What is a “Cubit”

Fort Bend County Levee Improvement District No. 2’s Experience and Response to Hurricane Harvey

André McDonald / Michael E. Stone
LID 2’s Experience and Response to Hurricane Harvey

• Hurricane Harvey
  • Timeline of event
  • Impact of event
  • LID 2’s operations during the event

• Immediate Response & Recovery

• Long Term Solutions
“Elevation is the Salvation from Inundation”... Windell Curole
Fort Bend County Floodplain
LID 2 - Funding

Levee District is funded solely by ad valorem property taxes

• No Federal Funds
• No State Funds
• No County Funds
• No City Funds

July 10, 2018
So what is a cubit? *Genesis 6:15* The length of the ark shall be three hundred cubits, the breadth of it fifty cubits, and the height thirty cubits.

Cubit [N] [S]Heb. 'ammah; i.e., "mother of the arm," the fore-arm, is a word derived from the Latin cubitus, the lower arm. It is difficult to determine the exact length of this measure, from the uncertainty whether it included the entire length from the elbow to the tip of the longest finger, or only from the elbow to the root of the hand at the wrist. The probability is that the longer was the original cubit. The common computation as to the length of the cubit makes it 20.24 inches for the ordinary cubit, and 21.888 inches for the sacred one. This is the same as the Egyptian measurements.
Biblical View of Animals Headed to The Ark
2017 View of Animals Headed to the Ark
Here’s Harvey...
Harvey Crossed the Gulf of Mexico Quickly & Had Very Rapid Development
And Then it Stalled Out...

Critical Days
26 – Friday
27 – Saturday
28 – Sunday
29 – Monday
30 – Tuesday
Very wide impact of very high rainfall.

500 miles of coast affected
At 10:00am water level has reached a point where all pumps are turned off due to lack of submergence

Rapid Damage Assessment is underway by both City and LID 2 staff

Agreement is made with engineer to survey all affected homes:

<table>
<thead>
<tr>
<th>High water level / mark</th>
<th>Slab elevations</th>
<th>Curb elevation</th>
<th>Gutter elevation</th>
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Deadline for study completion 45 days
1. Identify every affected home
2. Create a map showing all of the affected areas
3. Gather data:
   1. Slab elevation
   2. Curb elevation
   3. High water elevation
   4. Time water entered home
4. Determine exact cause of flooding
5. Determine possible corrective actions to prevent recurrence
6. Present findings to affected homeowners in a public meeting
7. Conduct a public meeting with all LID 2 residents about Harvey and the plan forward
8. Begin work on projects
Monday 11 September 2018

- First public meeting with 80+ homeowners who flooded
- City and District both presenting and available for questions
- Presented 8 point Action Plan
  - Survey work was already underway, about 30% complete at that point
  - Inundation study was underway
  - Data collection on all flooded homes about 50% complete

July 10, 2018
Inundation modeling & study complete

Report on findings of all the survey data etc. prepared

Multiple meetings to review this data

Public meeting scheduled for all homeowners who suffered flooding

2nd public meeting scheduled for all residents
Total Rainfall within the District

- Measurements varied between 31” and 36” from various observers (or about 1½ Cubits)
- All data presented here are based upon 15 minute increments from NexRad radar services
- Over the 5,000 + acres the District received about 4.9 billion gallons of rain fall.
  - Approximately 3.7 billion gallons flowed out by gravity through the gates
  - And Approximately 1.2 billion gallons was removed by the pumps
Continuous public outreach

3 Large Public Meetings

• 8 Nov 17 for flooded
• 14 Nov 17 For District
• 04 April 18 for all interested
  • “Keeping Sugar Land Dry”

Ongoing Public Outreach
Monday / Tuesday
11-12 December 2018

• Board Retreat
• Develop project list
  • 3\textsuperscript{rd} Pump Station
  • Ditch Improvement Project
  • Levee Closure
• Set hard deadlines for completion
But my house never flooded before...
You don’t know what you don’t know!

Most significant discovery during the post Harvey study was the number of homes with slab elevations below the minimum building slab elevation of 66.5’
Impact of Projects on LID Tax Rates

1. LID 2 has roughly $5 billion in Taxable Assessed Value

2. Current Tax Rate is $0.111

3. Average District Tax Rate in Ft Bend County is $0.32

4. LID has authorization to sell $48 million in bonds
Lessons Learned

• All emergency planning and exercises are good, but they are only a guide.

• Share information with your partners in the community

• Do the right thing – act decisively and quickly

• Be open and honest with the public, even when it is painful

• You don't know what you don't know

• Have a reserve fund
“Without Flood Control, Nothing Else Matters”

Association of Levee Boards of Louisiana

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