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**1F. Standard and Green infrastructure utilization; impacts, regulations, and management of impervious cover; master planning and studies underway**  
(4/8/16)

Following the Memorial Day 1981 flood in which 13 lives were lost in Central Austin, the City of Austin implemented a drainage charge to fund an expanded stormwater management program. Since that fateful year, Austin has spent \$65 million on mitigation, less than \$2 million per year.

As of 2016, following three major storms in two years that caused flooding citywide, there are currently no plans or projects underway to mitigate the explosive growth Austin has experienced in the Shoal Creek Watershed. This scenario is repeated in other watersheds in Austin with inadequate infrastructure built prior to 1977 when the Drainage Criteria Manual was adopted.

While the Onion Creek and South Lamar studies are underway, the Flood Mitigation Task Force recommends the following regulatory and planning mechanisms as requested in Council Resolution 20150604-044. These recommendations are intended to be adopted as soon as possible prior to the CodeNEXT process to send a strong message to Austin's residents that the city takes seriously its responsibility to use its regulatory power to minimize the risk to public safety posed by flooding. These recommendations are not intended to replace a structured funding mechanism to address the capital improvements needed to manage the city's number one threat to life and property: flooding.

**Planning and Regulatory Recommendations:**

1. Engage in a comprehensive planning process regularly (e.g. every five years, perhaps in concert with the Drainage Master Plan) that addresses land use, transportation, utilities, and drainage concerns to map known and potential flood problem areas and determine:
  - a. A maximum amount of total impervious cover for flood-prone neighborhoods that must be considered prior to issuing any building permits.
  - b. Where onsite detention is required for proposed new and redevelopment.
  - c. Where flooding problems remain unresolved, new development or densification is discouraged.
  - d. Where, in areas to be annexed, potential flooding concerns and the cost for improvements are identified prior to annexation. For example, staff currently asks residents in an area to be annexed about flooding but examples show that, although none reported flooding, it may just be due to lack of a recent large rain event.
  - e. Where flood problems are severe enough to trigger a moratorium on new development, redevelopment, infill and auxiliary structures. The moratorium would remain until the problems are mitigated or certain conditions apply (no exceptions):
    - i. the developer provides a signed engineering study that proves no adverse downstream impact
    - ii. onsite mitigation is included in the development
    - iii. downstream infrastructure is improved by the development

2. Strengthen the City of Austin Land Development Code (LDC) regarding flood mitigation requirements for new development and redevelopment.
  - a. Known loopholes (as identified by staff) should be eliminated by way of the CodeNEXT process or sooner, if possible.
  - b. Existing code has provisions that would allow for the regulation of redevelopment but this code is not enforced. Identify, clarify and strengthen these provisions and provide a timeline and funding necessary for enforcement.
  - c. Determine whether the 1% annual exceedance probability (AEP) event should be replaced by a larger, less frequent event (perhaps only in certain watersheds) or if 'freeboard' requirements should be increased (freeboard is a factor of safety usually expressed in feet above a flood level for purposes of floodplain management).
  - d. Enhance stormwater discharge limit requirements in the COA LDC and Drainage Criteria Manual, Section 8.1.0., which requires that storm water management for peak rates of runoff shall provide for a temporary storage of stormwater runoff. Runoff is then released at a controlled rate which cannot exceed the capacities of the existing downstream drainage systems, or the pre-developed peak runoff rate of the site at each discharge point, whichever is less.
  - e. Require that all new or remodeled commercial and residential structures added to existing lots (e.g. Accessory dwelling units) comply with impervious cover limits.
  - f. Enhance requirements that all proposed land development projects, whether new or redevelopment, demonstrate no adverse downstream impacts. Onsite (and any necessary offsite) stormwater controls must be modeled to simulate proposed condition discharges and their impact on the city storm drain system, including the receiving waters of each watershed.
  - g. Require that commercial and residential redevelopment reduce post development peak rates of discharge to match peak rates of discharge for undeveloped conditions instead of existing predevelopment conditions. Undeveloped conditions are assumed to be grassland unless otherwise demonstrated by the applicant.
  - h. Require that all objects such as dumpsters and commercial use furniture in floodplains (benches, picnic tables, etc.) be anchored to the ground so as not to block storm drains, bridges and floodways during a flood. Food trailers should be transported offsite prior to flooding. Educate and enforce compliance during annual health inspections or similar routine inspections.
  - i. Ensure that City Code is compared for consistency with federal law acquisition procedures, where applicable. (See Section 1B Buyout recommendations.)
3. Implement City policies, programs, staffing levels, training opportunities and interdepartmental collaboration to enhance flood mitigation and preparedness.
  - a. Ensure that Development Review staff is aware of 2013 amendments in the LDC related to Resolution No.20131017-046 with special attention to enforcement of Article 4 Section 30-4-151 (the author of this recommendation needs to provide additional explanation).
  - b. Set up procedures so that One Stop Shop can easily check to see if proposed new or redevelopment is in or near any known local flood problem areas.

- c. Resolve flood-related Code enforcement problems in a timely manner. Immediately remedy problems such as blocked drainage easements that create safety hazards.
- d. If any existing stormwater infrastructure that is designed and/or constructed by entities other than the City of Austin require corrective measures, those fixes shall be paid for by the responsible developer or contractor.
- e. Implement a rapid licensing/approval process for flood restoration contractors in preparation for future flood events. This will provide assurance to homeowners and businesses that contractors are aware of current city regulations and that liability is assured.
- f. Increase commercial inspection and enforcement efforts to prevent flooding and offsite transport of stored chemicals and hazardous materials. Ensure that inspectors in applicable City programs (e.g. WPD Pollution Prevention and Reduction Program, Code Enforcement, and others) are aware of flood-prone problem areas.
- 4. Actively seek and participate in Public-Private Partnerships where the City can leverage private development activities to increase investment in new or updated flood mitigation infrastructure.
- 5. Implement a benefit-cost analysis for CIP projects to determine whether the use of smaller 'design storms' are more cost effective. This will help determine project viability, make it easier to seek funding, and stretch limited resources.

### **Green Infrastructure Recommendations**

Green infrastructure for stormwater management reduces impacts from built environments using landscape features and engineered systems that mimic natural processes to control the quantity and quality of runoff. Green stormwater infrastructure (GSI) often includes elements such as rainwater harvesting, rain gardens and pervious pavement (see figures 2-3 and 2-4). These features typically detain small volumes of water and therefore aren't always considered effective flood mitigation measures. However, when implemented on a widespread basis throughout a neighborhood they can provide essential benefits (Geosyntec/CoA Brentwood Study). To that end, green infrastructure projects on private land offer a way for community-minded residents to reduce their flood footprint and benefit their downstream neighbors.

#### **Recommendations**

- 1. Incentivize onsite retrofit floodwater management measures for private property owners.
  - a. Enhance outreach opportunities particularly for those who have suffered losses due to local flooding. Promote in specific neighborhoods (e.g., Brentwood)
  - b. WPD should partner with Austin Water Utility's existing Rainwater Harvesting and WaterWise Rainscape rebate programs to:
    - i. Enhance program guidance information regarding landscape elements that mitigate local flood impacts.

- ii. Contribute rebate dollars when onsite solutions provide flood detention (e.g. rainwater harvesting volumes over 1,000 gallons)
  - iii. Consider doubling the rebate amount for systems that use a smart controller to ensure that detention volume is available when needed
  - iv. Consider rebating professional drainage design guidance where local flooding problems exist
  - v. Consider administrative costs (e.g. operational, maintenance, inspection and enforcement activities) associated with GSI-related incentives and implement only those program elements that are cost-effective
- 2. Consider offering discounts to the City Drainage Fee for flood detention facilities that exceed regulatory requirements (consider location, size/capacity thresholds and possible cap on reduction values)
- 3. Implement best practices from peer cities (see Section 3)
- 4. Collaborate in cost-sharing opportunities that integrate GSI-flood detention with other projects, such as:
  - a. Other City CIP projects
  - b. Public-Private Projects
  - c. Interlocal jurisdictions and entities (see Section 4)
- 5. Integrate GSI with standard CIP solutions (gray infrastructure) when it can serve a vital role, such as:
  - a. to offset potential increases in peak flow created as a result of more efficient drainage conveyance
  - b. redirecting runoff away from structures