

Mapping Furman's Sprinkler System Using Drone Based Photographs

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Abstract

A common complaint among students and faculty is that they must dodge sprinklers while walking around campus. Substantial amounts of runoff puddle the roads and sidewalks. This presents an obvious problem for water conservation. Furman University prioritizes aesthetic landscaping and sustainability. However, the current sprinkler system poses a contradiction for upholding both of these priorities. Sprinklers are placed subjectively along the Furman mall to keep the grass and gardens as lush and green as possible. These sprinklers actually overlap and water the concrete much more than they were purposed to do. In this study, I have mapped the sprinklers which are located along the mall, the main fountain roundabout, and the highway fields to find the areas which are overwatered. This study will provide the information needed to reduce the amount of water used for landscaping.

Methodology and Previous Work

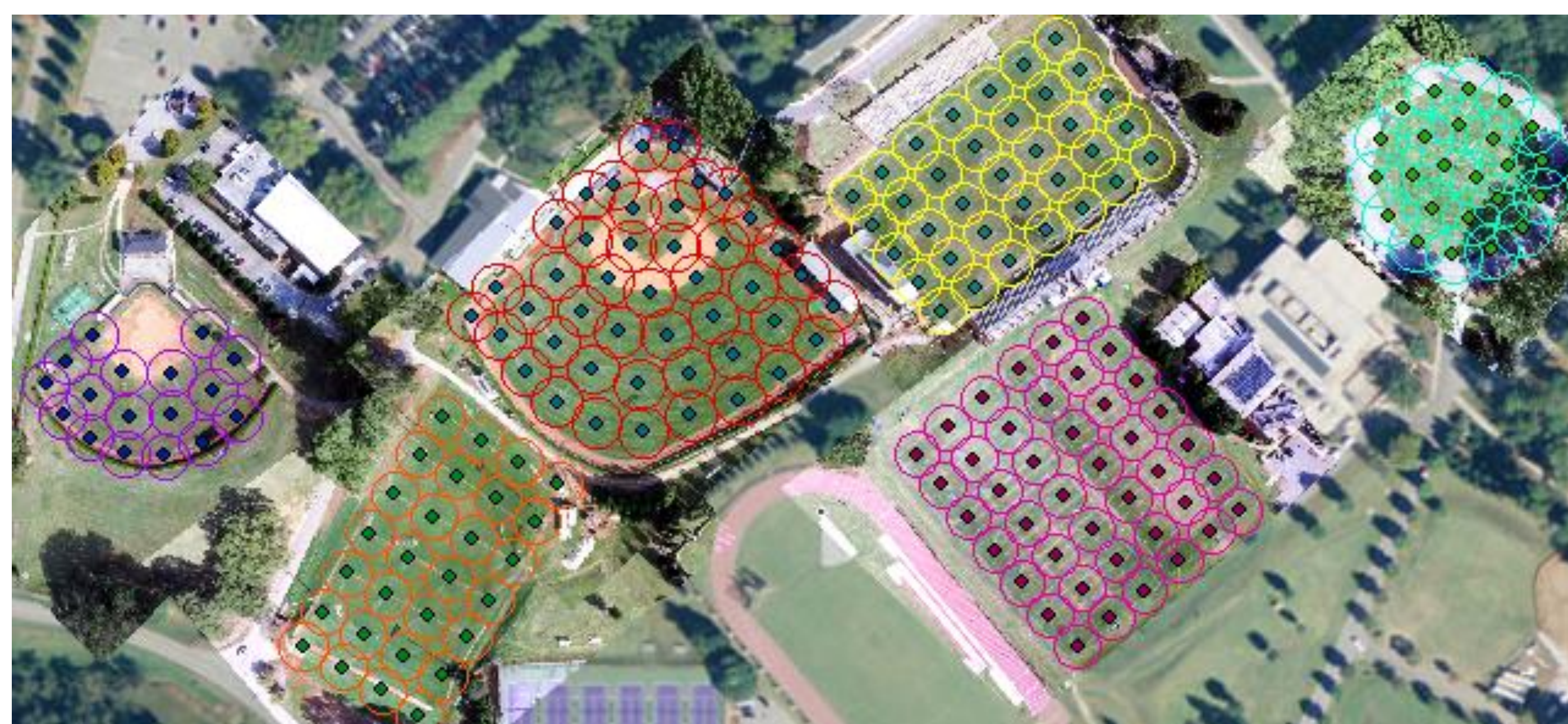
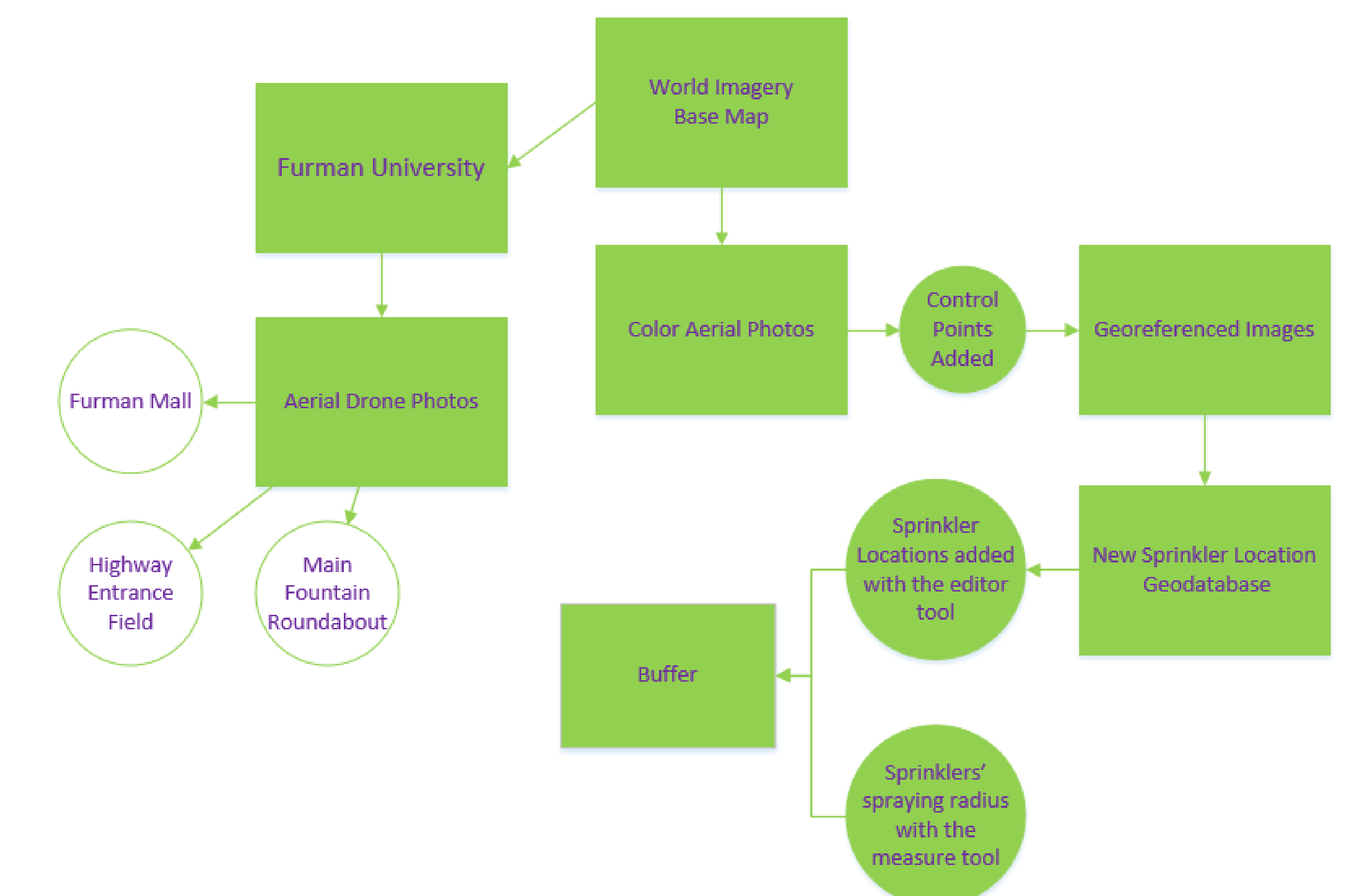


Figure 1: Similar research has been conducted by Meredith Schosky. This map shows her research of the irrigation system on the athletic fields. Her methodology was also used with my project.

Results

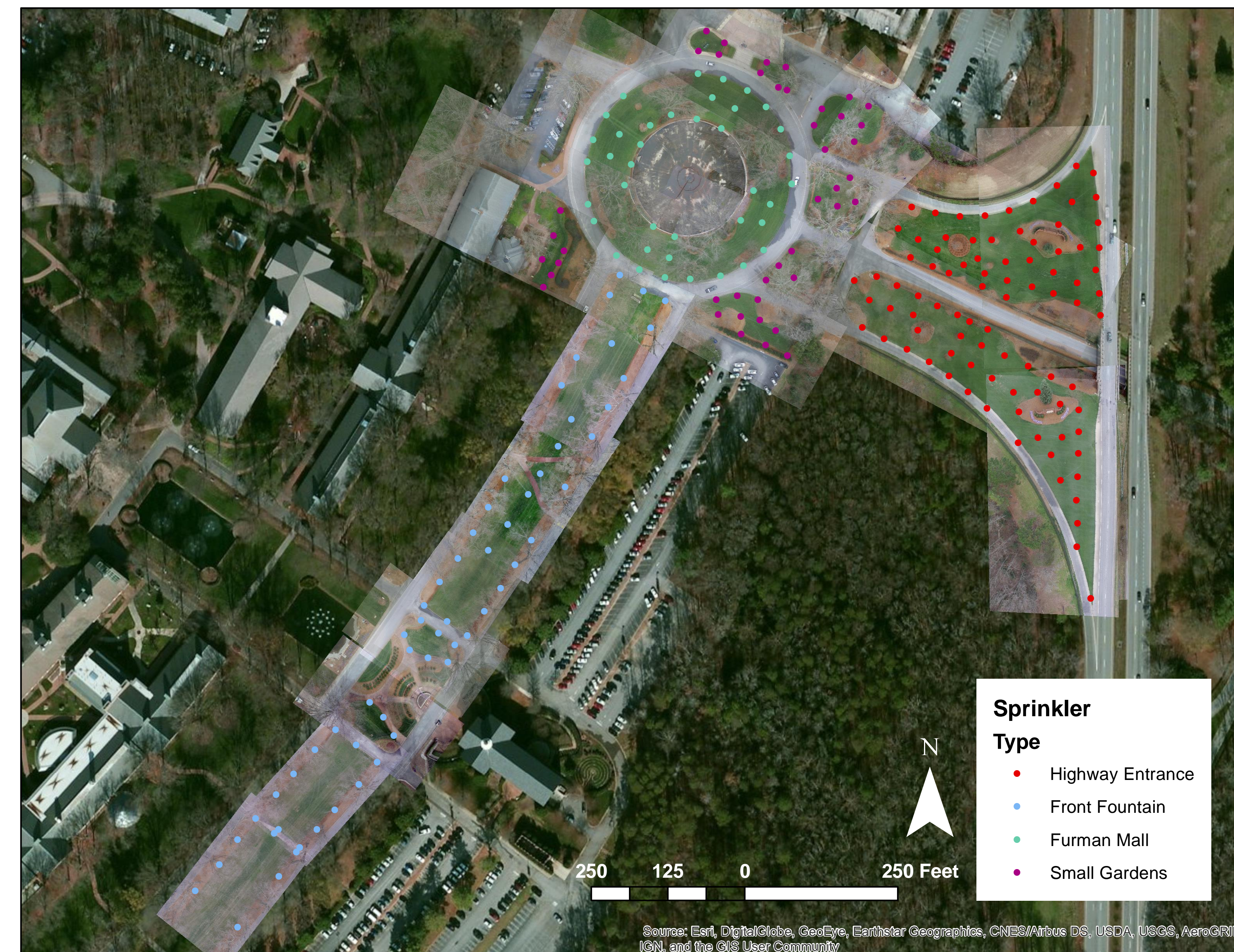


Figure 2: This map show the georeferenced aerial photographs and the sprinkler point locations.

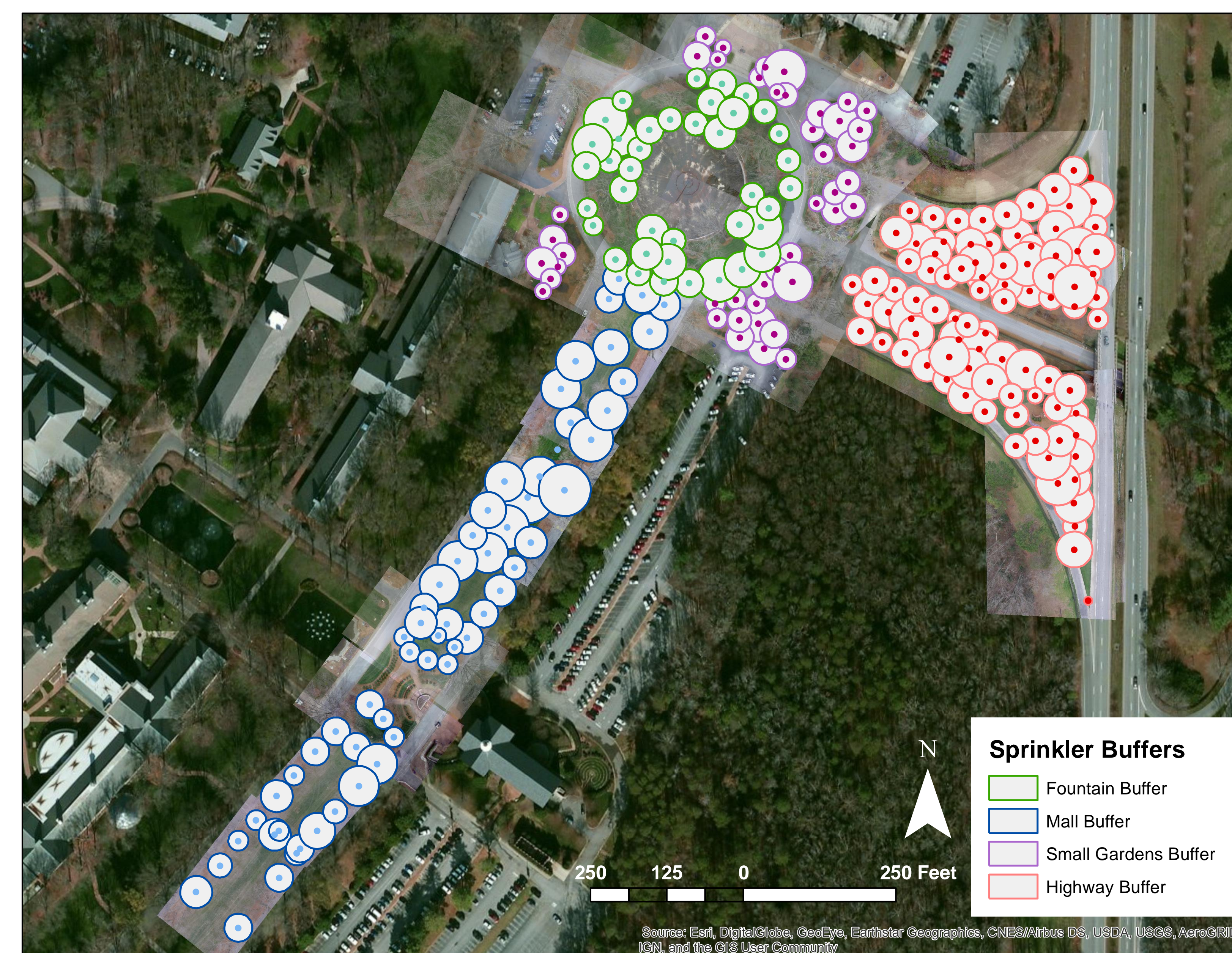


Figure 3: This map shows the georeferenced aerial photographs, the sprinkler point locations and the buffer layers.

Conclusion

With this visualization of the sprinklers found in this study, it becomes much easier to see the abundance of sprinklers that are located along the central parts of Furman. The buffers shown in Figure 3 indicate the areas that are sprayed. Figure 3 also shows the areas which are being overwatered by the areas that contain overlapping circles. It is also interesting to note that the runoff can be see not only from walking around campus, but also from the aerial photographs. These areas are a darker color in the drone photographs and are especially noticeable on the roads around the main roundabout and the highway entrance and exits.

While conducting this study the challenges I faced included:

In areas where there is more foliage, it is much harder to georeference the aerial photographs and find the exact location of the sprinklers and measure their spraying radius.

In certain areas, there were sprinklers which were only partially visible in the aerial photographs available. Therefore the measurements and locations for these points are less reliable than others.

These challenges can be overcome by doing another drone flight or walking around campus with the Collector app to locate the missing sprinkler points.

Some of these sprinklers do not rotate an entire 360 degrees around the center point. I was not able to create a buffer to represent the exact angle that these sprinklers spray with the technology at hand, but this problem could potentially be fixed by additional research. For the sake of this study, the sprinkler locations were the most valuable piece of information for Furman University.

References and Data Sources

I would like to thank Dr. Suresh Muthukrishnan for taking and compiling the aerial drone photographs used in this project. I would also like to acknowledge Meredith Schosky for the work done to produce the map shown in figure 1.

Greenwood, F. (n.d.). Ch. 4 How to Make Maps with Drone Photos. Retrieved March 18, 2017, from <http://drones.newamerica.org/primer/Chapter%204.pdf>

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