

TRANSPORTATION DEPARTMENT



**Scottish Hills:
Brookgreen Drive & Tarbert Drive**

Town of Cary – Traffic Calming Program

March 2024

Traffic Data Summary

Introduction

Cary has responded to a citizen-initiated application for traffic calming in the Scottish Hills community by collecting data on the speed and volume of vehicles traveling along both Brookgreen Drive and Tarbert Drive. The following presents a summary of the data and a discussion of how it informs the recommendation for or against traffic calming devices to be made by Cary staff.

Scottish Hills is located in central Cary, as shown on Figure 1. The areas evaluated include Brookgreen Drive from Plantation to Lake Pine and Tarbert Drive between Lake Pine and Cary Parkway. **Both are classified as Collector corridors in the Cary Community Plan**, Brookgreen being a Collector Street and Tarbert a Collector Avenue.

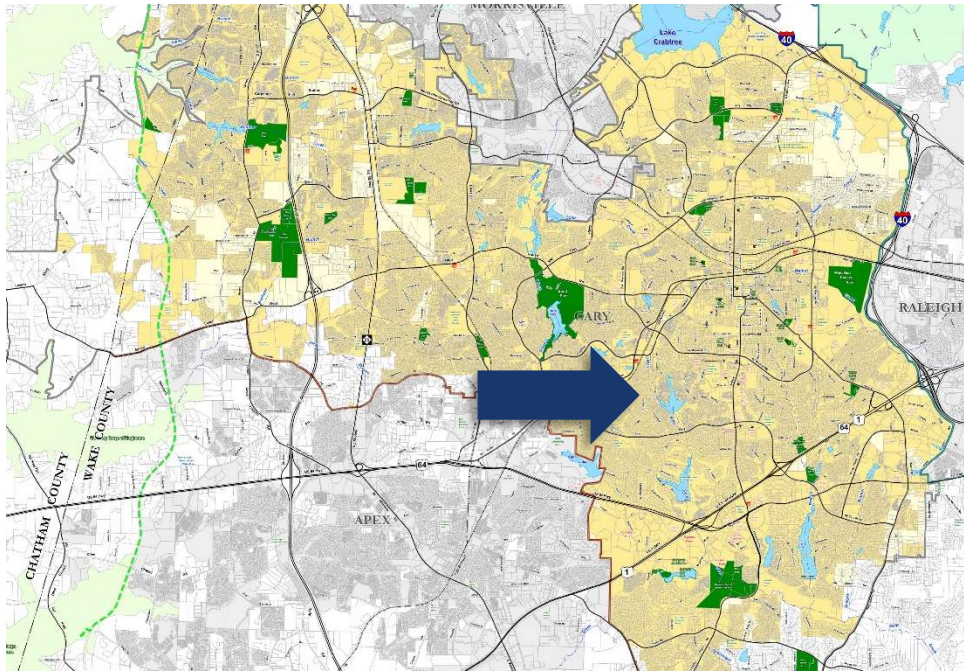


Figure 1 - Site Vicinity Map

Data Collection

Staff initiated traffic counts using one of Cary's on-call vendors for traffic data collection. Pneumatic tube counters were placed at the locations recommended by staff. Four (4) count locations were chosen for the little-over-a-mile long **Brookgreen Drive**, as shown on Figure 2. Three (3) count locations were chosen for the shorter, 3/4-mile long, segment of **Tarbert Drive**, as shown on Figure 3. The counters recorded each vehicle passing over the tubes for a 72-hr period in the September of 2023, the direction and speed thereof, and classified them according to size and axle configuration. The data was then aggregated into actionable metrics of volume (Average Daily Traffic) and speed (Average Speed and Percentile Speed).

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Figure 2 - Traffic Count Location (Brookgreen Drive)



Figure 3 - Traffic Count Location (Tarbert Drive)

Traffic Volume

The total volume of vehicles traveling over the count location is represented using the conventional traffic engineering metric of **Average Daily Traffic (ADT)**. ADT is the total volume during a given time period (in whole days), greater than one day and less than one year, divided by the number of days in that time period. It is common to see a fluctuation in the average daily traffic along a road. Therefore, the values presented herein are averages of the 24-hour counts in the collected data sets.

What are considered typical traffic volumes for various Cary street classifications are listed below, as defined in Section 3000 of the Cary Standard Specifications. The ADT limits listed are guidelines used for planning purposes and may vary.

- Minor Local Street..... ADT less than 400 vehicles per day
- Major Local Street..... ADT less than 1,500 vehicles per day
- Collector Street..... ADT less than 3,000 vehicles per day
- Major Collector Street/Avenue..... ADT expected to exceed 3,000 vehicles per day

The ADT data is presented in Table 1 and Table 2 for the traffic counts along Brookgreen and Tarbert Drives.

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Table 1 - Traffic Volume (Brookgreen Drive)

Location	Date	Average Daily Traffic (ADT)
1208 Brookgreen Drive	Sept 19-21, 2023	741 vehicles per day
1002 Brookgreen Drive	Sept 19-21, 2023	601 vehicles per day
909 Brookgreen Drive	Sept 19-21, 2023	671 vehicles per day
709 Brookgreen Drive	Sept 19-21, 2023	649 vehicles per day

Table 2 - Traffic Volume (Tarbert Drive)

Location	Date	Average Daily Traffic (ADT)
1600 Tarbert Drive	Sept 19-21, 2023	605 vehicles per day
Tarbert Drive @ Annie Jones Park	Sept 19-21, 2023	563 vehicles per day
1288 Tarbert Drive	Sept 19-21, 2023	486 vehicles per day

Traffic Speed

Directional speed was collected for each vehicle that traveled over the count location for the 72-hour collection period. Speed can be aggregated and presented using multiple metrics, each of which provides traffic engineers with a different perspective on the prevailing pattern of behavior. For the purpose of informing Cary staff's recommendations on traffic calming, the metrics of Average Speed and Percentile Speed are valuable.

Average Speed is a straightforward account of all speed measurements taken divided by the total number of vehicles counted. Average Speed would ideally fall below the posted speed limit and within a several miles-per-hour range of the Design Speed for a roadway. Cary staff use this to determine if other metrics are within a reasonable range of the total average.

Percentile Speed is the speed below which a given percentage of measured vehicles were traveling. For example, if 50 out of 100 vehicles are measured below 24 mph and all but 5 are measured below 30 mph, the 50th Percentile Speed for that group is 24 mph and the 95th Percentile Speed is 30 mph.

One of the most commonly used metrics by traffic engineers is the **85th Percentile Speed**. Again, this value shows the speed below which 85% of the vehicles counted were traveling. This value has historically been used by most U.S. jurisdictions to establish posted speed limits and should correlate to the safe travel speed (**Design Speed**) for a given roadway. It is also often used to describe the behavior of "most" drivers.

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The speed data is presented in Table 3 and Figure 4 for the traffic counts that were performed for **Brookgreen Drive**, which is posted at 25 mph. In the context of traffic calming, Cary staff look for the 85th Percentile Speed to fall within several miles-per-hour of the posted speed limit (orange line) and below the “ticketable” threshold for a roadway, which is considered more than 9 mph above posted (red line).

Table 3 - Traffic Speed (Brookgreen Drive)

Location	Direction	Average Speed	85 th Percentile Speed
1208 Brookgreen Drive	Northbound	26 mph	31 mph
	Southbound	27 mph	32 mph
1002 Brookgreen Drive	Northbound	27 mph	32 mph
	Southbound	26 mph	31 mph
909 Brookgreen Drive	Northbound	27 mph	33 mph
	Southbound	28 mph	33 mph
709 Brookgreen Drive	Northbound	28 mph	33 mph
	Southbound	28 mph	34 mph

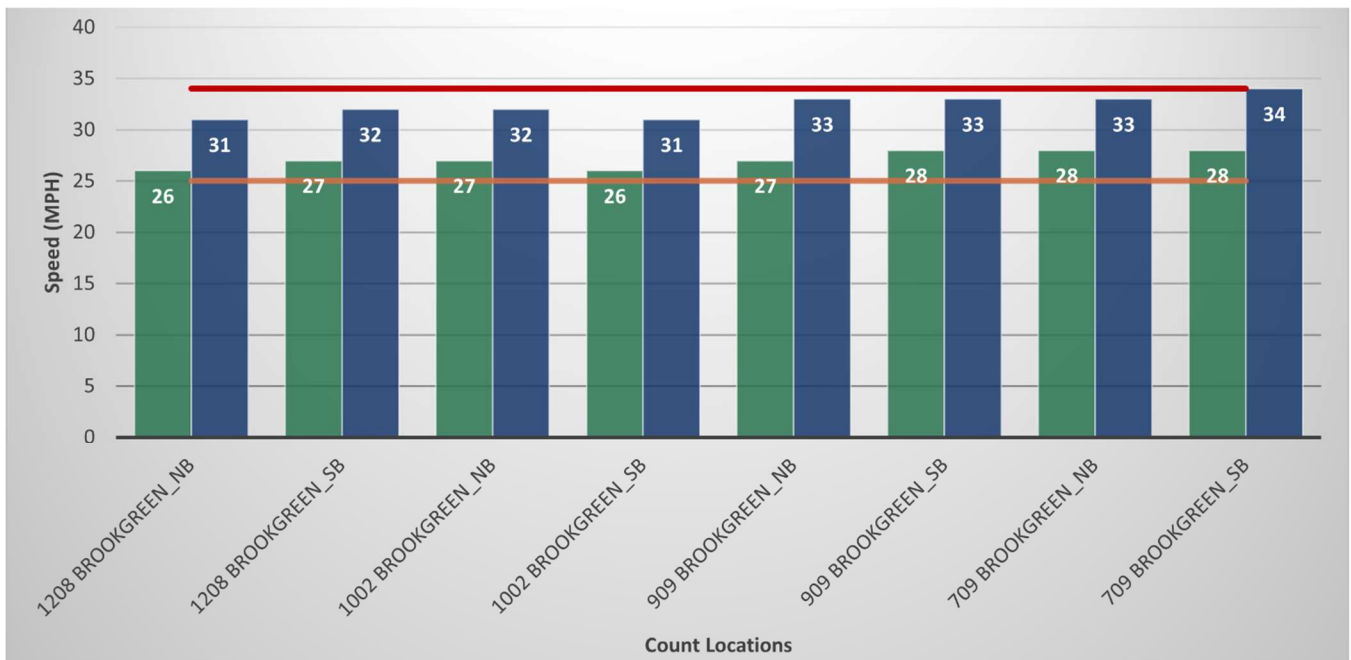


Figure 4 - Speed Metrics Chart (Brookgreen Drive)

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The speed data is presented in Table 4 and Figure 5 for the traffic counts that were performed for **Tarbert Drive**, which is also posted at 25 mph.

Table 4 - Traffic Speed (Tarbert Drive)

Location	Direction	Average Speed	85 th Percentile Speed
1600 Tarbert Drive	Eastbound	24 mph	29 mph
	Westbound	24 mph	31 mph
Tarbert Drive @ Annie Jones Park	Eastbound	25 mph	29 mph
	Westbound	27 mph	32 mph
1288 Tarbert Drive	Eastbound	25 mph	31 mph
	Westbound	22 mph	28 mph

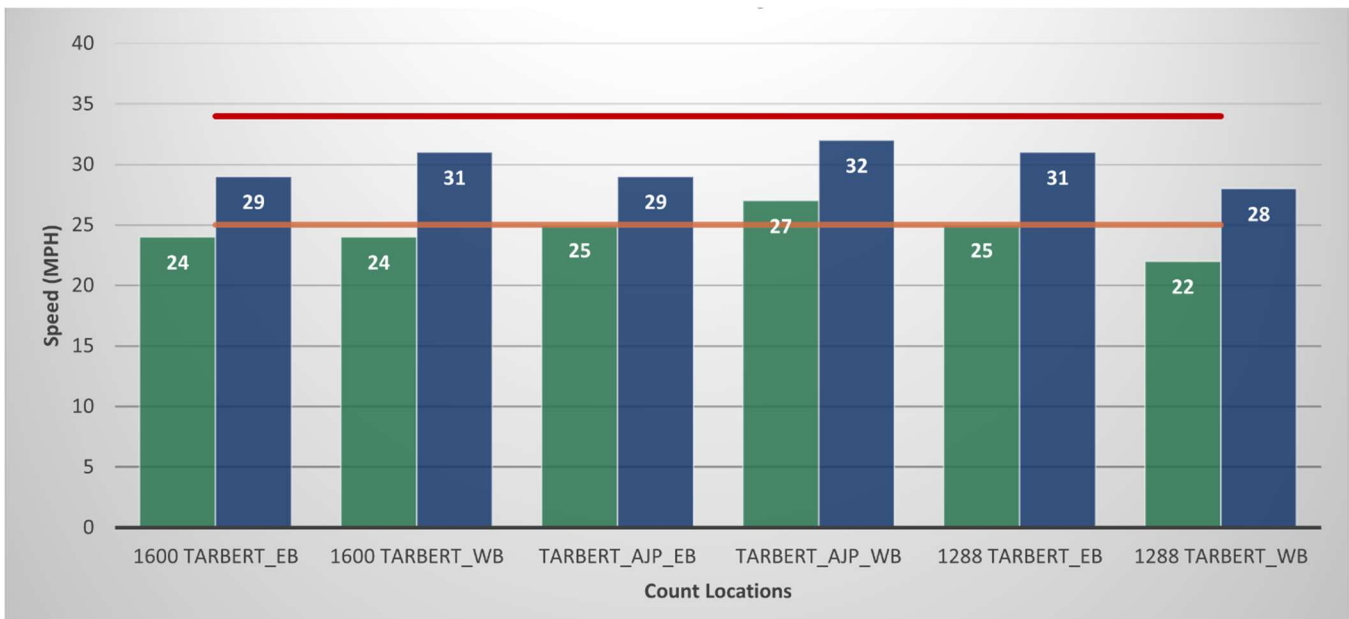


Figure 5 - Speed Metrics Chart (Tarbert Drive)

Beyond the measured numbers, how speeds are distributed across the range is reviewed by Cary staff. It is expected that speeds are normally distributed, meaning that most values for speed typically occur in a central range, with fewer values occurring outside of this range on either the high or the low side. Few drivers will drive extremely fast or extremely slow in comparison to others. In order to exhibit this, vehicle speeds are broken down into speed "bins" and charted as shown on Figure 7 and Figure 6. A gradual rise and fall of the speed curve (bell curve) represent a normal distribution.

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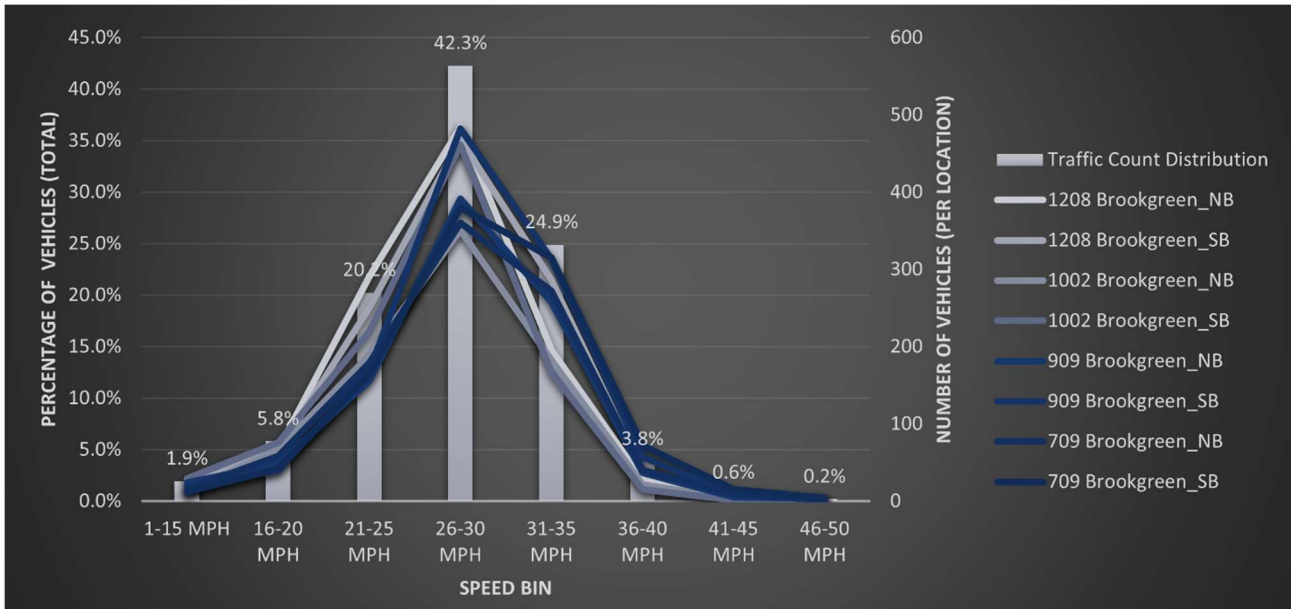


Figure 7 - Speed Distribution Chart (Brookgreen Drive)

The data trends for **Brookgreen Drive** show that the majority of traffic is traveling above the 25-mph posted speed limit. The distribution curves appear consistent across all count locations, all depicting peaks above the speed limit. Despite this trend, the curves also depict a relatively small portion of vehicles in the “ticketable” range. These results appear to indicate that a pattern of speeding exists along Brookgreen Drive, but that excessive speeding is not common.

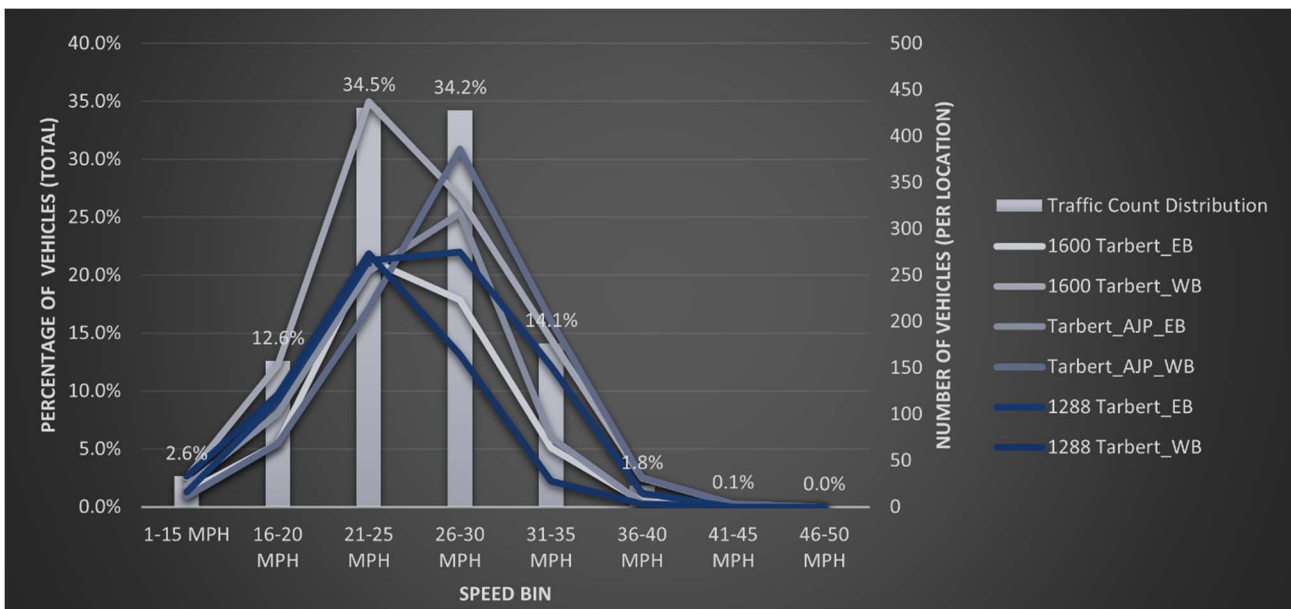


Figure 6 - Speed Distribution Chart (Tarbert Drive)

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The data for **Tarbert Drive** depicts a less distinct pattern with a higher percentage of traffic within 5 mph of the posted speed limit. The distribution curves are less consistent, as noted by the left-right offset of some. In total, the data shows that most drivers are within the 10-mph pace speed centered on the 25-mph limit and does not indicate a substantial percentage of vehicles in the “ticketable” range. These results do not indicate that a pattern of speeding exists along Tarbert Drive.

Conclusion & Recommendation

Traffic calming devices, and specifically speed humps, raised crosswalks and the like, are designed to keep traffic near Cary’s statutory speed limit of 25 mph and are therefore relatively traversable at that speed. In cases where the 85th Percentile Speed is 35 mph or higher, a reduction in average speed of several miles per hour or more can be anticipated with certain traffic calming solutions. Consequently, Cary’s *Traffic Calming Program* references a threshold of 9 mph as the benchmark for staff to recommend traffic calming in order to focus such devices where their impact can be maximized.

For instances where most vehicles are traveling near the 25-mph statutory limit, staff do not expect that speed humps or similar devices will result in a meaningful change to driver behavior. Neighborhoods where this is the case can sometimes benefit more from active efforts by the community, such as education of other residents and increasing the frequency of on-street parking.

The data for **Brookgreen Drive** measured a highest 85th Percentile Speed of 34 mph, approaching 10 mph above the posted speed limit. Several other measurements, while lower, were within a few miles-per-hour, indicating some consistency. In contrast, the percentage of vehicles measured in the “ticketable” range was not significant. The aggregate data is somewhat inconclusive but indicates that traffic calming may be warranted. Pairing the speed data with the traffic volume, which is notably low for a Collector Street classification, **staff are recommending that Brookgreen Drive be considered for traffic calming** to complement the residential nature of this community.

The data for **Tarbert Drive** tells a different story, with a highest measured 85th Percentile Speed of 32 mph and several values below 30 mph, which is within a reasonable range of the posted speed limit. The percentage of vehicles measured in the “ticketable” range is also not significant. The aggregate data indicates that traffic calming does not appear to be warranted so **staff are not recommending that Tarbert Drive be considered for traffic calming.**

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