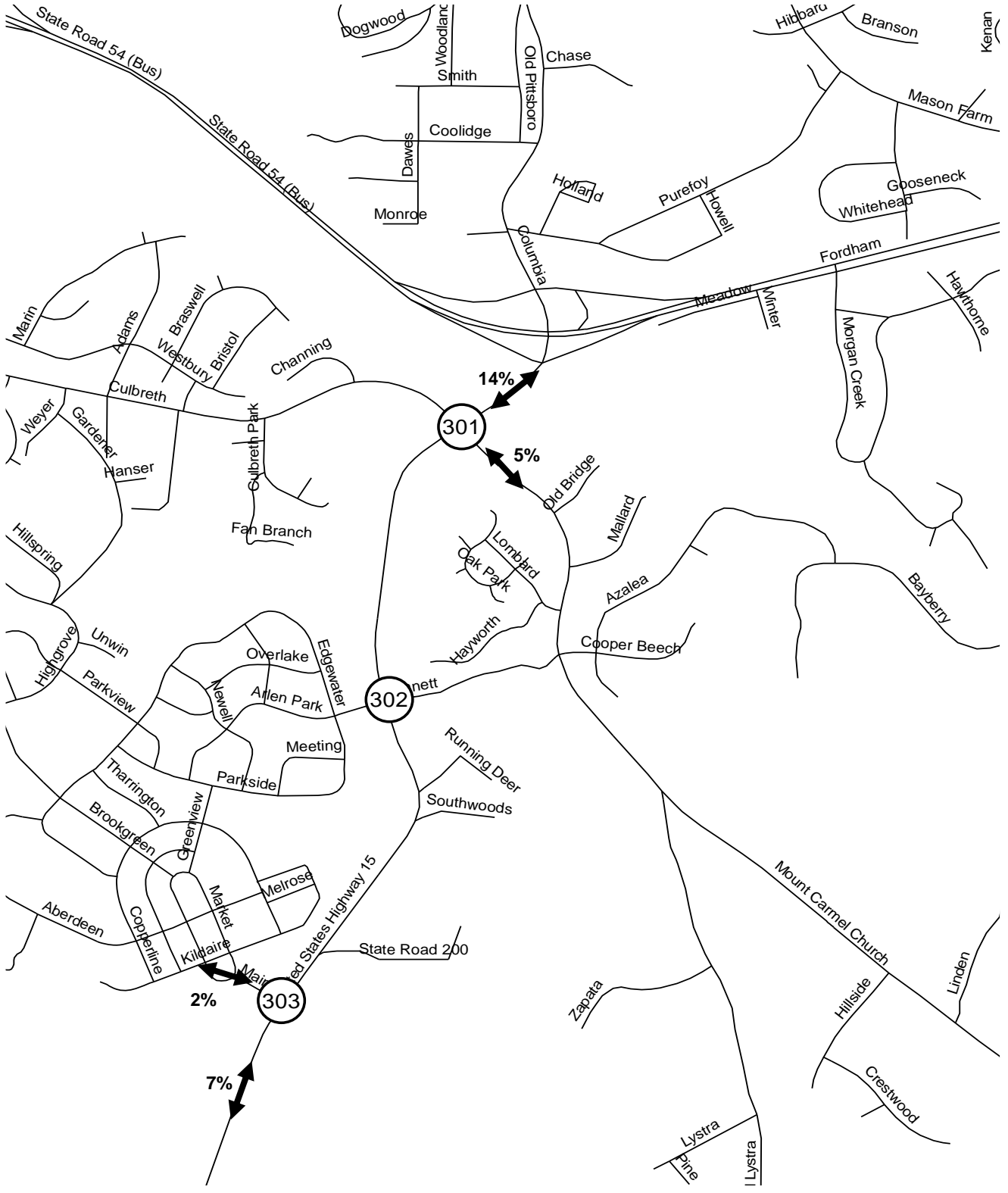
*See Figure 4-6 for Campus Parking Areas Locations



- Study Area Intersections
- ▲ Campus Parking Area

Figure 4-6a
Campus Parking Areas and Directional Distribution





○ Study Area Intersections

Figure 4-6d
US 15-501 South Directional Distribution

4.5 TRAFFIC PROJECTIONS

Through the year 2013 Development Plan TIA Update, the traffic projections for No-Build and Build conditions were estimated for the year 2015; however, the build year was changed to 2022 for the 2015 update. The No-Build and Build analyses for the 2017 update have been completed for the year 2024, maintaining a seven-year horizon. The change is intended to capture the anticipated completion of the main campus development plan.

The future build year traffic analysis is presented for the following cases:

- Year 2024 No-Build scenario traffic projections, consisting of projected background traffic growth.
- Year 2024 Build scenario traffic projections, including background traffic growth and Development Plan traffic as described in Section 4.4.

4.5.1 No-Build Scenario

No-Build traffic was developed for 2024. No-Build year 2024 intersection Average Daily Traffic (ADT) and turning movement volumes were determined as described below.

No-Build Average Daily Traffic

Based on historical count data from NCDOT, projected annual growth rates determined from the regional travel demand model, and information from the Town, annual growth rates were applied to existing traffic to yield the future background traffic for year 2024. The annual growth rates and projected future ADTs for study area roads are listed in Table 4-9 and are displayed in Figure 4-9.

No-Build Turning Movement Volumes

Utilizing the annual growth rates from Table 4-9, the intersection turning movement counts listed in Table 4-8 and shown in Figure 4-4 and Figure 4-5 were adjusted to reflect future year 2024 conditions. Growth rates were applied to each approach of the intersections, ranging from no growth to three percent annually. These volumes were then used in the 2024 No-Build analysis.

Table 4-8: Future No-Build Year 2024 Turning Movement Volumes

| AM Peak Hour | | | | | | | | | | | | | | |
|--------------|---|-----|------|-----|-----|------|-----|-----|------|-----|-----|-----|------|-----|
| ID # | Intersection | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
| 1 | Columbia Street/Rosemary Street | 122 | 179 | 23 | 11 | 120 | 59 | 35 | 348 | 35 | 0 | 122 | 588 | 163 |
| 2 | Columbia Street/Franklin Street | 63 | 296 | 49 | 89 | 327 | 74 | 39 | 298 | 93 | 0 | 50 | 544 | 45 |
| 3 | Franklin Street/Raleigh Street | 10 | 284 | 125 | 53 | 460 | 79 | 112 | 158 | 30 | 0 | 50 | 279 | 18 |
| 4 | Merritt Mill Road/Cameron Avenue | 0 | 0 | 0 | 64 | 0 | 33 | 0 | 175 | 455 | 0 | 120 | 95 | 0 |
| 5 | Cameron Avenue/Pittsboro Street | 0 | 122 | 178 | 638 | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Cameron Avenue/Columbia Street | 17 | 94 | 0 | 0 | 117 | 39 | 88 | 370 | 48 | 0 | 75 | 0 | 566 |
| 7 | Cameron Avenue/Raleigh Street | 19 | 90 | 27 | 27 | 183 | 207 | 24 | 48 | 14 | 0 | 330 | 158 | 54 |
| 8 | Pittsboro Street/McCauley Street | 0 | 113 | 32 | 146 | 37 | 0 | 0 | 0 | 0 | 0 | 169 | 597 | 10 |
| 9 | Columbia Street/South Road | 20 | 306 | 0 | 0 | 197 | 127 | 57 | 393 | 225 | 0 | 0 | 0 | 0 |
| 10 | Raleigh Street/South Road | 46 | 207 | 0 | 0 | 334 | 35 | 0 | 0 | 0 | 0 | 37 | 0 | 125 |
| 11 | Country Club Road/South Road | 5 | 158 | 48 | 516 | 406 | 532 | 30 | 37 | 78 | 0 | 313 | 180 | 18 |
| 12 | Columbia Street/Manning Drive | 69 | 415 | 0 | 61 | 0 | 181 | 0 | 411 | 357 | 0 | 0 | 0 | 0 |
| 13 | Manning Drive/West Drive | 70 | 404 | 322 | 217 | 238 | 38 | 0 | 0 | 0 | 0 | 18 | 6 | 17 |
| 14 | Manning Drive/East Drive | 85 | 351 | 124 | 262 | 340 | 95 | 94 | 31 | 280 | 0 | 0 | 0 | 0 |
| 15 | Ridge Road/Manning Drive | 124 | 345 | 74 | 11 | 659 | 62 | 23 | 40 | 6 | 0 | 47 | 117 | 365 |
| 16 | Mason Farm Road/Columbia Street | 7 | 6 | 1 | 147 | 0 | 74 | 6 | 658 | 249 | 0 | 119 | 210 | 5 |
| 17 | Mason Farm Road/West Drive | 0 | 261 | 24 | 10 | 234 | 0 | 0 | 0 | 0 | 0 | 33 | 7 | 31 |
| 18 | Mason Farm Road/East Drive | 60 | 210 | 66 | 14 | 134 | 6 | 59 | 19 | 170 | 0 | 0 | 0 | 0 |
| 19 | Mason Farm Road/Purefoy Road | 203 | 0 | 13 | 0 | 0 | 0 | 16 | 96 | 0 | 0 | 0 | 20 | 19 |
| 20 | Manning Drive/Skipper Bowles Drive | 0 | 354 | 24 | 283 | 645 | 0 | 1 | 0 | 43 | 0 | 0 | 0 | 0 |
| 21 | Columbia Street/Purefoy Road | 0 | 0 | 0 | 30 | 0 | 5 | 0 | 1003 | 366 | 0 | 13 | 406 | 0 |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | 0 | 0 | 0 | 553 | 0 | 68 | 252 | 1299 | 0 | 0 | 0 | 291 | 138 |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | 470 | 2 | 422 | 0 | 0 | 0 | 0 | 1079 | 0 | 0 | 58 | 791 | 0 |
| 24 | Mason Farm Road/Fordham Boulevard | 0 | 2419 | 0 | 0 | 1223 | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 25 | Manning Drive/Fordham Boulevard | 233 | 2350 | 4 | 8 | 1259 | 848 | 19 | 7 | 28 | 0 | 235 | 3 | 34 |
| 26 | Mason Farm Road/Oteys Road | 1 | 26 | 11 | 5 | 69 | 1 | 14 | 0 | 0 | 0 | 1 | 0 | 1 |
| 27 | Franklin Street/Boundary Street | 6 | 325 | 8 | 57 | 558 | 72 | 5 | 26 | 27 | 0 | 77 | 19 | 6 |
| 28 | Franklin Street/Park Place | 0 | 422 | 1 | 69 | 701 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 29 | Battle Lane/Boundary Street | 0 | 0 | 0 | 82 | 50 | 2 | 0 | 126 | 76 | 0 | 0 | 47 | 61 |
| 30 | Country Club Road/Battle Lane | 4 | 339 | 0 | 0 | 395 | 125 | 0 | 0 | 0 | 0 | 128 | 0 | 0 |
| 307 | Country Club Road & Boundary Street | 0 | 344 | 0 | 0 | 395 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 |
| 31 | Country Club Road/Gimghoul Road | 5 | 1 | 18 | 11 | 1 | 6 | 90 | 554 | 13 | 0 | 5 | 461 | 30 |
| 32 | Manning Drive/Hibbard Drive | 47 | 553 | 17 | 10 | 620 | 39 | 18 | 10 | 53 | 0 | 27 | 4 | 40 |
| 33 | Manning Drive/Craige Drive | 42 | 450 | 21 | 163 | 819 | 37 | 4 | 4 | 14 | 0 | 18 | 3 | 9 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | 0 | 0 | 0 | 0 | 0 | 3 | 20 | 395 | 2 | 0 | 81 | 106 | 217 |
| 35 | East Drive/Dogwood Deck Exit | 215 | 0 | 122 | 0 | 0 | 0 | 0 | 205 | 0 | 0 | 0 | 56 | 0 |
| 36 | Mason Farm Road/Hibbard Drive | 4 | 2 | 1 | 5 | 5 | 19 | 7 | 249 | 184 | 0 | 42 | 39 | 12 |
| 37 | South Road/Bell Tower Drive | 0 | 340 | 204 | 192 | 299 | 0 | 29 | 0 | 55 | 0 | 0 | 0 | 0 |
| 38 | Manning Drive/Old East Drive | 0 | 425 | 0 | 0 | 434 | 0 | 0 | 0 | 0 | 0 | 141 | 0 | 82 |
| 39 | Manning Drive/Craige Deck | 0 | 543 | 132 | 178 | 681 | 0 | 7 | 0 | 13 | 0 | 0 | 0 | 0 |
| 101 | US 15-501/Estes Drive | 71 | 2 | 277 | 1 | 10 | 15 | 378 | 1468 | 4 | 0 | 9 | 1342 | 73 |
| 102 | US 15-501/Willow Drive | 121 | 29 | 8 | 59 | 61 | 19 | 66 | 1475 | 12 | 0 | 17 | 1387 | 288 |
| 103 | US 15-501/Elliott Road | 40 | 0 | 115 | 0 | 0 | 0 | 127 | 1480 | 0 | 5 | 0 | 1590 | 124 |
| 104 | US 15-501/Ephesus Church Road | 28 | 31 | 32 | 239 | 96 | 85 | 56 | 1247 | 225 | 0 | 65 | 1326 | 8 |
| 105 | US 15-501/Erwin Road | 0 | 0 | 0 | 0 | 2035 | 297 | 0 | 0 | 0 | 0 | 0 | 0 | 469 |
| 106 | US 15-501/Europa Drive | 0 | 2009 | 140 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 0 | 0 |
| 107 | US 15-501/Superstreet NB U-Turn | 0 | 0 | 0 | 0 | 2001 | 0 | 276 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | US 15-501/Superstreet SB U-Turn | 0 | 2091 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 17 | 0 |
| 109 | US 15-501/Sage Road | 330 | 1534 | 148 | 170 | 1749 | 163 | 157 | 106 | 21 | 0 | 297 | 155 | 140 |
| 110 | US 15-501/Eastowne Drive/BCBS | 84 | 1631 | 9 | 30 | 2058 | 69 | 1 | 6 | 26 | 0 | 50 | 3 | 46 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | 14 | 1646 | 3 | 68 | 2136 | 326 | 13 | 31 | 144 | 0 | 88 | 8 | 2 |
| 201 | NC 54/Hamilton Street | 28 | 1885 | 162 | 86 | 2377 | 32 | 129 | 41 | 121 | 0 | 70 | 49 | 27 |
| 202 | NC 54/Burning Tree Lane | 33 | 1905 | 56 | 170 | 2506 | 24 | 37 | 3 | 144 | 0 | 42 | 12 | 47 |
| 203 | NC 54/Barbee Chapel Road Ext | 172 | 1916 | 103 | 93 | 2527 | 35 | 14 | 1 | 2 | 0 | 7 | 4 | 107 |
| 204 | NC 54/Meadowmont Lane | 197 | 1592 | 126 | 467 | 2562 | 134 | 68 | 3 | 45 | 0 | 67 | 19 | 136 |
| 205 | NC 54/Barbee Chapel Road (East) | 13 | 1615 | 210 | 25 | 2551 | 222 | 582 | 96 | 71 | 0 | 126 | 37 | 23 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | 228 | 89 | 68 | 10 | 130 | 555 | 69 | 1557 | 4 | 0 | 334 | 897 | 152 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | 106 | 22 | 9 | 108 | 14 | 24 | 7 | 1472 | 102 | 0 | 36 | 844 | 108 |
| 303 | US 15-501/Market Street | 261 | 0 | 41 | 0 | 0 | 0 | 202 | 1347 | 0 | 28 | 0 | 562 | 395 |

PM Peak Hour

| ID # | Intersection | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
|------|---|-----|------|-----|------|------|-----|-----|------|-----|-----|-----|------|-----|
| 1 | Columbia Street/Rosemary Street | 195 | 263 | 64 | 35 | 202 | 67 | 43 | 655 | 71 | 0 | 78 | 510 | 253 |
| 2 | Columbia Street/Franklin Street | 115 | 388 | 87 | 126 | 466 | 91 | 88 | 575 | 138 | 0 | 83 | 449 | 102 |
| 3 | Franklin Street/Raleigh Street | 43 | 456 | 225 | 49 | 561 | 176 | 116 | 315 | 26 | 0 | 97 | 328 | 20 |
| 4 | Merritt Mill Road/Cameron Avenue | 0 | 0 | 0 | 379 | 0 | 126 | 0 | 112 | 188 | 0 | 70 | 297 | 0 |
| 5 | Cameron Avenue/Pittsboro Street | 0 | 134 | 130 | 487 | 421 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Cameron Avenue/Columbia Street | 27 | 97 | 0 | 0 | 161 | 48 | 248 | 692 | 51 | 0 | 99 | 0 | 503 |
| 7 | Cameron Avenue/Raleigh Street | 36 | 173 | 51 | 25 | 156 | 285 | 68 | 122 | 59 | 0 | 346 | 178 | 78 |
| 8 | Pittsboro Street/McCauley Street | 0 | 95 | 19 | 207 | 227 | 0 | 0 | 0 | 0 | 0 | 244 | 463 | 39 |
| 9 | Columbia Street/South Road | 91 | 336 | 0 | 0 | 376 | 294 | 134 | 660 | 183 | 0 | 0 | 0 | 0 |
| 10 | Raleigh Street/South Road | 112 | 395 | 0 | 0 | 260 | 57 | 0 | 0 | 0 | 0 | 77 | 0 | 152 |
| 11 | Country Club Road/South Road | 41 | 413 | 31 | 191 | 273 | 484 | 31 | 169 | 407 | 0 | 554 | 78 | 24 |
| 12 | Columbia Street/Manning Drive | 65 | 201 | 0 | 221 | 2 | 496 | 0 | 437 | 58 | 0 | 0 | 0 | 0 |
| 13 | Manning Drive/West Drive | 26 | 211 | 27 | 30 | 654 | 18 | 0 | 0 | 0 | 0 | 9 | 5 | 29 |
| 14 | Manning Drive/East Drive | 33 | 237 | 45 | 76 | 447 | 54 | 174 | 26 | 477 | 0 | 0 | 0 | 0 |
| 15 | Ridge Road/Manning Drive | 226 | 781 | 71 | 20 | 216 | 89 | 105 | 167 | 58 | 0 | 83 | 79 | 117 |
| 16 | Mason Farm Road/Columbia Street | 1 | 2 | 2 | 405 | 0 | 122 | 7 | 350 | 91 | 0 | 57 | 551 | 6 |
| 17 | Mason Farm Road/West Drive | 0 | 137 | 17 | 7 | 436 | 0 | 0 | 0 | 0 | 0 | 21 | 3 | 35 |
| 18 | Mason Farm Road/East Drive | 27 | 261 | 155 | 111 | 210 | 3 | 33 | 0 | 28 | 0 | 0 | 0 | 0 |
| 19 | Mason Farm Road/Purefoy Road | 16 | 0 | 23 | 0 | 0 | 0 | 16 | 47 | 0 | 0 | 0 | 323 | 72 |
| 20 | Manning Drive/Skipper Bowles Drive | 0 | 815 | 11 | 87 | 255 | 0 | 19 | 0 | 252 | 0 | 0 | 0 | 0 |
| 21 | Columbia Street/Purefoy Road | 0 | 0 | 0 | 126 | 0 | 29 | 0 | 436 | 29 | 0 | 9 | 988 | 0 |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | 0 | 0 | 0 | 1279 | 0 | 48 | 320 | 421 | 0 | 0 | 0 | 769 | 297 |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | 146 | 2 | 328 | 0 | 0 | 0 | 0 | 577 | 0 | 0 | 90 | 1857 | 0 |
| 24 | Mason Farm Road/Fordham Boulevard | 0 | 1608 | 0 | 0 | 2328 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 239 |
| 25 | Manning Drive/Fordham Boulevard | 73 | 1590 | 4 | 10 | 2083 | 220 | 10 | 2 | 21 | 0 | 919 | 6 | 291 |
| 26 | Mason Farm Road/Oteys Road | 4 | 119 | 190 | 3 | 40 | 2 | 4 | 1 | 0 | 0 | 3 | 2 | 3 |
| 27 | Franklin Street/Boundary Street | 7 | 629 | 4 | 23 | 603 | 69 | 13 | 65 | 126 | 0 | 112 | 24 | 8 |
| 28 | Franklin Street/Park Place | 0 | 859 | 2 | 26 | 701 | 0 | 1 | 0 | 64 | 0 | 0 | 0 | 0 |
| 29 | Battle Lane/Boundary Street | 0 | 0 | 0 | 53 | 38 | 3 | 0 | 163 | 246 | 0 | 2 | 82 | 84 |
| 30 | Country Club Road/Battle Lane | 17 | 440 | 0 | 0 | 432 | 151 | 0 | 0 | 0 | 0 | 135 | 0 | 0 |
| 307 | Country Club Road & Boundary Street | 0 | 457 | 0 | 0 | 432 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 122 |
| 31 | Country Club Road/Gimghoul Road | 42 | 0 | 90 | 11 | 0 | 11 | 18 | 665 | 13 | 0 | 10 | 564 | 8 |
| 32 | Manning Drive/Hibbard Drive | 36 | 686 | 8 | 31 | 476 | 21 | 25 | 4 | 23 | 0 | 46 | 19 | 67 |
| 33 | Manning Drive/Craige Drive | 29 | 932 | 4 | 20 | 361 | 26 | 32 | 1 | 180 | 0 | 36 | 0 | 16 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | 0 | 0 | 0 | 2 | 0 | 21 | 3 | 678 | 0 | 0 | 1 | 50 | 75 |
| 35 | East Drive/Dogwood Deck Exit | 256 | 0 | 141 | 0 | 0 | 0 | 0 | 284 | 0 | 0 | 0 | 52 | 0 |
| 36 | Mason Farm Road/Hibbard Drive | 4 | 3 | 6 | 164 | 0 | 11 | 0 | 51 | 20 | 0 | 7 | 271 | 1 |
| 37 | South Road/Bell Tower Drive | 0 | 465 | 48 | 52 | 450 | 0 | 167 | 0 | 152 | 0 | 0 | 0 | 0 |
| 38 | Manning Drive/Old East Drive | 0 | 222 | 0 | 0 | 615 | 0 | 0 | 0 | 0 | 0 | 89 | 0 | 99 |
| 39 | Manning Drive/Craige Deck | 0 | 724 | 5 | 5 | 461 | 0 | 99 | 0 | 194 | 0 | 0 | 0 | 0 |
| 101 | US 15-501/Estes Drive | 102 | 11 | 317 | 8 | 16 | 13 | 487 | 1608 | 3 | 0 | 16 | 1442 | 112 |
| 102 | US 15-501/Willow Drive | 294 | 120 | 23 | 29 | 36 | 25 | 36 | 1683 | 41 | 0 | 42 | 1412 | 239 |
| 103 | US 15-501/Elliott Road | 145 | 0 | 278 | 0 | 0 | 0 | 226 | 1754 | 0 | 8 | 0 | 1394 | 199 |
| 104 | US 15-501/Ephesus Church Road | 96 | 94 | 73 | 348 | 137 | 59 | 158 | 1230 | 314 | 0 | 93 | 1210 | 13 |
| 105 | US 15-501/Erwin Road | 0 | 0 | 0 | 0 | 1927 | 406 | 0 | 0 | 0 | 0 | 0 | 0 | 434 |
| 106 | US 15-501/Europa Drive | 0 | 2677 | 90 | 0 | 0 | 0 | 0 | 0 | 234 | 0 | 0 | 0 | 0 |
| 107 | US 15-501/Superstreet NB U-Turn | 2 | 0 | 0 | 0 | 1946 | 0 | 396 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | US 15-501/Superstreet SB U-Turn | 0 | 2647 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 40 | 0 |
| 109 | US 15-501/Sage Road | 353 | 1822 | 213 | 54 | 1606 | 267 | 138 | 93 | 27 | 0 | 250 | 167 | 173 |
| 110 | US 15-501/Eastowne Drive/BCBS | 46 | 2086 | 5 | 33 | 1853 | 62 | 11 | 8 | 49 | 0 | 77 | 1 | 72 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | 2 | 2176 | 4 | 75 | 1972 | 190 | 21 | 17 | 123 | 0 | 261 | 31 | 20 |
| 201 | NC 54/Hamilton Street | 42 | 2280 | 48 | 121 | 2285 | 66 | 111 | 23 | 129 | 0 | 77 | 20 | 41 |
| 202 | NC 54/Burning Tree Lane | 79 | 2397 | 41 | 165 | 2307 | 36 | 71 | 16 | 149 | 0 | 27 | 11 | 49 |
| 203 | NC 54/Barbee Chapel Road Ext | 157 | 2343 | 48 | 10 | 2078 | 15 | 85 | 16 | 62 | 0 | 16 | 0 | 197 |
| 204 | NC 54/Meadowmont Lane | 142 | 2288 | 101 | 116 | 1885 | 111 | 117 | 25 | 441 | 0 | 167 | 11 | 182 |
| 205 | NC 54/Barbee Chapel Road (East) | 11 | 2238 | 866 | 133 | 1842 | 221 | 233 | 57 | 47 | 0 | 127 | 91 | 17 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | 124 | 64 | 68 | 13 | 85 | 323 | 67 | 968 | 20 | 0 | 687 | 1536 | 213 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | 117 | 14 | 6 | 78 | 23 | 1 | 6 | 932 | 127 | 0 | 27 | 1485 | 134 |
| 303 | US 15-501/Market Street | 337 | 0 | 121 | 0 | 0 | 0 | 144 | 695 | 0 | 10 | 0 | 1368 | 285 |



Figure 4-7a
Future No-Build Year 2024 A.M. Peak Hour Turning Movement Volumes

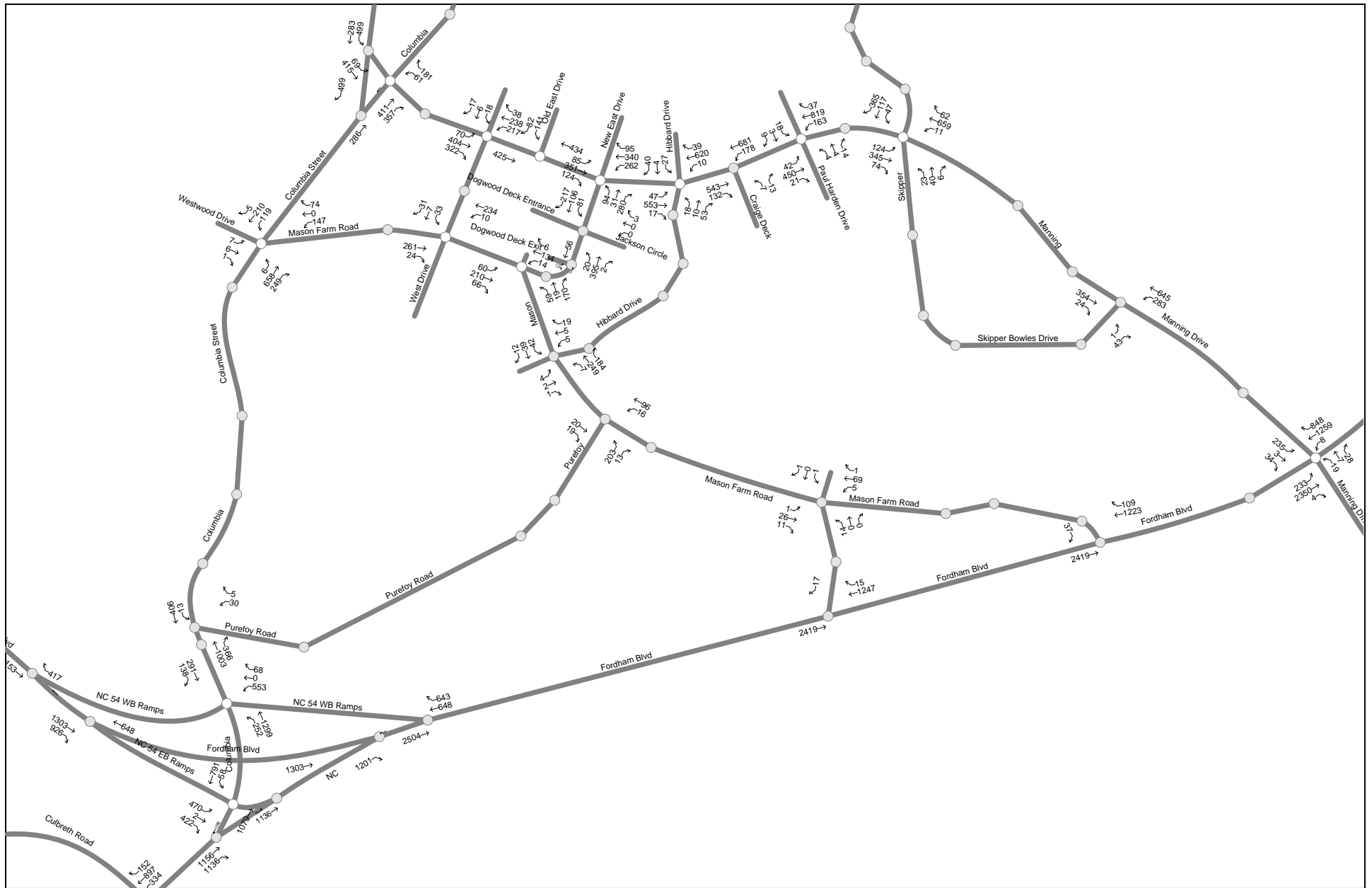


Figure 4-7b
Future No-Build Year 2024 A.M. Peak Hour Turning Movement Volumes

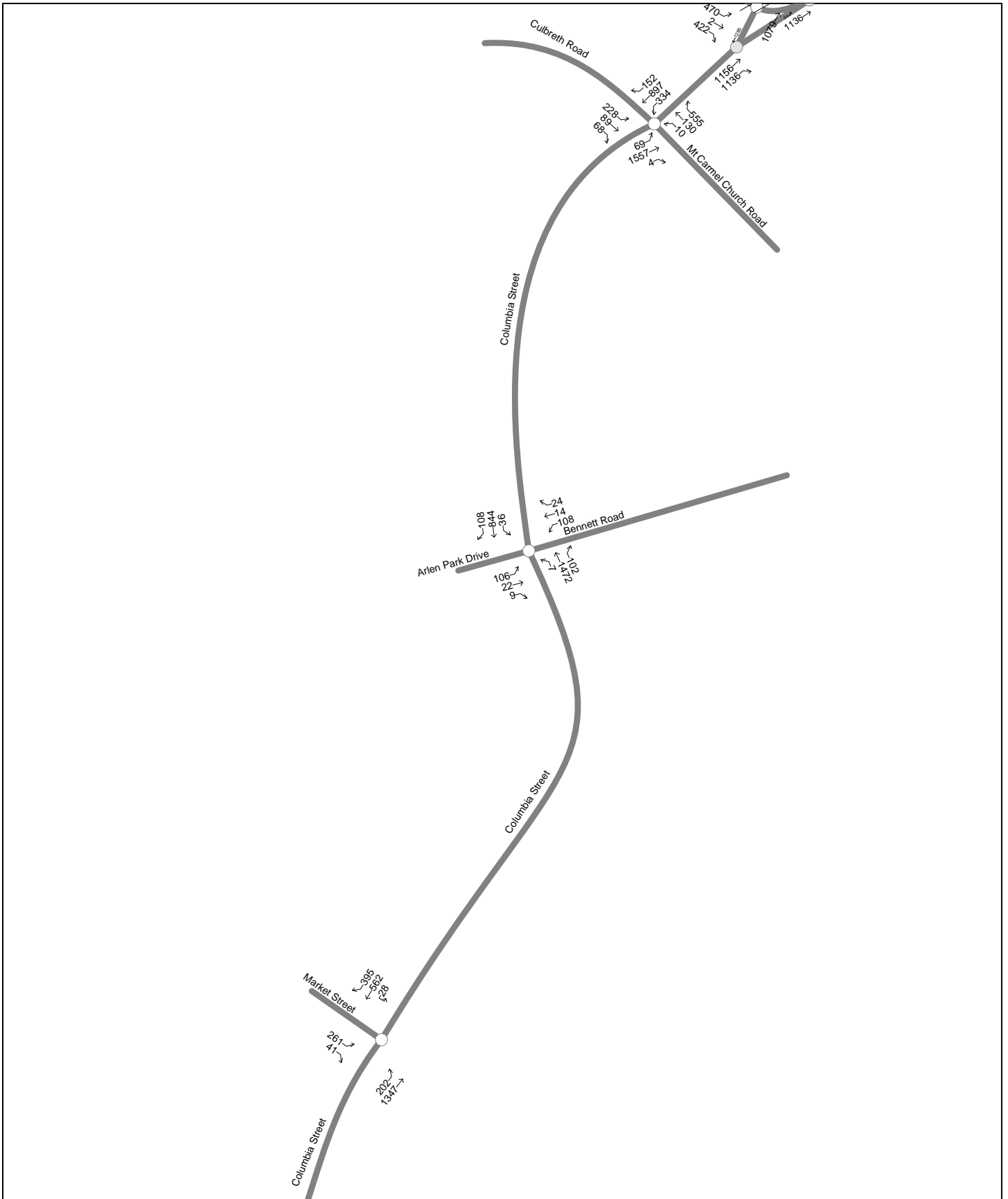


Figure 4-7c
 Future No-Build Year 2024 A.M. Peak Hour Turning Movement Volumes

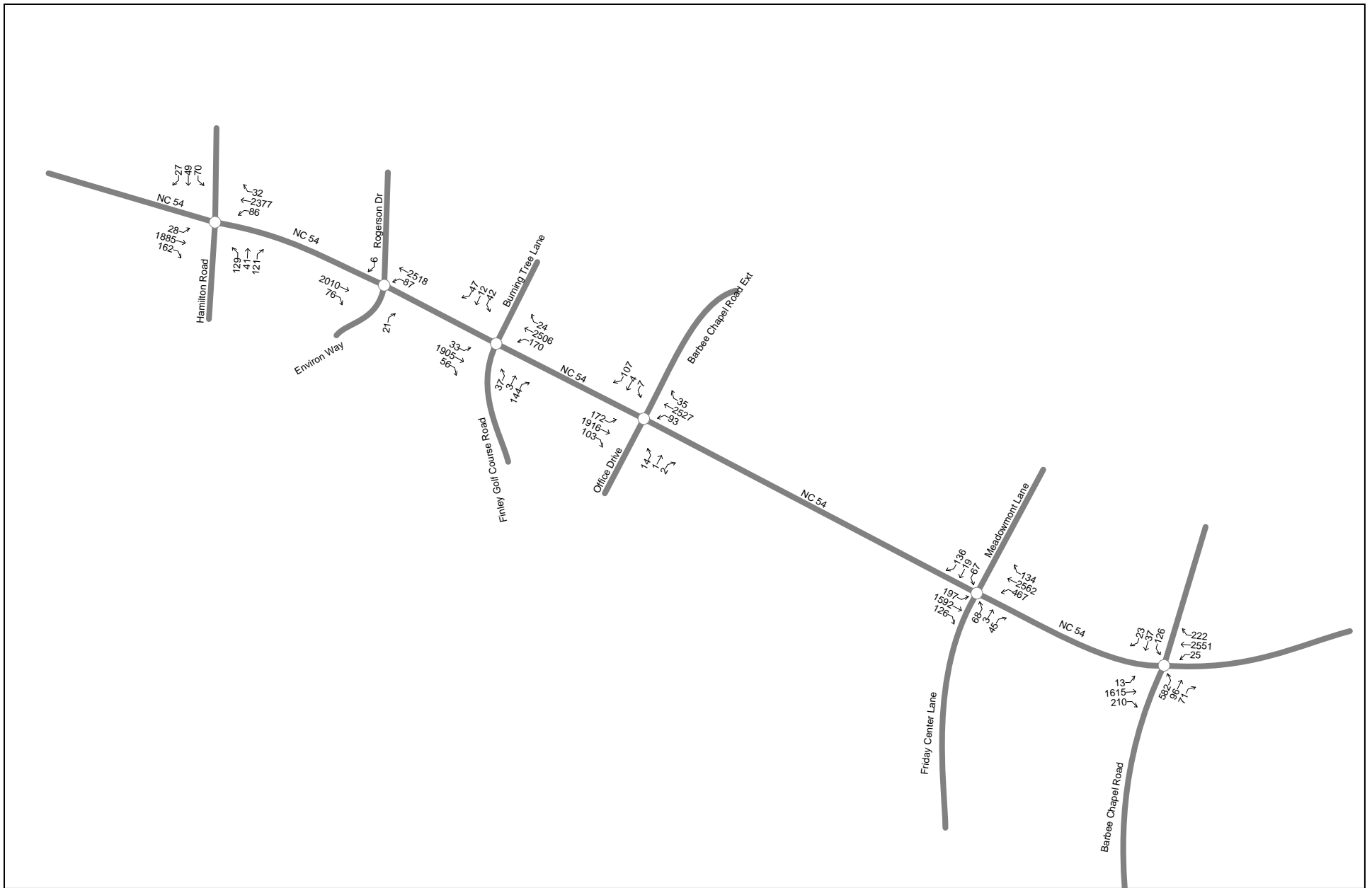


Figure 4-7d
Future No-Build Year 2024 A.M. Peak Hour Turning Movement Volumes

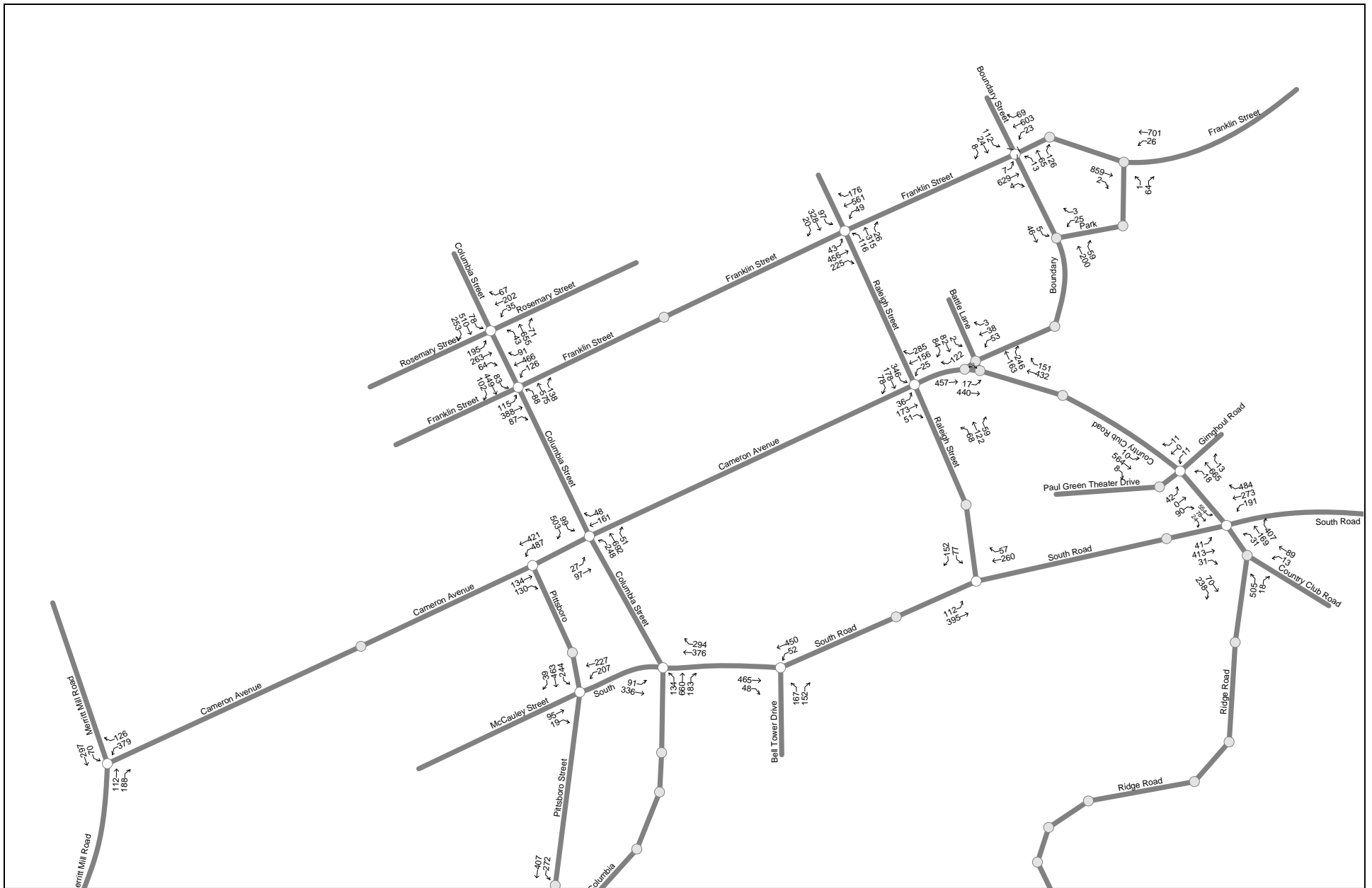


Figure 4-7a
Future No-Build Year 2024 P.M. Peak Hour Turning Movement Volumes

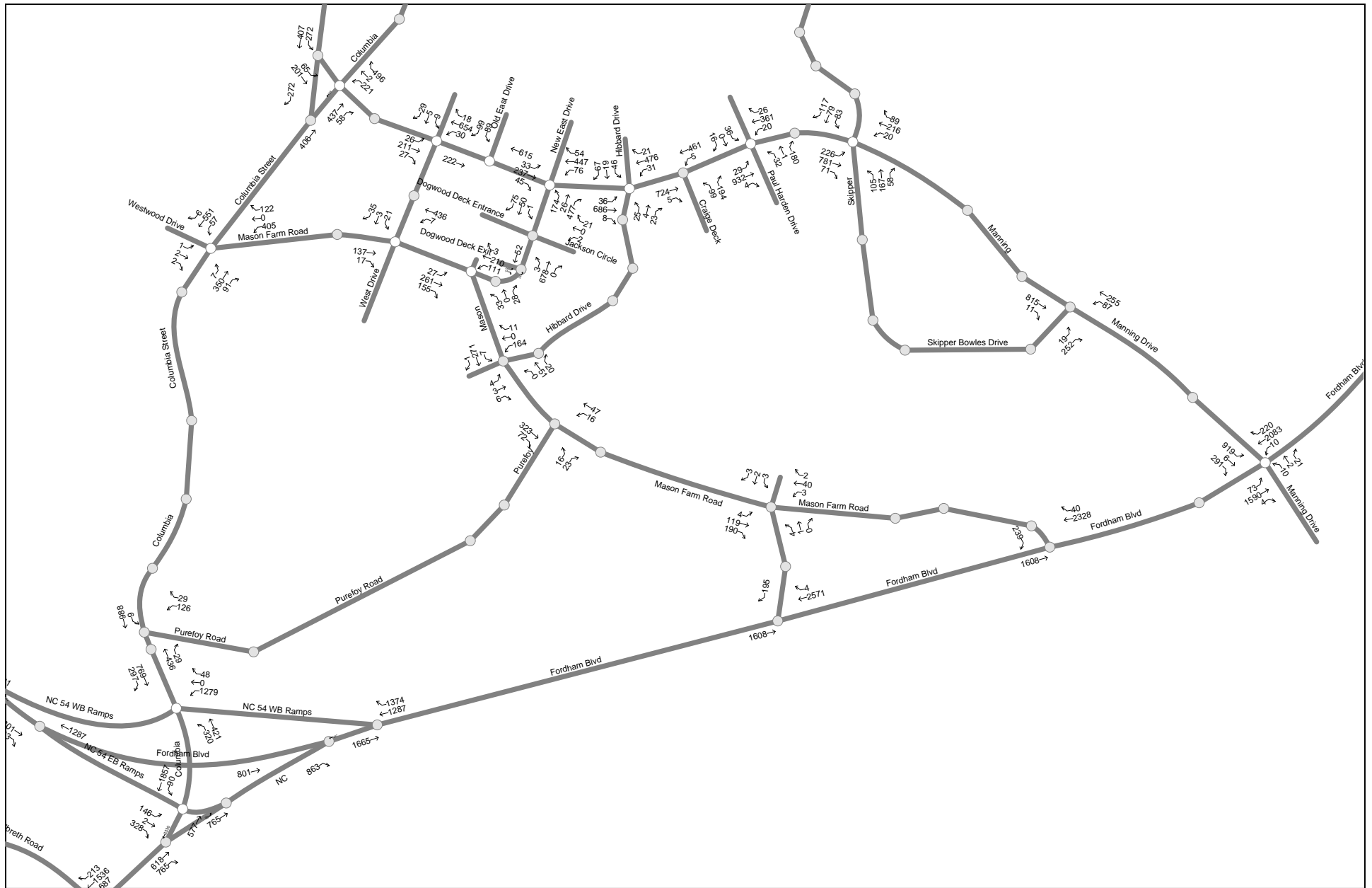


Figure 4-7b
Future No-Build Year 2024 P.M. Peak Hour Turning Movement Volumes

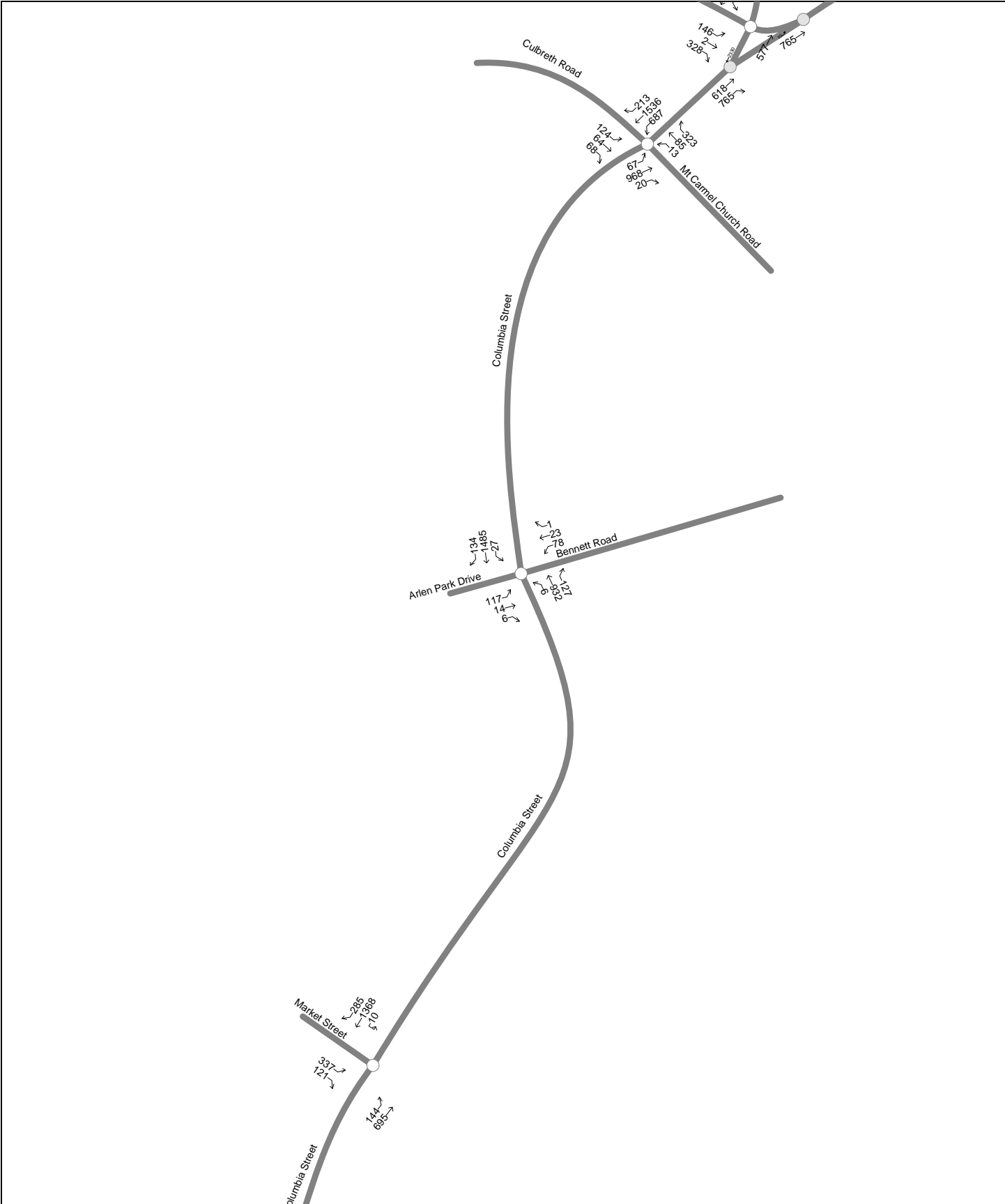


Figure 4-7c
Future No-Build Year 2024 P.M. Peak Hour Turning Movement Volumes

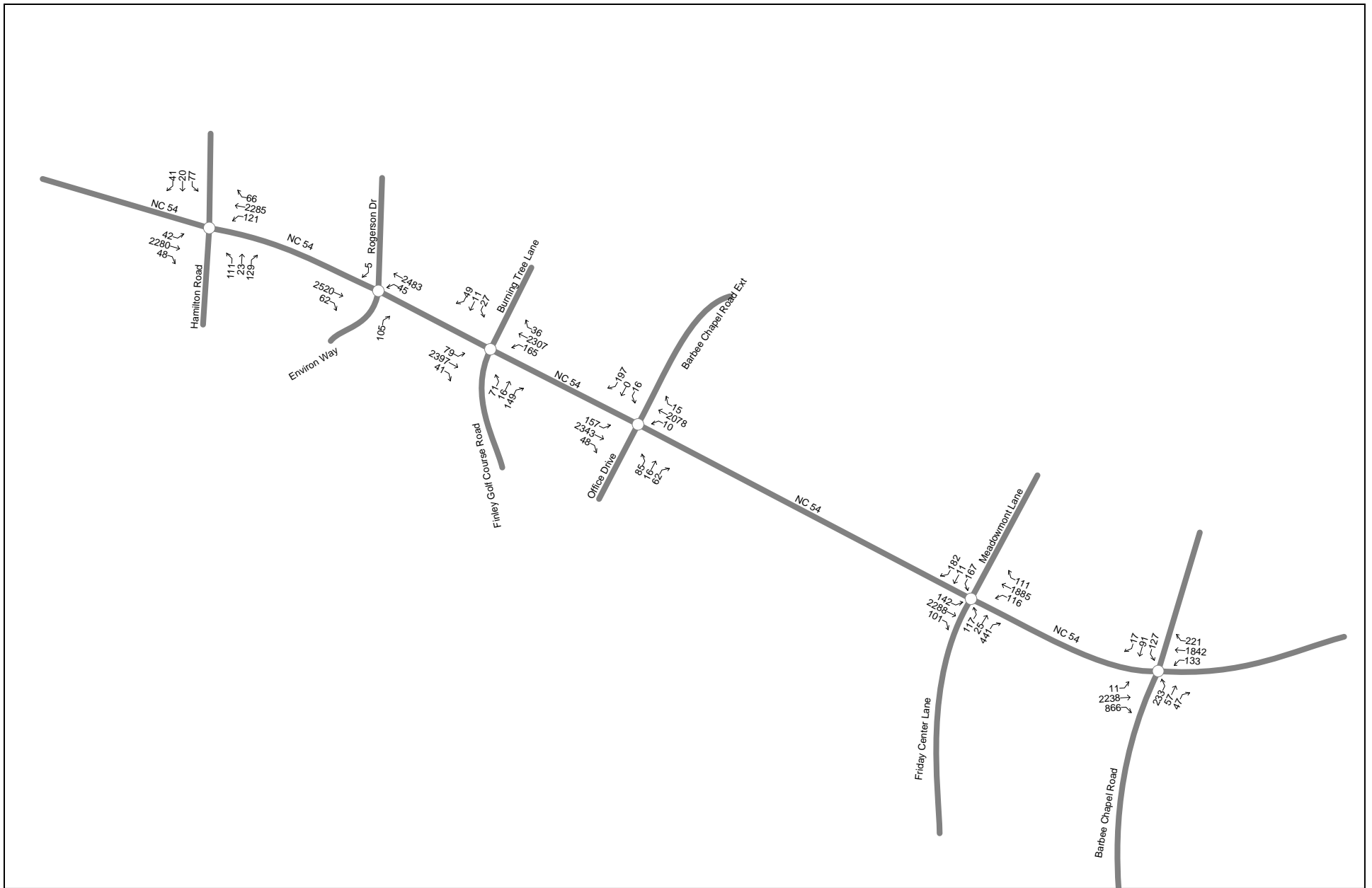


Figure 4-7d
 Future No-Build Year 2024 P.M. Peak Hour Turning Movement Volumes

4.5.2 Build Scenario

The development of the 2024 Build scenario turning movement volumes included the following steps:

- The 2024 No-Build volumes (Table 4-8) were used as a base, accounting for existing volumes and future annual growth.
- The future parking generated trips (as described in Section 4.4) were added to the 2024 No-Build volumes to yield 2024 Build volumes.

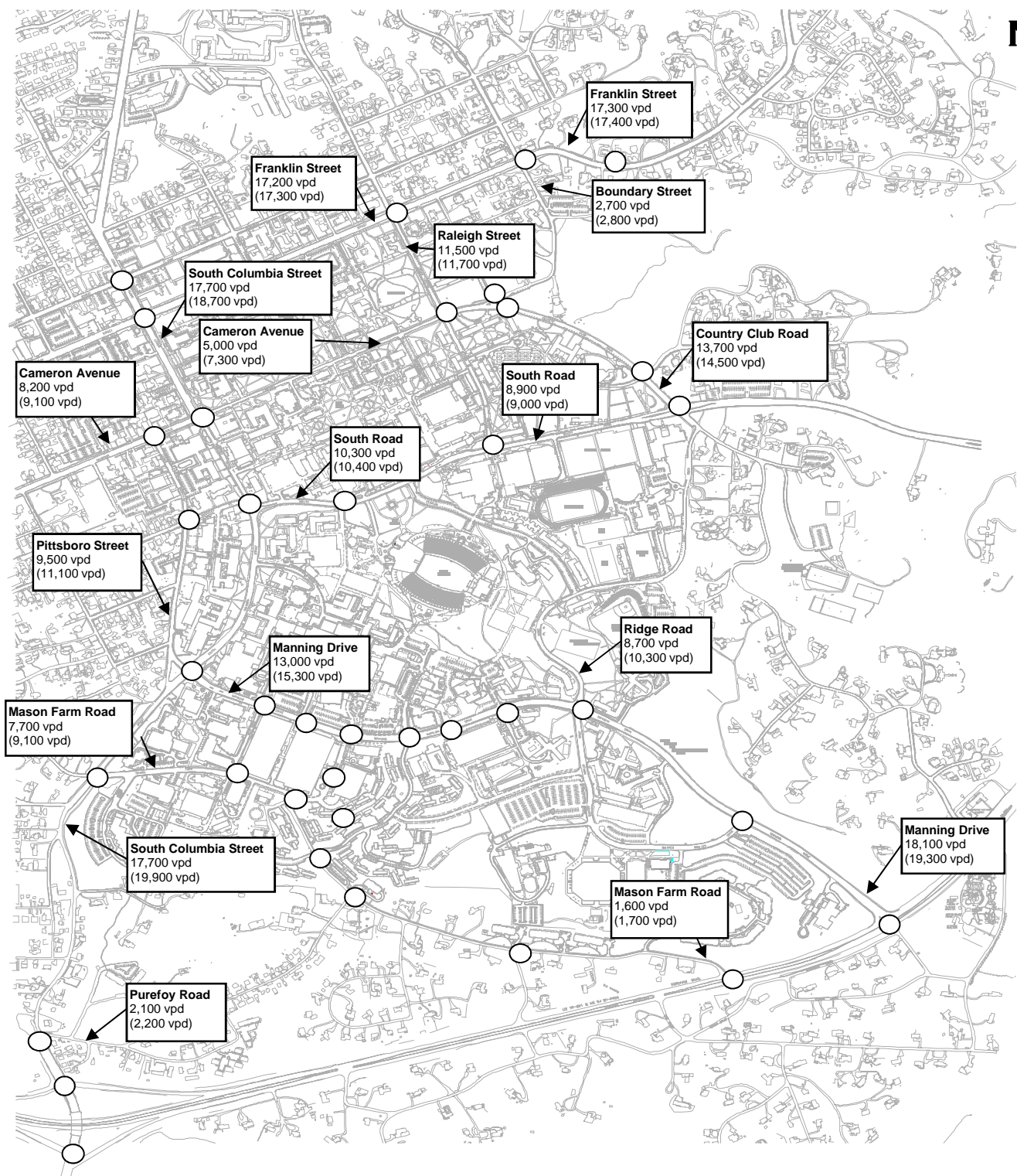
The Build scenario traffic volumes for the AM and PM peak hours are listed in Table 4-10 and illustrated in Figure 4-10 and Figure 4-11. The increase in traffic along the majority of campus roads will be minimal, though increases in individual turning movements at some intersections near proposed parking facilities may be significant. In some areas where parking is being eliminated, some turning movements will decrease compared to the No-Build scenario.

The largest increases in traffic volumes will be experienced on the major arteries serving Campus.

The annual growth rates and projected future ADTs for study area roads are listed in Table 4-9 and are displayed in Figure 4-9.

Table 4-9: Existing and Future (2024) Average Daily Traffic Volumes

| Link # | Roadway | 2001 ADT | 2003 ADT | 2005 ADT | 2006 ADT | 2007 ADT | 2009 ADT | 2011 ADT | 2013 ADT | 2015 ADT | 2017 ADT | 2017-2024 Annual Growth Rate | Projected 2024 No-Build ADT | Projected 2024 Build ADT | 2001-2009 AGR |
|--------|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------------------------|-----------------------------|--------------------------|---------------|
| 1 | S. Columbia St. (south of Franklin St.) | 20,720 | 19,060 | 17,530 | - | 17,530 | 15,410 | 14,380 | 14,663 | 16,329 | 15,783 | 1.7% | 17,700 | 18,700 | -3.6% |
| 2 | Raleigh St. (south of Franklin St.) | 14,470 | 10,710 | 13,080 | 13,080 | 11,020 | 11,710 | 9,910 | 10,514 | 10,450 | 11,031 | 0.6% | 11,500 | 11,700 | -2.6% |
| 3 | Cameron Ave. (west of Pittsboro St.) | 9,820 | 8,300 | 8,510 | - | 7,630 | 9,260 | 7,220 | 6,693 | 7,558 | 7,710 | 0.9% | 8,200 | 9,100 | -0.7% |
| 4 | Cameron Ave. (east of S. Columbia St.) | 9,070 | 8,330 | 6,430 | 6,430 | 5,270 | 5,540 | 5,910 | 4,679 | 4,881 | 4,616 | 1.2% | 5,000 | 7,300 | -6.0% |
| 5 | Country Club Rd. (north of South Rd.) | 13,470 | 14,080 | 12,200 | 12,200 | 12,990 | 11,960 | 11,260 | 10,726 | 12,534 | 13,060 | 0.7% | 13,700 | 14,500 | -1.5% |
| 6 | South Rd. (east of Columbia St.) | 10,460 | 8,840 | 11,400 | - | 8,400 | 7,430 | 8,370 | 8,593 | 9,649 | 9,209 | 1.7% | 10,300 | 10,400 | -4.2% |
| 7 | South Rd. (east of Raleigh St.) | 9,840 | 10,000 | 12,890 | 12,890 | 7,500 | 7,510 | 7,730 | 7,944 | 7,744 | 7,802 | 2.0% | 8,900 | 9,000 | -3.3% |
| 8 | Pittsboro St. (south of McCauley St.) | 10,960 | 10,070 | 10,920 | - | 9,550 | 9,750 | 8,810 | 8,061 | 8,487 | 8,632 | 1.4% | 9,500 | 11,100 | -1.5% |
| 9 | Manning Dr. (east of Columbia St.) | 14,100 | 13,220 | 12,480 | 12,480 | 11,070 | 11,060 | 10,020 | 10,713 | 11,298 | 11,828 | 1.4% | 13,000 | 15,300 | -3.0% |
| 10 | Ridge Rd. (north of Manning Dr.) | 8,320 | 7,870 | 7,300 | 7,300 | 7,910 | 8,730 | 8,110 | 7,819 | 7,216 | 7,594 | 2.0% | 8,700 | 10,300 | 0.6% |
| 11 | S. Columbia St. (south of Mason Farm Rd.) | 18,470 | 18,250 | 16,190 | - | 16,090 | 15,430 | 14,760 | 13,982 | 15,480 | 16,285 | 1.3% | 17,700 | 19,900 | -2.2% |
| 12 | Manning Dr. (east of Ridge Rd.) | 17,260 | 14,680 | 17,880 | 17,880 | 15,680 | 16,150 | 14,660 | 15,734 | 15,879 | 17,023 | 0.9% | 18,100 | 19,300 | -0.8% |
| 13 | Franklin St. (west of Raleigh St.) | 17,000 | 19,260 | 18,850 | - | 19,320 | 16,250 | 14,370 | 14,605 | 14,895 | 16,228 | 0.9% | 17,200 | 17,300 | -0.6% |
| 14 | Franklin St. (east of Boundary St.) | - | 23,560 | 20,190 | 20,190 | 24,730 | 17,390 | 16,770 | 16,614 | 16,620 | 16,327 | 0.9% | 17,300 | 17,400 | -4.9% |
| 15 | Boundary St. (south of Franklin St.) | - | 3,230 | 2,320 | 2,320 | 2,140 | 2,230 | 2,400 | 2,225 | 2,008 | 2,581 | 0.6% | 2,700 | 2,800 | -6.0% |
| 16 | Mason Farm Rd. (east of S. Columbia St.) | 7,700 | 8,230 | 3,400 | 3,400 | 8,390 | 7,330 | 6,910 | 6,314 | 6,755 | 6,746 | 2.0% | 7,700 | 9,100 | -0.6% |
| 17 | Mason Farm Rd. (north of Fordham Blvd.) | 1,360 | 770 | 1,830 | - | 1,820 | 1,770 | 1,730 | 1,720 | 1,546 | 1,596 | 0.4% | 1,600 | 1,700 | 3.3% |
| 18 | Purefoy Rd. (east of Columbia St.)* | 970 | 970 | 1,130 | - | 1,360 | 1,450 | 2,070 | 1,705 | 1,747 | 2,044 | 0.4% | 2,100 | 2,200 | 5.2% |
| 19 | US 15-501 (west of Main St.) | - | - | - | - | 17,840 | 17,080 | 16,770 | 19,993 | 20,801 | 22,587 | 2.0% | 25,800 | 26,400 | -2.2% |
| 20 | US 15-501 (east of Culbreth Rd.) | 30,480 | - | 30,000 | - | 30,310 | 30,570 | 28,390 | 31,867 | 35,429 | 38,238 | 2.0% | 43,600 | 44,800 | 0.0% |
| 21 | NC 54 (west of Hamilton Rd.) | 45,400 | - | 44,000 | - | 47,940 | 43,470 | 41,230 | 41,388 | 48,286 | 51,099 | 2.0% | 58,300 | 60,800 | -0.5% |
| 22 | NC 54 (east of East Barbee Chapel Hill Rd.) | - | - | - | - | 32,100 | 37,390 | 36,320 | 39,967 | 44,174 | 46,875 | 2.0% | 53,400 | 55,600 | 7.9% |



Legend:
2024 No-Build Vehicles Per Day
(2024 Build Vehicles Per Day)

Figure 4-9a
Future (2024) Average Daily Traffic Volumes

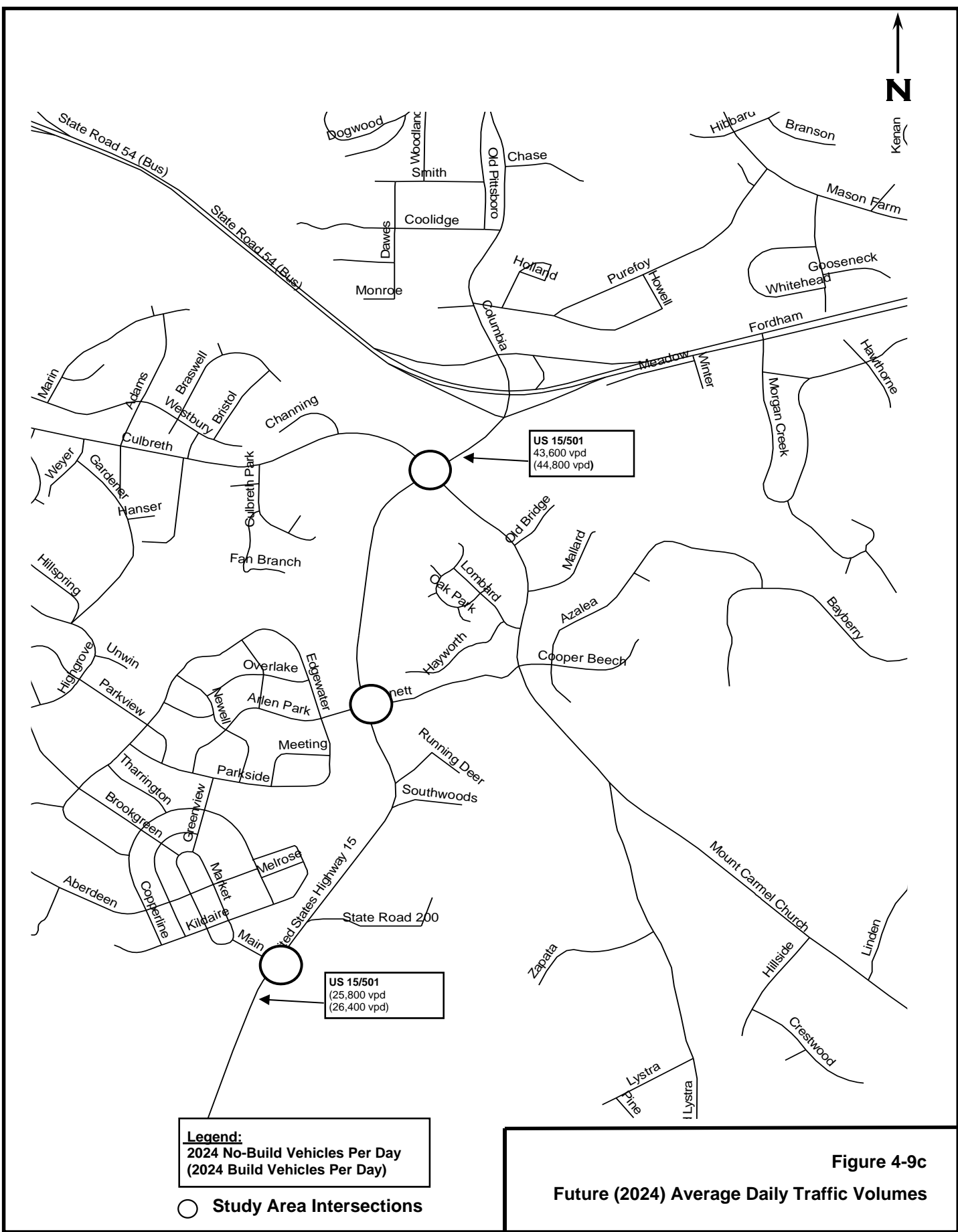


Table 4-10: Future Build Year 2024 Turning Movement Volumes

| AM Peak Hour | | | | | | | | | | | | | | |
|--------------|---|-----|------|-----|------|------|-----|-----|------|-----|-----|-----|------|-----|
| ID # | Intersection | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
| 1 | Columbia Street/Rosemary Street | 122 | 179 | 28 | 11 | 120 | 59 | 36 | 359 | 35 | 0 | 122 | 619 | 163 |
| 2 | Columbia Street/Franklin Street | 63 | 296 | 61 | 89 | 327 | 74 | 44 | 310 | 93 | 0 | 50 | 580 | 45 |
| 3 | Franklin Street/Raleigh Street | 10 | 284 | 125 | 53 | 460 | 79 | 112 | 163 | 30 | 0 | 50 | 279 | 18 |
| 4 | Merritt Mill Road/Cameron Avenue | 0 | 0 | 0 | 72 | 0 | 38 | 0 | 175 | 478 | 0 | 137 | 95 | 0 |
| 5 | Cameron Avenue/Pittsboro Street | 0 | 133 | 207 | 755 | 149 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Cameron Avenue/Columbia Street | 17 | 105 | 0 | 0 | 200 | 42 | 98 | 384 | 107 | 0 | 86 | 0 | 603 |
| 7 | Cameron Avenue/Raleigh Street | 25 | 123 | 27 | 27 | 282 | 206 | 24 | 48 | 14 | 0 | 330 | 155 | 74 |
| 8 | Pittsboro Street/McCauley Street | 0 | 116 | 41 | 146 | 41 | 0 | 0 | 0 | 0 | 0 | 169 | 742 | 11 |
| 9 | Columbia Street/South Road | 23 | 306 | 0 | 0 | 197 | 127 | 61 | 473 | 225 | 0 | 0 | 0 | 0 |
| 10 | Raleigh Street/South Road | 46 | 207 | 0 | 0 | 334 | 35 | 0 | 0 | 0 | 0 | 37 | 0 | 122 |
| 11 | Country Club Road/South Road | 5 | 158 | 48 | 621 | 406 | 565 | 30 | 34 | 113 | 0 | 324 | 172 | 18 |
| 12 | Columbia Street/Manning Drive | 80 | 407 | 0 | 61 | 0 | 216 | 0 | 439 | 446 | 0 | 0 | 0 | 0 |
| 13 | Manning Drive/West Drive | 283 | 392 | 322 | 275 | 294 | 228 | 0 | 0 | 0 | 0 | 18 | 6 | 17 |
| 14 | Manning Drive/East Drive | 85 | 400 | 124 | 262 | 575 | 95 | 94 | 31 | 298 | 0 | 0 | 0 | 0 |
| 15 | Ridge Road/Manning Drive | 164 | 390 | 56 | -145 | 770 | 62 | 20 | 32 | -15 | 0 | 50 | 81 | 492 |
| 16 | Mason Farm Road/Columbia Street | 7 | 6 | 1 | 183 | 0 | 86 | 6 | 763 | 276 | 0 | 156 | 215 | 5 |
| 17 | Mason Farm Road/West Drive | 0 | 279 | 24 | 10 | 262 | 0 | 0 | 0 | 0 | 0 | 33 | 7 | 89 |
| 18 | Mason Farm Road/East Drive | 60 | 228 | 66 | 14 | 134 | 6 | 87 | 19 | 170 | 0 | 0 | 0 | 0 |
| 19 | Mason Farm Road/Purefoy Road | 203 | 0 | 13 | 0 | 0 | 0 | 16 | 124 | 0 | 0 | 0 | 20 | 10 |
| 20 | Manning Drive/Skipper Bowles Drive | 0 | 378 | 27 | 344 | 600 | 0 | 1 | 0 | 54 | 0 | 0 | 0 | 0 |
| 21 | Columbia Street/Purefoy Road | 0 | 0 | 0 | 21 | 0 | 5 | 0 | 1135 | 366 | 0 | 13 | 447 | 0 |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | 0 | 0 | 0 | 556 | 0 | 68 | 252 | 1431 | 0 | 0 | 0 | 308 | 153 |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | 518 | 2 | 422 | 0 | 0 | 0 | 0 | 1163 | 0 | 0 | 58 | 811 | 0 |
| 24 | Mason Farm Road/Fordham Boulevard | 0 | 2372 | 0 | 0 | 1250 | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 25 | Manning Drive/Fordham Boulevard | 186 | 2350 | 4 | 8 | 1287 | 911 | 19 | 7 | 28 | 0 | 271 | 3 | 33 |
| 26 | Mason Farm Road/Oteys Road | 1 | 26 | 11 | 5 | 69 | 1 | 42 | 0 | 0 | 0 | 1 | 0 | 1 |
| 27 | Franklin Street/Boundary Street | 6 | 325 | 8 | 57 | 558 | 72 | 5 | 26 | 27 | 0 | 77 | 19 | 6 |
| 28 | Franklin Street/Park Place | 0 | 422 | 1 | 127 | 701 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 29 | Battle Lane/Boundary Street | 0 | 0 | 0 | 74 | 116 | 2 | 0 | 126 | 96 | 0 | 0 | 47 | 61 |
| 30 | Country Club Road/Battle Lane | 26 | 350 | 0 | 0 | 427 | 123 | 0 | 0 | 0 | 0 | 120 | 0 | 0 |
| 307 | Country Club Road & Boundary Street | 0 | 377 | 0 | 0 | 427 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 177 |
| 31 | Country Club Road/Gimghoul Road | 5 | 1 | 18 | 11 | 1 | 6 | 90 | 584 | 13 | 0 | 5 | 464 | 30 |
| 32 | Manning Drive/Hibbard Drive | 47 | 620 | 17 | 10 | 855 | 39 | 18 | 10 | 53 | 0 | 27 | 4 | 40 |
| 33 | Manning Drive/Craige Drive | 42 | 517 | 21 | 163 | 1054 | 37 | 4 | 4 | 14 | 0 | 18 | 3 | 9 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | 0 | 0 | 0 | 0 | 0 | 3 | 20 | 413 | 2 | 0 | 81 | 106 | 217 |
| 35 | East Drive/Dogwood Deck Exit | 215 | 0 | 122 | 0 | 0 | 0 | 0 | 223 | 0 | 0 | 0 | 56 | 0 |
| 36 | Mason Farm Road/Hibbard Drive | 4 | 2 | 1 | -4 | 5 | 19 | 35 | 249 | 184 | 0 | 42 | 39 | 12 |
| 37 | South Road/Bell Tower Drive | 0 | 340 | 204 | 192 | 299 | 0 | 29 | 0 | 55 | 0 | 0 | 0 | 0 |
| 38 | Manning Drive/Old East Drive | 0 | 413 | 0 | 0 | 669 | 0 | 0 | 0 | 0 | 0 | 202 | 0 | 151 |
| 39 | Manning Drive/Craige Deck | 0 | 610 | 132 | 178 | 916 | 0 | 7 | 0 | 13 | 0 | 0 | 0 | 0 |
| 101 | US 15-501/Estes Drive | 71 | 2 | 277 | 1 | 10 | 15 | 378 | 1504 | 4 | 0 | 9 | 1433 | 73 |
| 102 | US 15-501/Willow Drive | 121 | 29 | 8 | 59 | 61 | 19 | 66 | 1511 | 12 | 0 | 17 | 1478 | 288 |
| 103 | US 15-501/Elliott Road | 40 | 0 | 115 | 0 | 0 | 0 | 127 | 1516 | 0 | 5 | 0 | 1681 | 124 |
| 104 | US 15-501/Ephesus Church Road | 28 | 33 | 32 | 252 | 96 | 85 | 56 | 1279 | 229 | 0 | 65 | 1404 | 8 |
| 105 | US 15-501/Erwin Road | 0 | 0 | 0 | 0 | 2146 | 305 | 0 | 0 | 0 | 0 | 0 | 0 | 494 |
| 106 | US 15-501/Europa Drive | 0 | 2059 | 140 | 0 | 0 | 0 | 0 | 0 | 175 | 0 | 0 | 0 | 0 |
| 107 | US 15-501/Superstreet NB U-Turn | 0 | 0 | 0 | 0 | 2112 | 0 | 276 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | US 15-501/Superstreet SB U-Turn | 0 | 2141 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 17 | 0 |
| 109 | US 15-501/Sage Road | 332 | 1569 | 152 | 170 | 1843 | 163 | 168 | 106 | 21 | 0 | 297 | 155 | 146 |
| 110 | US 15-501/Eastowne Drive/BCBS | 84 | 1666 | 9 | 30 | 2152 | 69 | 1 | 6 | 26 | 0 | 50 | 3 | 46 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | 14 | 1681 | 3 | 68 | 2230 | 326 | 13 | 31 | 144 | 0 | 88 | 8 | 2 |
| 201 | NC 54/Hamilton Street | 28 | 1929 | 164 | 86 | 2510 | 32 | 134 | 41 | 121 | 0 | 70 | 49 | 27 |
| 202 | NC 54/Burning Tree Lane | 33 | 1949 | 56 | 170 | 2639 | 24 | 37 | 3 | 144 | 0 | 42 | 12 | 47 |
| 203 | NC 54/Barbee Chapel Road Ext | 175 | 1957 | 103 | 93 | 2652 | 35 | 14 | 1 | 2 | 0 | 7 | 4 | 116 |
| 204 | NC 54/Meadowmont Lane | 199 | 1629 | 128 | 467 | 2677 | 134 | 73 | 3 | 45 | 0 | 67 | 19 | 141 |
| 205 | NC 54/Barbee Chapel Road (East) | 13 | 1646 | 216 | 25 | 2648 | 222 | 600 | 96 | 71 | 0 | 126 | 37 | 23 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | 228 | 89 | 68 | 10 | 130 | 575 | 69 | 1593 | 4 | 0 | 341 | 910 | 152 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | 106 | 22 | 9 | 108 | 14 | 24 | 7 | 1508 | 102 | 0 | 36 | 857 | 108 |
| 303 | US 15-501/Market Street | 269 | 0 | 41 | 0 | 0 | 0 | 202 | 1375 | 0 | 28 | 0 | 572 | 398 |

PM Peak Hour

| ID # | Intersection | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBU | SBL | SBT | SBR |
|------|---|-----|------|-----|------|------|-----|-----|------|-----|-----|------|------|-----|
| 1 | Columbia Street/Rosemary Street | 195 | 263 | 67 | 35 | 202 | 67 | 50 | 690 | 71 | 0 | 78 | 531 | 253 |
| 2 | Columbia Street/Franklin Street | 115 | 388 | 96 | 126 | 466 | 91 | 102 | 617 | 123 | 0 | 83 | 473 | 102 |
| 3 | Franklin Street/Raleigh Street | 43 | 456 | 225 | 49 | 561 | 176 | 116 | 333 | 26 | 0 | 97 | 328 | 20 |
| 4 | Merritt Mill Road/Cameron Avenue | 0 | 0 | 0 | 405 | 0 | 144 | 0 | 112 | 206 | 0 | 83 | 297 | 0 |
| 5 | Cameron Avenue/Pittsboro Street | 0 | 154 | 141 | 570 | 465 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | Cameron Avenue/Columbia Street | 27 | 117 | 0 | 0 | 247 | 61 | 276 | 720 | 163 | 0 | 119 | 0 | 516 |
| 7 | Cameron Avenue/Raleigh Street | 53 | 279 | 51 | 25 | 253 | 286 | 68 | 122 | 59 | 0 | 346 | 179 | 90 |
| 8 | Pittsboro Street/McCauley Street | 0 | 101 | 22 | 207 | 236 | 0 | 0 | 0 | 0 | 0 | 244 | 552 | 44 |
| 9 | Columbia Street/South Road | 97 | 336 | 0 | 0 | 376 | 294 | 143 | 822 | 183 | 0 | 0 | 0 | 0 |
| 10 | Raleigh Street/South Road | 112 | 395 | 0 | 0 | 260 | 57 | 0 | 0 | 0 | 0 | 77 | 0 | 153 |
| 11 | Country Club Road/South Road | 41 | 413 | 31 | 231 | 273 | 542 | 31 | 175 | 507 | 0 | 602 | 80 | 24 |
| 12 | Columbia Street/Manning Drive | 113 | 203 | 0 | 221 | 8 | 596 | 0 | 490 | 82 | 0 | 0 | 0 | 0 |
| 13 | Manning Drive/West Drive | 82 | 239 | 27 | 99 | 772 | 69 | 0 | 0 | 0 | 0 | 9 | 5 | 29 |
| 14 | Manning Drive/East Drive | 33 | 397 | 45 | 76 | 544 | 54 | 174 | 26 | 518 | 0 | 0 | 0 | 0 |
| 15 | Ridge Road/Manning Drive | 314 | 891 | 74 | 20 | 272 | 92 | 112 | 182 | 58 | 0 | 84 | 87 | 151 |
| 16 | Mason Farm Road/Columbia Street | 1 | 2 | 2 | 485 | 0 | 148 | 7 | 401 | 99 | 0 | 67 | 573 | 6 |
| 17 | Mason Farm Road/West Drive | 0 | 178 | 17 | 7 | 444 | 0 | 0 | 0 | 0 | 0 | 21 | 3 | 104 |
| 18 | Mason Farm Road/East Drive | 27 | 302 | 155 | 111 | 210 | 3 | 41 | 0 | 28 | 0 | 0 | 0 | 0 |
| 19 | Mason Farm Road/Purefoy Road | 16 | 0 | 23 | 0 | 0 | 0 | 16 | 55 | 0 | 0 | 0 | 323 | 72 |
| 20 | Manning Drive/Skipper Bowles Drive | 0 | 925 | 12 | 109 | 311 | 0 | 22 | 0 | 304 | 0 | 0 | 0 | 0 |
| 21 | Columbia Street/Purefoy Road | 0 | 0 | 0 | 126 | 0 | 29 | 0 | 495 | 29 | 0 | 9 | 1090 | 0 |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | 0 | 0 | 0 | 1295 | 0 | 48 | 320 | 480 | 0 | 0 | 0 | 834 | 334 |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | 168 | 2 | 328 | 0 | 0 | 0 | 0 | 614 | 0 | 0 | 90 | 1938 | 0 |
| 24 | Mason Farm Road/Fordham Boulevard | 0 | 1619 | 0 | 0 | 2361 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 239 |
| 25 | Manning Drive/Fordham Boulevard | 84 | 1590 | 4 | 10 | 2091 | 287 | 10 | 2 | 21 | 0 | 1056 | 6 | 316 |
| 26 | Mason Farm Road/Oteys Road | 4 | 119 | 190 | 3 | 40 | 2 | 12 | 1 | 0 | 0 | 3 | 2 | 3 |
| 27 | Franklin Street/Boundary Street | 7 | 629 | 4 | 23 | 603 | 69 | 13 | 65 | 126 | 0 | 112 | 24 | 8 |
| 28 | Franklin Street/Park Place | 0 | 859 | 2 | 67 | 701 | 0 | 1 | 0 | 127 | 0 | 0 | 0 | 0 |
| 29 | Battle Lane/Boundary Street | 0 | 0 | 0 | 55 | 77 | 3 | 0 | 163 | 309 | 0 | 2 | 82 | 84 |
| 30 | Country Club Road/Battle Lane | 75 | 488 | 0 | 0 | 491 | 156 | 0 | 0 | 0 | 0 | 137 | 0 | 0 |
| 307 | Country Club Road & Boundary Street | 0 | 563 | 0 | 0 | 491 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 161 |
| 31 | Country Club Road/Gimghoul Road | 42 | 0 | 90 | 11 | 0 | 11 | 18 | 729 | 13 | 0 | 10 | 614 | 8 |
| 32 | Manning Drive/Hibbard Drive | 36 | 887 | 8 | 31 | 573 | 21 | 25 | 4 | 23 | 0 | 46 | 19 | 67 |
| 33 | Manning Drive/Craige Drive | 29 | 1133 | 4 | 20 | 458 | 26 | 32 | 1 | 180 | 0 | 36 | 0 | 16 |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | 0 | 0 | 0 | 2 | 0 | 21 | 3 | 719 | 0 | 0 | 1 | 50 | 75 |
| 35 | East Drive/Dogwood Deck Exit | 256 | 0 | 141 | 0 | 0 | 0 | 0 | 325 | 0 | 0 | 0 | 52 | 0 |
| 36 | Mason Farm Road/Hibbard Drive | 4 | 3 | 6 | 164 | 0 | 11 | 0 | 51 | 20 | 0 | 7 | 271 | 1 |
| 37 | South Road/Bell Tower Drive | 0 | 465 | 48 | 52 | 450 | 0 | 167 | 0 | 152 | 0 | 0 | 0 | 0 |
| 38 | Manning Drive/Old East Drive | 0 | 250 | 0 | 0 | 712 | 0 | 0 | 0 | 0 | 0 | 221 | 0 | 240 |
| 39 | Manning Drive/Craige Deck | 0 | 925 | 5 | 5 | 558 | 0 | 99 | 0 | 194 | 0 | 0 | 0 | 0 |
| 101 | US 15-501/Estes Drive | 102 | 11 | 317 | 8 | 16 | 13 | 487 | 1745 | 3 | 0 | 16 | 1517 | 112 |
| 102 | US 15-501/Willow Drive | 294 | 120 | 23 | 29 | 36 | 25 | 36 | 1820 | 41 | 0 | 42 | 1487 | 239 |
| 103 | US 15-501/Elliott Road | 145 | 0 | 278 | 0 | 0 | 0 | 226 | 1891 | 0 | 8 | 0 | 1469 | 199 |
| 104 | US 15-501/Ephesus Church Road | 96 | 112 | 73 | 348 | 137 | 69 | 158 | 1347 | 334 | 0 | 93 | 1275 | 13 |
| 105 | US 15-501/Erwin Road | 0 | 0 | 0 | 0 | 2013 | 436 | 0 | 0 | 0 | 0 | 0 | 0 | 454 |
| 106 | US 15-501/Europa Drive | 0 | 2855 | 90 | 0 | 0 | 0 | 0 | 0 | 234 | 0 | 0 | 0 | 0 |
| 107 | US 15-501/Superstreet NB U-Turn | 32 | 0 | 0 | 0 | 2032 | 0 | 396 | 0 | 0 | 0 | 0 | 0 | 0 |
| 108 | US 15-501/Superstreet SB U-Turn | 0 | 2809 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 40 | 0 |
| 109 | US 15-501/Sage Road | 360 | 1948 | 228 | 54 | 1679 | 267 | 147 | 93 | 27 | 0 | 250 | 167 | 177 |
| 110 | US 15-501/Eastowne Drive/BCBS | 46 | 2212 | 5 | 33 | 1926 | 62 | 11 | 8 | 49 | 0 | 77 | 1 | 72 |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | 2 | 2302 | 4 | 75 | 2045 | 190 | 21 | 17 | 123 | 0 | 261 | 31 | 20 |
| 201 | NC 54/Hamilton Street | 42 | 2423 | 53 | 121 | 2380 | 66 | 114 | 23 | 129 | 0 | 77 | 20 | 41 |
| 202 | NC 54/Burning Tree Lane | 79 | 2540 | 41 | 165 | 2402 | 36 | 71 | 16 | 149 | 0 | 27 | 11 | 49 |
| 203 | NC 54/Barbee Chapel Road Ext | 167 | 2476 | 48 | 10 | 2166 | 15 | 85 | 16 | 62 | 0 | 16 | 0 | 203 |
| 204 | NC 54/Meadowmont Lane | 147 | 2411 | 106 | 116 | 1967 | 111 | 120 | 25 | 441 | 0 | 167 | 11 | 185 |
| 205 | NC 54/Barbee Chapel Road (East) | 11 | 2341 | 886 | 133 | 1911 | 221 | 246 | 57 | 47 | 0 | 127 | 91 | 17 |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | 124 | 64 | 68 | 13 | 85 | 339 | 67 | 996 | 20 | 0 | 716 | 1588 | 213 |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | 117 | 14 | 6 | 78 | 23 | 1 | 6 | 960 | 127 | 0 | 27 | 1537 | 134 |
| 303 | US 15-501/Market Street | 343 | 0 | 121 | 0 | 0 | 0 | 144 | 717 | 0 | 10 | 0 | 1408 | 297 |

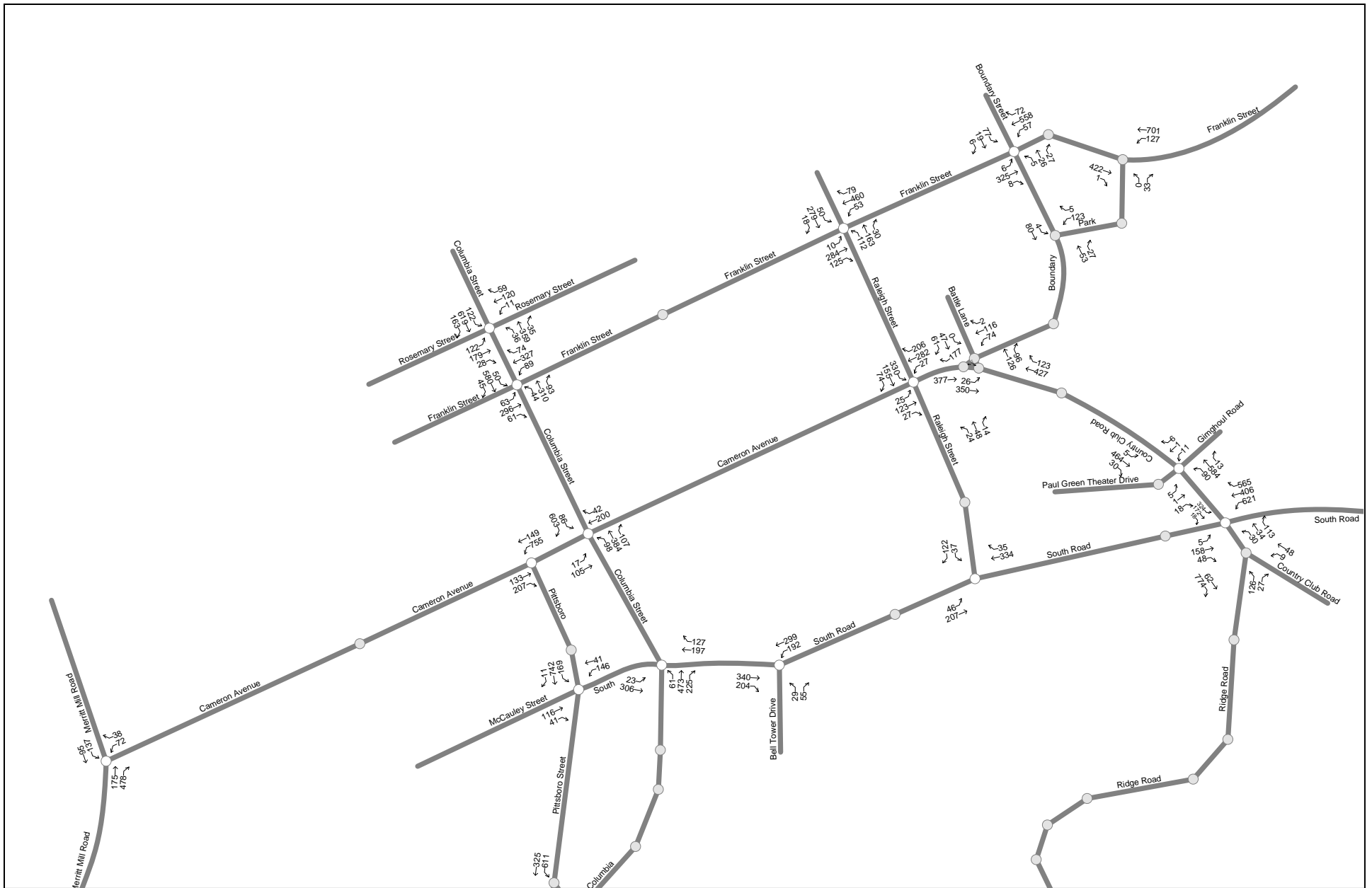


Figure 4-10a
Future Build Year 2024 A.M. Peak Hour Turning Movement Volumes



Figure 4-10b
Future Build Year 2024 A.M. Peak Hour Turning Movement Volumes

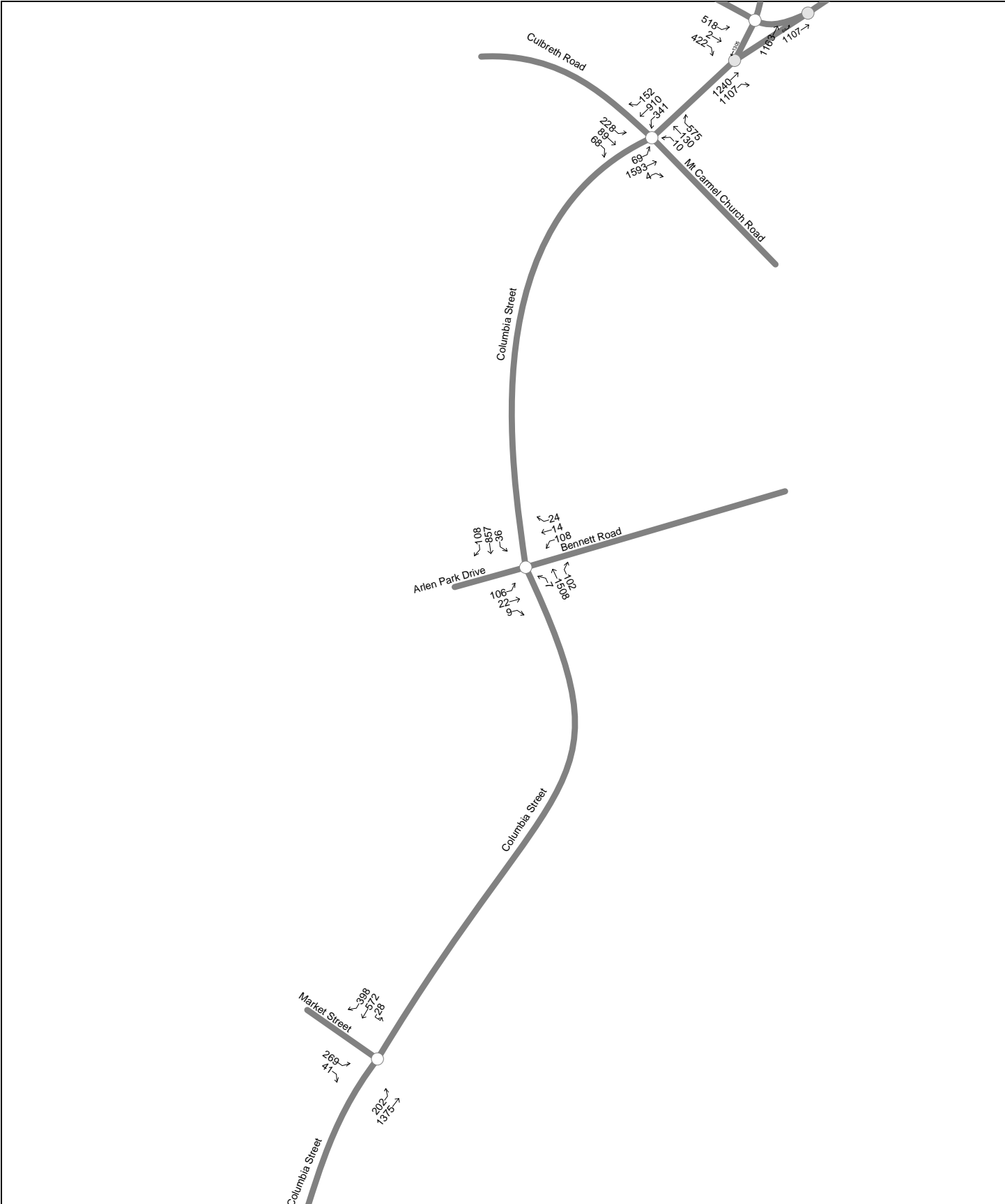


Figure 4-10c
 Future-Build Year 2024 A.M. Peak Hour Turning Movement Volumes

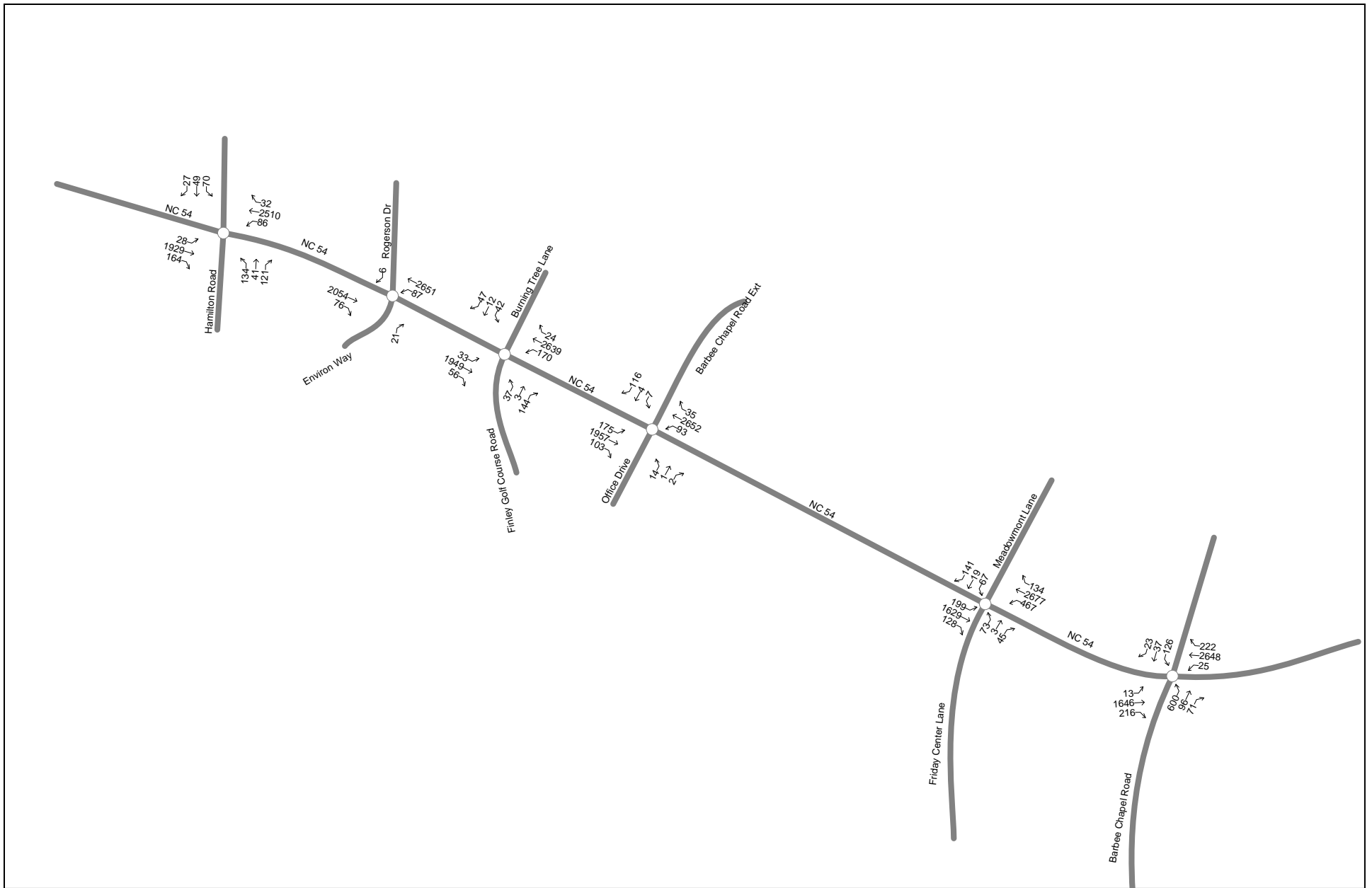


Figure 4-10d
Future Build Year 2024 A.M. Peak Hour Turning Movement Volumes

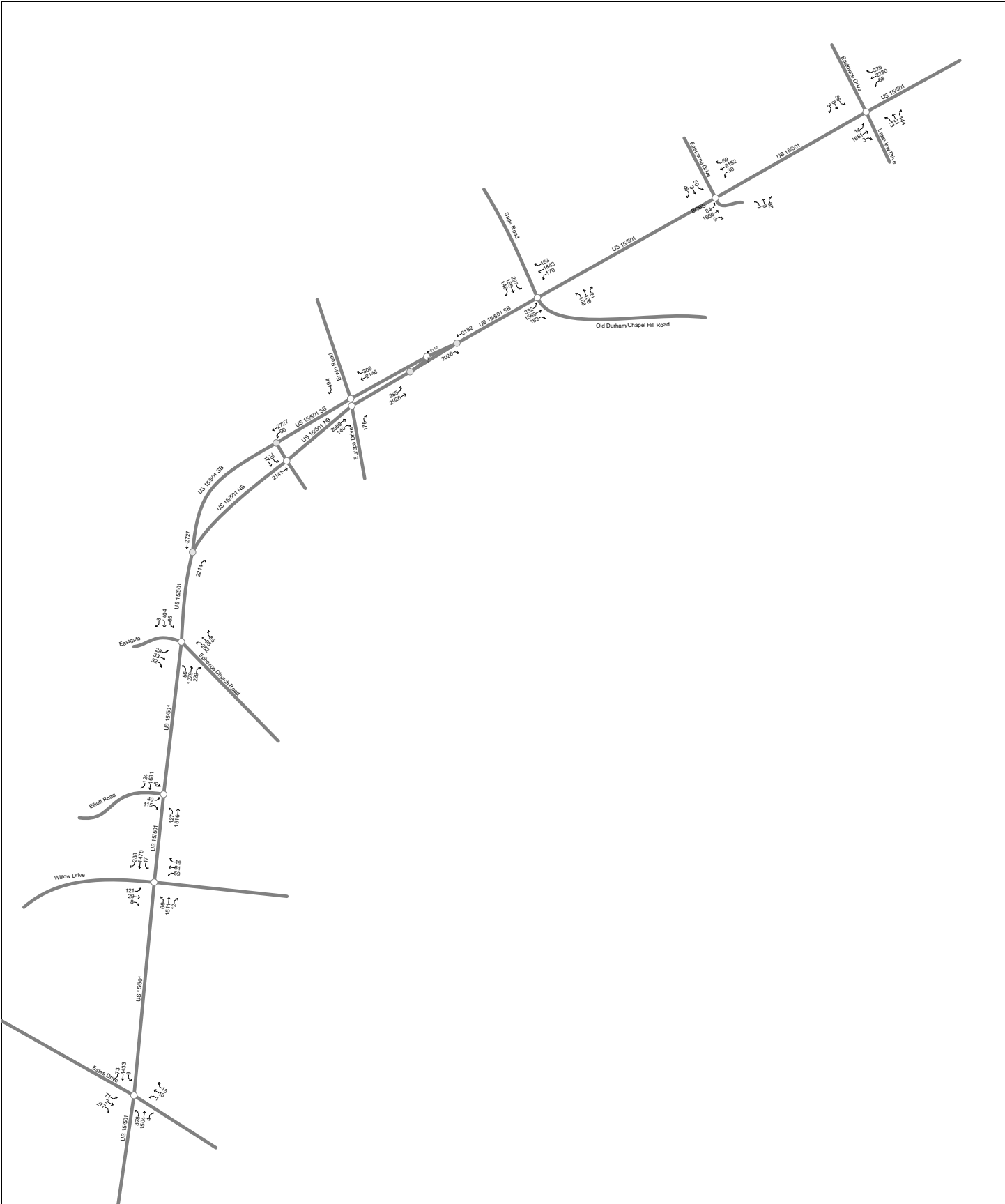


Figure 4-10e
 Future Build Year 2024 A.M. Peak Hour Turning Movement Volumes

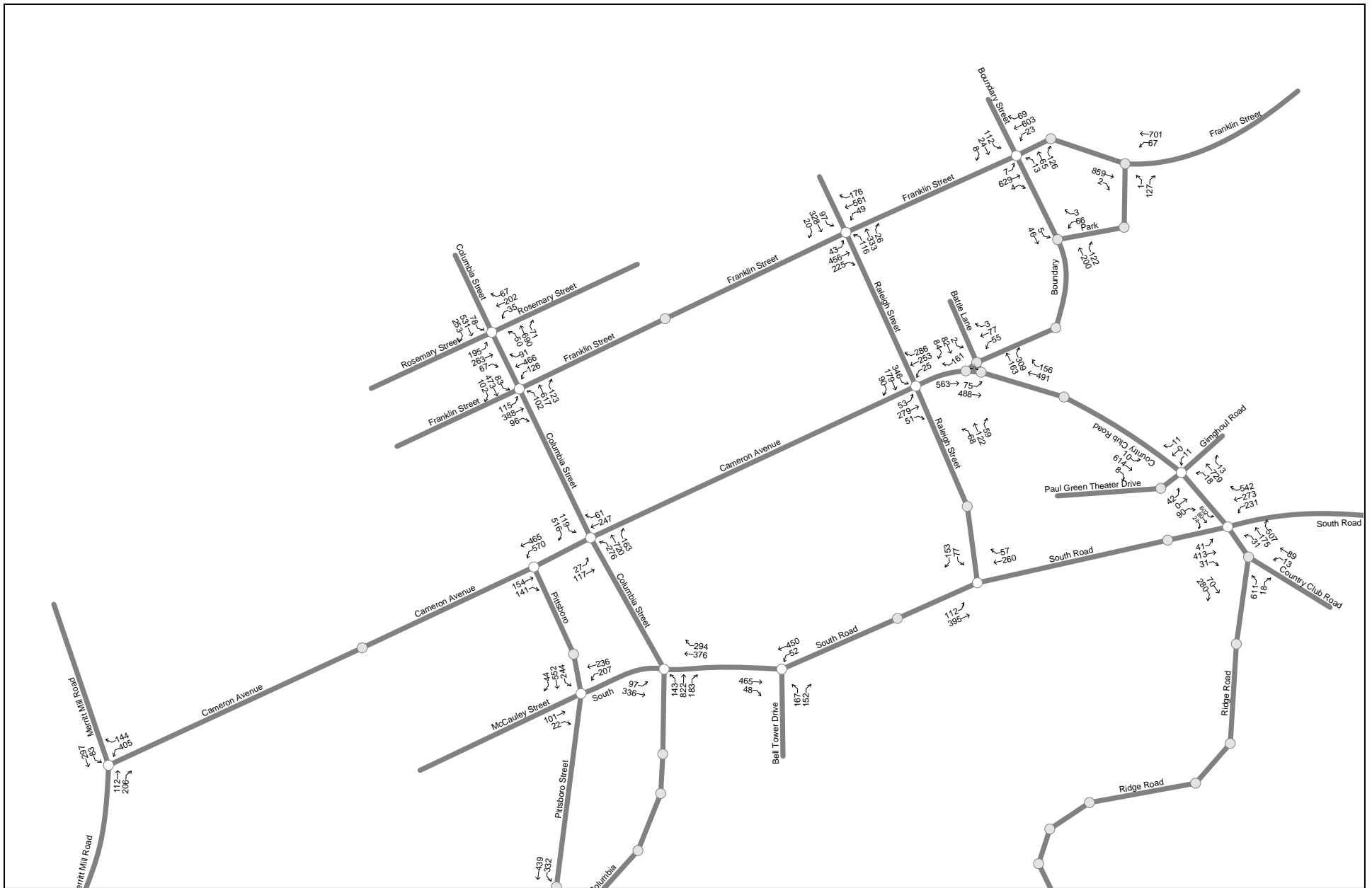


Figure 4-11a
Future Build Year 2024 P.M. Peak Hour Turning Movement Volumes

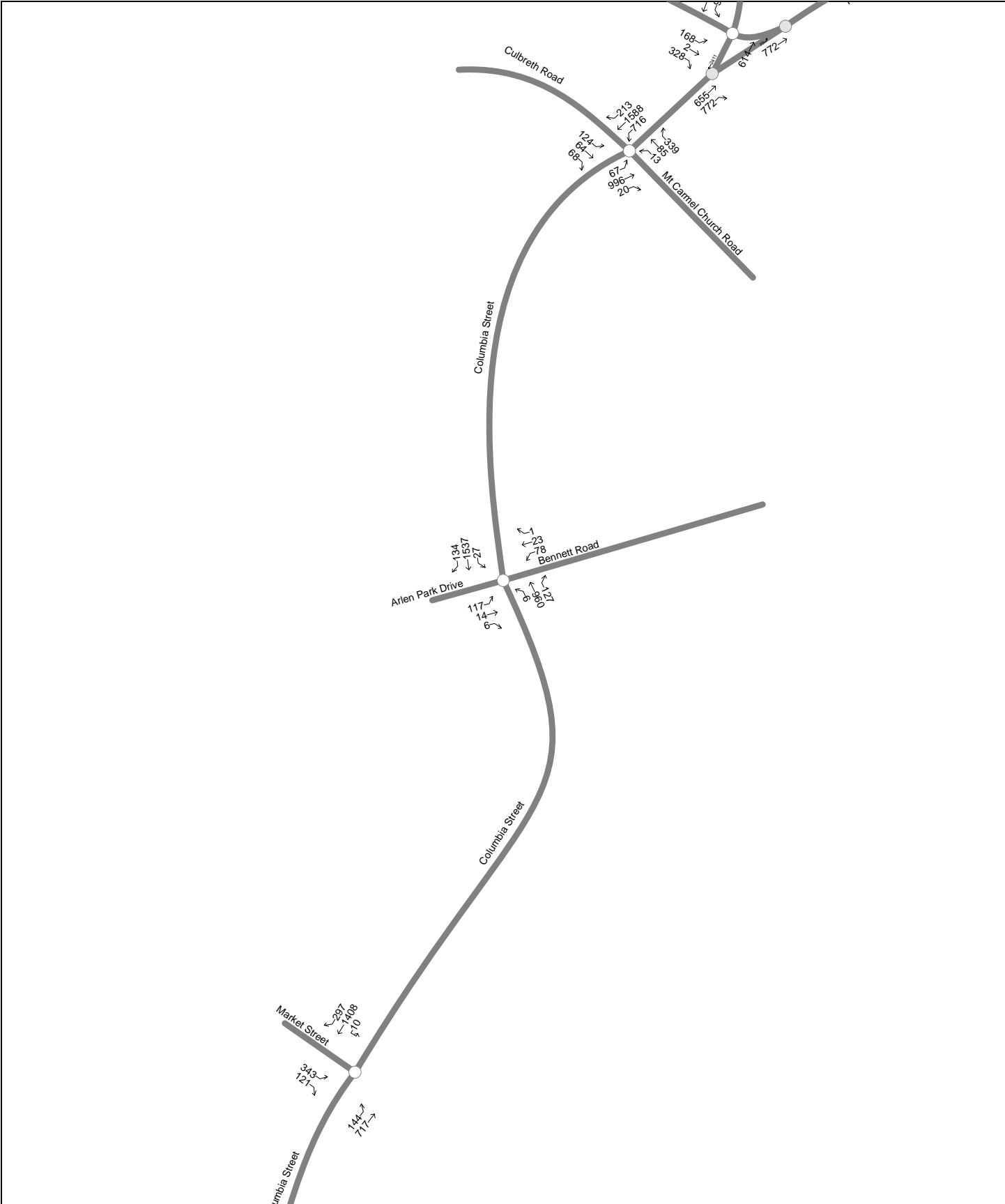


Figure 4-11c
 Future Build Year 2024 P.M. Peak Hour Turning Movement Volumes

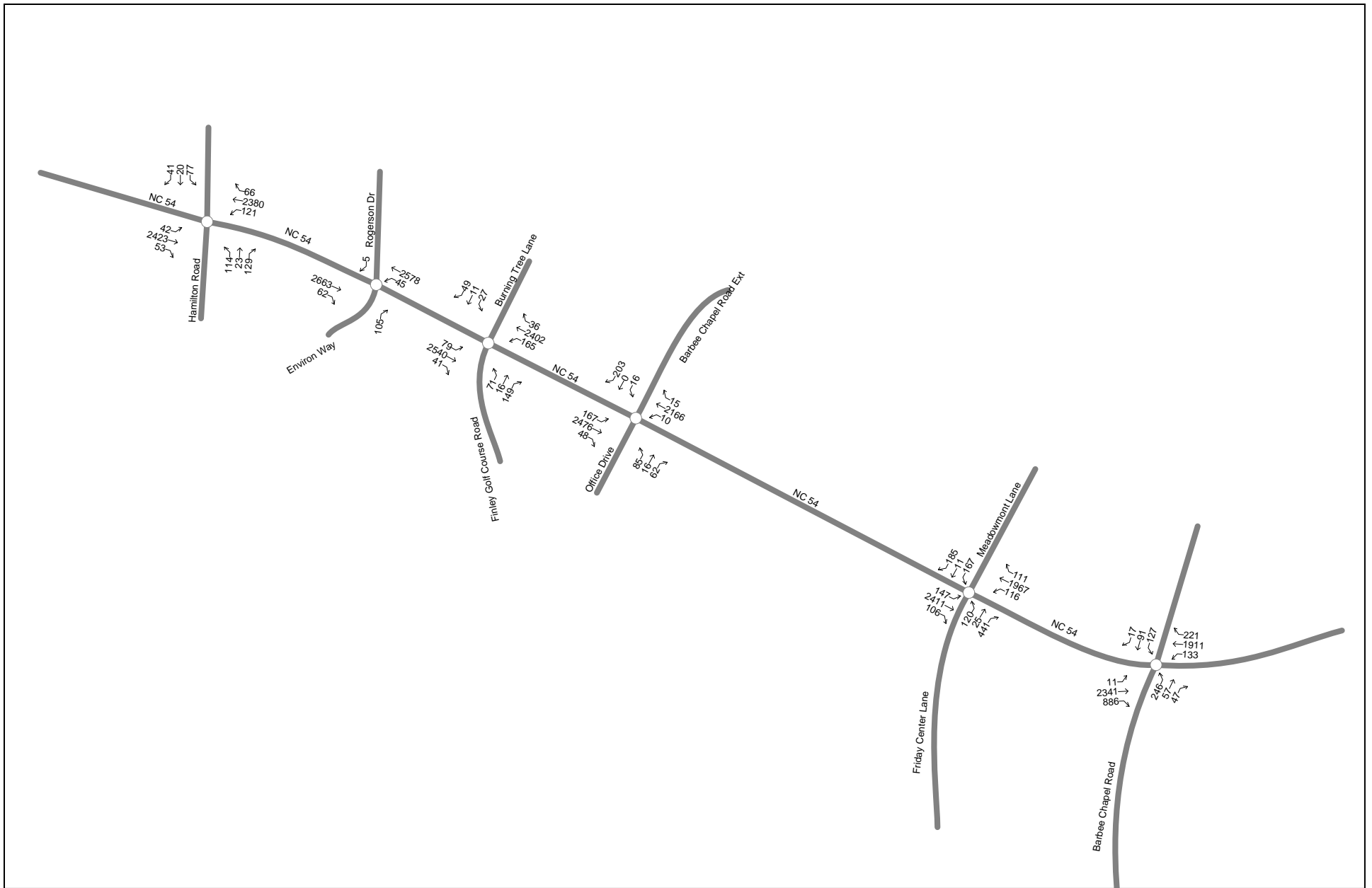


Figure 4-11d
Future Build Year 2024 P.M. Peak Hour Turning Movement Volumes

4.6 FUTURE INTERSECTION LEVEL OF SERVICE ANALYSIS

AM and PM peak hour capacity analyses were performed for the No-Build (2024) and Build (2024) conditions. Per the *Transportation Impact Analysis Guidelines*, all intersections listed in Section 4-3 for which traffic data was available were analyzed for the AM and PM peak hours.

The traffic volumes computed for both scenarios were used to conduct an intersection capacity analysis in the same manner that the existing intersections were examined. The No-Build and Build cases utilized the existing geometrics shown in Figure 4-2. The LOS results are summarized in Table 4-11.

4.6.1 No-Build Analysis Results

As in the Existing Conditions analysis described in Section 4.3, the same intersections that were suffering poor levels of service in 2017 will continue to operate poor levels in 2024 even without any impacts from the Development Plan. Other intersections that were not operating at poor levels in the analysis of existing conditions will deteriorate to poor levels of service in the future as well with the addition of background traffic. In particular, the following intersections were determined to experience a substantial change in LOS (i.e. from acceptable LOS to unacceptable LOS) under No-Build (2024) conditions:

- The intersection of Columbia Street at Manning Drive is currently operating at LOS C during the PM peak hour but is projected to operate at LOS F during the PM peak hour in the No-Build (2024) scenario.
- The intersection of Columbia Street at Fordham Boulevard (northern ramp) is currently operating at LOS D during the PM peak hour but is projected to operate at LOS E during the PM peak hour in the No-Build (2024) scenario.
- The intersection of Manning Drive at Fordham Boulevard is currently operating at LOS E during the PM peak hour but is projected to operate at LOS F during the PM peak hour in the No-Build (2024) scenario.

4.6.2 Build Analysis Results

The following intersections were further degraded under Build (2024) conditions:

- The intersection of Cameron Avenue at Columbia Street is expected to operate at LOS E during the AM peak hour and at LOS F during the PM peak hour in the Build (2024) scenario.
- The intersection of Columbia Street at Purefoy Road is expected to operate at LOS E during the PM peak hour under the Build (2024) scenario.
- The intersection of NC 54 at Barbee Chapel Road (East) is expected to operate at LOS E during the AM peak hour under the Build (2024) scenario.

Table 4-11: Future No-Build and Build Year 2024 Intersection Levels of Service

| ID # | Intersection | Control | No-Build (2024) | | Build (2024) | |
|------|---|--------------|-----------------|----------|--------------|----------|
| | | | AM | PM | AM | PM |
| 1 | Columbia Street/Rosemary Street | Signalized | C (WB-D) | C (WB-E) | C (WB-D) | C (WB-E) |
| 2 | Columbia Street/Franklin Street | Signalized | C (SB-D) | D (NB-E) | C (EB-D) | D (NB-E) |
| 3 | Franklin Street/Raleigh Street | Signalized | C (NB-F) | C (NB-D) | C (NB-F) | C (NB-C) |
| 4 | Merritt Mill Road/Cameron Avenue | Signalized | B (WB-D) | B (NB-C) | B (WB-D) | B (NB-C) |
| 5 | Cameron Avenue/Pittsboro Street | Signalized | B (EB-D) | C (EB-E) | B (EB-D) | C (EB-E) |
| 6 | Cameron Avenue/Columbia Street | Signalized | D (WB-E) | E (WB-F) | E (NB-F) | F (WB-F) |
| 7 | Cameron Avenue/Raleigh Street | Signalized | C (NB-D) | D (NB-E) | C (NB-D) | D (NB-F) |
| 8 | Pittsboro Street/McCauley Street | Signalized | B (WB-E) | D (WB-E) | B (WB-E) | D (WB-E) |
| 9 | Columbia Street/South Road | Signalized | C (EB-D) | D (EB-E) | C (EB-D) | D (EB-E) |
| 10 | Raleigh Street/South Road | Signalized | A (SB-C) | A (SB-D) | A (SB-C) | A (SB-C) |
| 11 | Country Club Road/South Road | Signalized | C (SB-D) | C (SB-D) | C (SB-D) | D (SB-D) |
| 12 | Columbia Street/Manning Drive | Signalized | C (EB-D) | F (WB-F) | C (EB-D) | F (WB-F) |
| 13 | Manning Drive/West Drive | Signalized | A (SB-D) | A (SB-C) | A (SB-D) | A (SB-C) |
| 14 | Manning Drive/East Drive | Signalized | B (NB-D) | C (NB-D) | B (NB-D) | C (NB-D) |
| 15 | Ridge Road/Manning Drive | Signalized | C (NB-D) | C (NB-D) | C (NB-D) | C (NB-D) |
| 16 | Mason Farm Road/Columbia Street | Signalized | B (EB-D) | C (WB-D) | C (EB-D) | C (WB-D) |
| 17 | Mason Farm Road/West Drive | Signalized | A (SB-D) | A (SB-C) | A (SB-C) | A (SB-C) |
| 18 | Mason Farm Road/East Drive | Signalized | C (NB-D) | A (NB-C) | C (NB-E) | A (NB-C) |
| 19 | Mason Farm Road/Purefoy Road | Unsignalized | A (EB-A) | B (SB-B) | A (EB-A) | B (SB-B) |
| 20 | Manning Drive/Skipper Bowles Drive | Unsignalized | A (NB-B) | A (NB-C) | A (NB-B) | A (NB-D) |
| 21 | Columbia Street/Purefoy Road | Unsignalized | A (WB-E) | C (WB-F) | A (WB-F) | E (WB-F) |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | Signalized | C (WB-E) | E (WB-E) | C (WB-E) | E (WB-E) |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | Signalized | C (EB-D) | B (EB-E) | C (EB-D) | B (EB-E) |
| 24 | Mason Farm Road/Fordham Boulevard | Unsignalized | A (SB-C) | C (SB-F) | A (SB-C) | D (SB-F) |
| 25 | Manning Drive/Fordham Boulevard | Signalized | D (SB-E) | F (WB-F) | D (SB-E) | F (WB-F) |
| 26 | Mason Farm Road/Oleys Road | Unsignalized | A (NB-A) | A (EB-A) | A (NB-A) | A (EB-A) |
| 27 | Franklin Street/Boundary Street | Signalized | A (SB-E) | C (SB-F) | A (SB-E) | C (SB-F) |
| 28 | Franklin Street/Park Place | Unsignalized | A (NB-A) | A (NB-B) | A (NB-B) | A (NB-B) |
| 29 | Battle Lane/Boundary Street | Unsignalized | A (WB-A) | B (NB-B) | A (WB-A) | B (NB-B) |
| 30 | Country Club Road/Battle Lane | Unsignalized | A (SB-D) | A (SB-F) | A (SB-D) | C (SB-F) |
| 307 | Country Club Road & Boundary Street | Unsignalized | A (SB-B) | A (SB-B) | A (SB-B) | A (SB-C) |
| 31 | Country Club Road/Gimghoul Road | Signalized | A (WB-D) | A (EB-D) | A (WB-D) | A (EB-D) |
| 32 | Manning Drive/Hibbard Drive | Signalized | A (SB-D) | A (SB-D) | A (SB-D) | A (SB-D) |
| 33 | Manning Drive/Craige Drive | Signalized | A (SB-D) | B (SB-E) | A (SB-D) | B (SB-D) |
| 34 | East Drive/Jackson Circle/Dogwood Deck Entrance | Unsignalized | A (WB-B) | A (WB-B) | A (WB-B) | A (WB-C) |
| 35 | East Drive/Dogwood Deck Exit | Unsignalized | A (EB-B) | A (EB-B) | A (EB-B) | A (EB-B) |
| 36 | Mason Farm Road/Hibbard Drive | Unsignalized | A (EB-B) | A (WB-C) | A (EB-C) | A (WB-C) |
| 37 | South Road/Bell Tower Drive | Signalized | A (NB-D) | C (NB-D) | A (NB-D) | C (NB-D) |
| 38 | Manning Drive/Old East Drive | Signalized | B (SB-D) | A (SB-D) | B (SB-D) | B (SB-D) |
| 39 | Manning Drive/Craige Deck | Unsignalized | A (NB-D) | A (NB-E) | A (NB-D) | B (NB-F) |
| 101 | US 15-501/Estes Drive | Signalized | C (WB-D) | C (WB-E) | C (WB-D) | D (WB-E) |
| 102 | US 15-501/Willow Drive | Signalized | B (WB-E) | C (EB-E) | B (WB-E) | C (EB-F) |
| 103 | US 15-501/Elliott Road | Signalized | A (EB-D) | B (EB-E) | A (EB-E) | B (EB-E) |
| 104 | US 15-501/Ephesus Church Road | Signalized | C (WB-F) | D (EB-F) | C (WB-F) | D (EB-F) |
| 105 | US 15-501/Erwin Road | Signalized | A (WB-A) | A (WB-A) | A (WB-A) | A (WB-A) |
| 106 | US 15-501/Europa Drive | Signalized | A (NB-F) | A (NB-F) | A (NB-F) | A (NB-F) |
| 107 | US 15-501/Superstreet NB U-Turn | Signalized | B (NB-E) | B (NB-E) | B (NB-E) | B (NB-E) |
| 108 | US 15-501/Superstreet SB U-Turn | Signalized | A (SB-C) | B (SB-E) | A (SB-D) | C (SB-E) |
| 109 | US 15-501/Sage Road | Signalized | E (NB-E) | D (NB-F) | E (WB-F) | D (NB-F) |
| 110 | US 15-501/Eastowne Drive/BCBS | Signalized | B (SB-E) | B (SB-D) | B (SB-E) | B (SB-D) |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | Signalized | C (SB-F) | D (SB-F) | C (SB-F) | D (SB-F) |
| 201 | NC 54/Hamilton Street | Signalized | B (NB-E) | B (SB-E) | B (NB-E) | B (NB-E) |
| 202 | NC 54/Burning Tree Lane | Signalized | A (SB-E) | B (NB-D) | A (SB-E) | B (NB-D) |
| 203 | NC 54/Barbee Chapel Road Ext | Signalized | A (NB-E) | B (NB-F) | A (NB-E) | B (NB-F) |
| 204 | NC 54/Meadowmont Lane | Signalized | C (NB-D) | C (NB-E) | C (NB-D) | C (NB-E) |
| 205 | NC 54/Barbee Chapel Road (East) | Signalized | D (NB-F) | C (SB-F) | E (NB-F) | C (SB-F) |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | Signalized | D (EB-E) | C (EB-E) | D (EB-E) | D (NB-E) |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | Signalized | B (EB-E) | B (EB-E) | B (EB-E) | B (EB-E) |
| 303 | US 15-501/Market Street | Signalized | B (EB-D) | C (EB-E) | B (EB-D) | C (EB-E) |

Legend: X = Overall intersection level of service; (X) = worst movement level of service.

4.7 COMPARISON OF 2015 TIA UPDATE AND 2017 TIA UPDATE

Table 4-12 identifies those intersections where the existing year LOS has degraded compared to the existing year LOS from the 2015 Update during either the AM peak hour or the PM peak hour. Some minor changes in LOS are simply a result of the traffic assignment and simulation programs responding to a change anywhere in the network. Some of the other changes can be contributed to changes in the transportation network such as increases in volume.

Some of the LOS changes have occurred at unsignalized intersections where a poor LOS is expected on the stop-controlled approaches; however some degradation in LOS is apparent at signalized intersections as well. As noted in previous sections, most intersections are currently operating at LOS D or better and even though some intersections are reporting a worse LOS than in the 2015 Update, most are still reporting acceptable LOS D or better.

Table 4-12: Comparison of 2015 Update and 2017 Update Existing Levels of Service

| ID # | Intersection | Existing (2015) | | Existing (2017) | |
|------|---|-----------------|----------|-----------------|----------|
| | | AM | PM | AM | PM |
| 1 | Columbia Street/Rosemary Street | C (WB-E) | C (WB-E) | C (WB-D) | E (NB-F) |
| 2 | Columbia Street/Franklin Street | C (SB-D) | D (EB-D) | C (SB-D) | E (EB-E) |
| 4 | Merritt Mill Road/Cameron Avenue | A (WB-C) | C (WB-D) | B (WB-D) | C (WB-C) |
| 6 | Cameron Avenue/Columbia Street | C (WB-E) | D (WB-F) | D (WB-E) | E (EB-F) |
| 7 | Cameron Avenue/Raleigh Street | C (NB-D) | C (NB-E) | C (NB-E) | D (NB-E) |
| 12 | Columbia Street/Manning Drive | B (EB-C) | C (EB-D) | C (EB-E) | C (EB-E) |
| 14 | Manning Drive/East Drive | A (NB-C) | C (NB-D) | B (NB-C) | C (NB-E) |
| 21 | Columbia Street/Purefoy Road | A (WB-E) | A (WB-F) | A (WB-E) | B (WB-F) |
| 22 | Columbia Street/Fordham Boulevard (northern ramp) | B (WB-D) | D (WB-D) | C (WB-E) | D (WB-E) |
| 23 | Columbia Street/Fordham Boulevard (southern ramp) | B (EB-D) | B (EB-D) | C (EB-E) | B (EB-E) |
| 24 | Mason Farm Road/Fordham Boulevard | A (SB-C) | A (SB-F) | A (SB-C) | C (SB-F) |
| 25 | Manning Drive/Fordham Boulevard | C (SB-E) | D (SB-E) | C (SB-E) | E (SB-F) |
| 32 | Manning Drive/Hibbard Drive | A (SB-D) | A (SB-D) | A (SB-D) | B (SB-E) |
| 101 | US 15-501/Estes Drive | B (WB-D) | C (WB-E) | C (WB-D) | C (WB-E) |
| 102 | US 15-501/Willow Drive | A (WB-D) | C (WB-E) | B (WB-E) | C (EB-E) |
| 103 | US 15-501/Elliott Road | A (EB-C) | B (EB-E) | A (EB-E) | C (EB-E) |
| 107 | US 15-501/Superstreet NB U-Turn | B (NB-D) | B (NB-E) | C (NB-E) | C (NB-E) |
| 110 | US 15-501/Eastowne Drive/BCBS | A (SB-D) | B (SB-E) | C (SB-E) | B (SB-E) |
| 111 | US 15-501/Eastowne Drive/Lakeview Drive | B (SB-F) | D (SB-F) | C (SB-F) | C (SB-F) |
| 202 | NC 54/Burning Tree Lane | A (SB-D) | A (SB-D) | B (SB-E) | B (NB-E) |
| 204 | NC 54/Meadowmont Lane | B (NB-D) | B (SB-D) | C (NB-D) | C (NB-D) |
| 301 | US 15-501/Culbreth Road/Mt Carmel Church Road | D (WB-F) | B (EB-D) | C (EB-E) | C (EB-D) |
| 302 | US 15-501/Bennett Road/Arlen Park Drive | A (EB-E) | A (EB-E) | B (EB-E) | B (EB-E) |

Legend: X = Overall intersection level of service; (X-XX) = worst movement level of service.

4.8 SIGNAL WARRANT ANALYSES

This section provides a signal warrant analysis of three intersections on or near Main Campus that are likely to be impacted by the Development Plan. Intersection level of service analyses were undertaken for these intersections for existing conditions, and year 2024 with and without the Development Plan (No-Build and Build conditions respectively), per the *Transportation Impact Analysis Guidelines*. The following three intersections are

now analyzed for potential signalization for the existing (2017) and future (2024) scenarios:

1. Mason Farm Road and Purefoy Road (unsignalized)
2. Mason Farm Road and Oteys Road (unsignalized)
3. Manning Drive and Skipper Bowles Drive (unsignalized)

The following two intersections were assessed for traffic signal warrants in prior updates and modifications to the Development Plan.

1. Mason Farm Road and West Drive – A traffic signal with metal pole and mast arm supports was constructed in the Fall of 2015.
2. Mason Farm Road and East Drive – A design for a new traffic signal with metal poles and mast arm supports has been constructed at this intersection.

Because the traffic signals at the intersections on Mason Farm at West Drive and at East Drive have been implemented, signal warrant analyses were not performed for those intersections for this update of the TIA.

4.8.1 Warrants for Traffic Signalization

The *Manual on Uniform Traffic Control Devices (MUTCD) 2009 Edition* recommends the following warrants for installation of a traffic signal:

1. Warrant 1, Eight-Hour Vehicular Volume
2. Warrant 2, Four-Hour Vehicular Volume
3. Warrant 3, Peak Hour Vehicular Volume
4. Warrant 4, Pedestrian Volume
5. Warrant 5, School Crossing
6. Warrant 6, Coordinated Signal System
7. Warrant 7, Crash Experience
8. Warrant 8, Roadway Network
9. Warrant 9, Intersection Near a Grade Crossing

Satisfaction of one or more of the warrants does not in itself justify the installation of a traffic signal. Additional data and study may be necessary to determine the appropriate measure to address a congested or unsafe condition at an unsignalized intersection. As per the *Transportation Impact Analysis Guidelines*, Warrants 1, 2, 3 and 7 were tested for the intersections of Manning Drive at Skipper Bowles Drive, Mason Farm Road at Purefoy Road, and Mason Farm Road at Oteys Road.

As stated in the MUTCD regarding Warrant 1, the Eight-Hour Vehicular Volume Warrant is intended for application either at locations “where a large volume of intersection traffic is the principal reason to consider installing a traffic control signal” or locations “where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.”

For Warrant 2, “The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.”

For Warrant 3, “The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.”

For Warrant 7, “The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.”

4.8.2 Existing Conditions Signal Warrant Analysis Results

Signal warrant analyses were performed for existing conditions at the subject intersections utilizing data collected and summarized in Section 4.3. A reduction of right-turning vehicles as recommended by the MUTCD was applied for the northbound right-turn at Manning Drive and Skipper Bowles Drive due to the exclusive right-turn lane at the intersection. The results of the existing warrant analysis are presented in Table 4-13.

For Warrant 7, the accident reports for the three subject intersections were obtained from NCDOT for a five-year period from August 1, 2012 through July 31, 2017.

Table 4-13: Existing (2017) Conditions Signal Warrant Analysis

| Intersection | Eight-Hour Volume Warrant Satisfied? (Warrant 1) | Four-Hour Volume Warrant Satisfied? (Warrant 2) | Peak Hour Volume Warrant Satisfied? (Warrant 3) | Crash Experience Warrant Satisfied? (Warrant 7) |
|--|--|---|---|---|
| 1. Mason Farm Road at Purefoy Road | No | No | AM – No PM - No | No |
| 2. Mason Farm Road at Oteys Road | No | No | AM – No PM - No | No |
| 3. Manning Drive at Skipper Bowles Drive | No | No | AM – No PM – No | No |

The intersections of Mason Farm Road at Purefoy Road, Mason Farm Road at Oteys Road do not meet the requirements for Warrants 1-3. Additionally, there were no crashes recorded at either location during the study period for consideration in Warrant 7.

The intersection of Manning Drive and Skipper Bowles Drive does not meet the requirements for Warrants 1-3. The Warrant 7 - Crash Experience requirement was not met for signalization. The thirteen (13) crashes occurring at this intersection over the 5-year period could be attributed to the delays and queues that occur on the southbound approach of Manning Drive to Fordham Boulevard. Additionally, ten (12) or ninety-two percent (92%) of the crashes recorded at this location were property damage only crashes. Class C severity accounted for zero (0) of the total crashes and Class B severity accounted for one (1) or eight percent (8%) of the crashes. No fatal crashes or Class A severity crashes were recorded at this location during the study period.

Turn restrictions, placed at the intersection during the peak hours, have been suggested for the intersection of Manning Drive and Skipper Bowles Drive in past reports. However, turn restrictions should not impact special event traffic utilizing Skipper Bowles Drive, i.e.

concrete median. Any turn restrictions should be accomplished through signing or striping. The number of left-turning vehicles is low during the peak hours; therefore, restricting left-turns would not significantly impact motorists who could simply use the Ridge Road signalized intersection as an alternative route. No daily peak period turn restrictions have been implemented at this intersection.

4.8.3 Future Conditions Signal Warrant Analysis

Signal warrant analyses were performed for future conditions at the subject intersections utilizing the projected volumes summarized in Section 4.5. Under future conditions, Warrants 1, 2, 3 and 7 were tested for the intersections of Manning Drive at Skipper Bowles Drive, Mason Farm Road at Purefoy Road, and Mason Farm Road at Oteys Road.

The results of the analysis are summarized in Table 4-14. Again, the intersections of Mason Farm Road at Purefoy Road and Mason Farm Road at Oteys Road do not meet Warrants 1-3 for signalization given the projected future year volumes. A reduction of right-turning vehicles as recommended by the MUTCD was applied for the northbound right-turn at Manning Drive and Skipper Bowles Drive due to the exclusive right-turn lane at the intersection. The intersection does not meet any of the signal warrants with the right-turn reduction.

Table 4-14: Future (2022) Conditions Signal Warrant Analysis

| Intersection | Eight-Hour Volume Warrant Satisfied? (Warrant 1) | Four-Hour Volume Warrant Satisfied? (Warrant 2) | Peak Hour Volume Warrant Satisfied? (Warrant 3) |
|--|--|---|---|
| 1. Mason Farm Road at Purefoy Road | No | No | AM – No PM - No |
| 2. Mason Farm Road at Oteys Road | No | No | AM – No PM – No |
| 3. Manning Drive at Skipper Bowles Drive | No | No | AM – No PM - Yes |

4.9 MITIGATION STRATEGIES

4.9.1 Planned Intersection Improvements

The intersection improvements previously suggested by the University and approved and/or stipulated by the Town are discussed below. Some have been implemented while some others have not. The improvements include geometric improvements and signal timing and phasing modifications at some intersections. Optimized timings are included in the Appendix.

South Columbia Street/South Road/McCauley Street

The radius of the northbound right-turn lane at this intersection has been reduced as recommended in earlier Development Plan Updates. A smaller island has been provided to provide refuge for pedestrians crossing South Columbia Street and South Road. The existing median island on South Road remained in place.

Following the submittal of the February 2006 Update, the Town requested that the eastbound approach of McCauley Street at the intersection with S. Columbia Street be upgraded to include an exclusive left-turn lane. The requested improvement has been

accomplished through pavement marking changes. The roadway was not widened and the eastbound and westbound approaches continue to operate on split phasing.

These improvements are complete. A new traffic signal controller and traffic signal controller cabinet were installed and the new signal is in operation.

South Road/Country Club Road

An analysis of this intersection with future traffic volumes identified the long-term need for improvements. The stipulations associated with Modification No.1 required the addition of the northbound right-turn lane (which could be accomplished without widening the road), and converting a southbound shared through-right lane to a shared left-through-right lane (again, no widening was required). These improvements have been implemented.

An additional improvement recommended for this area was the realignment of the junction of Ridge Road and Country Club Road to give priority to Ridge Road since this is the major movement. This is particularly important since the construction of the Rams Head deck, and can be achieved by eliminating a small number of parking spaces on the west side of the intersection. The northwest corner of this intersection was altered by removing the curb extension, but the intersection remains with stop control on the approach of Ridge Road.

Cameron Avenue/Raleigh Street

Signal phasing improvements were desirable at this intersection to improve the level of service in the PM peak hour (permitted/protected phasing for the left turns). This improvement has been completed. New traffic signal heads, controller, controller cabinet, and audible, countdown pedestrian signals were installed.

Country Club Road/Battle Lane/Boundary Street

The stipulations associated with Modification No.1 of the University Development Plan required a study of this intersection to identify feasible improvements to traffic safety and operations. Signalization and a roundabout were among the measures studied, but it was agreed to upgrade the Country Club Road/Gimghoul Road intersection instead. Bollards and chains were strategically provided at the intersection of Country Club Road, Battle Lane, and Boundary Street to control pedestrians in and around this intersection.

The recently collected peak period traffic data collected for this intersection indicates that the traffic traveling eastbound and westbound on Country Club Road is slightly higher than what was recorded in the 2015 TIA update, but the turning volumes to and from Country Club Road and Battle Lane are very similar in the AM Peak Hour. The PM peak hour turning volumes and through-moving traffic on Country Club Road are very similar to what was recorded in 2015.

The LOS results indicate that the intersections are operating at acceptable levels now but the intersection of Country Club Road at Battle Lane is projected to degrade to LOS E during the PM peak period in year 2024. The southbound, stop-controlled approach to this intersection would be projected to operate at LOS F in year 2024 as is typical at most unsignalized intersections.

The improvements that have been implemented at this intersection as a result of the study that was performed during Modification No. 1 (marked crosswalks, improved pavement markings, and bollards with chains) have reportedly been successful treatments. At this

time, the University is not recommending any further study or the implementation of additional improvements at this intersection but will continue to monitor this intersection and to coordinate with the Town of Chapel Hill on how to address concerns that may be presented at this intersection.

Country Club Road/Gimghoul Road/Paul Green Theater Drive

The stipulations associated with Modification No.1 required a new traffic signal to be implemented at this intersection. This improvement is complete. A new traffic signal with decorative poles and mast arms was installed. The poles and mast arms were colored dark green and the signal heads were colored black. In addition, stamped asphalt crosswalks were installed to simulate a brick pattern. Audible, countdown pedestrian signal heads were also provided.

Manning Drive/Skipper Bowles Drive

Turn restrictions have been implemented to prevent eastbound left-turns from Skipper Bowles Drive onto northbound Manning Drive during special events.

Pittsboro Street/McCauley Street

One of the stipulations that was associated with the University development plan included replacing the traffic signal heads at the intersection of Pittsboro Street and McCauley Street. The existing traffic signal heads has only 8" incandescent displays; the stipulation specifies for the heads to be upgraded to traffic signal heads with 12" LED displays. Prior to submittal of the 2015 update of this TIA, the University started the necessary steps to replace the heads, but the replacement was not completed prior to publishing the 2015 TIA update.

As part of the efforts to replace the traffic signal heads in 2011, staff of VHB Engineering NC, P.C., measured vertical clearances between the traffic signal heads and the road surface, the clearances between the traffic signal wires and the utilities on the existing wood poles, and the available space at the top of the existing wood poles above the current attachment points of the traffic signal cables and the utilities. It was evident that the existing traffic signal heads did not provide the minimum vertical clearances to satisfy requirements of NCDOT; therefore replacing the existing heads with new traffic signal heads featuring 12" displays would even further violate the minimum vertical clearance requirement. In 2011 staff of the Town of Chapel Hill and NCDOT indicated they would require that the minimum vertical clearances be provided with the replacement of the signal heads.

Since publication of the 2013 TIA Update, University staff have coordinated with staff of the Town of Chapel Hill to eliminate the stipulation requiring that the University upgrade the traffic signal heads at the intersection of Pittsboro Street at McCauley Street to 12" LED displays. It is not anticipated that any further action will be necessary for this formerly stipulated improvement.

4.9.2 Suggested Intersection Improvements

Some intersection improvements were previously suggested by the University. Some have been approved for implementation, some have been implemented, while others are still under consideration. Those improvements are discussed below.

Manning Drive/Ridge Road

Manning Drive is a major access street into Main Campus and is the main access to the UNC Hospitals. Manning Drive is a wide four-lane street, expanding to five lanes at major intersections and driveways. It has the character of a suburban arterial road rather than an urban street. While the speed limit is posted at 25 MPH, the appearance and design of Manning Drive encourages speeding. The high volume of traffic, in conjunction with speeding, poses a major safety hazard to the many pedestrians who cross the street in the vicinity of the student housing towers and the Hospital areas. Pedestrian safety and aesthetic improvements in the vicinity of Ridge Road (the student housing area) are very desirable in the near term. Measures to reduce and calm traffic and improve the appearance of Manning Drive are being studied. This could include adding a median on Manning Drive through this area. This suggested improvement has not been designed or implemented.

Mason Farm Road/East Drive

Prior studies suggested that the unsignalized intersection of Mason Farm Road at East Drive may have needed signalization (although the Master Plan includes changes to the road network in this area). Plans for the design of a new traffic signal at this intersection have been completed and the traffic signal has been constructed. The traffic signal includes metal poles and mast arms, audible countdown pedestrian signals, and push-buttons. The metal poles, mast arms, and push-button housing are colored dark green and the housing for all signal heads are black.

Mason Farm Road/West Drive

Again, prior studies and field observations indicated that this intersection may have needed signalization. A traffic signal was installed at this location utilizing wood poles and messenger cable supports. The wood pole supported signal remained in operation for the duration of the construction of the Marsico Hall (formerly Imaging Research Building) on the adjacent corner of the intersection. The construction of Marsico Hall is complete and the wood pole supported traffic signal has been replaced with a new traffic signal including metal poles and mast arm supports. The new traffic signal includes metal poles and mast arms, audible countdown pedestrian signals, and push-buttons. The metal poles, mast arms, and push-button housing are colored dark green and all signal heads are colored black.

4.9.3 *Planned Mid-Block Improvements*

A number of mid-block improvements were previously identified by the University and were approved for implementation. Some of those improvements have been implemented, while others are yet to be implemented.

South Columbia Street between Manning Drive and South Road

Modifications to South Columbia Street between Manning Drive and South Road were recommended to improve safety for cyclists and pedestrians. This section of South Columbia Street was one-way northbound with four traffic lanes, though the eastern curb lane was almost exclusively used by buses in the peak times. Preliminary 2025 traffic projections indicated that two lanes with a bus lane should result in acceptable traffic conditions.

There was a desire to narrow the pavement through this area as it represents a barrier between the Health Science buildings on the two sides of South Columbia Street. The number of lanes may have also encouraged motorists to travel at speeds in excess of the

25 MPH speed limit. Pedestrian flows across the street are high, and safety was a concern even with the signalized pedestrian crossing in front of the Health Sciences Library. South Columbia Street directly north of the Manning Drive intersection had additional width on the west side which could also be narrowed by extending the curb out to achieve a symmetrical section. This improvement has been completed and consisted of the following:

- Removal a travel lane resulting in the following cross-section: two general traffic lanes, a dedicated bike lane, and a dedicated bus lane on the east side;
- Extending the western curb to the east to narrow the pavement;
- Eliminating the excess pavement in the northwest corner of the intersection of South Columbia Street and Manning Drive, and
- Construction of a new traffic signal at the intersection of South Columbia Street at Medical Drive. The signal is pedestrian activated, i.e. the traffic signal remains green for the South Columbia Street vehicular traffic until a pedestrian wishing to cross South Columbia Street presses the push-button. The westbound approach of Medical Drive remains stop-controlled.

4.9.4 Suggested Mid-Block Improvements

Some mid-block improvements were suggested previously by the University, but have not yet been approved for implementation by the Town. Those improvements are discussed below.

Ridge Road

Ridge Road is an important north-south connection on Campus. It is the only significant north-south route aside from the one-way pair of S. Columbia Street and Pittsboro Street. In the peak periods Ridge Road is used by employees in the South Campus area as an alternate route to using Fordham Boulevard to travel between NC 54 from the east and the Hospitals area.

The most significant safety problem is created by the sharp curve near the drive by the practice field. For a 20 MPH design speed, cars turning left or right out of the drive need 230 feet sight distance to see approaching vehicles. Cars turning left out of the drive need 210 feet to clear approaching vehicles from the left.

The sight line out of the drive is now restricted by cars parking on the right side of the drive and by cars parking on the north side of Ridge Road on both sides of the drive. There is also a sign on the left side of the drive, which interferes with the left view.

The following improvements were recommended in previous updates to this TIA and have been implemented:

- Remove the last parking space on the right side of the drive at Ridge Road.
- Remove the last two parking spaces in the curve on the left (north side) Ridge Road approach to the drive.
- Remove the parking spaces between the gate to the Hockey field and the drive on the north side of Ridge Road.

- Move the sign 20 feet back from Ridge Road.

Pedestrian facility improvements were implemented on Ridge Road between Boshamer Stadium and Henry Stadium as part of the Boshamer Stadium improvements. Other facility improvements for pedestrians and bicycles are currently under study.

The Rams Head deck included a northbound left-turn lane on Ridge Road at the main entrance to the deck. In addition a speed table/raised crosswalk was constructed on Ridge Road north of the deck entrances and south of the intersection with Stadium Drive.

4.10 TRAFFIC CALMING MEASURES AND PEDESTRIAN MEASURES

This section discusses improvements that are planned or have been completed to calm traffic or to improve pedestrian facilities on Campus.

Traffic calming measures are intended to slow vehicular traffic and enhance the safety of pedestrians. Calming measures can include devices such as medians, speed tables/bumps, or traffic/pedestrian signals. Other calming measures include intersection and mid-block stop signs, enhanced pedestrian crosswalk striping, or the elimination of turning lanes to reduce pavement width for crossing pedestrians. Figure 4-12 shows existing and proposed traffic calming measures, and planned pedestrian enhancements, for Main Campus. Some of these proposed measures are long term that may extend beyond the Development Plan period.

Not only has the University agreed to provide traffic calming measures on campus, but the University agreed to provide traffic calming measures on streets in neighborhoods immediately adjacent to Campus. As part of the 2006 update, the University coordinated with the traffic engineering staff of the Town of Chapel Hill to identify streets in neighborhoods adjacent to Campus for consideration of implementing traffic calming devices and to identify type and location of appropriate traffic control measures.

The traffic calming devices listed below are the types of devices that were considered appropriate for review for implementation on neighboring streets:

- All-way stops at intersections
- Speed tables
- Speed humps
- Pavement markings

Table 4-15 identifies which streets were considered and which streets were recommended for further consideration for the implementation of traffic calming devices. These recommendations remain unchanged from the February 2006 TIA Update. The University designed and implemented the traffic calming plans at no cost to the Town of Chapel Hill. The Town of Chapel Hill has been responsible for maintaining the traffic calming devices on Town streets after implementation was completed.

All of the traffic calming measures identified in Table 4-15 have been implemented.

For the 2011 TIA update, the Town of Chapel Hill requested additional traffic data be collected on some of the streets where the University previously designed and implemented traffic calming devices. Daily traffic volumes and vehicle speed data were collected at the following locations:

- Ransom Street south of McCauley Street
- Ransom Street south of Vance Street
- McCauley Street west of Brookside Drive

These locations were specified in the fall of 2011 by staff of the Town of Chapel Hill during a field meeting with staff of VHB. The daily traffic volume and speed data were provided to the staff of the Town of Chapel Hill as part of the submission of the 2011 TIA update.

During preliminary discussions with Town staff to prepare for the 2017 TIA update, staff of the Town of Chapel Hill requested that the University gather new traffic and volume data at the same locations noted above. The new data was gathered during the Fall of 2017 and has been provided to the Town of Chapel Hill as part of the submission of the 2017 Development Plan TIA Update.

Following the 2009 TIA update, the University designed and implemented an in-pavement warning light system for a mid-block pedestrian crosswalk on Mason Farm Road between West Drive and South Columbia Street. The system was implemented as part of the construction of the Marsico Hall Building with the support and approval of the Town of Chapel Hill and has been maintained by the Town of Chapel Hill. When activated, the warning light system alerts approaching drivers that pedestrians are in or are approaching the crosswalk. The system initially included push-button activation of the warning light and bollards equipped with sensors to detect pedestrians approaching the crosswalk were installed as part of the completed construction of the Marsico Hall Building in 2016. Staff observed that as of November 2017, the warning light system has been disabled.

The following pedestrian facility improvements, not all shown on Figure 4-12, have also been provided:

- Bell Tower area – New campus open space and pedestrian circulation system were constructed throughout what was previously a parking lot, including ADA accessible sidewalks, pedestrian bridge between the new parking deck and Medical Drive, and landscaping. New walks, and steps were also constructed to connect the Genome Science building with the NC Area Health Education Center, and Fordham Hall, and Medical Drive. New walks and steps were constructed to connect to Taylor Student Health.
- Dental School – New sidewalks were constructed, with establishment of a pedestrian safety zone between the street and the sidewalk along South Columbia Street between the Health Sciences Library and Manning Drive. The improvement extends along Manning Drive to a new patient drop-off on Manning drive and includes a new pedestrian bridge across Manning Drive and landscaping.
- Kenan Stadium – A new fire lane/brick sidewalk access between Stadium Drive and the northwest entry to Kenan Stadium has been constructed.
- New sidewalk on north side of Kenan Stadium connecting the east/west sidewalk along Stadium Drive to the east/west sidewalk on the north side of the stadium has been constructed.
- New sidewalk and steps in the Geology Department Wheeler Memorial Garden that connects Wilson and Mitchell Hall have been constructed
- A newly improved pedestrian circulation system between Stadium Drive and South Road between Fetzer Gymnasium and Woollen Gymnasium has been constructed.

Figure 4-12: Traffic Calming Measures

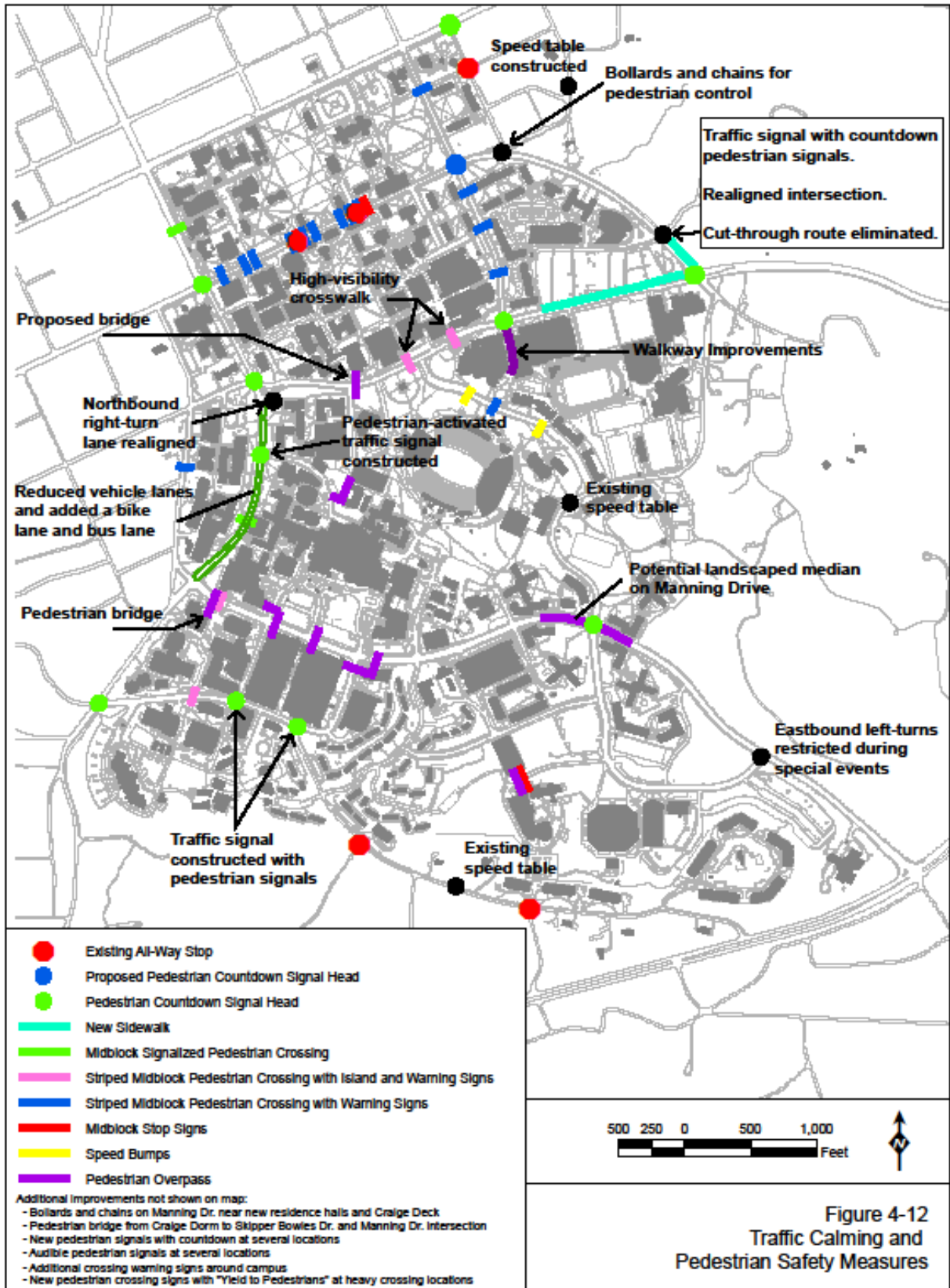


Table 4-15: Neighborhood Streets Considered for Traffic Calming Devices

| Street | Identified for Implementation? | Traffic Calming Measures | |
|--|---|--------------------------|--|
| | | Status | Element |
| Westwood Drive, Ransom Street, McCauley Street, and Vance Street | No. Traffic calming measures have already been implemented. | Complete | All-way stops Improved pavement markings Speed tables |
| Oteys Road | No. Traffic calming measures have already been implemented. | Complete | Speed table |
| Purefoy Road | No. Traffic calming measures have already been implemented. | Complete | Speed tables and all-way stops |
| Mason Farm Road | No. Traffic calming measures have already been implemented. | N/A | N/A |
| Ridge Road | No. Traffic calming measures have already been implemented. | N/A | N/A |
| Laurel Hill Road | No. Alignment and cross-section of road is already a calming measure prohibiting high travel speeds and creating longer travel times than competing routes. | N/A | N/A |
| Gimghoul Road | No. Church property was sold and will be redeveloped as residential units. As a result, the cut-through route connecting to South Road (NC 54) was eliminated. The intersection of Gimghoul Road and Country Club Road has been signalized. Paul Green Theater Drive was relocated to align with Gimghoul Road. | Complete | New traffic signal Decreased corner radii at intersection with Country Club Road Stamped asphalt crosswalks Audible, countdown pedestrian signals |
| Raleigh Street | No. Traffic calming measures have already been implemented. | N/A | N/A |
| Cameron Avenue | No. Traffic calming measures have already been implemented. | N/A | N/A |
| Battle Lane | No. Traffic calming measures have already been implemented. | N/A | N/A |
| Boundary Street | Yes. Plans were completed and submitted to Town for implementation. | Complete | Speed table |
| Park Place | No. Traffic calming devices were deemed not feasible on this street. | N/A | N/A |