HURRICANE HARVEY

AFTER ACTION REVIEW AND AREAS OF IMPROVEMENT REPORT
OBJECTIVES

• Hurricane Harvey Recap
  • Pre – Storm
  • During the Storm
  • Post – Storm
• After Action Review
• Areas of Improvements
• Moving Forward
HURRICANE HARVEY RECAP

- **HARVEY'S HISTORY**
  - **AUGUST 2017**
  - **STALLS OVER TEXAS ON AUG. 26**
  - **LANDFALL AS CAT. 4 ON TEXAS COAST AUG. 25**
  - **STRENGTHENS INTO A HURRICANE AUG. 24**
  - **DEGENERATED INTO A TROPICAL WAVE AUG. 19**
  - **INVEST 91L DESIGNATED AUG. 13**
  - **HARVEY NAMED AUG. 17**
  - **HARVEY’S FINAL LANDFALL NEAR CAMERON, LA ON AUG. 30**
HURRICANE HARVEY RECAP

• PRE-STORM
  • AUGUST 23RD – CONCENTRATED EFFORTS IN CITY PREPARATION / RECALL NOTIFICATION
  • AUGUST 24TH – EOC LEVEL ACTIVATION TO LEVEL III
  • AUGUST 25TH – 6PM – EOC LEVEL ACTIVATION TO LEVEL 1

• DEPARTMENT CHECKLISTS COMPLETED

• PLAN OF ACTION WAS BEING FORMULATED

• EVERYTHING HAPPENED QUICKLY BUT CAME TOGETHER LIKE IT HAD BEEN PLANNED OUT
HURRICANE HARVEY RECAP

- DURING THE STORM
  - 2 – 12 HOUR SHIFTS
  - TASKS FORCES FORMED (PW, FIRE, POLICE)
  - PLAN WAS BEING FORMULATED FOR EACH OPERATIONAL PERIOD
- INCIDENT ON HAND WAS QUICKLY BEYOND OUR MEANS
- CREWS NEVER GAVE UP AND PROVIDED THE BEST
- EOC STAFF STAYED STRONG
- DISPATCH CENTER ACCOMPLISHED A LOT
HURRICANE HARVEY RECAP

Top 10 Point Rainfall Amounts in Inches

Harvey produced record breaking rainfall totals of 40 to over 50 inches

<table>
<thead>
<tr>
<th>SITE</th>
<th>RAINFALL</th>
</tr>
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<tbody>
<tr>
<td>Cedar Bayou</td>
<td>51.88</td>
</tr>
<tr>
<td>Mary’s Creek</td>
<td>50.04</td>
</tr>
<tr>
<td>Clear Creek</td>
<td>48.20</td>
</tr>
<tr>
<td>Beaumont</td>
<td>47.52</td>
</tr>
<tr>
<td>Santa Fe</td>
<td>46.70</td>
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<tr>
<td>Berry Bayou</td>
<td>44.88</td>
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<tr>
<td>Galveston</td>
<td>43.91</td>
</tr>
<tr>
<td>Goose Creek</td>
<td>43.87</td>
</tr>
<tr>
<td>League City</td>
<td>43.32</td>
</tr>
<tr>
<td>Cheek Canal</td>
<td>43.11</td>
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## Rainfall Comparisons

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<th>Time</th>
<th>1-hr</th>
<th>2-hr</th>
<th>3-hr</th>
<th>6-hr</th>
<th>12-hr</th>
<th>24-hr</th>
<th>2-day</th>
<th>4-day</th>
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</thead>
<tbody>
<tr>
<td>Peak Rainfall (inches)</td>
<td>6.8”</td>
<td>11.9”</td>
<td>14.8”</td>
<td>18.9”</td>
<td>20.9”</td>
<td>25.6”</td>
<td>35.2”</td>
<td>47.4”</td>
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<tr>
<td>Return Interval</td>
<td>1,500</td>
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<td></td>
<td></td>
<td>5,000</td>
<td>12,000</td>
<td>50,000</td>
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</tbody>
</table>

*Hurricane Harvey – Storm and Flood Information (10/10/2017)*
## Rainfall Comparisons

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1-hr</td>
<td>6.8”</td>
<td>5.7”</td>
<td>4.7”</td>
<td>3.7”</td>
</tr>
<tr>
<td>2-hr</td>
<td>11.9”</td>
<td>9.9”</td>
<td>7.3”</td>
<td>4.7”</td>
</tr>
<tr>
<td>3-hr</td>
<td>14.8”</td>
<td>13.5”</td>
<td>8.3”</td>
<td>5.3”</td>
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<tr>
<td>6-hr</td>
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<tr>
<td>12-hr</td>
<td>20.9”</td>
<td>28.3”</td>
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<td>1-day</td>
<td>25.6”</td>
<td>28.4”</td>
<td>17.4”</td>
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<tr>
<td>2-day</td>
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<td>28.5”</td>
<td>17.5”</td>
<td>23.1”</td>
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<td>4-day</td>
<td>47.4”</td>
<td>38.5”</td>
<td>N/A</td>
<td>28.9”</td>
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</table>
HURRICANE HARVEY RECAP

• POST-STORM
  • CONTINUED EFFORT TO GETTING THINGS BACK TO AN ACCEPTABLE OPERATIONAL LEVEL
  • EOC WAS DISCONTINUED AND RETURNED TO A LEVEL 4 ON SEPTEMBER 2ND
    • MANY CONTINUOUS DAYS OF WORK
    • 71 OPERATIONAL PERIODS (12 TO 24 HR. OPERATION PERIODS)
    • JOBS OUTSIDE OUR EVERYDAY SCOPE
  • PUBLIC WORKS CONTINUED WITH DEBRIS MANAGEMENT UNTIL NOVEMBER 3RD (ESTIMATED)
  • FINANCE CONTINUES THEIR WORK FOR THE TIME BEING
AFTER ACTION REVIEW

• CITY STAFF
• CITY DEPARTMENTS
• CITY OPERATIONS
AFTER ACTION REVIEW

- CITY DEPARTMENTS
  - EACH DEPARTMENT WAS PREPARED PRE STORM FOLLOWING THEIR RESPECTIVE CHECKLIST
AFTER ACTION REVIEW

• CITY STAFF
  • CAMARADERIE FOR ALL EMPLOYEES - PRE/DURING/POST
  • CITY STEPPED UP, CAME TOGETHER, AND ACCOMPLISHED THE UNTHINKABLE
  • STAFF CAME TOGETHER AND COMPLETED DAILY SCOPE
  • NO LOSS OF LIFE OR INJURIES REPORTED
AFTER ACTION REVIEW

• EOC OPERATIONS
  • ACTIVATED FOR 8 DAYS OF FULL ACTIVATION (AUGUST 25TH – SEPTEMBER 2ND)
  • CAME TOGETHER AND AT TIMES WAS OVERWHELMING
  • FUNCTIONALITY WAS AMAZING BUT HAD ITS FLAWS AS WELL
  • MAINTAINED A SENSE OF CALMNESS WITH A FORWARD LOOKING PERSPECTIVE
  • LOGISTICS STOOD OUT
  • DISPATCH CENTER WAS AMAZING
AREAS OF IMPROVEMENT

• CITY DEPARTMENTS
  • STAFFING HANDLED DIFFERENTLY REGARDING RECALL DURING INCIDENTS
  • REEVALUATE PREPAREDNESS PLAN FOR STAFF
  • SUGGESTED NOT ONLY FOCUS ON DEPARTMENT PREPARATION BUT CITY WIDE AS WELL
AREAS OF IMPROVEMENT

- CITY STAFF
  - TRAINING
    - SPECIFIC TRAINING OUTSIDE OF NIMS
      - FLOOD SPECIFIC
      - SAFETY / SITUATIONAL AWARENESS
  - SPECIALIZED EQUIPMENT
  - ADDRESS NUMBER VISIBILITY
  - CUSTOMER SERVICE
  - ON-SITE RESOURCES AVAILABLE FOR EMPLOYEES TO DECOMPRESS, REDUCE EMOTION STRESS, ETC.
AREAS OF IMPROVEMENT

• EOC OPERATIONS
  • TRAINING
    • MORE SPECIFIC POSITION TRAINING
    • SPECIFIC DOCUMENTATION TRAINING
      • VERY HELPFUL FOR OPERATIONS BUT ALSO FINANCE
  • CONSISTENCY IN OUR OPERATIONS
    • FUNCTIONALITY OF NIMS
  • RESOURCES
    • VEHICLES, EQUIPMENT, VOLUNTEERS, CERT TEAMS, ETC
  • OPERATIONAL PERIOD CHANGE OUTS
AREAS OF IMPROVEMENT

• EOC OPERATIONS
  • FINANCE
    • DOCUMENTATION IS THE KEY
      • NIMS FORMS
      • WORK FORCE DOCUMENTATION
      • EQUIPMENT USED
      • PAYCOM
    • COMMUNICATE NECESSARY INFORMATION TO STAFF TO START OFF ON THE SAME PAGE
MOVING FORWARD

• WHAT IS THE NEXT STEP
  • TRAIN, TRAIN, TRAIN
    • GATHER A COLLECTION OF CLASSES FOR CITY STAFF
  • PRACTICE
    • TABLE TOPS
    • CITY EVENTS
• COMMUNICATION
  • BETWEEN STAFF MEMBERS ALONG WITH INFORMATION BEING RELAYED TO DEPARTMENTS FOLLOWING OUR MEETINGS
  • OPERATIONAL BRIEFINGS SHOULD BE DONE AS A WHOLE
MOVING FORWARD

• WHAT IS THE NEXT STEP (CONT.)
  • EDUCATION FOR OUR CITIZENS
    • NATURAL DISASTER PREPARATION (BENEFIT BOTH CITIZENS/EMPLOYEES)
    • EOC OPERATIONS FAMILIARIZATION
    • SOCIAL MEDIA HUBS FOR NOTIFICATION
  • RESOURCES
    • BRAINSTORM
    • WANTS VS NEEDS
    • OBTAIN AGREEMENTS EARLY AS WELL
CONCLUSION

- Hurricane Harvey was a big success
  - Take a lot of positives from the incident
  - Learn a lot as well
  - Together we will continue to grow
  - Not only train for today but train for tomorrow as well
  - Share our knowledge to others makes us versatile

- Great job all!!! Now let's get ready for the next one