

Arlington County Finds the Best Spots for Rectangular Rapid Flashing Beacons

Arlington, Virginia

KEY ELEMENTS:



RRFB Implementation



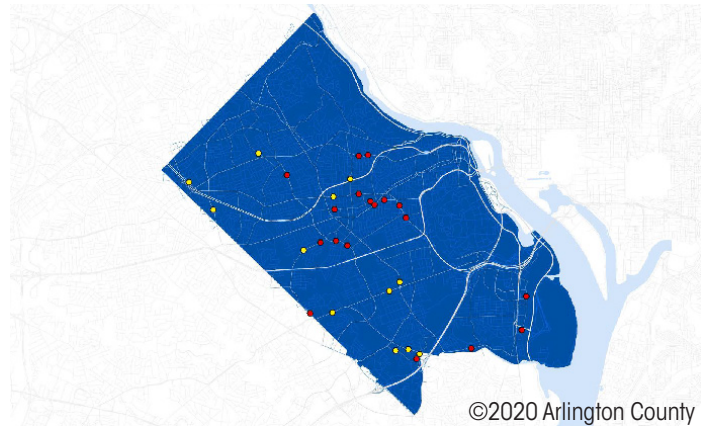
Data-Driven Evaluation

Arlington County, Virginia has developed a program for widespread implementation of Rectangular Rapid-Flashing Beacons (RRFBs) in an effort to improve pedestrian safety and increase driver yielding behavior at crosswalks throughout the County. To maximize the safety benefits of the RRFBs, the County has developed a data collection and evaluation program to inform future site selection and implementation.

RRFB IMPLEMENTATION IN ARLINGTON COUNTY

RRFBs are pedestrian-actuated devices consisting of two rectangular yellow light-emitting diode (LED) arrays that flash when activated. RRFBs are combined with pedestrian, school, or trail crossing warning signs to improve safety and enhance conspicuity at uncontrolled pedestrian crossings.

Arlington County, Virginia, has a high level of transit accessibility because of its proximity to the Washington, D.C. metropolitan area, leading to increased pedestrian activity. To systemically improve pedestrian safety, Arlington County installed 10 RRFBs at active pedestrian crossings through the end of 2017. Subsequently the County has planned the installation of 20 more by the end of 2020 (figure 1).



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Figure 1. Graphic. RRFB locations, existing and planned.

EVALUATING EXISTING RRFB SITES

The Arlington County Department of Environmental Services' Transportation Engineering and Operations evaluated the first 10 RRFB locations, which were spread across the County and implemented in a range of settings, to optimize the placement of the 20 planned RRFBs. The County asked several key questions regarding both pedestrian and driver behavior at RRFB locations as part of their evaluation, including:

- Are pedestrians actuating the RRFB? How often?
- What are the volumes and characteristics of the pedestrians at the crossing?
- At what rate are drivers yielding to pedestrians at the RRFB?
- How do vehicle speeds change when the RRFB is flashing?



U.S. Department of Transportation
Federal Highway Administration



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Case Study: Arlington County Finds the Best Spots for Rectangular Rapid Flashing Beacons

STEP: https://safety.fhwa.dot.gov/ped_bike/step/

In addition to these items, the County Staff recorded data at each site including the number of lanes and the posted speed limit.



Figure 2. Photo. RRFB evaluation site on N. Quincy St. at 15th St. N.

RRFB EVALUATION RESULTS

The results across the 10 study locations showed that after installing the RRFBs, driver speeds reduced by 15 percent. Crossings experienced an overall increase of 110 percent in driver yielding (for an overall yielding rate of 70 percent following implementation). The sites also experienced an increase in pedestrian volumes.

Additionally, Arlington County modeled the average driver yielding rate as a function of the 85th-percentile speed (measured when the RRFBs were not flashing). As the 85th-percentile speed increases, average driver yielding rate decreases according to a logistic function. The results showed that when the 85th-percentile speed is between 30 and 35 miles per hour (mph), a 1-mph reduction in speed corresponds to an 11-percent increase in average driver yielding rate. At 30 mph, the modeled yielding rate was 75 percent, but it decreases to 50 percent at 34 mph and to 25 percent at 37.5 mph.

BEST PRACTICES AND RRFB SITING MATRIX

Arlington County used the results from the 10 RRFB study locations to support screening out high-speed (i.e., 40 miles per hour or above) roads from potential RRFB locations and prioritizing locations with the highest potential benefit. The team also required collecting aggregate speed data for the “before” condition for use in future evaluation and recommended the computation of a benefit/cost ratio. On an individual project level, the team recommended considering speed mitigation measures (such as speed feedback signs, “slow” markings, and speed enforcement) alongside RRFBs at higher speed locations to augment the safety effects.

Arlington County used the evaluation results to update their guidelines for uncontrolled crosswalk treatments. Now, practitioners can determine appropriate treatments (including RRFB) based on factors including average daily traffic, pedestrian activity, posted speed limit (or 85th percentile speed), lane configuration, and median presence for a given location.

Arlington County plans to continue evaluating the RRFB installations and collecting additional safety and operational data as RRFB implementation continues.

When the 85th-percentile speed is between 30 and 35 miles per hour (mph), a **1-mph reduction** in speed corresponds to an **11-percent increase** in average driver yielding rate.

Resources

Arlington, Virginia Department of Environmental Services, “Pedestrian Planning and Design Assessing the Effectiveness of RRFBs,” <https://www.novaregion.org/DocumentCenter/View/12191/PAC-Presentation-Arlington-REGIONAL>. n.d.

Smith, J., “Making Walker Safer with Rapid Flashing Beacons,” <https://newsroom.arlingtonva.us/release/making-walking-safer-with-rapid-flash-beacons/>. June 7, 2019.