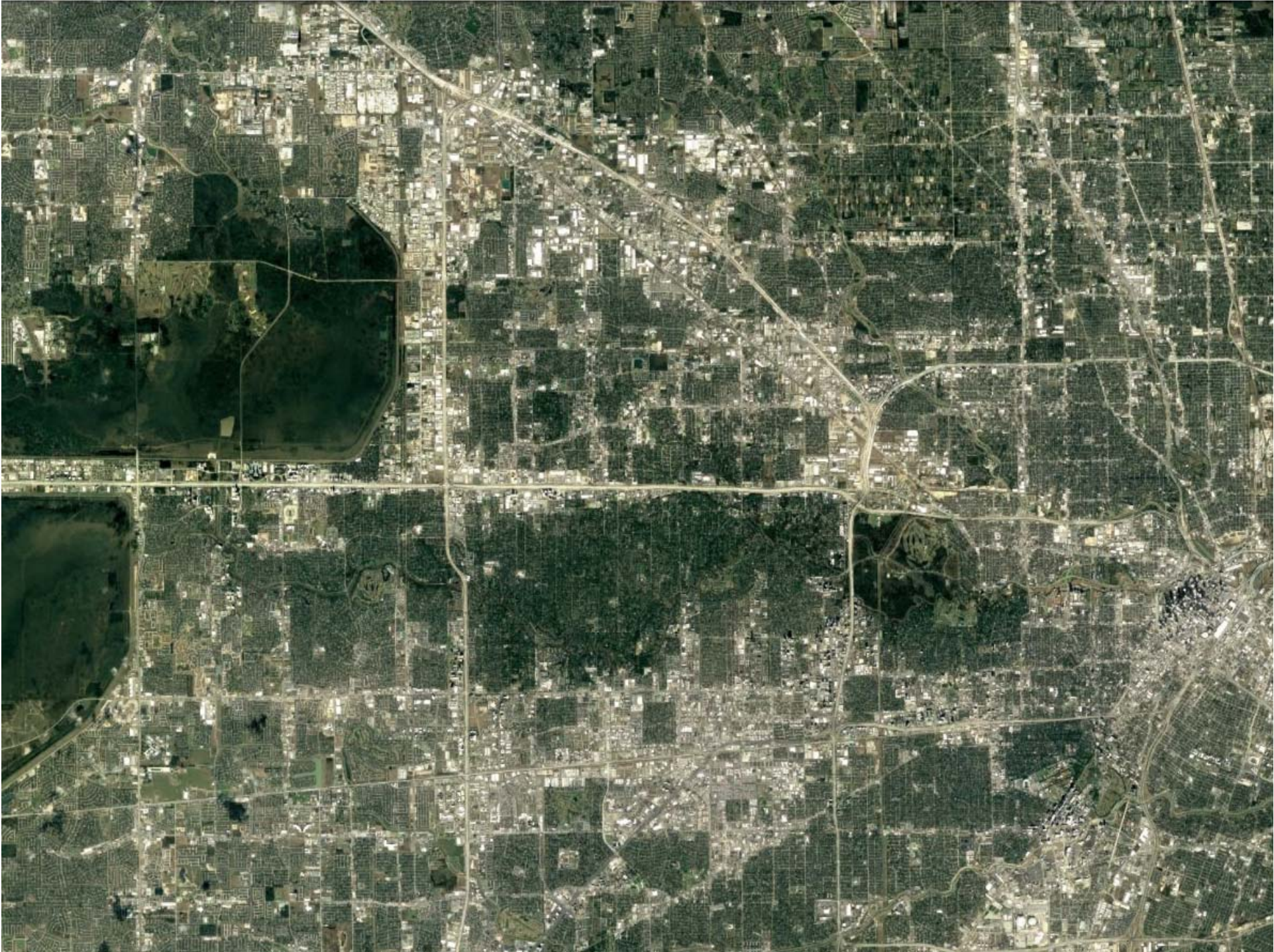


A satellite image of Earth showing a large, swirling storm system (Hurricane Harvey) over the Gulf of Mexico. The storm is characterized by a dense, dark, circular cloud structure with a distinct eye. The surrounding ocean and landmasses are visible in shades of blue and brown. The Earth's curvature is visible at the top of the frame.

September 12, 2017

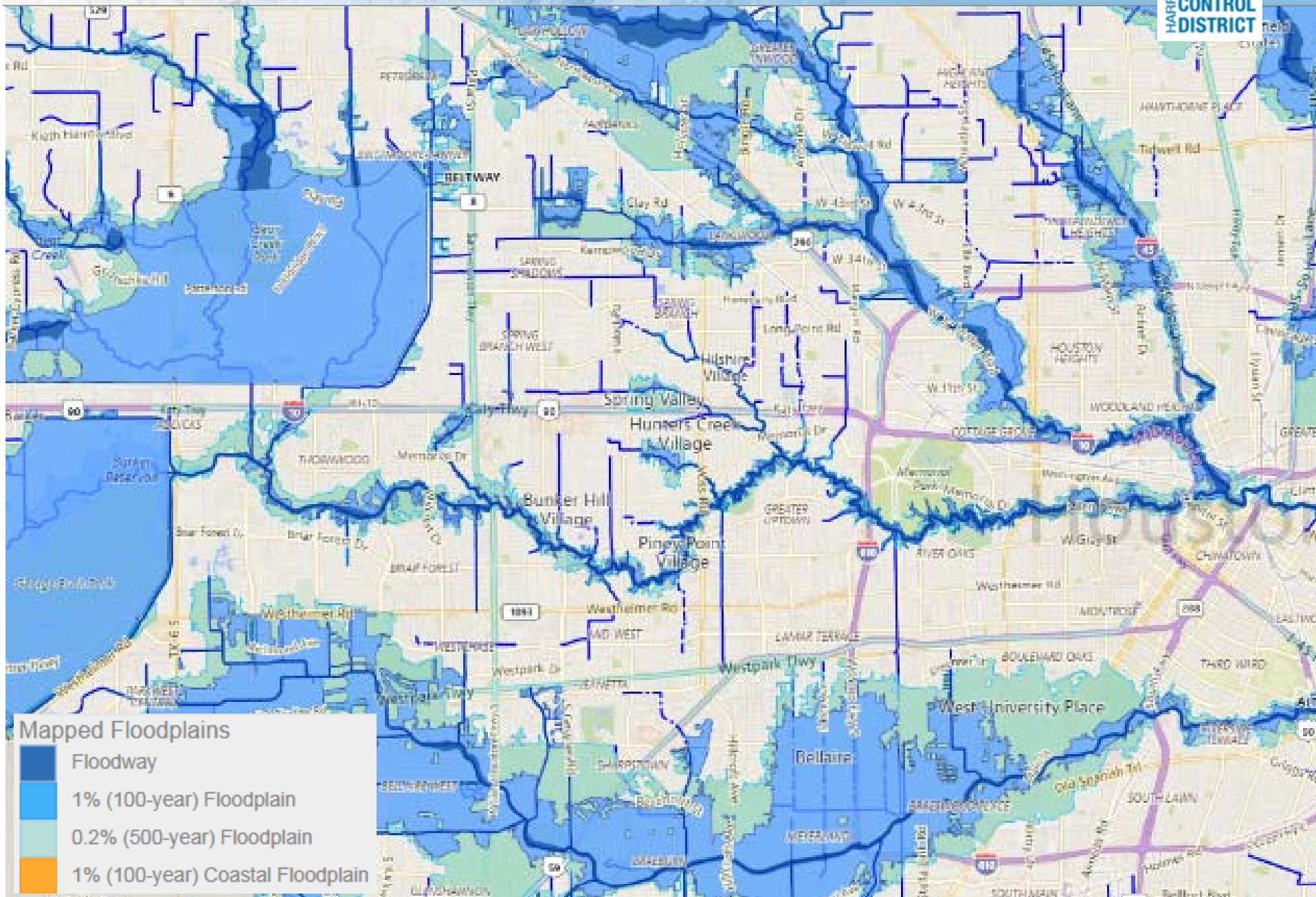
HURRICANE HARVEY

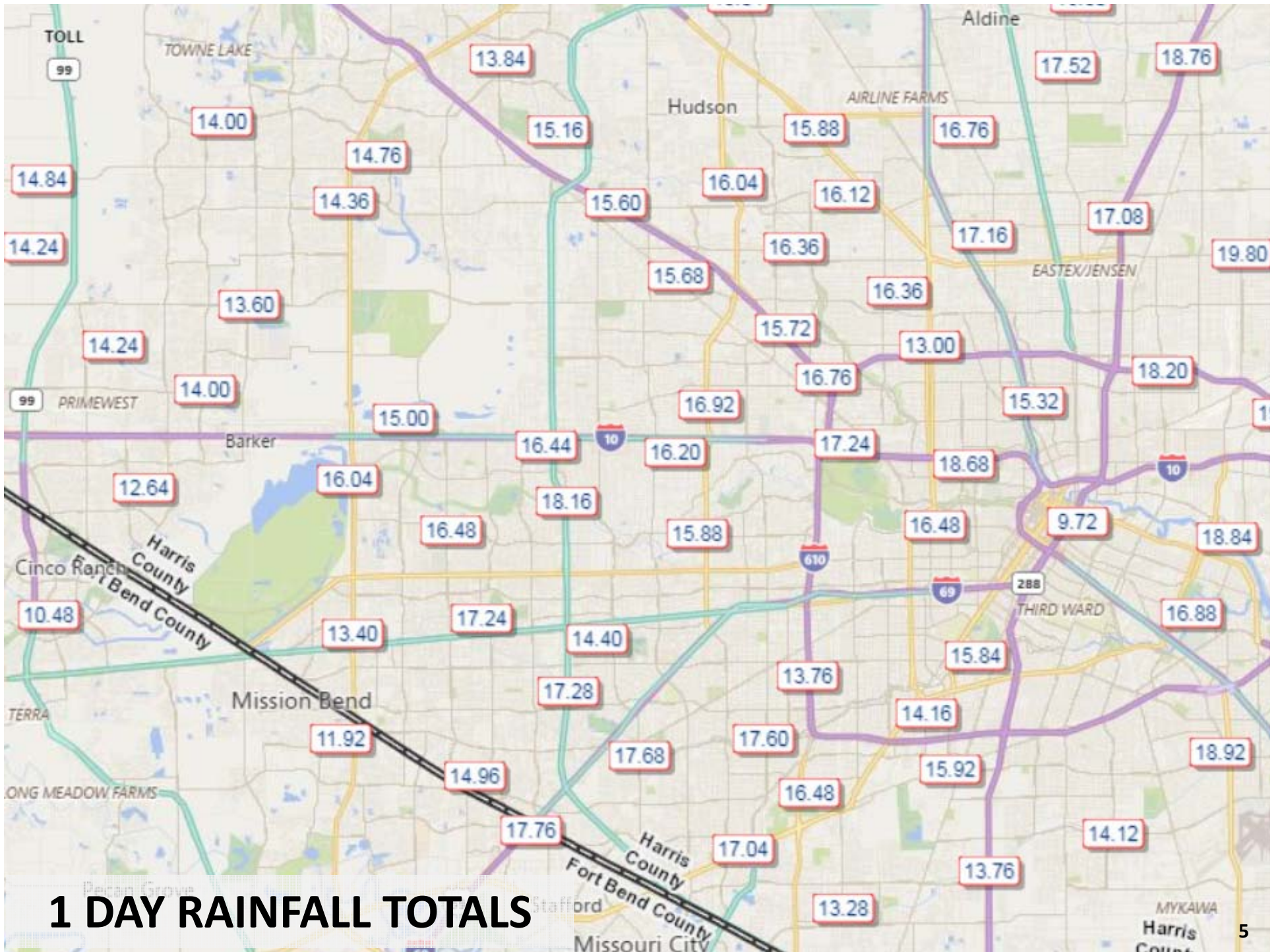
Michael F. Bloom, P.E., CFM, BCEE
R. G. Miller Engineers, Inc.
Houston, Texas



FLOOD EDUCATION MAPPING TOOL

FLOOD EDUCATION MAPPING TOOL | ABOUT THE TOOL | FAQs | HCFCD.org

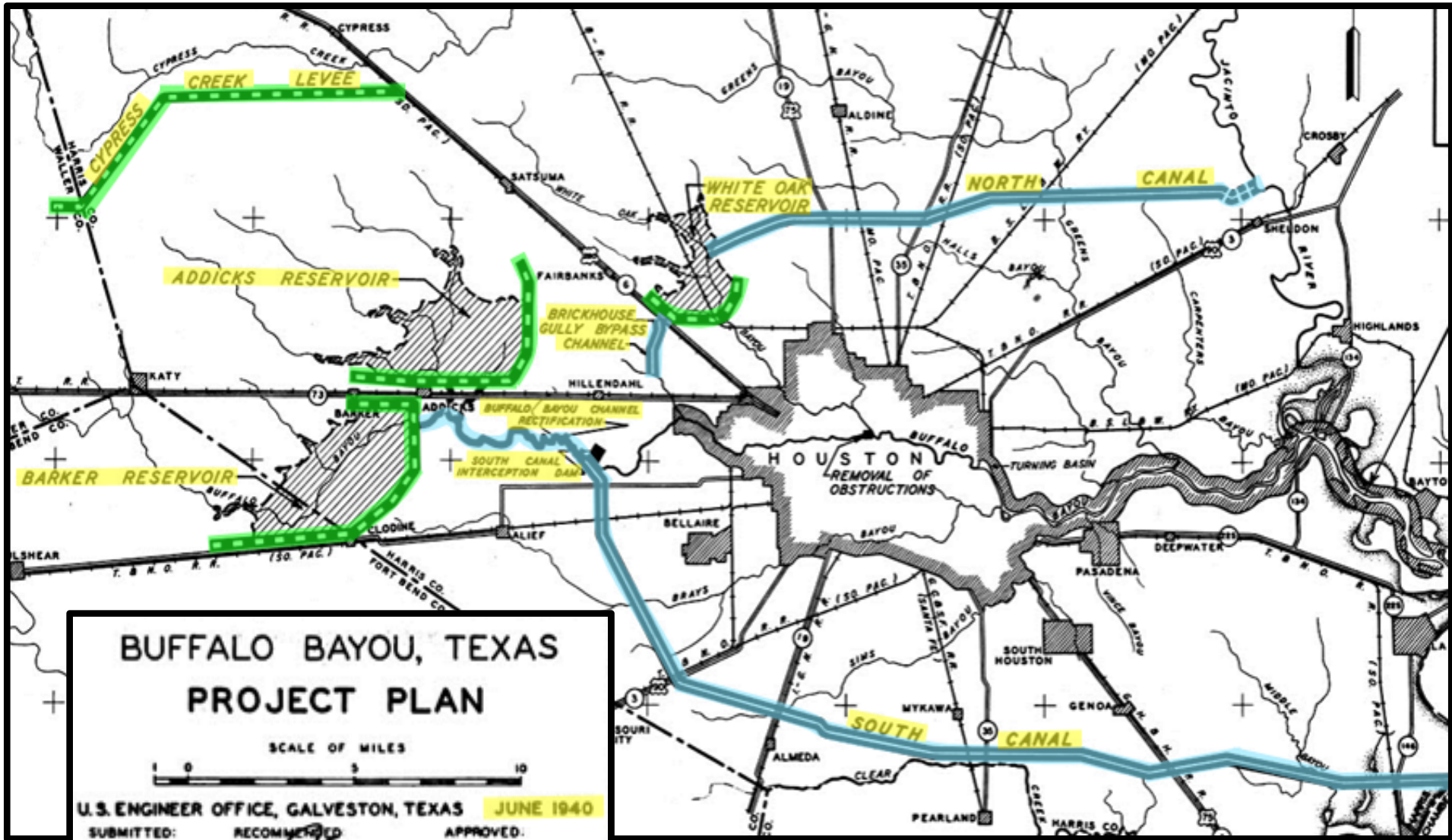




1 DAY RAINFALL TOTALS

DOWNTOWN HOUSTON, 1935





BUFFALO BAYOU, TEXAS PROJECT PLAN

SCALE OF MILES



U.S. ENGINEER OFFICE, GALVESTON, TEXAS **JUNE 1940**

SUBMITTED:

RECOMMENDED

APPROVED:

H. R. Termon
ENGINEER

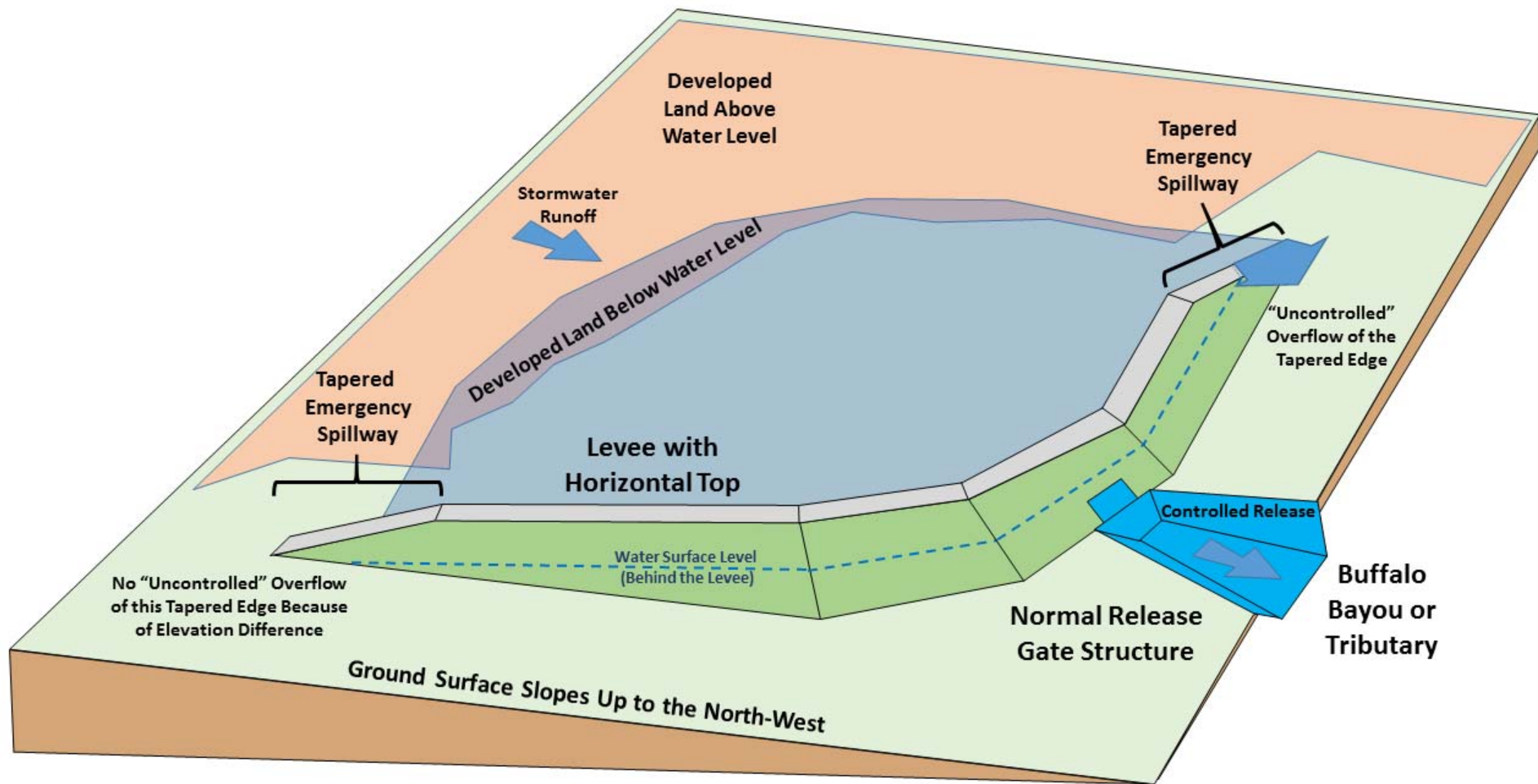
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CAPTAIN, CORPS OF ENGINEERS
CHIEF, TECHNICAL DIVISION

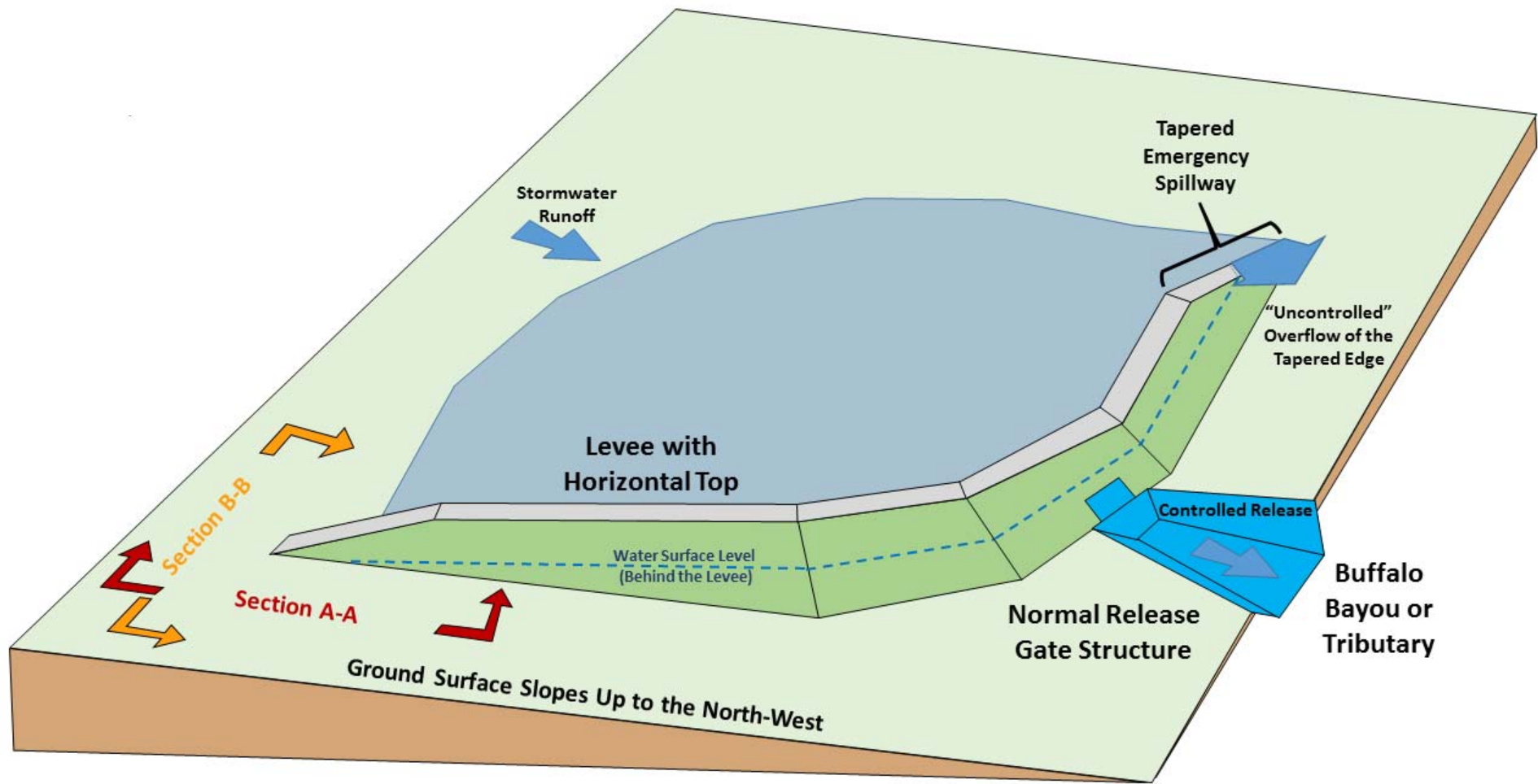
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COL., CORPS OF ENGINEERS
DISTRICT ENGINEER

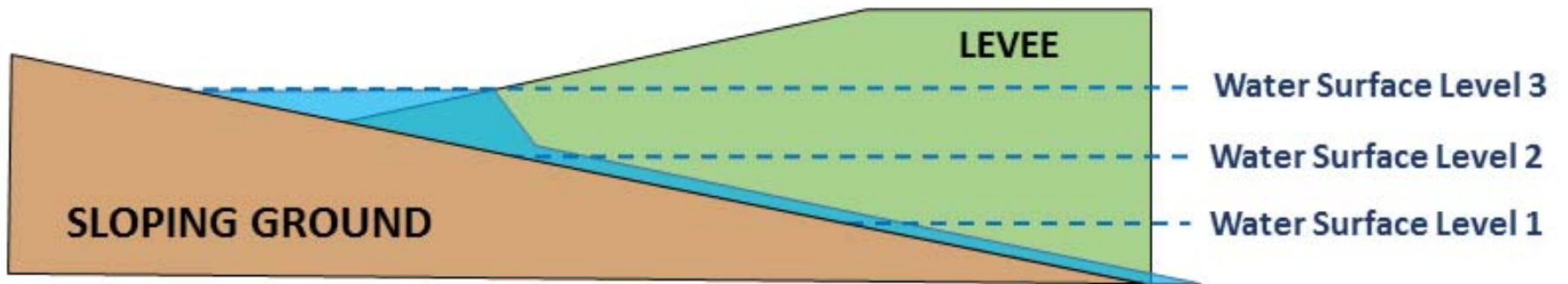
DRAWN BY R.L.S.-E.A.C.

PLATE

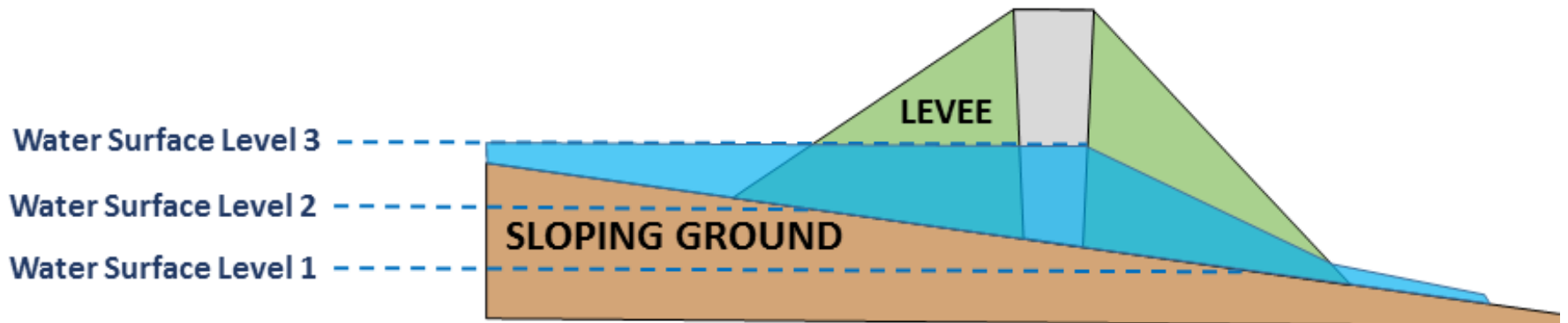
FILE: HSC 402-50







Section A-A



Section B-B

Cause of Death	Lifetime Odds of Dying from Cause (80 Years)
Heart Disease and Cancer	14%
Chronic Lower Respiratory Disease	3.6%
Motor Vehicle Crash	0.88%
Fall	0.79%
Pedestrian Incident	0.15%
Fire, Flames, or Smoke	0.067%
Choking	0.029%
Excessive Natural Heat	0.0060%
Contact with Sharp Objects	0.0026%
Storm	0.0015%
Being Bitten or Struck by a Dog	0.0009%
Lightning Strike	0.0006%
100-Year Storm (30 Years)	
500-Year Storm (1 Year)	

PLANNING & DESIGN CRITERIA QUESTIONS?

- Peak flow control or volume control?
- 1% annual chance level of service or better?
- How future proof?
- Street conveyance or storm sewer conveyance?
- Redevelopment drainage system requirements?
- New development drainage system requirements?



AFTER HARVEY: TOP 10 PLANNING & ENGINEERING ACTIONS

- 1. Update Rain Event Statistics**
- 2. Estimate Future Conditions**
- 3. Prepare Cost Estimates**
- 4. Discuss Policy Options & Costs**
- 5. Invest to Reduce EXISTING Risks**

AFTER HARVEY: TOP 10 PLANNING & ENGINEERING ACTIONS

- 6. Select Risk Level and Update Planning & Design Requirements**
- 7. Increase Spending**
- 8. Use Natural Drainage Approaches**
- 9. Enhance Risk Communication and Citizen Engagement**
- 10. Implement Volume Trading**



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[After Harvey: Top 10 Planning & Engineering Actions](#)

Welcome to Riparian Houston.

riparian: *adjective.* *ri·par-i-an \ rə-ˈper-ē-ən, rī- * *Relating to or living or located on the bank of a natural watercourse (such as a river) or sometimes of a lake or a tidewater. (From Merriam-Webster Dictionary)*

Riparian came to English from the same source that gave us “river” – the Latin *riparius*, a noun deriving from *ripa*, meaning “bank” or “shore.” First appearing in English in the 19th century, “**riparian**” refers to things that exist alongside a river (such as riparian wetlands, habitats, trees, etc.). Some river communities have laws called “riparian rights,” referring to the rights of those owning land along a river to have access to the waterway. Note the distinction of this word from “littoral,” which usually refers to things that occur along the shore of a sea or ocean. (From Merriam-Webster Dictionary)

QUESTIONS?

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