

## Scope of Work Narrative

This section includes a summary of the study's background, need, goals, objectives, workplan, evaluation of success, scope of services, and the application form for grant and loan requests for all categories of the CFPF grant.

### Project Background & Need



*Figure 3 – Photo Contributed by Flooding Questionnaire Participant*



*Figure 3 – Ranger Road Park Flooding, Photo Contributed by Flooding Questionnaire Participant*

Hurricane Helene made landfall in 2024 as a Category 4 hurricane and caused widespread, severe, unprecedented flooding with hundreds of fatalities and billions of dollars in property damage, including in Virginia [1]. The City of Fairfax was motivated to conduct this flood study because there is a lack of available flood model data in the City for high recurrence interval storms like Hurricane Helene and the City is unsure of what groups, areas, and infrastructure would be at risk if a similar caliber storm were to hit the City.

As part of developing its Resilience Plan in 2023, the City of Fairfax distributed flooding questionnaires to approximately 1,400 property owners in the FEMA Special Hazard Flood Area (SFHA) and/or Resource Protection Area (RPA) to collect information about flooding in their area. The results from one questionnaire item indicated that 58% of City residents in the SFHA and/or RPA experience adverse flooding every 10+ years. The City's lack of flood model data exceeding the 500-year storm event combined with the responses from residents in the SFHA and/or RPA justifies the need for the study proposed as part of this grant application to better understand the impacts of catastrophic storm events in the City. A photolog containing flooding images from the City's Resilience Plan questionnaire has been included in Section C for reference.

There is inherent risk associated with unknown flooding impacts for high-level storm events, particularly regarding public safety. Without data-driven awareness of flood-prone areas, infrastructure that is inadequate to handle large-scale storm events may go undetected, evacuation strategies may not consider the entirety of high flood risk areas, and emergency response may be delayed if community lifelines are impacted by high-level storm events in unforeseen ways. The results of this study will be utilized by the City to drive design alternatives analysis, create secondary evacuation routes, and implement projects to assist with catastrophic flooding.

A short-term public safety benefit of this flood study will be the ability for the City to use modeled flood inundation boundaries to identify high-risk areas for focused preventative actions

prior to anticipated large storm events. A long-term impact of this proposed study to public safety will be using study results to make informed decisions when prioritizing high impact flood mitigation projects to protect the City's residents, property owners, businesses, and natural areas that lie within the inundation limits of the 1,000-year storm. An ancillary benefit of this study is identifying the riparian areas within the

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floodplain corridors that can be utilized to implement floodplain restoration practices that can assist in protecting and conserving natural resources in the City.

Being awarded a CFPF grant would expedite the timeline of this study and would expand the City's budget so additional funds can be concentrated on flood mitigation efforts based on the results of the study. If the City were not to receive funding, the City would still proceed with the study, but the timeline may be delayed and there may not be residual funding for further flood mitigation efforts.

### Goals, Objectives, and Work Plan

Table 1 contains the goals, objectives, and work plan items that have been identified for the proposed study, and additional information for this project can be found in the scope of services included in this section. Assuming Kimley-Horn receives a notice to proceed by May 2, 2025, Kimley-Horn anticipates completion of the scope of work and the items outlined in Table 1 by August 29, 2025.

This study is intended to identify areas vulnerable to catastrophic storms and will be used to drive project selection and emergency planning efforts. As such, a maintenance plan is not applicable to this study at this time.

*Table 1 – Proposed Goals, Objectives, and Work Plan*

Goals/Tasks	Objectives	Responsible Parties/Required Partners	Deliverable(s)
Base Map Creation and Project Due Diligence	<ul style="list-style-type: none"> <li>➤ Identify floodplain characteristics within the City</li> <li>➤ Incorporate critical infrastructure, including but not limited to, buildings, roadways, utilities, and community lifelines</li> <li>➤ Compile pertinent Citywide information from the reports and datasets included in the scope of services</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> <li>➤ City of Fairfax Public Works Department</li> </ul>	<ul style="list-style-type: none"> <li>➤ Geographic Information System (GIS) basemaps</li> <li>➤ Data compilation based on reports and datasets included in the scope of services</li> </ul>
Update City HEC-HMS Model	<ul style="list-style-type: none"> <li>➤ Update FEMA-provided HEC-HMS model</li> <li>➤ Simulate hydrologic stream processes at junctions and specific locations across the City, as shown in the scope of services</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> </ul>	<ul style="list-style-type: none"> <li>➤ Updated HEC-HMS Model</li> </ul>
Hydraulic Study	<ul style="list-style-type: none"> <li>➤ Modify the Accotink Creek FEMA Effective HEC-RAS Model</li> <li>➤ Generate graphical outputs for flood depth, velocity, water surface elevation, and inundation boundaries</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> <li>➤ City of Fairfax Public Works Department</li> </ul>	<ul style="list-style-type: none"> <li>➤ Updated HEC-RAS Model</li> <li>➤ Graphical outputs for flood depth, velocity, water surface elevation, and inundation boundaries</li> </ul>
Results Mapping and Quantification of Storm Impact	<ul style="list-style-type: none"> <li>➤ Overlay graphical outputs over base maps to determine buildings, roads, utilities, and critical facilities impacted</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> </ul>	<ul style="list-style-type: none"> <li>➤ Base maps overlaid with graphical model outputs</li> <li>➤ Tabular and statistical summaries of impacts</li> </ul>
Draft a Study Report	<ul style="list-style-type: none"> <li>➤ Develop study report outlining the modeling and mapping information derived as part of the study</li> <li>➤ Summarize the impact and difference in magnitude of the 1,000-year floodplain compared to the 100 and 500-year storm events</li> </ul>	<ul style="list-style-type: none"> <li>➤ Kimley-Horn</li> </ul>	<ul style="list-style-type: none"> <li>➤ Report outlining model and graphical information derived as part of this study as well as an impact comparison between the 100, 500, and 1,000-year storm events.</li> </ul>