Traffic Calming Study

Foreman Hill Road
Bluffton, SC

Prepared By:
Beaufort County Traffic Engineering
1.0 Introduction

The roadway under consideration is Foreman Hill Road in Bluffton, South Carolina. Foreman Hill Road is a 0.9 mile long residential roadway that is owned and maintained by Beaufort County. Foreman Hill Road is essentially an extension of Malphrus Road to Ulmer Road/Shad Avenue. Shad Avenue leads to a small residential community on the May River. Figure 1.1 shows a map of the area surrounding Foreman Hill Road. Foreman Hill Road had been a dead-end dirt road. Beaufort County paved the roadway and connected it to Malphrus Road in 2011. During the paving of Foreman Hill Road, three median chicanes were installed in an effort to control speeding on the roadway. After completion of the project, residents began complaining about speeding and cut-through traffic. Since then, Beaufort County has conducted three speed studies and installed centerline and edgeline pavement markings along the entire length of the roadway. Beaufort County has also collected traffic volume data on Foreman Hill Road using pneumatic tubes and manual counts. The purpose of this study is to analyze the results of the previous speed studies, traffic volume data and to investigate potential traffic calming measures that could be implemented.
2.0 Existing Conditions

The posted speed limit on Foreman Hill Road is 25 miles per hour (mph). The roadway cross-section consists of 2 – 11 ft wide lanes in a 50 ft right-of-way. There are three median chicanes on Foreman Hill Road. The locations of the chicanes are shown in Figure 2.1. Pictures of the chicanes and the roadway are attached in Appendix A. Chicanes 1 and 3 provide a significant change in curvature of the roadway and are effective at reducing vehicle speeds around the chicanes. Chicane 2 only slightly increases the curvature of the roadway. Because of the spacing of chicanes, there is ample distance to allow vehicles to accelerate above the speed limit between each device.

![Figure 2.1 Chicane Locations](image-url)
3.0 Data Collection and Analysis

Beaufort County has conducted the following data collection:

- Spot Speed Studies Using Radar Gun
- Twenty-Four Hour Counts Using Pneumatic Tubes
- Turning Movement Counts

3.1 Vehicle Speed Analysis

Beaufort County Traffic Engineering has conducted three spot speed studies on Foreman Hill Road since December 2012 in response to requests from residents. Figures 3.1 and 3.2 indicate the speed distribution of observations from each of the three speed studies. Vehicle speeds were collected via radar gun at the same location for all of the speed studies. As seen in Figures 3.1 – 3.3, vehicle speeds have increased from an 85th percentile speed of 32.5 mph in December 2012 to an 85th percentile speed of 34 mph in September 2013 and September 2014. The September 2014 study indicates that 50 percent of vehicles measured on Foreman Hill Rd were travelling at 30 mph or greater.

![Figure 3.1](image_url)
Table 3.3 Speed Studies’ Statistics Comparison

<table>
<thead>
<tr>
<th>Speed Statistic</th>
<th>December 14, 2012 Study</th>
<th>September 9, 2013 Study</th>
<th>September 10, 2014 Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Collection Time</td>
<td>12:00 pm – 1:45 pm</td>
<td>2:45 pm – 4:20 pm</td>
<td>2:15 pm – 3:45 pm</td>
</tr>
<tr>
<td>Total Observations</td>
<td>102</td>
<td>129</td>
<td>112</td>
</tr>
<tr>
<td>Mean Speed</td>
<td>29.2 mph</td>
<td>30.6 mph</td>
<td>30.9 mph</td>
</tr>
<tr>
<td>85th Percentile Speed</td>
<td>32.5 mph</td>
<td>34 mph</td>
<td>Approx. 34 mph</td>
</tr>
<tr>
<td>10 mph Pace</td>
<td>25-34 mph</td>
<td>25-34 mph</td>
<td>25-34 mph</td>
</tr>
</tbody>
</table>

3.2 Turning Movement Counts

Three AM and PM peak hour turning movement counts have been performed at the intersection of Foreman Hill Road and Ulmer Road/Shad Avenue since the beginning of 2013. Figure 3.4 offers a comparison of volume statistics from each of the turning movement counts. Figure 3.5 provides the average annual daily traffic volumes (AADT) for years 2013 and 2014.
4.0 Potential Solutions and Safety Concerns

The following sections provide a plan to reduce speeding and improve safety along Foreman Hill Road.

4.1 Speed Humps

One potential strategy to reduce speeding is to install speed humps at various locations on Foreman Hill Road. Studies have determined that properly designed, installed and spaced speed humps can result in a significant reduction of vehicle speeds exceeding 30 mph with most vehicles travelling at 20-25 mph.

Since Foreman Hill Road is a county owned and maintained roadway, the installation of speed humps is only permissible if the roadway meets the conditions set forth in the Beaufort County Traffic Calming Policy, which is attached to this report in Appendix B. Figure 4.1 summarizes the conditions for the installation of speed humps and whether or not Foreman Hill Road meets the conditions based on the collected data. The 85\textsuperscript{th} percentile speed indicates slightly less than the baseline to install speed humps; however, due to the high percentage of traffic travelling at speeds of 30 mph or greater, speed humps should be considered for installation. With proper design, speed humps do have the ability to reduce speeding. Based on criteria from the Institute of Transportation Engineers (ITE) and Federal
Highway Administration (FHWA), speed humps should be spaced between 250 to 550 ft in order to achieve consistent vehicle speeds averaging 25 mph. Speed humps should be placed halfway between other existing traffic calming devices to manage a consistently lower vehicle speed. Potential locations for speed humps are shown in Figure 4.2. Sample pictures and details of typical speed humps are shown in Appendix C.

<table>
<thead>
<tr>
<th>Traffic Calming Policy Condition</th>
<th>Foreman Hill Road Condition</th>
<th>Condition Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posted speed limit of 30 mph or less</td>
<td>Posted speed limit is 25 mph</td>
<td>Yes</td>
</tr>
<tr>
<td>85th percentile speed greater than 10 mph over posted speed limit</td>
<td>85th percentile speed is 9 mph over the posted speed limit</td>
<td>No</td>
</tr>
<tr>
<td>Volume less than 2,500 vehicles per day</td>
<td>AADT of 2,000 vehicles per day</td>
<td>Yes</td>
</tr>
<tr>
<td>Roadway classified as local or minor collector</td>
<td>Roadway is classified as local</td>
<td>Yes</td>
</tr>
<tr>
<td>Location will not have significant interruption of emergency services</td>
<td>Unlikely to have significant interruption</td>
<td>Yes</td>
</tr>
<tr>
<td>Neighborhood agrees to share in funding of improvements</td>
<td>Unknown at this time</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Figure 4.1 Beaufort County Traffic Calming Policy Conditions**

### 4.2 Sidewalk

Another potential strategy to improve safety is to install a sidewalk on one side of the roadway. Residents along Foreman Hill Road have expressed concern about the safety of pedestrians that walk along Foreman Hill Road. A solution to improve safety of pedestrians is to install a sidewalk along at least one side of the roadway. Foreman Hill Road has a 50’ wide right-of-way with open drainage. Given the cross section and right-of-way, there should be sufficient space to accommodate a sidewalk on one side of the roadway. This will require further storm water analysis to determine if drainage will be impacted.

Installing sidewalk along Foreman Hill Road would be considered the first step towards an important new network of sidewalk in the area. There are many residents that live along Malphrus Road and in the Alljoy area. There is also a recreation facility nearby on Ulmer Road. McRiley Elementary School is nearby on Burnt Church Road, and downtown Bluffton is not far away. The future network of sidewalk would begin at the existing pathway on Bluffton Parkway, down Malphrus Road and Foreman Hill Road, and then along Ulmer Road to connect with Burnt Church Road. Sidewalk would then be added along Burnt Church Road from Ulmer Road to connect with existing sidewalk on Bruin Road. Sidewalk could also be added to Alljoy Road and Shad Avenue giving residents in the Alljoy area pedestrian access to many facilities.

### 4.3 Mini Traffic Circle

A mini traffic circle is another strategy to reduce speeding on the roadway. A mini traffic circle is a traffic calming method that involves placing a small, landscaped or painted circle in the center of an intersection. This requires approaching vehicles to change their path and go around the circle, which reduces vehicle speeds. Mini traffic circles are a relatively popular traffic calming device for neighborhoods as they can be aesthetically pleasing and inexpensive to install. Near the north end of Foreman Hill Road, there is a wide section of roadway that was previously a cul-de-sac. This location would be ideal to install a mini traffic circle. A map showing the location of the mini traffic circle in relation to the proposed speed humps is shown in Figure 4.2 and a picture of the potential mini traffic circle location is shown in Figure 4.3. Sample pictures of mini traffic circles and a sketch of the potential circle installation on Foreman Hill Road are show in Appendix D.
Figure 4.2 Potential Speed Hump and Mini Traffic Circle Location
5.0 Recommendations

After careful review of data and existing conditions, Beaufort County Traffic Engineering recommends installation of a mini traffic circle and four speed humps in the locations shown in Figure 4.2. Sidewalk should also be considered for installation along one side of the roadway pending a more thorough design review. A cost estimate for the proposed traffic calming measures is presented in Figure 5.1.

<table>
<thead>
<tr>
<th>Traffic Calming Device</th>
<th>Quantity</th>
<th>Unit Price ($)</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed Hump</td>
<td>4</td>
<td>3,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Mini Traffic Circle</td>
<td>1</td>
<td>10,000</td>
<td>10,000</td>
</tr>
</tbody>
</table>

**TOTAL COST WITH CONTINGENCY = $30,000**

Figure 5.1 Cost Estimate
APPENDIX A

Chicane 1

Chicane 2
APPENDIX B
Beaufort County - Traffic Calming Policy
June 11, 2013

1. Process starts with written request from Homeowners Association or residential neighborhood group.

2. Traffic Engineering Staff will meet with neighborhood representatives to discuss study need, study scope and neighborhood limits.

3. Traffic Engineering Department conducts study of neighborhood. Study may include:
   a. Speed studies using radar gun
   b. Traffic Counts
   c. Signing evaluation and appropriateness
   d. Accident Analysis
   e. Pedestrian Access evaluation
   f. Intersection and Corridor Condition Diagrams

4. Once data collected, evaluation completed to determine demonstrated need and applicability.

5. For Speed Humps and Speed Tables, the following conditions must exist:
   a. Posted speed limit of 30 mph or less
   b. Speed study demonstrates need with 85% speed greater than 10 mph over posted
   c. Volume less than 2,500 vehicles per day
   d. Roadway classified as either Local or Minor Collector
   e. Location will not have significant interruption of emergency services
   f. Neighborhood agrees to share in funding of improvements

6. For other calming devices, the following conditions must exist:
   a. Posted speed limit of 35 mph or less
   b. Speed study demonstrates need with 85% speed greater than 10 mph over posted
   c. Volume less than 3,500 vehicles per day
   d. Roadway classified as either Local or Minor Collector
   e. Location will not have significant interruption of emergency services
   f. Neighborhood agrees to share in funding and/or maintenance of improvements

7. Proposed Traffic Calming Plan must be approved by 75 percent of those owning real property within the residential development.

8. Proposed traffic calming plan and requisite budget are given necessary Committee/County Council approval.

9. Expenditure of traffic calming funds on first come first serve basis as funds permit.

10. Traffic calming features may include the following:
    a. Speed humps
    b. Speed tables (raised crosswalks)
    c. Roadway narrowing (Chicanes)
    d. Mini traffic circles
    e. On-street Parking bump-outs

11. Pavement markings and signing based on guidance of MUTCD. Follow-up Study will be completed 3-12 months after traffic calming plan has been enacted to determine compliance and results.
APPENDIX C
SAMPLE SPEED HUMP PICTURES AND DETAILS
Construction Detail
Not to Scale

Sign Descriptions:
W17-1 (Speed Hump Sign)
W13-1 (Advisory Speed Plaque)

"Use 12" taper with curb & gutter, not encroaching into gutter area.

Note:
1. Materials must be approved by Resident Maintenance Engineer.
2. Decorative asphalt paving may be used if in accordance with SC DOT standards.

PARABOLIC SPEED HUMP
For use on roadways with ADTs ≤ 2,000
APPENDIX D
SAMPLE MINI TRAFFIC CIRCLE PICTURES AND DESIGN SKETCH