Future Trends
Assessment Memo:
Downtown Greenville, SC

Downtown Transportation Master Plan

Greenville, SC
October 14, 2019
# Table of Contents

Table of Contents ........................................................................................................................1
Introduction ................................................................................................................................. 2
2040 GPATS Model Run.............................................................................................................2
Strong Growth 2040 Model .....................................................................................................4
  Comparison of Models.............................................................................................................6
Long Term Project Needs .........................................................................................................8
  Areas Identified by Long Term Trends Assessment...........................................................8
  Areas Identified in Previous Assessments .........................................................................8
  Bicycle and Pedestrian Improvements..............................................................................9
Introduction

Previous memoranda have addressed short-term transportation project needs in downtown Greenville, SC, and have proposed solutions for these areas which can be implemented in a near-term timeframe. This assessment will consider the traffic projections in downtown Greenville, SC for a future-year scenario in order to identify potential future project area needs for long-term planning, design, and funding efforts. The assessment will include a review of issues of congestion and poor mobility for a model year of 2040. The latest version of the Greenville-Pickens Area Transportation Study (GPATS) Horizon2040 travel demand model was used to attain long-term traffic growth projections. An additional model was also generated by modifying the GPATS model’s socio-economic data (i.e., population and employment) to represent an alternative, stronger growth pattern based on additional potential growth opportunities documented in the recently adopted Downtown Strategic Master Plan (DSMP), completed by others in coordination with the City’s Planning and Development Division. In addition to the needs identified in this document based on the growth models, further needs based on additional analysis and stakeholder input will be developed in Phase II of this project. Specific solutions to the needs identified in this assessment will be also be developed and prioritized in Phase II.

2040 GPATS Model Run

For the first alternative, the future-year traffic conditions were projected using the GPATS Horizon2040 travel demand model, based on the existing configurations of the roadways. The Horizon 2040 GPATS model accounts for regional socio-economic changes based on anticipated land use patterns derived from municipal planning efforts and other sources. One important factor to note is that this model did not project any additional population growth within downtown Greenville. Figure 1 shows roadway conditions in terms of PM level of service (LOS). Green segments indicate minor delays (LOS A-C), and red segments indicate severe delays (LOS F). The target desirable LOS is C for urban SCDOT roads. Note that all of the maps in this document show the PM peak hour results, because this was found to represent the worst predicted conditions. The AM peak hour scenario did not identify any additional significant results.

The model indicates very poor (E or F) levels of service around the center of downtown, including Main Street, Church Street, East North Street, Washington Street, and Broad Street. Corridors with LOS D (yellow) are also prevalent around the entire downtown area and include sections of Stone Avenue, North Street (west of Academy Street), West Washington Street, US 29/Church Street and McDaniel Avenue.
Figure 1. GPATS 2040 Model Results
Strong Growth 2040 Model

A second alternative model was also generated which accounted for a stronger growth pattern than the Horizon2040 base model. This scenario was built upon the GPATS base model, and includes modifications based on a market analysis from the current DSMP and upcoming planned downtown developments such as the County Square mixed-use redevelopment site. These modifications focused on the potential for development within the downtown area by making adjustments to socio-economic input parameters (households, total population, and employment). Some assumptions were made during the process to estimate employment and households from market analysis information, which was in the form of gross floor area by residential, commercial or civic lane use. Note that the process did not change the base trip generation rates or origin-destination matrices of the Horizon 2040 model.

Figure 2 shows the LOS results from this model run. The results indicate level of service issues on similar corridors as the GPATS model, but several of these show a poorer LOS than Figure 1. This change in LOS is an indication of the sensitivity of a given road to additional vehicular demands, and this is discussed in a subsequent section of this report.

Any corridor indicating an LOS of E or F in Figure 1 or 2 should be noted as a high-priority project area, since these are projected to be at or near capacity by 2040 and will need improvements to prevent or mitigate congested conditions. A list of all of the areas identified by the various analyses in this document is included in the final section.
Figure 2. Strong Growth 2040 Model Results
Comparison of Models

The two model alternatives were compared to determine where the greatest differences in output occurred between the GPATS model and the strong growth model. These differences indicate that these areas are the most sensitive to growth in population and/or employment, and it is possible that poor operating conditions can develop on these roads if growth occurs at a rate more aggressive than anticipated in long-range planning efforts.

Figure 3 shows the gradient difference between the volume-to-capacity (V/C) ratios in each model. Corridors where the V/C ratio is the most impacted by the stronger growth are shown in red, while dark green indicates corridors that are unchanged.

Figure 3. Change in Volume to Capacity Ratio: GPATS 2040 Model to Strong Growth 2040 Model

While any corridors shown in red should be noted as highly sensitive to changes, the most critical of these areas are those in which the shift in V/C results in a LOS of D or greater. These areas are not only sensitive, but also at the greatest risk of developing poor conditions. Figure 4 indicates the areas which showed both a considerable (greater than 0.02) shift in V/C and an LOS of D or worse in either model.
While some of these sensitive spots represent small localized points of congestion, other areas, such as those along the Main Street, North Street, and Church Street corridors, comprise large portions of roadways through downtown. These areas should be noted as high-need project areas, since they indicate that the entire corridor is likely to be impacted by the effects of future growth.
Long Term Project Needs

Areas Identified by Long Term Trends Assessment

It should be noted that the two models generated projected 2040 traffic conditions based on the existing configuration of the roadways in downtown Greenville with no improvements. However, many roadway and intersection improvement projects have been identified for completion in the short-term future. A list of these projects can be found in the Downtown Transportation Master Plan Short-Term Needs Assessment Memorandum. Some of the corridors which indicate a need for improvement in Figures 1-4 are addressed in the Short-Term Needs memo, and will likely exhibit better future-year operations than those indicated by the models if the short-term projects are performed. A Build 2040 model run will be completed in Phase II to examine those projects’ effects on roadway mobility.

Based on the assessment and considerations in this document, a list of high-need long term project areas is included below:

- Main Street from Ashley Avenue to Academy Street
- Main Street from College Street to Pendleton Street
- Church Street from College Street to Augusta Street
- McDaniel Avenue from McBee Avenue/Washington Street to Pearl Avenue
- McBee Avenue and Washington Street from McDaniel Avenue to Toy Street
- Butler Avenue from Buncombe Street to Westfield Street
- North Street/Buncombe Street from I-385 to Rutherford St
- Richardson Street/River Street from Buncombe Street to South Main Street
- Academy Street from Buncombe Street to Westfield Street
- Washington Street from Mulberry Street to Broad Street
- Washington Street from Church Street to Hudson Street

It may be that not all areas listed above can be addressed through traditional capacity improvement methods. Road widening’s and the use of alternative alignments are limited in scale and application due to the downtown character of the study area. Phase II will evaluate where areas can be improved through these methods, and the influence will be quantified through performance measures.

Areas Identified in Previous Assessments

While further analysis is required to determine other project need areas based on public and stakeholder input, multimodal considerations, and other issues, some additional areas for improvement were already identified during the development of the Downtown Transportation Master Plan Short-Term Needs Assessment Memo. Those potential projects which were determined in that stage to be long-term rather than short-term needs are included below, to be analyzed in further detail for consideration as long-term projects.

- **I-385 and Stone Avenue/Laurens Road Interchange**

  This interchange was indicated as a high-need area during existing conditions analysis and public outreach. The intersection of Stone Avenue and Park Avenue is also impacted by congestion in the area due to its proximity to the freeway ramp entrances. Possible projects could include an alternative interchange configuration such as a diverging diamond or dual roundabout design. A second interstate access point with uni-directional on- and off-ramps to the Laurens Road and Washington Street signal could also divert some traffic away from this intersection. The Park Avenue signal could be reconfigured as a quadrant road intersection, using Hilly Street and Becker Street to divert left turns away from the interchange area. Further evaluation of potential alternatives will be conducted in Phase II.

- **Broad Street-Washington Street Connector**

  Currently, there are limited choices for travelers desiring to travel across the entire downtown area, especially in the southern portion of the city. A southern loop could enhance the connectivity of this area and divert some traffic from the more congested roads like College Street and North Street. Broad Street could serve this purpose, but it currently has
poor connectivity on the east side of downtown. Designing a new alignment that connects Broad Street to the McBee Avenue or Washington Street corridor would complete a loop around the center of downtown.

• **Stone Avenue Safety Improvements**

Stone Avenue provides an important connection across the north end of downtown and carries large volumes of traffic. It currently has narrow lanes and includes very few turn lanes for driveways or intersections along its length. This is a safety issue as well as a cause of congestion on this corridor. A project to widen Stone Avenue for the addition of a two-way left turn lane could improve operations. However, the developments along this road may not allow for a large-scale widening, and in this case, isolated widening’s to provide left turn lanes at strategic intersections may be considered.

• **Pete Hollis Boulevard/Buncombe Street Corridor Improvements**

Pete Hollis Boulevard is the main entry point into downtown Greenville from the northwest. The Downtown Strategic Master Plan proposes a road diet for the Pete Hollis Boulevard/Buncombe Street corridor as part of transforming this highway to an urban boulevard design including landscaped medians and transit, pedestrian, and bicycle accommodations. Initial analysis of the corridor indicated that the proposed road diet is feasible; however, this area is expected to see large amounts of long-term growth, and a detailed analysis of the future traffic conditions is necessary to ensure that an effective design is achieved.

**Bicycle and Pedestrian Improvements**

Greenville’s downtown is a place where many residents live, work, and play. Continuing to maintain the bicycle and pedestrian environment should be an ongoing, long-term goal. Projects such as the Cultural Corridor space on College Street, which was initially proposed in the 2010 Downtown Streetscape Master Plan and new connections between the Swamp Rabbit Trail and Cleveland Park on the east side of downtown are considered to be mid- to long-term endeavors that are worth exploring for future mobility benefits. The Swamp Rabbit Trail connections could be completed along what is known as the McBee Rail-Trail alignment and would connect to a planned Richland Creek greenway system, which was discussed in the 2007 Trails and Greenways Master Plan.

More discussions on long-term bicycle and pedestrian improvements, in the form of new linear connections along potentially available right-of-way will be discussed in Phase II.