

ROADS, ACCESS, AND EMERGENCY RESPONSE

HOW ASSESSMENT PRODUCTS CAN INFORM EMERGENCY MANAGERS

Road accessibility and response drive times are critical pieces of information for emergency managers. During flood events, emergency response drive times can be altered due to impacts on the most time-efficient routes. Some areas have the potential for complete loss of access due to inundated or damaged roads—these are often areas with a single point of road access.

This analysis, performed for North Carolina's Triangle region, seeks to inform emergency managers about vulnerability related to response and road accessibility. The results of this type of analysis can be used to help a community and its emergency responders understand potential road connectivity issues caused by hazard events. This assessment considers flooding as the barrier or hazard; other analyses could include barriers due to other common hazards, such as wildfire or snow and ice events.

Understanding vulnerabilities in a community's road network before an event can reduce the overall impact and can prepare emergency managers with better information for response and recovery. Ultimately, emergency managers can use this information to develop resilience strategies.

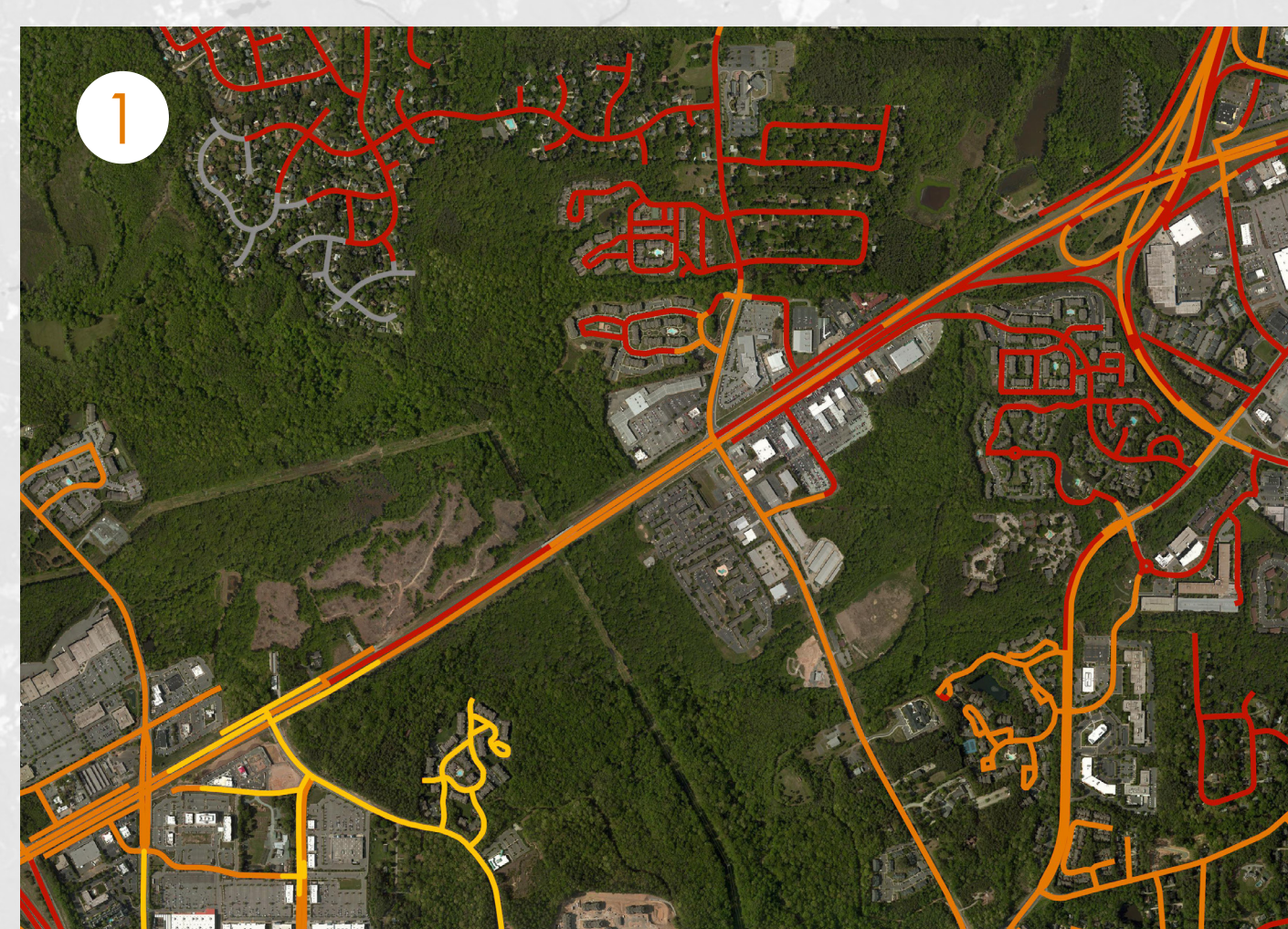
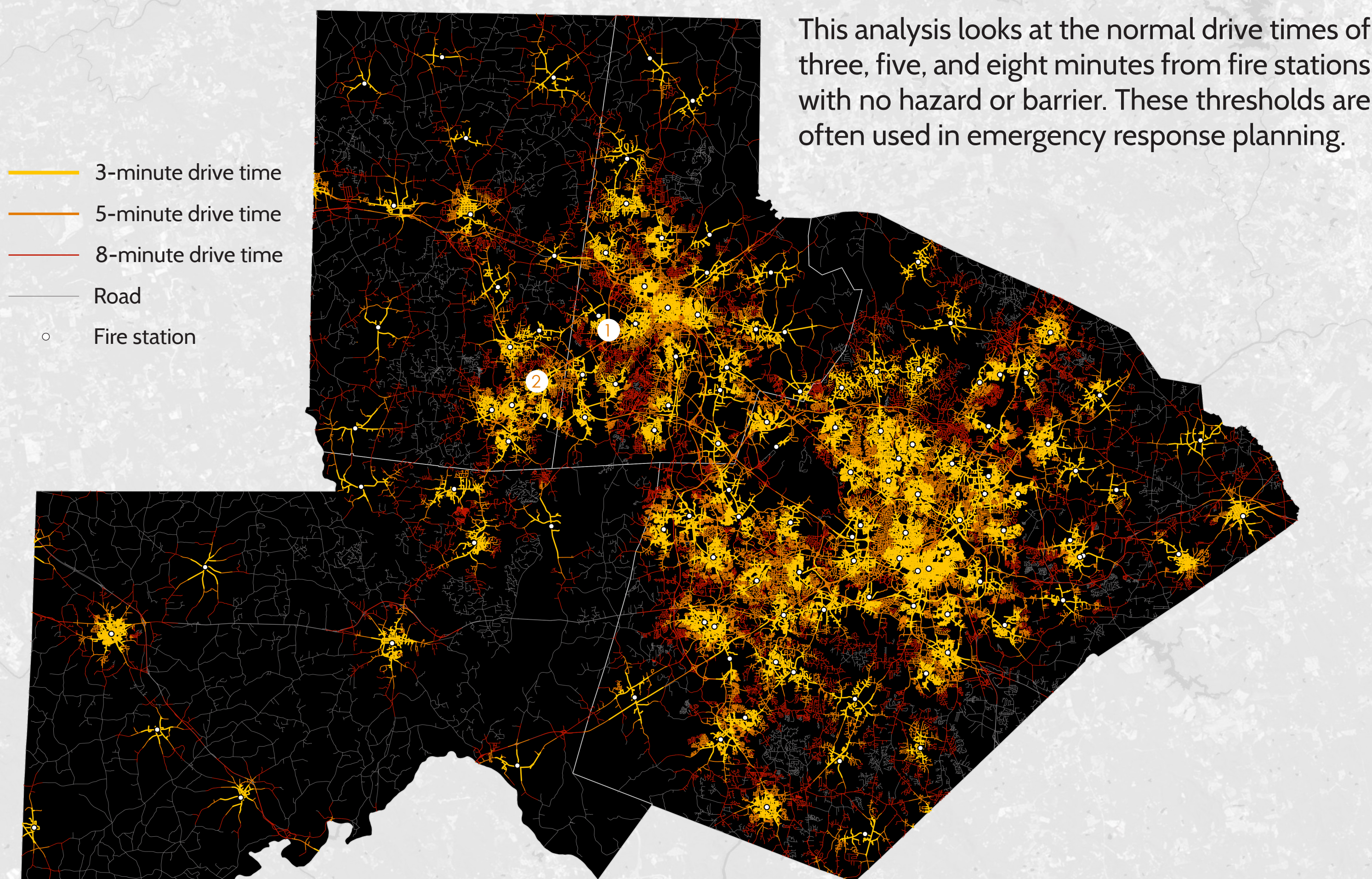
CONSIDERATIONS

Many locally created street GIS network datasets lack correct topology to perform this type of analysis (such as disconnected nodes, missing intersections, and missing road directionality). Having a robust GIS dataset is often a challenge.

- Bridge height and structural condition is critical in understanding potential inundation events—a robust analysis should include these bridge attributes.
- Road centerlines were used in this analysis. It is possible that roadways are only partially inundated, allowing a possible response by emergency services.
- Flood mapping extents were considered equal in this analysis. Flood inundation depths should be considered in future analyses.

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What are my emergency response times in a business-as-usual scenario?

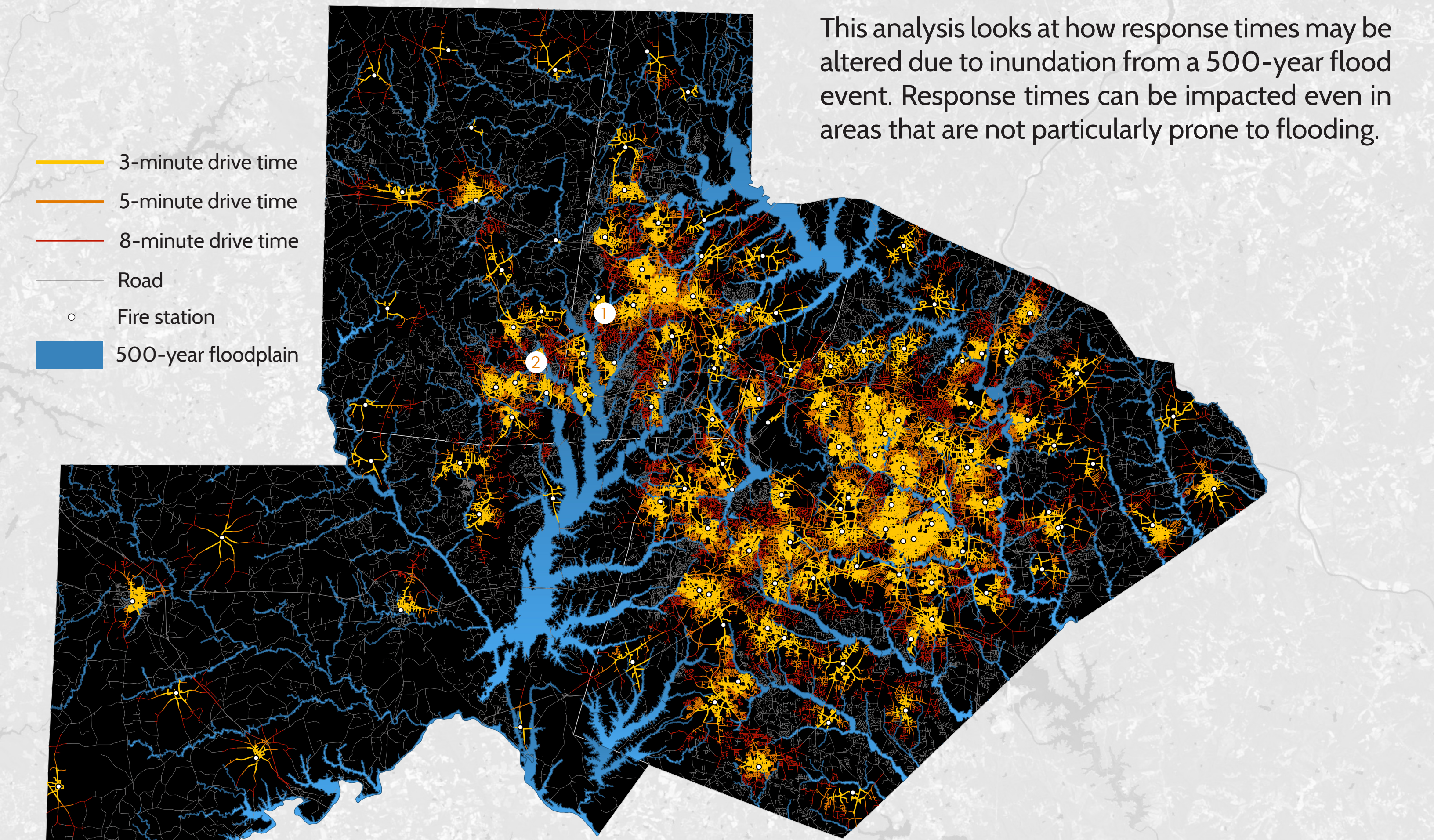


U.S. Route 501—or Durham-Chapel Hill Boulevard—is a primary transportation corridor connecting Chapel Hill and Durham. Even under normal conditions, many of the residential areas along this route have five- and eight-minute response times.



Under normal conditions, roads leading to the residences and shopping centers throughout this area are shown to have fairly short response times of three minutes or less.

What are my emergency response times in a flood event?

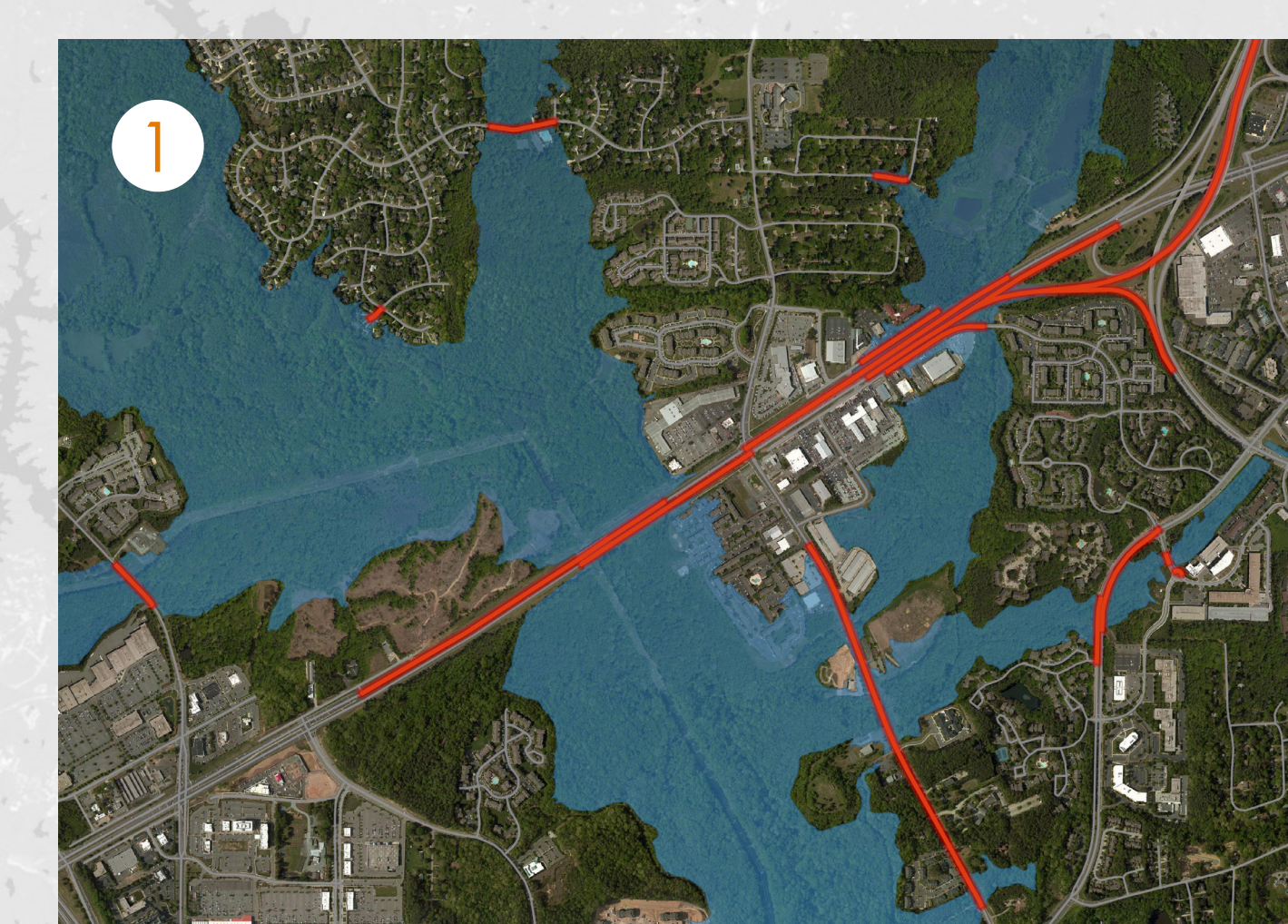
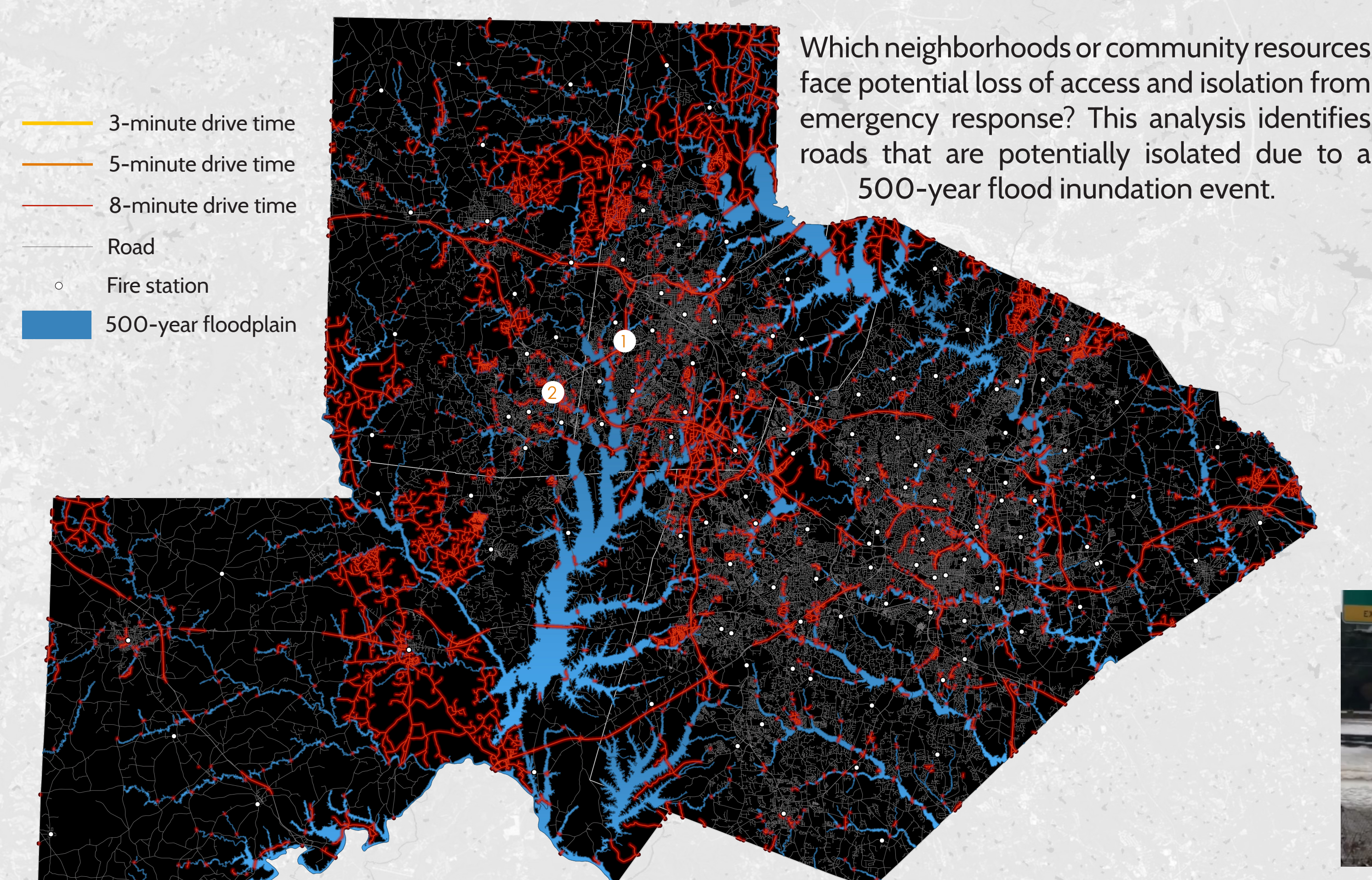


A 500-year flood event has the potential to change response times to many residential areas, despite their proximity to fire stations. In this example, potential flooding around Sandy and New Hope Creeks could increase drive times to more than eight minutes for many areas.



The 500-year floodplain surrounding Bolin Creek could result in a drastic change in emergency response drive times. In this scenario, many of the roadways and communities they connect appear to be potentially inaccessible or inundated.

Who becomes isolated in a flood event?



The model would suggest that many primary transportation corridors, such as this U.S. Route, have potential for inundation.



The analysis suggests that roads leading to and throughout the Camelot Village Condominiums complex face potential isolation during a 500-year flood event.



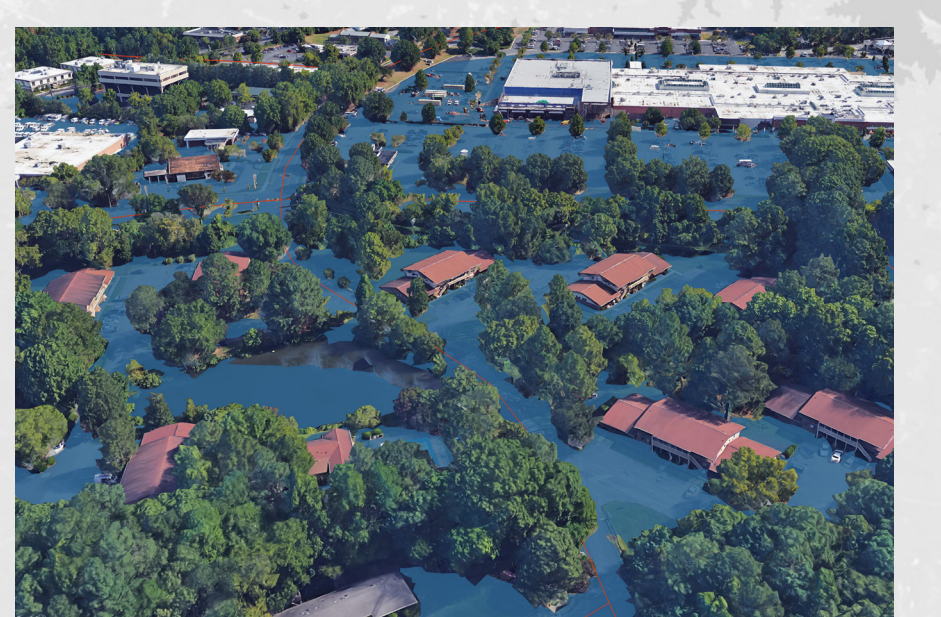
Heavy rain in the wake of Hurricane Florence caused flooding on Durham-Chapel Hill Boulevard in Durham. (Photo: © Shawn Rocco; used with permission.)



A 3D rendering of the 500-year floodplain on Durham-Chapel Hill Boulevard. Note the road sign and U-Haul building from the photo above.



Flood waters from Hurricane Florence in the Camelot Village Condominiums on South Estes Drive in Chapel Hill. The dark shadow on the brick building shows the highest extent of the water level. (Photo: Town of Chapel Hill. Used with permission.)



An aerial, 3D rendering of the 500-year floodplain on the Camelot Village Condominiums.



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