

## **The Road Ahead at the corner of Resiliency & Recovery**

**Erwin Burden, P.E., CFM, Director of Recovery and Resiliency**

Harris County Engineering  
1111 Fannin,  
Houston, TX 77001

### **Abstract –**

#### **1. Introduction – Harris County Engineering Resiliency and Recovery Division**

The Harris County Engineering Department, with direction from Commissioners Court, established the Recovery and Resiliency Division (RRD) in 2019 to oversee the subdivision drainage improvement projects as part of the \$2.5 billion Harris County Flood Control Bond Program approved by Harris County voters in 2018 in response to the devastating floods that occurred during Hurricane Harvey in 2017.

This spring, the Commissioners Court directed RRD to deliver a new section of Precinct-led and Partnership projects within the RRD portfolio. These projects will receive \$150 million in Community Development Block Grant – Mitigation (CDBG-MIT) funding.

#### **2. Objectives are to provide Subdivision Drainage Improvement Projects to reduce repetitive losses from flooding events.**

The purpose of these projects is to improve the internal drainage systems and related infrastructure that convey stormwater from neighborhoods to major drainage channels or bayous. RRD projects are solely dedicated address local drainage infrastructure needs of the County in preparation for any future disasters.

#### **3. Severe Flooding Experience**

Although Harris County has experienced many flooding events, such as the Memorial Day flood of 2015, Tax Day flood of 2016, and the Memorial Day flood of 2016, the regional devastation caused by Hurricane Harvey in 2017 prompted Harris County voters in 2018 to approved \$2.5 billion in bonds to finance flood damage reduction projects, which is known as the 2018 Harris County Flood Control District Bond Program. Many homes experienced flooding of 2 feet to 4 feet inside their home.

The current program managed by RRD consists of 93 projects. As of today, RRD has completed the Study phase for 92 of the stormwater subdivision drainage projects in the program, and most of the projects are currently in the Design, & Construction Phases. The Study phase includes confirmation/revision of the planning level proposed conditions of the subdivisions with detailed survey, environmental and geotechnical studies. The design Phase includes plans, specifications

and cost estimate work based on approved Study phase findings that are brought before Commissioners Court for approval. Approximately 15 projects are currently under construction and 18 projects are complete. In 2023, Harris County RRD is awarding \$247 million in construction costs and is targeted to complete the majority of the current subdivision projects by the end of 2024.

With the additional \$150M in CDBG-MIT grant funding, RRD will review, evaluate, rank, and deliver additional critical flood damage reduction projects for the region.

#### Project #1: Castlewood

One example is the Castlewood subdivision located in northeast Harris County, the subdivision was severely damaged by floods overpowering shallow drainage ditches and cracking asphalt streets during Hurricane Harvey. The community contained outdated drainage systems unable to mitigate stormwater in time to reduce flood risks. To solve this issue, the RRD team began the study and design of the Castlewood Drainage project in April 2019 and the project underwent construction on September 20, 2021.

The \$14.5 million Castlewood Addition Section 3 and 4 Subdivision Drainage Improvement Project, funded by the Community Development Block Grant (CDBG) Program, installed new underground storm sewer systems on the Castlewood Subdivision to provide drainage mitigation intended for 100-year storm events, and transformed the subdivision by implementing reinforced 5-foot concrete sidewalks with ADA-compliant ramps in place of roadside ditches, routing extreme storm event drainage to two locations and replacing existing asphalt pavement with fresh concrete curbs and gutter roadways.



**BEFORE**



**AFTER**

**4. Lessons Learned**

There is no one standard design that the residents of all subdivisions will agree to. Some want the rural feel of two-lane streets with ditches, where other residents want a curb and gutter section with sidewalks. Other neighborhoods are all about preserving trees or an open space or existing pond. However, in some cases the options are limited to provide the benefits that the residents need and want.

Although the Subdivision Program brings a unique set of challenges when current drainage design criteria are retrofit into 50- to 60-year-old subdivision. Many of the subdivisions in the current portfolio were built prior to detention ponds being required. The HCED is extremely excited to have the support of the Commissioners Court and the voters to remove or reduce the risk of flooding to more than 4,300 homes out of the Atlas 14 1% floodplain and thousands more with a reduced risk of flooding.