A3 Environmental, PLLC
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TWO-DIMENSIONAL URBAN FLOOD MODELING

Overview

A3 Environmental, PLLC is a Licensed Professional Design Firm focused on providing quality environmental, ecological and engineering services.

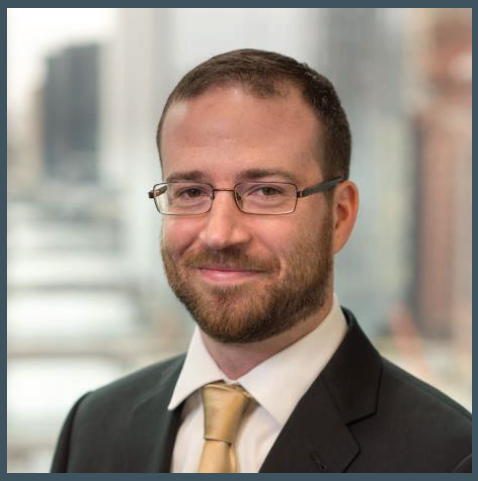
We are a WBE/DBE consultant certified with IDOT, METRA, CTA, MWRD, State of Illinois, City of Chicago, and others.

A3E has staff with experience performing various types of one-off or ad-hoc complex hydraulic analyses.

A3E Engineering Services

- **Sewer Design & Roadway Drainage**
- Stormwater & Sewer Master Planning
- Floodplain Management & Stream Restoration
- Two-Dimensional Urban Flood Modeling
- Advanced Hydraulic Analysis

Key Staff



NICHOLAS STEPINA, PE, CFM
Senior Project Engineer
nick@a3e.com

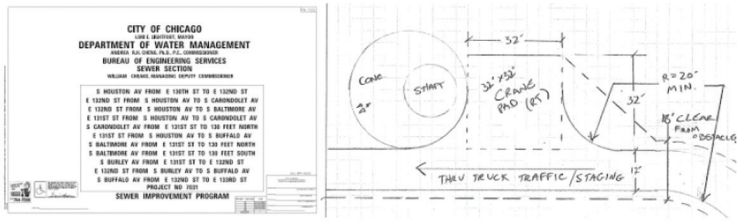
Registrations & Training:

- Professional Engineer (PE) #062.067171 – Illinois
- Certified Floodplain Manager (CFM) #IL-19-00847 – Illinois
- OSHA 40-hour HAZWOPER

A3E Capabilities

A3E has staff with experience performing urban flooding simulation and analysis in two-dimensional space. We have the capability to support your team on a range of tasks involving Two-Dimensional Urban Flood Modeling:

- Operation of 2-D simulation software including HEC-RAS, Infoworks ICM, and PC-SWMM
- Refinement, gap analysis, correction, and QA/QC of model source data
- Assembly and calibration of 2-D flooding models from limited available data
- Results analysis, detailed reporting, and presentation of model results to clients



Two-Dimensional Urban Flood Modeling Project Experience

- Simulated, analyzed, and reported environmental and flood-related impacts from closure of a hazardous waste management unit on a refinery property adjacent to a federally-protected sensitive wildlife area.
- Created a 2-D integrated catchment model by merging a HEC-RAS stream model built by USGS with an urban sewershed InfoWorks ICM combined sewer model. Analyzed the hydraulic impacts from dynamic stream elevations on combined sewer overflows.
- Merged a HEC-RAS stream model supplied by FEMA with an urban sewershed InfoWorks ICM model and analyzed the hydraulic impacts from climate change on flood levels and sewer overflows.
- Led experimental pilot study to devise new methods for modeling green infrastructure explicitly. Demonstrated how the two-dimensional integrated approach can be used to explicitly model green infrastructure elements.
- Performed QA/QC review for a flood risk assessment of the Skokie River watershed. A 2-D HEC-RAS model was created from scratch containing over 40 hydraulic structures.

A3E CONSULTANTS

Waste Management Unit Closure Stormwater Impact Analysis, Confidential Client, Bay Area, CA (2019-2020)

Lead Modeler for a stormwater impact analysis led by Stantec in a multi-disciplinary joint venture. This task was part of a larger project to design the remediation and closure of a historic stormwater management unit on refinery property. The stormwater analysis was required by regulators to ensure that the remediation would cause no adverse impacts to nearby environmentally sensitive areas. This project utilized PC-SWMM software with 2-D capability and consisted of review and upgrade of the existing Stormwater Pollution Control and Countermeasure model, analysis of existing conditions, and identification of potential mitigation measures for containment of the 100-year, 24-hour event.

HEC-RAS 2-D Probabilistic Flood Risk Modeling, Confidential Client, Lake and Cook Counties, IL (2019)

Hydraulic Modeler and QA/QC Reviewer of a watershed analysis and flood risk assessment of the Skokie River in Lake and Cook Counties, IL. The project involved creation of a 2-D HEC-RAS model from scratch and calibration of the model for extreme (1,000+ year) events. Specific steps in the model construction included creation of a terrain model from LiDAR data products, analysis of over 40 hydraulic structures, review of Flood Insurance Studies, calculation of baseflow from USGS gage data, and detailed refinement of the 2-D mesh. A unique aspect of this project was the calibration process, which used a probabilistic method to estimate flows greater than the existing gage record.

Clean Water Atlanta Memorial Park Flooding Analysis, City of Atlanta, Atlanta, GA (2016)

Project Modeler responsible for integrating a HEC-RAS creek model with the City's InfoWorks ICM combined sewer model into a 2-D integrated catchment model. The model was used to simultaneously analyze the interaction of the creek with the combined sewer to determine hydraulic impacts from dynamic stream elevations on combined sewer flooding.

Climate Change Vulnerability Assessment, City of Cambridge, Cambridge, MA (2016)

Project Modeler in the riverine flooding study of the City of Cambridge Climate Change Vulnerability Assessment. The task included combination of the City's combined sewer InfoWorks ICM model with the FEMA HEC-RAS model of the Alewife Brook watershed. The integrated catchment model was then used to simulate the interaction of overbank riverine flooding with the City's and the MWRA's regional combined sewer system.

Phase II Green Infrastructure Pilot Study for the City of Chicago, Metropolitan Water Reclamation District of Greater Chicago, Cook County, IL (2015-2016)

Lead InfoWorks ICM Modeler for a pilot study to determine the effectiveness of two-dimensional integrated catchment modeling for simulation of green infrastructure (GI). The pilot study demonstrated how two-dimensional integrated catchment modeling can be used to provide reliable, accurate depictions of overland flooding issues and that the integrated approach can be used to explicitly model GI elements for a realistic evaluation of their role in the overall drainage system.