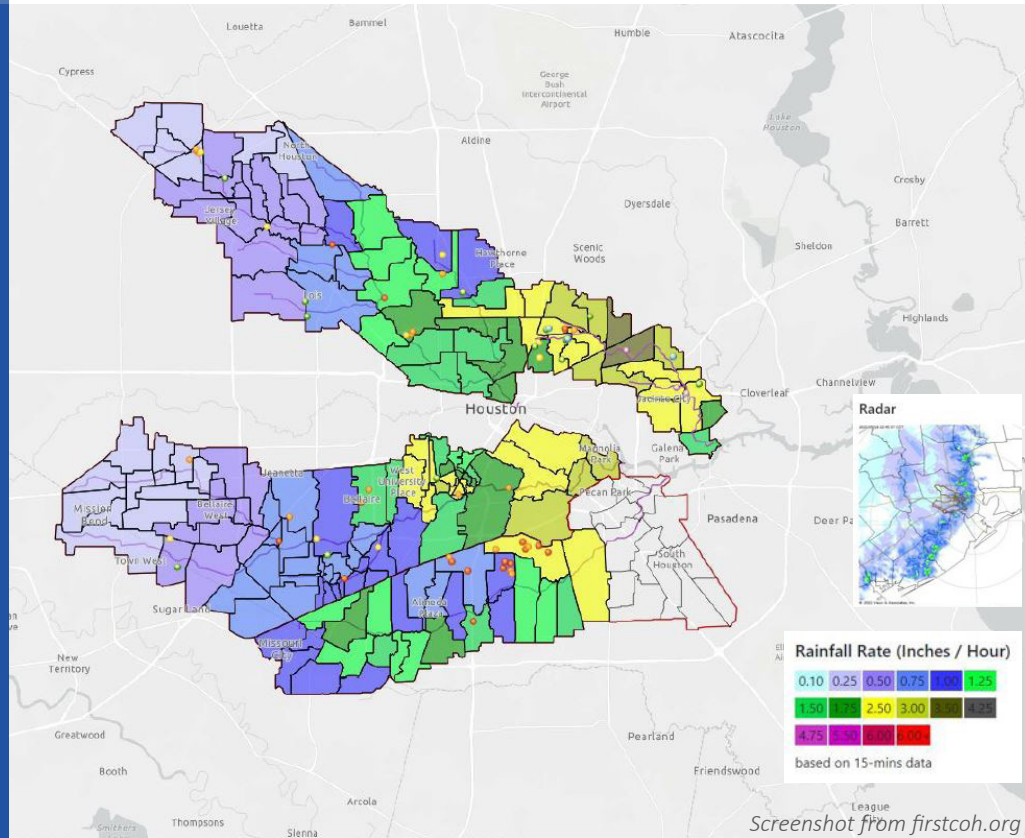




# FIRST:

Flood Information and  
Response System for the  
City of Houston

Spring 2023



## Overview

The Flood Information & Response System (FIRST) was developed for the City of Houston (COH) as an end-to-end, radar-based flood assessment and mapping tool for critical infrastructure.

## FIRST Maps Critical Care Facilities

FIRST allows for early warning with real-time visualizations of critical hotspots and inundated areas during rain events. It assists the COH in addressing emergency management and operations, including emergency closures, evacuation, and rescue operations.

- |                         |                          |
|-------------------------|--------------------------|
| <b>H</b> Hospital       | <b>NH</b> Nursing homes  |
| <b>FS</b> Fire stations | <b>S</b> Shelters        |
| <b>UC</b> Urgent Care   | <b>PS</b> Public Schools |

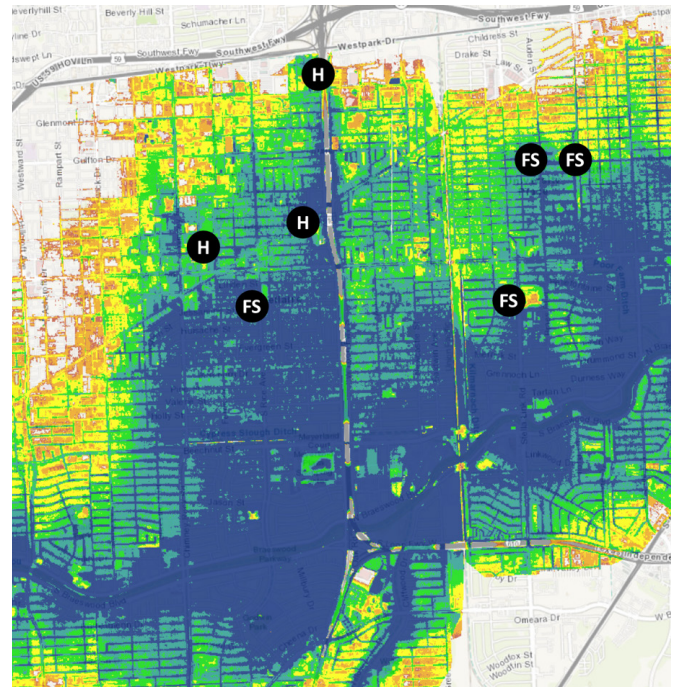


Figure 1. Example of estimated inundation, including critical facilities

# FIRST Watersheds

FIRST can display rainfall intensity for all the sub-catchments of the four major watersheds in real time, and forecast the flood inundation maps over the watersheds using NEXRAD radar rainfall data. FIRST watersheds include: Brays Bayou, Hunting Bayou, White Oak Bayou and Sunnyside/Sims Bayou.

## Flooding, Public Health & the Environment

While flash flooding is not new to Houston, the rapid urbanization of the region has exacerbated its vulnerability. This includes the devastation from Hurricane Harvey (2017) and Tropical Storm Imelda (2019). Moreover, localized severe flooding poses a threat to the COH resiliency goals.

While structural measures are necessary to reduce flooding, nonstructural solutions, such as FIRST provide:

- Timely data for the COH to better understand environmental and flood risks during severe storms;
- Tools for emergency personnel to initiate evacuation strategies during flood inundation of transportation infrastructure; and
- Mapping of critical care facilities, such as hospitals, nursing homes and fire stations.



Figure 2. Harvey near Kashmere Gardens



Figure 3. Houston Fire Department's flood response equipment



# Flood Risks for Critical Neighborhoods

FIRST is designed to visualize flood inundation maps (49 maps) relative to the neighborhoods and critical facilities located within the four watersheds.

The flood inundation is mapped in terms of water depth and water surface elevation and along with the selected critical facilities.

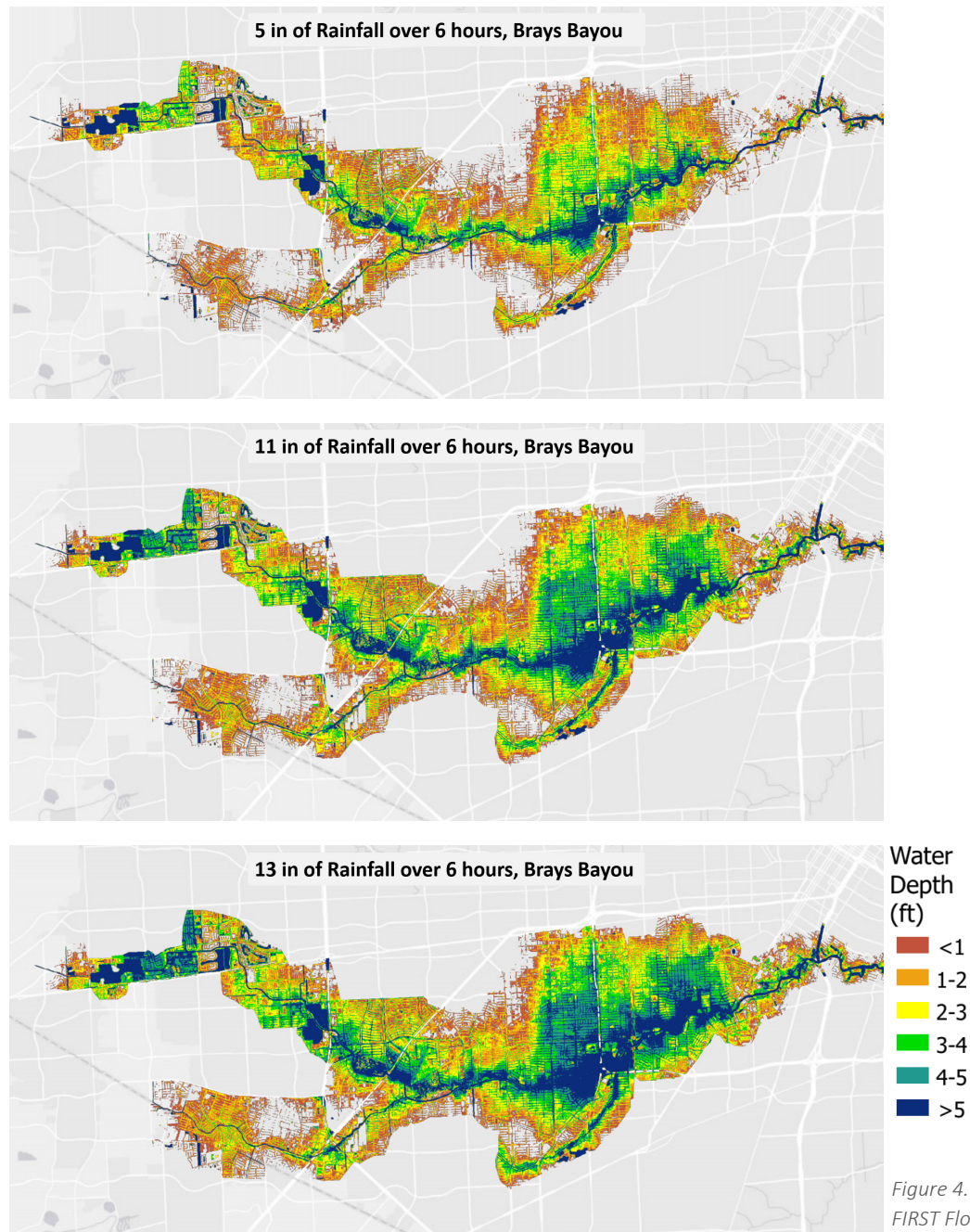


Figure 4. Sample of FIRST Flood Plain Maps

