Hurricane Harvey

Response, Recovery, Resilience - Now the Path Forward after Harvey

Bayou Preservation Association

October 18, 2018
Hurricane Harvey

Harris County Rainfall Statistics
• 1 Trillion gallons of water over 4-days (1,777 sq mi)
  ○ Would run Niagara Falls for 15 days
  ○ Fill the Astrodome 3200 times
• 33.7 inches average Harris County rainfall over 4 days
  ○ 68% of Harris County yearly rainfall in 4 days

Lake Houston
• Reached peak inflow of approximately 430,000 cfs
  ○ At peak inflow could fill empty Lake Houston in just under 5 hours
Immediately following Hurricane Harvey, Harris County Engineering Department rapidly mobilized to achieve the following key accomplishments:

- Successfully completed over $10 million dollars in repairs to the Lynchburg Ferry in less 180 days

- Rapidly repaired 12 washed out roads to allow pedestrian/emergency vehicle access. Most Notable: Market Street ($1.8 Million) & Garret Road ($950k)

- Inspected 886 bridges in 2 week, to ensure structural stability and public safety. Most Notable: Clay Road over South Mayde Creek ($310k)

- The HCED was able to quickly respond to and address over 200 Damaged Items through the use of a flexible and adaptive staff organization
Market Street

- Section of Road (250’ x 200’)
- Four-way intersection washed out.
- Roadway re-opened in less than 120 days later.
- Cost: $1,714,386.87
Garrett Road

- Section of Road (300’ x 25’)
- Washed out
- Repaired in less than 90 days
- Cost: $928,000
Clay Rd. over South Mayde Creek

Items Damaged and Repaired:
- Concrete Slope Paving Failure
- Debris Build Up
- Cost: $310,386.87
HCED Key Accomplishments
Traffic Signals

In addition to the key road & bridge accomplishments, HCED successfully mobilized to inspect and repair traffic signals across the County, including:

- Completed $2 Million in repairs
- Inspected over 900 signals in 4 days
- Inspected 347 communication locations in 2 weeks
- Replaced 58 damaged signal cabinets
- Repaired/Replaced 95 damaged communication locations
 Identified 104 subdivisions for upgrades in drainage infrastructure
7 applications that include 14 subdivisions have been submitted to HMGP (Section 404)

 Identified 28 subdivisions for preliminary engineering to be included in the CBDG-DR
Remaining subdivisions will be identified within the next 2 months

FEMA HMGP and CBDG-DR progress
HCED Public Infrastructure Recovery Stats

- Over 716 damage projects after Hurricane Harvey
- 544 of them are at 100% complete costing at $160,183,142
- Remaining cost is $73,468,146
- Total damage is estimated to cost $233,651,558

*Figures are current as of 8/23/2018*
# Floodplain Management Regulation Changes

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<tbody>
<tr>
<td></td>
<td>Freeboard Elevation Above .2%</td>
<td>Foundation Type</td>
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<td>Floodway</td>
<td>36 inches (Horizontal Member)</td>
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<td>V Zone</td>
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<td>24 inches</td>
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<td>EC or HC Form</td>
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*Whichever is greater and not based on .2%
No Standard  Current Standard  Old Standard
Proposed changes to infrastructure regulations

3. Consideration of Overland Flow

- Change: Item 2 The engineer shall show the proposed structure’s minimum slab elevation at eighteen inches (18") above the 1% (100-year) flood plain, one foot (1`) above the ponding depth within a ten foot (10`) radius of the proposed building pad, or set or above the 500-year floodplain elevation, whichever is applicable and greater.
- IMPACT: Mexico newly adopted Floodplain Regulations requiring all structures to be placed at minimum of the 500-year elevation.
- ADD VERBAGE: An engineer’s certification stating that the grading, elevations, and drainage are within engineering tolerances of the approved plans shall be submitted prior to issuance of structure permits associated with that approved plan set.
- IMPACT: ensures all subdivisions including private, get built to ensure compliance, especially to lot elevations.
- Add verbage: In areas where the project design incorporates fill adjacent to neighboring landowners, the Contractor shall implement grading and/or perimeter runoff catchment devices (e.g., perimeter ditches) during construction to ensure that adjacent parcels bordering the project site do not experience interim drainage flows that exceed pre-development conditions for storm events up to and including the 100-year event or carry sediment generated as part of construction activities. Where applicable, these practices are in addition to the standard Storm Water Pollution Prevention design and shall include additional ditches redirecting site drainage or temporary piping. This note is not intended to address any liability or responsibility under Texas Water Code s.0.08.
- IMPACT: codifies note being added for developments to assist in enforcing interim drainage during construction activities for a site.

SECTION 6.03 STORM WATER DETENTION

1. Application of detention

- Changed: Item li.1 removed exemption for detention requirement for tracts not falling into a roadside ditch that are less than 1 acre and less than 150’.
- IMPACT: continuous with the County’s stance that all new development shall require detention

2. Calculations of Detention Volume

- Changed: Item E. (1) maximum pumped volume from 75% to 50%.
- IMPACT: puts the Engineering Department’s criteria in line with HCFCDS’s requirements.

- Changed: minimum detention storage rate for pumped outlets into storm sewers from 0.65 acre-day to 0.75 acre-day.
- IMPACT: puts that criteria in line with increases found in roadside ditch outlets and HCFCDS outlets.

- Changed: Item 3 maximum drain time for a pumped system from 7 to 4 days. If drain time is longer than four days, use the increase in detention volume that approximates the drain time as shown in Figure 3.
- IMPACT: puts the Engineering Department’s criteria in line with HCFCDS requirements.

- Changed: Reverses criteria from min 6’ to an appropriate sized restricted.
- IMPACT: allows engineer to design restrictor to whatever the allowable flow is.

SECTION 6.05 SUBMERGED STORM SEWERS

- Changed: submerged storm sewers are not allowed within the ROWs of major thoroughfares.
- IMPACT: codifies County’s desire to not want systems draining major roadways used as exits for the public during an event to be submerged.
Immediately following Hurricane Harvey the Permit Division mobilized over 200 personnel to execute Private Damage Recovery Operations for Residential and Commercial structures. In the months that followed HCED achieved the following:

- Recorded floodwater elevations on 31,000 structures within 2 weeks of the storm.
- Issued over 31,000 permits for flood-damage repair.
- Established a call center staffed by 15 personnel to respond to constituents’ inquiries. The call center responded to 15,000 calls from September to November 2018. Distributed 8 truckloads of food and water to Harris County residents affected by flooding.
- Analyzed lessons learned to begin creating the Disaster Assessment Recovery Enhancement app to streamline data tracking and recordation for future disaster events.
HC $20 M Buy-out Program for Special Circumstance Properties
Buy Out Program Progress:

- First home purchased 2 month after flooding and only 30 days after Commissioners Court approved the buyout program.
- First home was demolished by **Nov 10, 2017**
- Total of 46 homes were purchased with County Emergency Program and 48 pending purchases of lots.

Summary of ongoing Hurricane Harvey HMGP (Hazard Mitigation Grant Program) project:

- # homes agreed to sell - 19
- # additional homes we should be making offers on - 329
Upcoming Major Projects

Construction to Criminal Justice Court to start in 2019

- Building Improvements Highlights
  - First floor lobby expansion and reconfiguration to alleviate congestion at Security Screening and Public Elevator Lobby areas.
  - Five new elevators to be added to expand vertical transportation capacity and modernization of existing elevators.

Jury Assembly Improvements to start 2019

- Flood Mitigation and Protection Highlights
  - New Flood proof building designs
  - New flood barriers at stair doors
  - Replacement of existing flood doors
  - Replacement of materials and finishes with flood resistant options
  - Replacement of assembly area seating with exterior-grade flood resistant options
  - New emergency sump pumps

- Building Improvement Highlights
  - New enclosed/air-conditioned entry expansion at street level for 160-person queuing capacity
Question?
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