



January 17, 2025

Satoshi Eto - Public Works Program Manager
City of Fairfax, Department of Public Works
10455 Armstrong Street, Room 200
Fairfax, Virginia 22030

PROPOSAL FOR THE CITY OF FAIRFAX – CITYWIDE FLOODPLAIN EVALUATION FOR A LARGE RECURRENCE INTERVAL (1000-YEAR) STORM

Dear Mr. Eto:

Kimley-Horn and Associates, Inc. (Kimley-Horn) is pleased to submit this task order proposal to the City of Fairfax (City) to provide professional consulting services related to the development of Hydraulic Study to evaluate the effect of a large recurrence interval storm (1000-year storm) on the Accotink Creek floodplain and ultimately the City's infrastructure, residential and commercial areas, utilities, critical facilities, and FEMA defined City "lifelines". The language outlined below identifies our project understanding, scope of requested services, and accompanying fees related to the overall project.

PROJECT UNDERSTANDING

This proposal summarizes the phases and tasks necessary to prepare a Hydraulic Study to determine the effects of the 1000-year storm on the Accotink Creek floodplain within the City of Fairfax. Development of Citywide modeling, mapping, tabular and graphical results illustrating the effects of the 1000-year storm on City residential and commercial areas, roadways, flood evacuation routes, community lifelines, and other pertinent infrastructure will be derived and compiled into a report format to assist the city with understanding the impacts and aid in planning for catastrophic storms.

SCOPE OF SERVICES

This proposal has been divided into six (6) tasks. Each task is outlined below with a brief summary defining the Scope of Services for each task. A time and materials not-to-exceed cost to perform this work is provided (Attachment 1) and includes Kimley-Horn project management and coordination time.

1. Base Map Creation and Project Due Diligence
2. Update of the City HEC-HMS Model to derive 1000-Year Peak Flows along Accotink Creek
3. Hydraulic Study of the effect of the 1000-Year Storm on the Accotink Creek Floodplain within the City
4. Mapping of Results and Quantification of the impact of the 1000-year storm on the City.
5. Report on the effects of a Large Recurrence Interval (1000-Year) Storm on the City of Fairfax.
6. Meetings & Coordination

TASK 100 - BASE MAP CREATION AND PROJECT DUE DILIGENCE

Kimley-Horn will develop Geographic Information Systems (GIS) base mapping for the entire City. The base mapping will focus on the floodplain characteristics of Accotink Creek, and the areas adjacent to the floodplain, to include buildings, roadways, utilities, critical facilities and community lifelines. Readily available City of Fairfax, Fairfax County, and FEMA GIS shapefile data and aerial imagery will be

utilized to derive the base mapping. As part of this task, Kimley-Horn will perform project due diligence by compiling pertinent Citywide information from the following reports and data sets:

- TSDN Hydrology Report – Accotink Creek Watershed (Prepared by STARR – FEMA Region III) – December 2019
- City of Fairfax existing HEC-HMS (Hydrologic Models) for Accotink Creek (MPAO_Watershed_1703782062081)
- City of Fairfax Effective HEC-RAS (Hydraulic / Floodplain Models) for Accotink Creek (Provided to Kimley-Horn by the City through a FEMA Data Request)
- City of Fairfax DCR Approved – Flood Resilience Plan
- City of Fairfax - Flood Insurance Study (FIS)
- FEMA relevant Flood Insurance Rate Maps (FIRMs)
- Best available FEMA, State, and City GIS Shapefile Data and Aerial Imagery

Kimley-Horn will utilize the site base mapping and background data obtained through this task to supplement all proposed tasks outlined in this Scope of services, including all modeling, mapping, and report development tasks.

TASK 200 – UPDATE OF THE CITY HEC-HMS MODEL TO DERIVE 1000-YEAR PEAK FLOWS ALONG ACCOTINK CREEK

Kimley-Horn will update the FEMA provided Accotink Creek HEC-HMS (Hydrologic Modeling System) Model, shown in Figure 1, to simulate the hydrologic stream processes at junctions and specific locations across the city. Kimley-Horn will create a 1000-year meteorological model and input time series precipitation data in the form of a 1000-year precipitation gage.

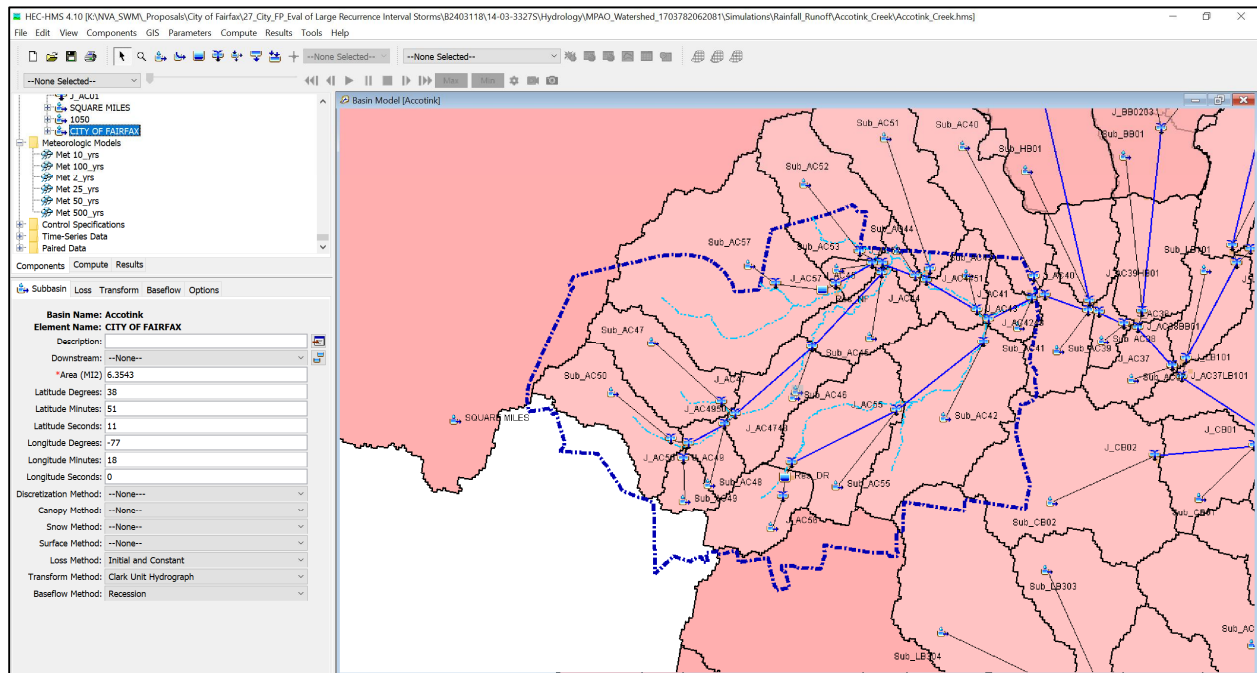


Figure 1. FEMA HEC-HMS for Accotink Creek (City of Fairfax shown with blue outline)

Kimley-Horn will utilize NOAA Atlas 14 Precipitation Data as the rainfall input data for the precipitation gage. Once the meteorological model and precipitation gage are incorporated into the HEC-HMS model, they will be applied to all City subbasins that drain to Accotink Creek, and a simulation run for the 1000-year event will be created. Runoff peak inflows for Accotink Creek within the City at all modeled junctions for the 1000-yr storm event will be derived and compiled in a tabular format. This data will be utilized in Task 300 as flow data input values for the Accotink Creek Floodplain FEMA Effective HEC-RAS Model. All information derived and modeled in this task will be documented in the Report in Task 500.

TASK 300 – HYDRAULIC STUDY OF EFFECT OF THE 1000 YEAR STORM ON THE ACCOTINK CREEK FLOODPLAIN WITHIN THE CITY

Kimley-Horn will modify the Accotink Creek FEMA Effective HEC-RAS Model with the flow values derived in Task 300. If necessary, the Effective Model channel and cross-sectional geometry will be adjusted with lidar topographic data to account for the anticipated increase in flow, water surface elevations and floodplain top widths in order to encumber the effects of the 1000-year storm within the model geometry. If cross sections are required to be extended Kimley-Horn will also incorporate any pertinent characteristics (obstructions, structures, residences etc.) into the model.

Kimley-Horn will run the updated Effective HEC-RAS model to derive the following tabular and graphical comparison data for the 100-year, 500-year, and 1000-year storms:

- HEC-RAS Profile Summary Tables
- Floodplain Cross Sectional Data
- Water Surface Profiles
- X-Y-Z Prospective Plots

As part of this task, Kimley-Horn will utilize the RAS-Mapper tool to generate inundation limits spatially and graphically along Accotink Creek within the City. The following graphical outputs will be derived for the 100, 500, and 1000-year storms:

- Flood Depths
- Velocity
- Water Surface Elevations
- Inundation Boundaries

The graphical outputs generated will be utilized in Task 400 to compare the scale differences between the 100-, 500-, and 1000-year storms within the City of Fairfax, as well as their respective impact City infrastructure, residential and commercial areas, utilities, critical facilities, and City lifelines.

TASK 400 – MAPPING OF RESULTS AND QUANTIFICATION OF THE IMPACT OF THE 1000-YEAR STORM ON THE CITY

Kimley-Horn will utilize the mapped Hydraulic results derived in Task 300 and overlay them on the base mapping developed in Task 100. Kimley-Horn will utilize GIS processing features to determine the following:

- Buildings impacted by the 100-year, 500-year, and 1000-year events, to include breakdown of residential, commercial, and industrial buildings.
- Roads impacted by the 100-year, 500-year, and 1000-year events, to include evaluation of roads closed by each corresponding event (evacuation routes).
- Utilities impacted by the 100-year, 500-year, and 1000-year events.
- Critical facilities and FEMA defined City “lifelines” impacted by the 100-year, 500-year and 1000-year events.

GIS maps will be derived and paired with tabular and statistical summaries to create report graphics (Task 500) as well as mapping that can help the City understand impact as well as aid in planning for catastrophic storms.

TASK 500 – REPORT ON THE EFFECTS OF A LARGE RECURRENCE INTERVAL STORM ON THE CITY OF FAIRFAX

Kimley-Horn will develop a Study report outlining the information derived in tasks 100 - 400. The report language, graphics, tabular summaries and numerical analyses will focus summarizing the impact and difference in magnitude of the 1000-year floodplain on the city, when compared to the 100 and 500 year storm events.

TASK 600 – MEETINGS & COORDINATION

Kimley-Horn staff will be available for up to two (2) project coordination meetings to discuss the project. In addition, Kimley-Horn staff will participate in calls to discuss the project with City staff. If additional meetings and coordination activities are requested, Kimley-Horn will prepare a separate Scope of Services and cost estimate for client approval prior to proceeding with the additional work.

DELIVERABLES

The following items are anticipated as project deliverables for this Scope of Services.

- HEC-HMS Hydrologic / HEC-RAS Stream Hydraulic Models(s) analyzing the 1000-year storm impact on the City of Fairfax
- GIS Maps to be utilized for Citywide planning and Public Education events relate to catastrophic storm impacts on the City
- One (1) Report on the effects of a large recurrence interval storm on the City of Fairfax.

OVERALL PROJECT ASSUMPTIONS

For the purposes of developing this proposed Scope of Services and the accompanying cost estimate, we have made the following assumptions:

- It is assumed that the City will obtain the topographic surface utilized to derive the model geometry for effective FEMA model referenced in this study.
- The flood studies and analyses proposed in this Scope of Services are intended as a planning level and will not constitute a formal FEMA floodplain study.

- All analyses and studies developed in this Scope of Services will be based on GIS information and unknown survey information utilize to derive the Effective modeling. As such, the information derived throughout this study will be considered “for informational purposes only”
- Accuracy and precision of data and previous studies provided by others is solely on the consulting firm that derived the studies. Kimley-Horn will review all data provided by the City and FEMA with regards to the Study Area but assumes no responsibility for information outlined or derived in the studies developed by others.
- Readily available City of Fairfax and Fairfax County GIS shapefile information will be used to supplement this study, as needed.
- The city will provide all coordination with FEMA and Fairfax County (if needed) with regards to this project.

OVERALL PROJECT EXCLUSIONS

Services that are not currently anticipated as part of this project and are therefore outside the scope of this task order proposal include the following:

- FEMA Coordination and Applications
- Engineering Design
- Construction Drawing Development
- Development/Delivery of Presentations, Board of Supervisors, Committees, or the Public
- Notifications to impacted Property Owners
- All other services not explicitly stated in this Scope of Services

SCHEDULE

The tasks referenced in this scope will be coordinated with City Staff. Meetings, action items, and deliverables will be tracked on a monthly basis and reported to the City with a monthly progress report for documentation of services provided. Assuming Kimley-Horn receives a notice to proceed by May 2, 2025, Kimley-Horn anticipates completion of the scope of work outlined above by August 29, 2025.

FEE AND BILLING

Kimley-Horn will provide the following scope of services under our term contract #23050-A. The following tasks will be provided on a time and materials basis not to exceed a total project cost of **\$45,162.64**. A detailed breakdown (by task) of Kimley-Horn’s fee estimate is provided in Attachment 1 and utilizes the rate schedule as provided for in the City of Fairfax Task Order Contract #23050-A, Year 2. Please note that hourly fees will be invoiced monthly based upon hours expended for services performed and payment will be due within 25 days of receipt of invoices related to this project.

CLOSURE

The work described with this proposal will be completed in accordance with the terms and conditions of Contract #23050-A between the City of Fairfax and Kimley-Horn. We appreciate the opportunity to provide these services to you. Please contact me if you have any questions.

Very truly yours,
KIMLEY-HORN AND ASSOCIATES, INC.

A handwritten signature in blue ink, appearing to read "Jon D' Alessandro".

Jon D' Alessandro, P.E.
Senior Project Manager