Availability of rural water supply for fighting fires

172 feet

(From home plate to second base)

Average distance to the nearest hydrant for buildings served by municipal water.

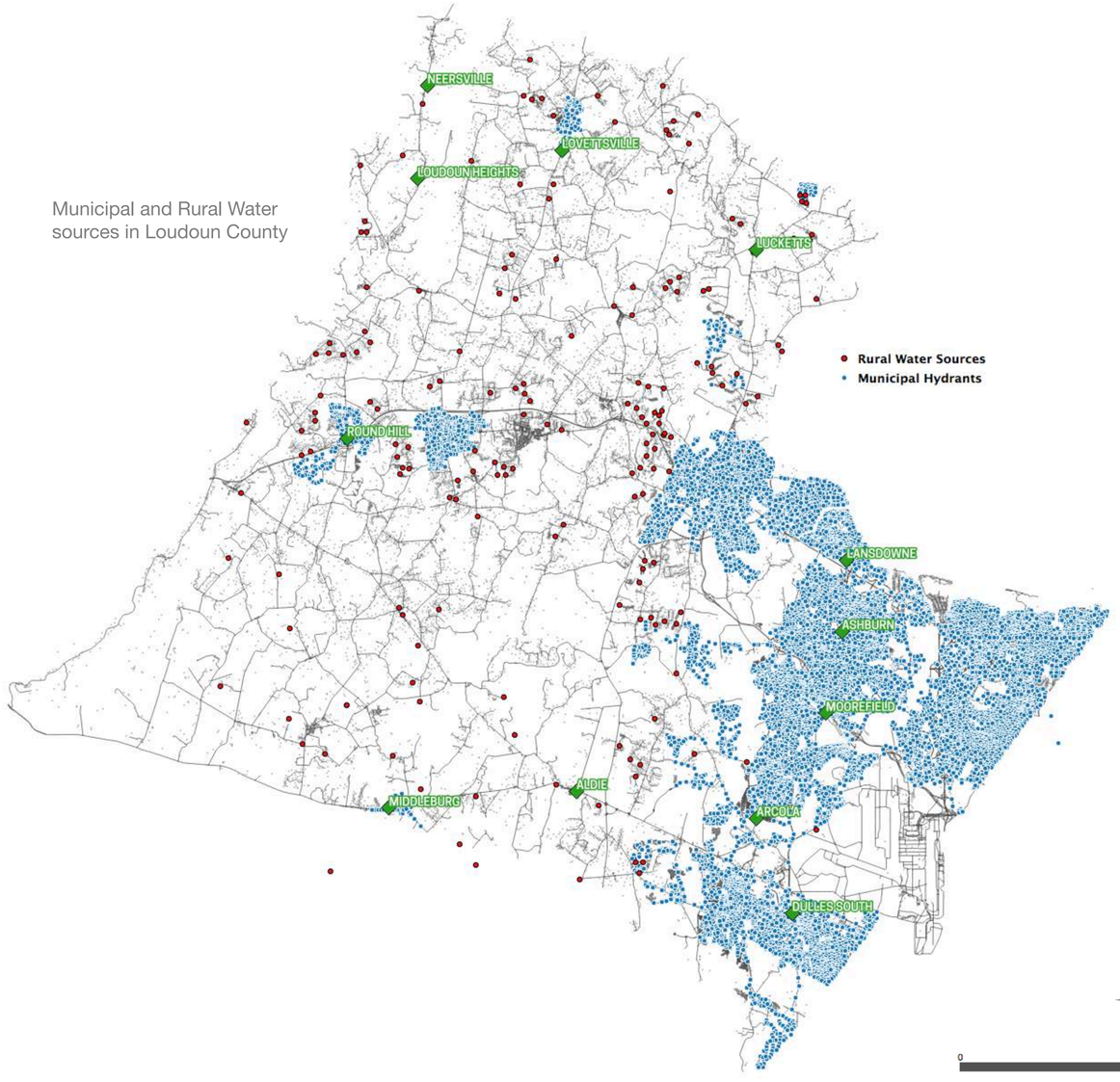
compare

3,497 feet

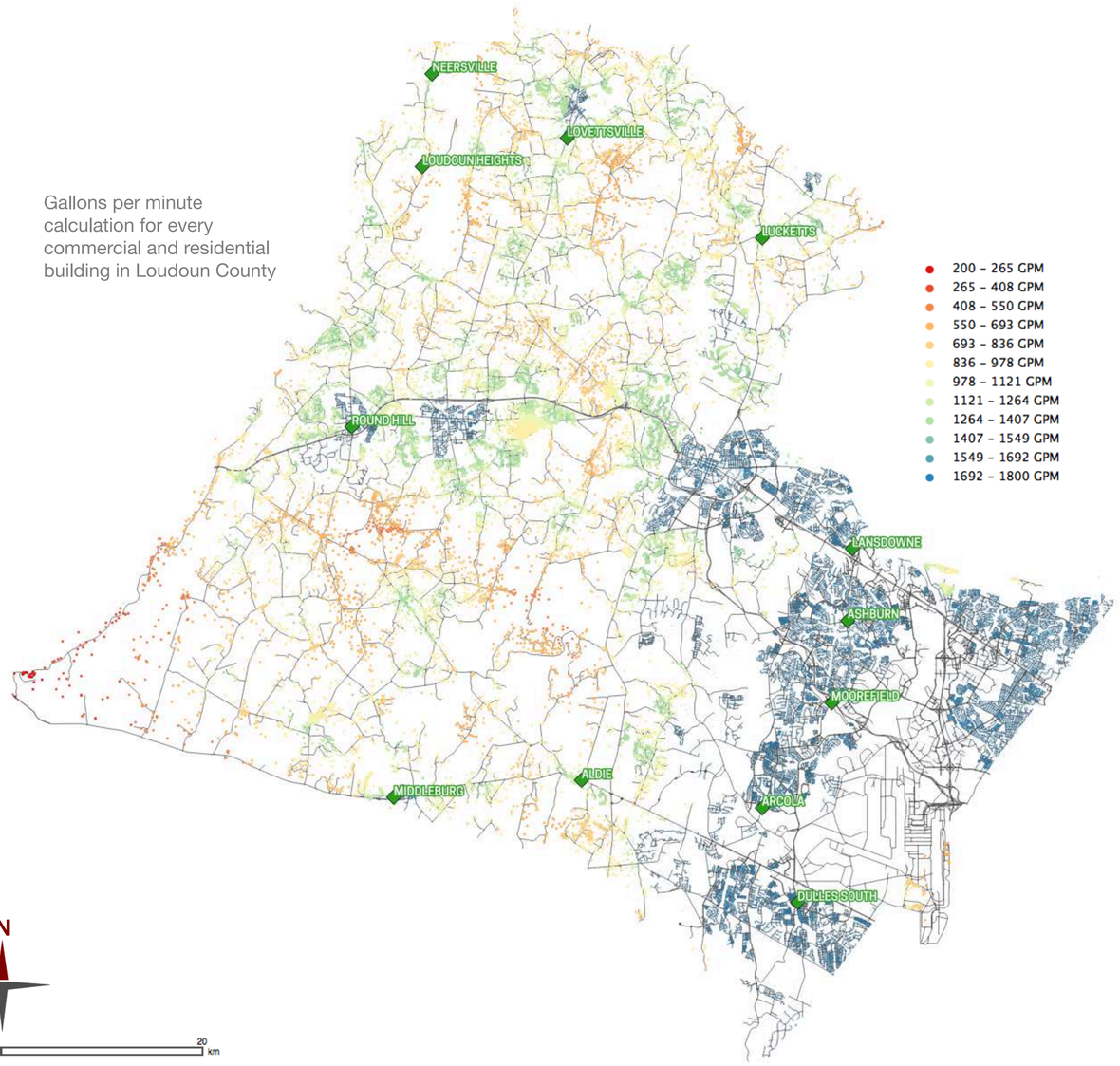
(Just over one kilometer)

Average distance for buildings served by rural water. The average estimated effective flow rate is 590 GPM for rural areas.

Municipal and Rural Water sources in Loudoun County



Gallons per minute calculation for every commercial and residential building in Loudoun County



THE PROBLEM: In the majority of residential areas, fire departments simply rely on water hydrants sourced from municipal water supply systems to extinguish fires. Rural territories, on the other hand, often lack this resource. Instead, they use static sources such as ponds or lakes with road access, fitted with a dry hydrant, or an underground storage tank constructed to fit the needs of the community surrounding it at the time it was put in place. Fire crews use tanker shuttle operations to relay water to the fire using tanker trucks. The net effect of this is that homes and businesses are farther from water sources in rural areas than in municipalities, decreasing the effective flow of water available for fire fighting.

THE ANALYSIS: Our team analyzed data from Loudoun Co. GIS and Loudoun Co. Fire Dept. using custom software developed for this purpose to calculate the effective flow rate for each of the over 166,000 addresses in the County. In Loudoun, the average distance to the nearest fire hydrant for residences and businesses in municipal areas is 172 feet, while in rural areas of the same county, the distance is 3,497 feet, or just over a kilometer. By having to shuttle water rather than connecting directly to a hydrant, the effective GPM drops well below the hydrant supplied flow of around 1800 GPM. This amounts to an effective difference of 800-1000 gallons per minute difference on average across the county, with many areas seeing much larger disparities. This map shows the locations of both municipal and rural water sources available in Loudoun County, and an analysis done to calculate the effective flow in gallons per minute for every building in the county.

THE RECOMMENDATION: There are several steps that can be taken to improve the effective flow rate in the underserved areas. One is to increase the availability of water sources near those areas. Installation of underground tanks is the most common remediation technique. The addition of tankers to the fleet is also a way to improve the flow rate by increasing the rate at which tankers of water can be brought to the fire scene.

Portable tanks used to supply the fire fighting attack apparatus

Dry Hydrant – Rural water supply point

AZIMUTH1

LOUDOUN COUNTY VIRGINIA FIRE-RESCUE

This project is a collaboration between Azimuth1 and the Loudoun County Fire Department. For more information, or to have this analysis for another area, contact:
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