City of Bellaire Master Drainage Concept Plan

PUBLIC WORKS DEPARTMENT / OFFICE OF THE CITY ENGINEER

Drainage Plan Overview

1. Exciting Project!
2. Study drainage from a regional perspective
3. Partners have agreed to participate financially in the study.
4. Funded to proceed now.
   - Bellaire
   - TXDOT
   - HCFD
5. Deliverable – plan with options for improving performance of drainage systems in our area
6. Plan will align partners for eligibility for grant funding for next steps
   - Next Steps, PER, Deign Construction

Presentation Outline

1. Study Background
2. Related work performed to date
3. Proposed study overview
   A. Purpose
   B. Partners
   C. Possible outcomes
   D. Phasing and costs
4. Relationship to possible FY19 Bond Election
5. Next Steps / Schedule

Study Background

Flood Hazard Mitigation Task Force (FHMT)

- Formed 2017 post Harvey
- Identified 32 priorities
- Regional participation is a theme of many of the 32 priorities

Local, Regional Regulatory

- Approach since Harvey consistent with FHMT recommendations

Local / Current Approach: design for 100yr storm on local streets when logical helps performance of future regional systems

Continue to Utilize current regulatory home elevation criteria for construction of new homes

Work Performed to Date

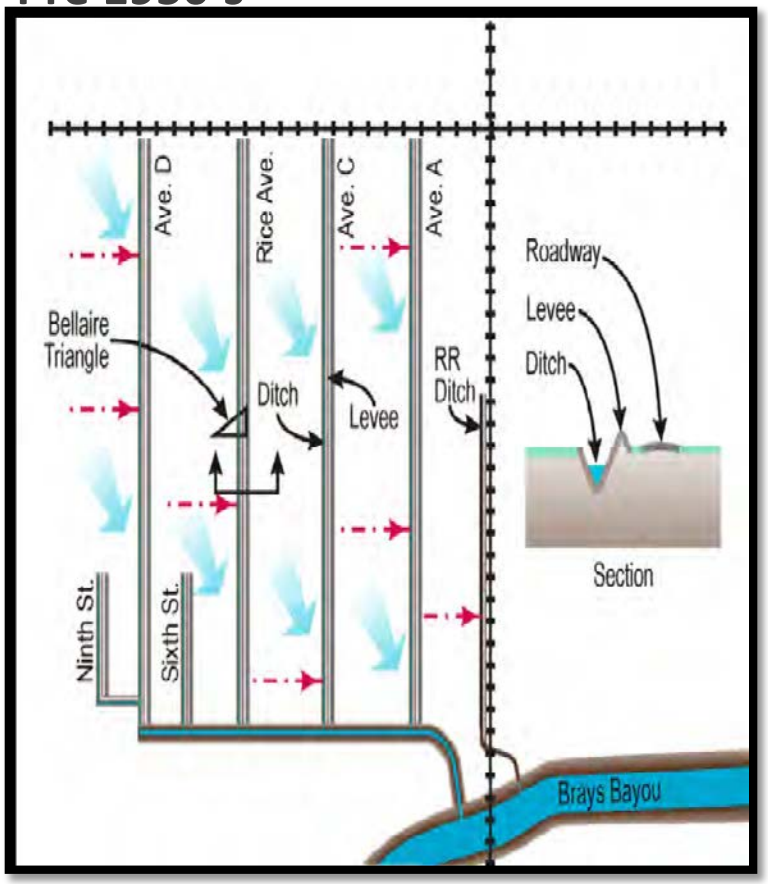
City Engineer identified need for regional cooperation in 2016 report

- Coordinate with Harris County Flood Control (HCFC)
- City of Houston (COH)
- Texas Department of Transportation (TxDOT)

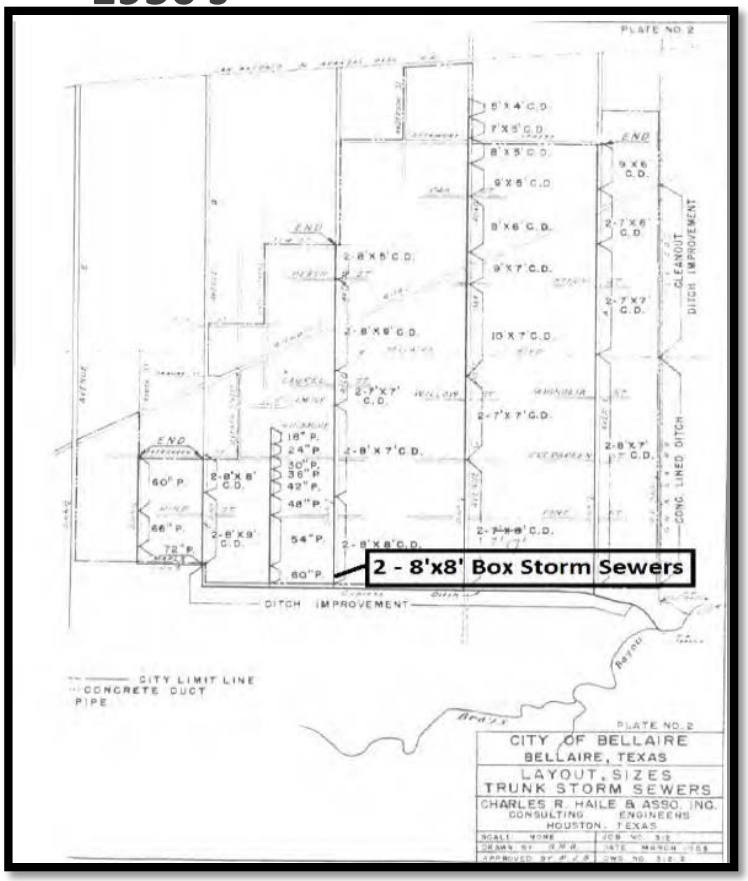
- City Engineer report also provides extensive history of Bellaire drainage
- 2016 study had a local focus but spoke to regional needs
- Consistent with message of regional cooperation and discussion at 10-22-18 workshop on possible future bond election

Work Performed to Date

Pre 1950's



1950's



Study Overview

Purpose of the Study:

Strategic -

Provide a plan that would qualify Bellaire and partners for other funding sources for design and construction:

- HGAC, TDEM, FEMA, TWDB, Grants, etc.

Engineering -

Provide options and plan to improve level of service protection for Bellaire - Better level of protection for street and structures.

Understating of investment and level of protection.

This is not a design project. It is a study to set the stage for design.

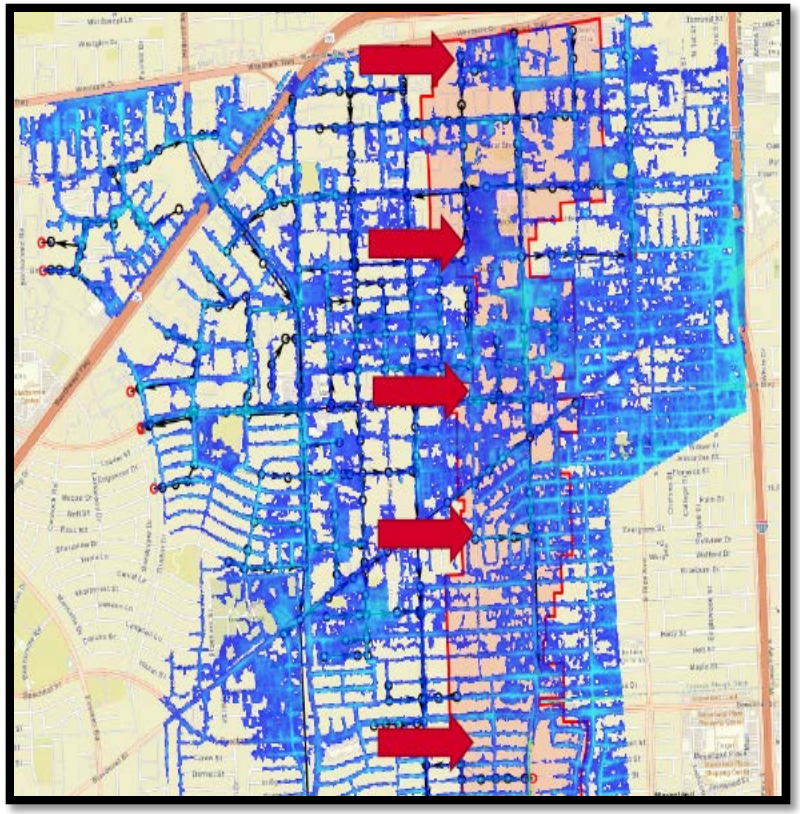
Study Overview

Study Challenge Highlight:

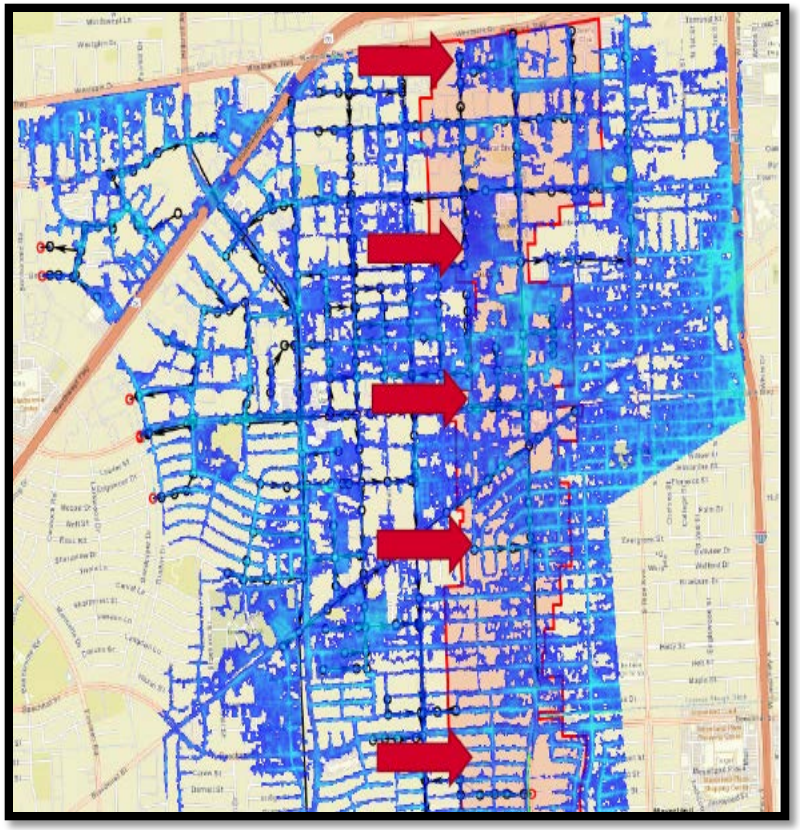
Sheet flow analysis from outside of Bellaire (COH)

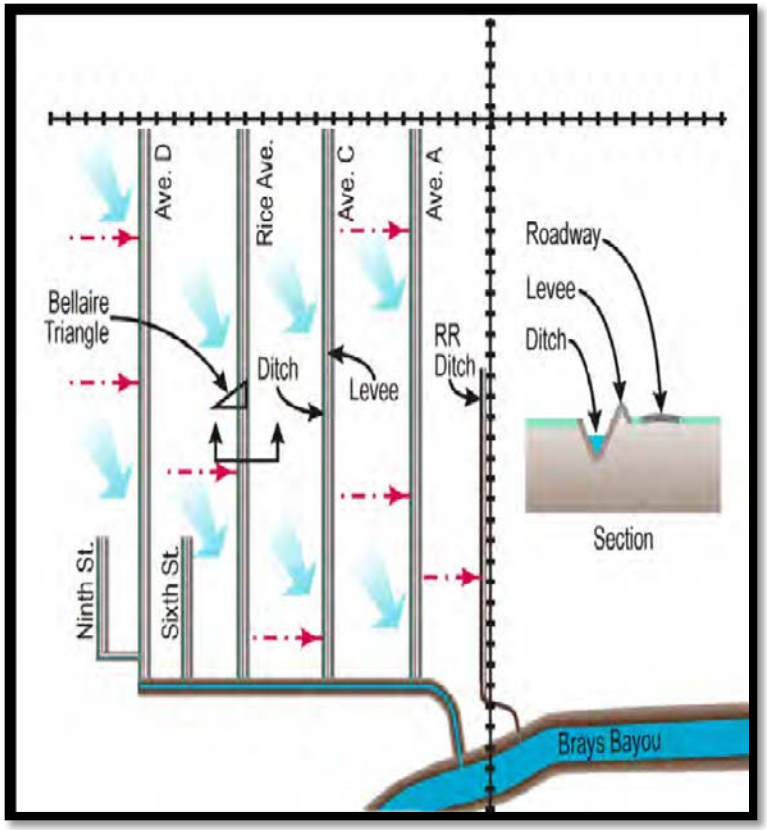
Determine storm sewer performance and sheet flow patterns

Study performance of existing systems (COH, Bellaire, HCFC, UPRR, etc.) during a variety of conditions. 2yr, 25yr, 100yr, 500yr, etc.



Study Overview





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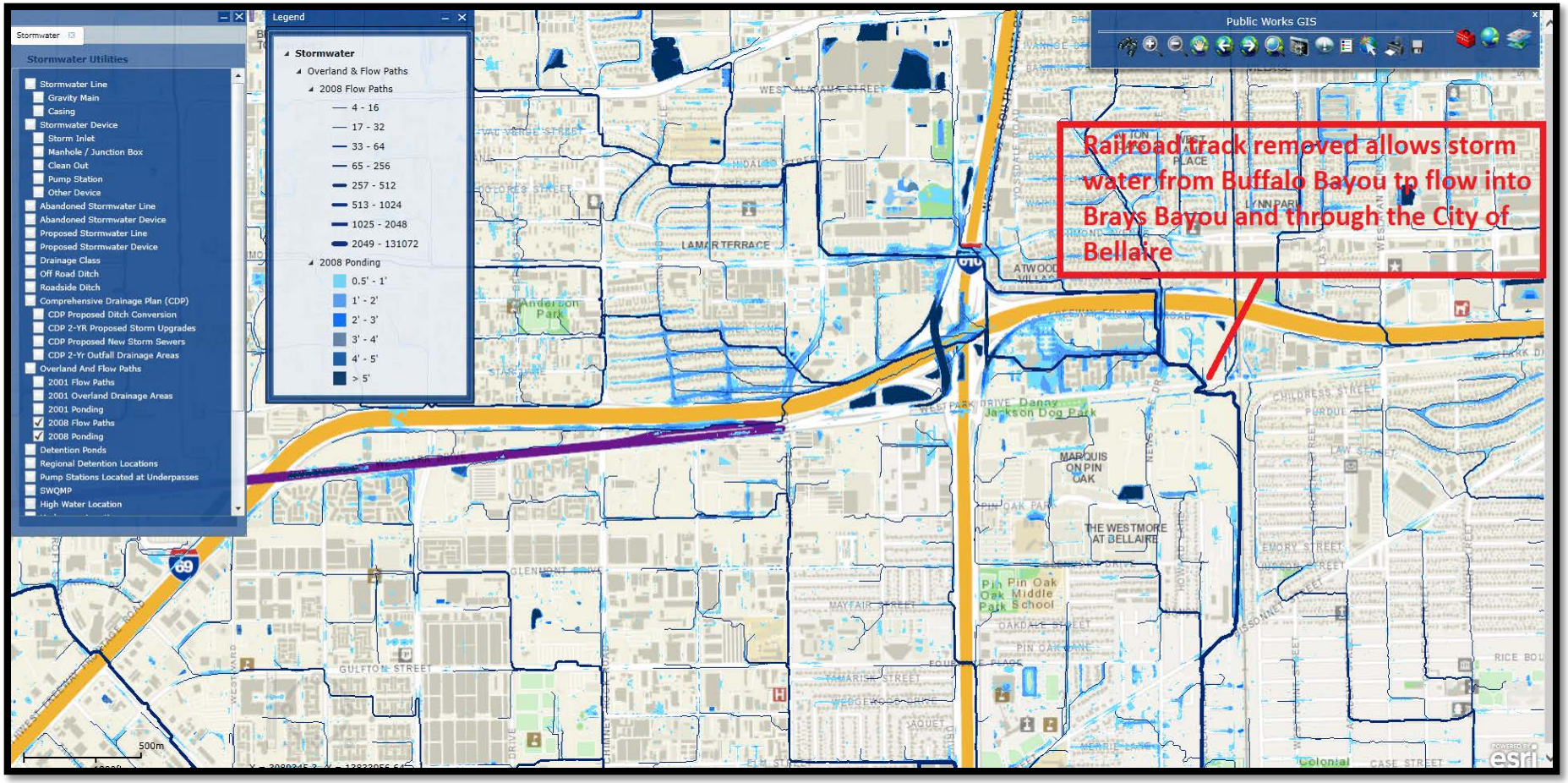

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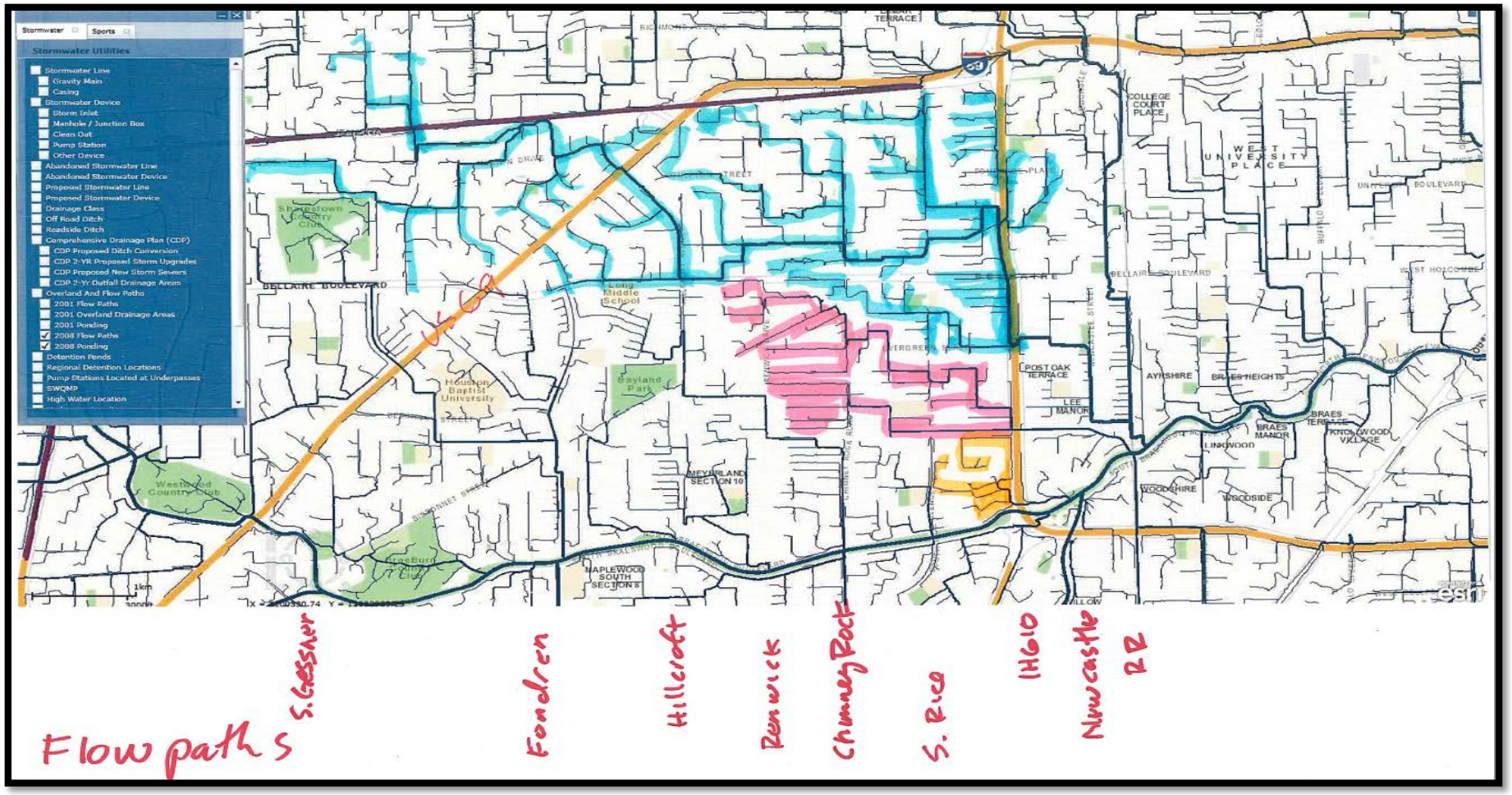


Study Overview

Study Engineering Process:

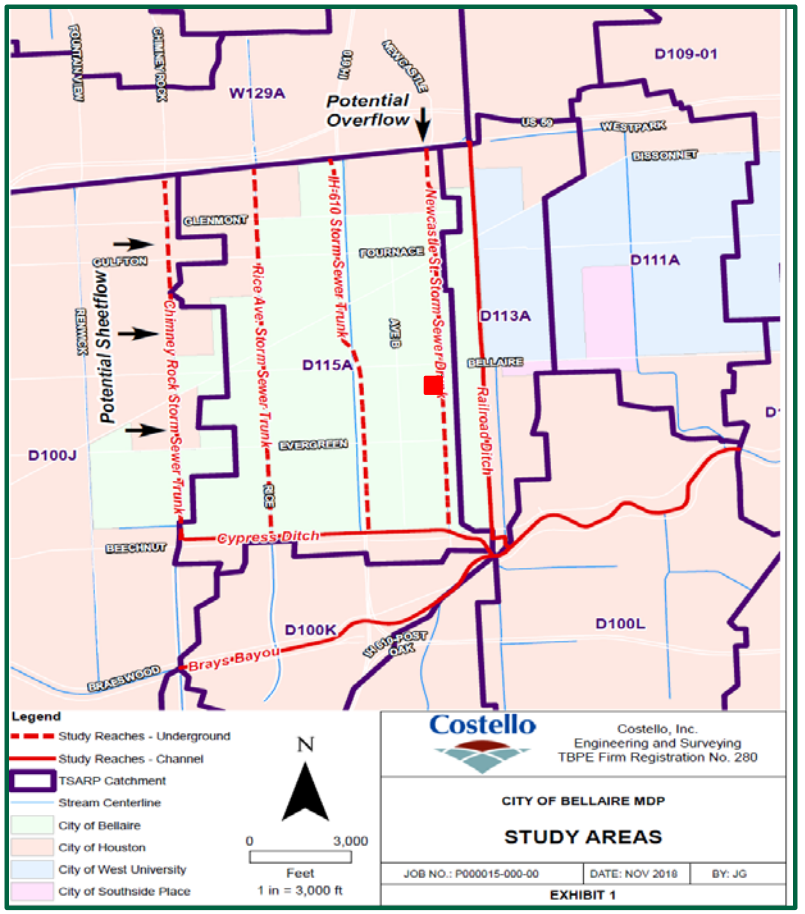
Terrain data gathering– LiDAR

Existing conditions data – COH GIS, Bellaire, HCFC

HCFC and TxDOT (IH610) processes used for analysis

Atlas 14 Rainfall data (may change definition of 100yr, 25yr, etc., storm during study)

Modeling Technology



Study Overview

Communication Process:

- Project Website
  - Updates
  - Progress reports
  - Graphics
  - History ,etc.

Scope includes 3 public meetings for the study

- Meeting 1 – solicit public input: survey, meeting
- Meeting 2 – status update and additional input opportunity
- Meeting 3 - Presentation of results and plan to move forward

Study Overview

Study Deliverables:

Technical report, exhibits, tables

Conceptual schematic

Additionally refined cost estimates

Construction project cost benefit matrix

- Constructability
- Homes protected
- Risk
- Similar to TDEM model

Options and recommended option

Study Overview

Project Costs and Phasing Plan:

Phase 1: Master Drainage Concept Plan (this study)

Bellaire 18% or	$126,360
TxDOT 18.4% or	$129,250
HCFCD 63.6% or	$446,390
Total	$702,000

- Phase 2: PER and Design $20- $25 million
- Phase 3: Construction $125 - $175 million

Future Bond Election

Project Schedule:

Phase 1 Study:	7 months from date of execution
Phase 2 PER / Design:	18 - 30 months from date of execution
Phase 3: Const.	TBD

The construction of this project is expected to be broken into at least several phases

Phases will be ranked and implemented relative to overall system effective

Future Bond Election

Possible Bond Program Schedule:

2019 - Phase 2:	Design:	City of Bellaire Share
2022 – Phase 3:	Construction:	City of Bellaire Share

Next Steps

Scope has been accepted by staff leadership and engineers at HCFC and TxDOT

Execute agreement with HCFC

Execute agreement with TxDOT

Execute agreement with ARKK

Begin study

Receive more refined information about cost and scope of Phase 2 for programming into future bond election.