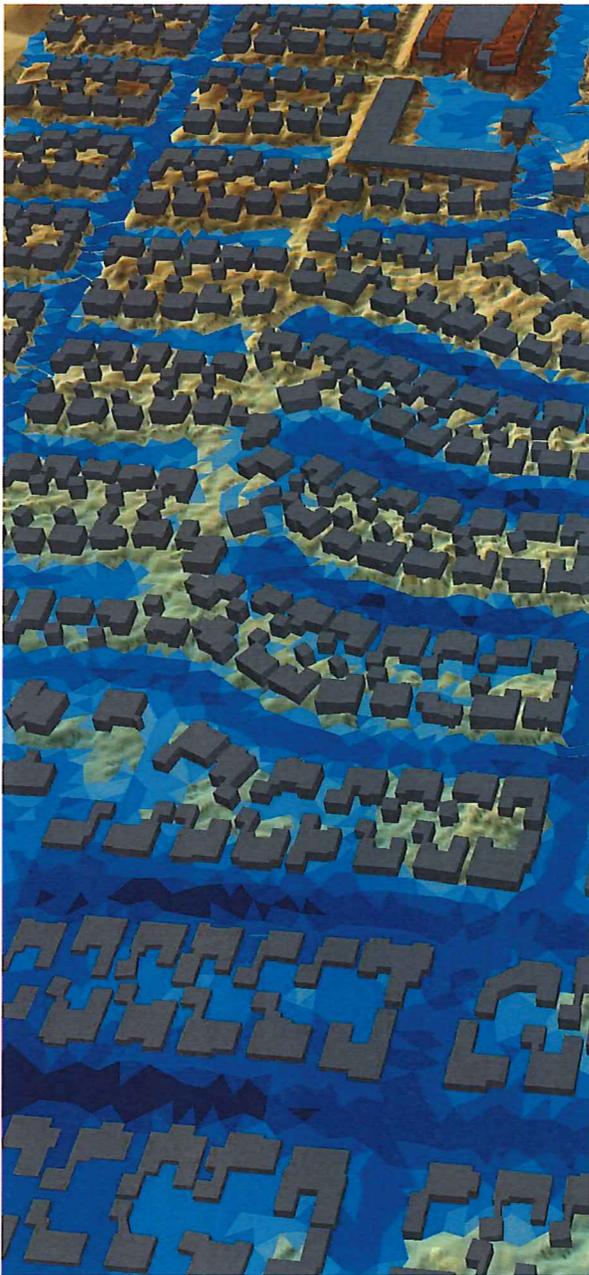
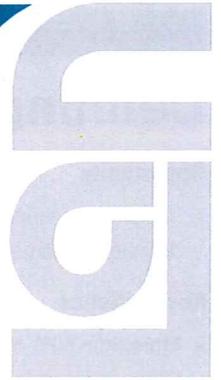


Defining Flood Risk – A New Approach

How Comprehensive Infrastructure Assessments & 2D Modeling
Provide a Holistic Understanding of Drainage Performance



Lockwood, Andrews
& Newnam, Inc.
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Defining Flood Risk – A New Approach

Opportunity

- » Implement an innovative, technologically-driven approach to improve our understanding of drainage systems and extend FEMA floodplains into the upland overbank areas

Key Statistics

- » More than 50% of the homes that flooded in the Houston area during Harvey were outside the 500-year floodplain

Previous Approach

- » Disconnected and uncoordinated system evaluation
- » Open channels evaluated via FEMA, an approach which limits floodplain knowledge to only studied open channels
- » Collection system evaluated independently – typically no floodplain defined

Deficiencies

- » Open channel and collection systems are analyzed independently but function dependently, resulting in inaccurate evaluations, particularly outside the floodplain.
- » There are no maps or tools based on current data and technology to adequately communicate flood risks to homeowners and government officials.

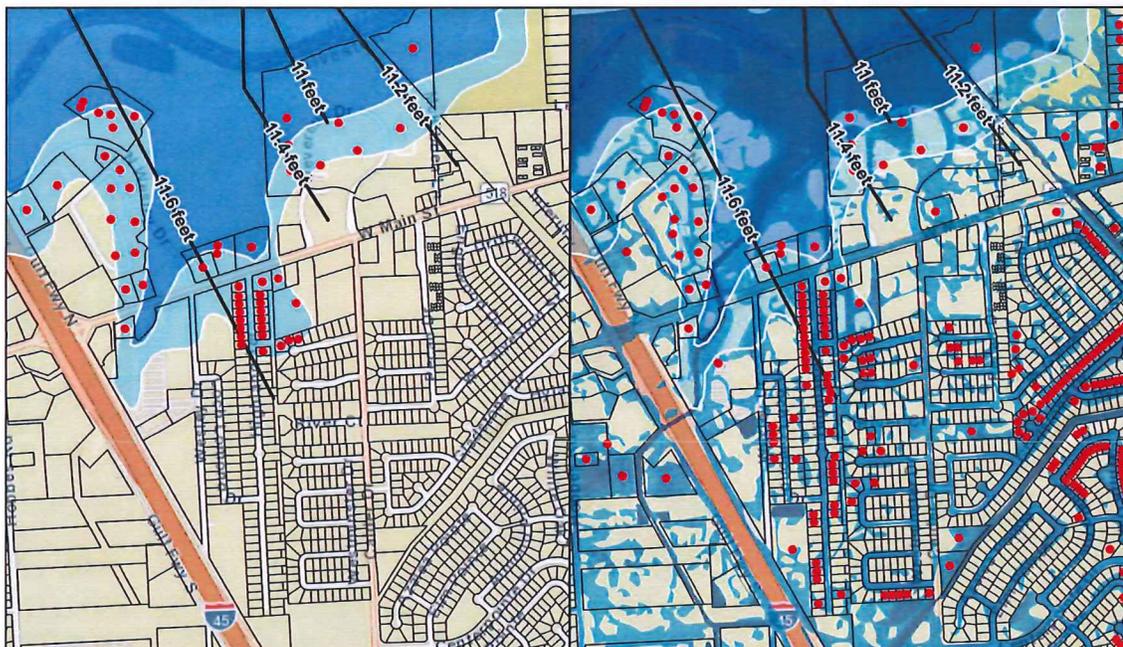
Innovative, Technologically-Driven Approach

- » Comprehensive open channel and collection system evaluation
- » New technology-driven 2-Dimensional (2D) analysis approach to extend floodplains into the collection system

Benefits

- » Holistic understanding of all drainage infrastructure interaction
- » Ability to accurately communicate flood risk
- » Promote data-driven decision making:
 - Prioritize underperforming systems and areas that include structural flooding and critical infrastructure
 - Understand cause of flooding and solution levels
 - CIP program support for drainage specific-projects and non-drainage projects
- » Evaluate the impacts of the updated NOAA rainfall (Atlas 14)

50% More than 50% of the homes that flooded in the Houston area during Harvey were outside the 500-year floodplain



FEMA Floodplain (Current Approach)

Comprehensive 2D Floodplain (New Approach)



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