Various studies have declared the use of streetlights to be an ineffective method of combating criminal activity. However, we found most of these studies to have a broad focus, on the other hand, were interested in the less-studied minutes of how bright and operational streetlights influence the location of criminal activity. The intent of this project is to evaluate the streetlights in two neighborhoods in the Greenville area, Poe Mill and New Washington Heights, by comparing their illumination radii and determining their correlation with recent crime statistics. Between both sites, we catalogued over 100 streetlights, many of these were non-operational. It should be noted that the intent of this project is not to determine the ability of nighttime lighting to remove crime from a neighborhood altogether, but to instead search for a noticeable relationship between illumination and reported crime.

Methodology
In cataloging each streetlight, we took note of three characteristics: the location of the streetlight (later confirmed and pinpointed via Google Earth), whether or not it is operational, and what type it is. We found all of our streetlights to be of two uniform models: older incandescent lights and newer LED lights. Both models were of equal height, approximately 8.25 meters above the ground. We then proceeded to measure the light level beneath each streetlight model using an Esrich Probeam. Using this data and the output in lumens of each streetlight model, we were able to model illumination under any streetlight using the equation $Eh = (I N / \Phi)$ where $E$ is the intensity of light in a given direction relative to $I$, $N$ is the number of lumens output, and $\Phi$ is the angle in degrees from the point of measurement to the light source relative to the ground. After obtaining our crime data courtesy of the Greenville County Sheriff’s Office, we then separated out crime reports from the past 5 years. Using this data and the output in lumens of each streetlight model, we were able to model illumination under any streetlight using the equation $Eh = (I N / \Phi)$ where $Eh$ is the intensity of light in the ground direction.

Results and Discussion
Our pilots showed significant variance between the two neighborhoods. In Poe Mill, there were streetlights, supported by the increase in crime hotspots in these areas at night, particularly in non-residential areas. In New Washington Heights, however, the streetlights appeared to have little impact and actually increased the reporting of crime. Many factors are at work here, while in some cases crime could be reduced due to the illumination of the streetlights, streetlights could also be increasing the reporting of crime due to visibility and community pride. For example, community leaders have informed us of hotspots of criminal activity not visible in our maps due to underreporting. Additionally, our sample size is small enough that natural variance could cause significant discrepancies in the data. We would recommend that community leaders use these maps as a supplement to their current knowledge of criminal activity in the community rather than relying solely on statistical analysis.

Future Research
Further research could be conducted in the differences between types of streetlights. Most streetlights in these areas are 175W mercury vapor lamps and 100W high-pressure sodium lamps. Despite the difference in wattage, the newer high-pressure sodium and LED lights provide greater illumination for a lower cost. Further research could also be conducted in the differences between types of streetlights, with the newer high-pressure sodium and LED lights providing greater illumination for a lower energy input. Modeling the actual ground illumination of these streetlights and the effect of different light levels on crime could play a major role in determining how communities should apply lighting to create a safer community.

References/ Data Sources

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