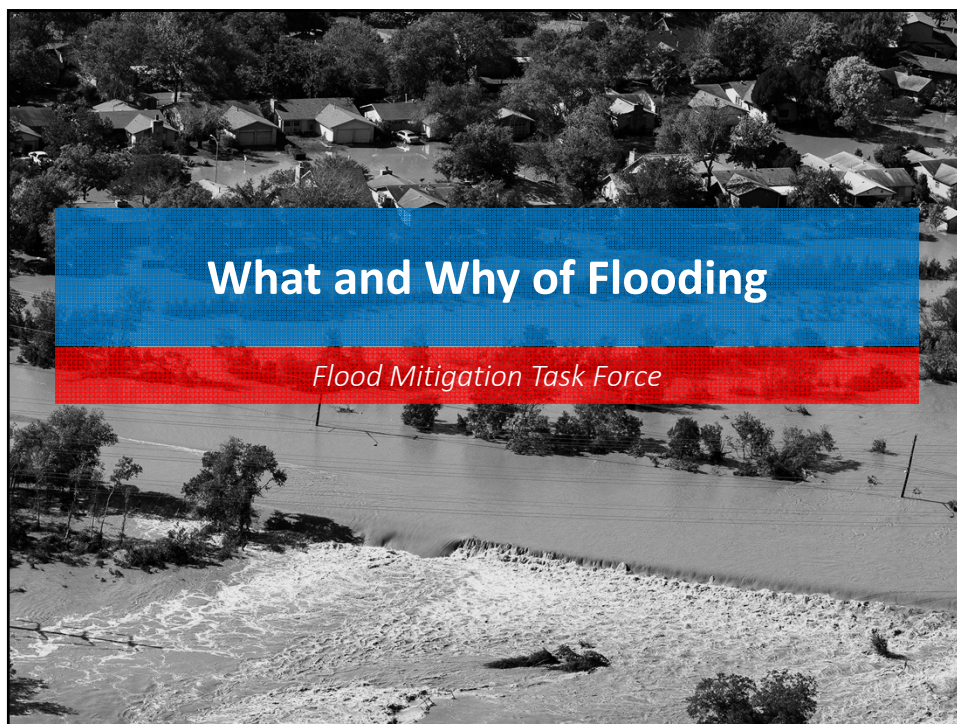
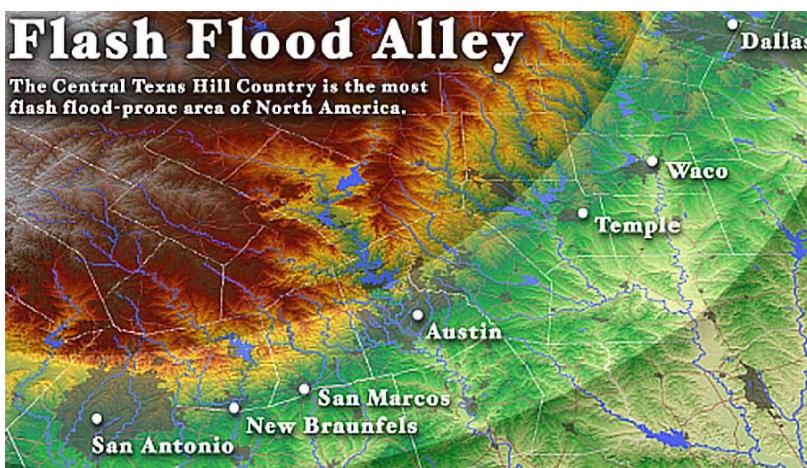


## Presentation Overview

- What and Why of Flooding
- Flood Risk
- Flood Mitigation Strategies
- Flood Prevention Strategies
- Master Planning Process
  - Creek Flood Problem Identification and Prioritization
  - Local Flood Problem Identification and Prioritization



## Need for Flood Mitigation Services



## Why Does Flooding Occur?

Flooding occurs as a result of **overloads** of **the primary drainage system, the creeks**, “CREEK FLOODING” or the secondary drainage system, **the storm drains**, “LOCAL FLOODING”.



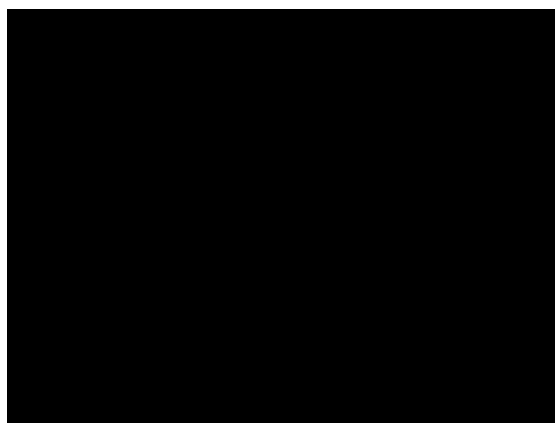
Local Flooding



Creek Flooding

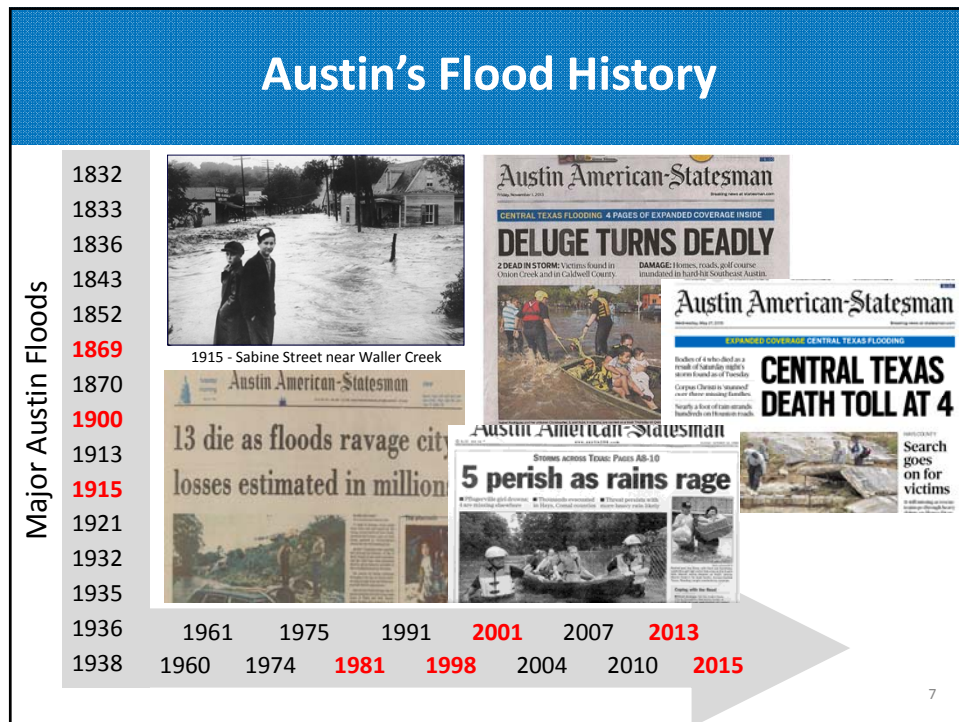
5

## What is a Floodplain?

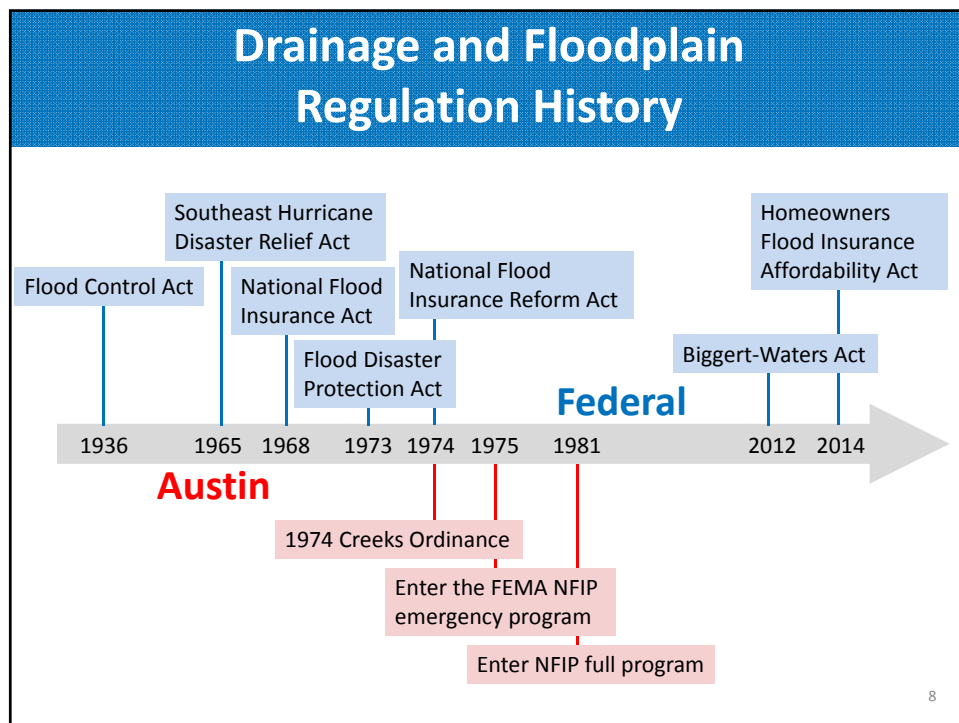


*The floodplain is the area of land that is likely to be under water when the creek overtops its banks. In a sense, the floodplain is the full extension of the creek.*

6



7



8



## What is a 100-year flood?

- 1% annual chance flood (i.e. it has a 1% chance of happening every year)
- Has a 26% chance of happening over a 30 year mortgage
- Can occur multiple times per year
- Does *not* mean that it will be another 99 years before it happens again
- What are the 2-year (50%), 10-year (10%), 25-year (4%), 500-year (0.2%) floods?

10

## What level of risk does FEMA require in the NFIP?

- The standard is the 100-year flood
- Currently 22,100 communities in the NFIP nationwide



**FEMA**

11

## What level of risk do we currently accept in Austin?

- **Storm drains:** 25-year inside the pipe; 100-year in the roadway right-of-way/drainage easement
- **Ditches/Channels/Creeks/Rivers:** 100-year
- **Roadway crossings:** 100-year; max. 0 – 12 inches over the roadway (depending on road class)
- **Floodplain regulations:** fully developed 100-year, no adverse impact, freeboard, safe access

12

### Why would a community strive for less risk than other communities?

- Increased protection for lives and property
- Location in Flash Flood Alley
- **Community Rating System** – NFIP program that rewards communities that surpass minimum requirements with flood insurance discounts

13

### Community Decisions Regarding Flood Risk

*What is an acceptable level of risk?*

14



## Flood Mitigation Strategies

- How do we minimize or eliminate existing flood risk for development that occurred before the establishment of drainage and floodplain regulations or for newly annexed areas?
  - Flood mitigation projects
  - Regulations for redevelopment projects

## Flood Mitigation Projects: Capital Solutions

- Low-water crossing upgrades
- Detention and retention ponds
- Conveyance improvements
- Diversion
- Barriers
- Structure elevating/floodproofing
- Nonstructural

17

## Flood Mitigation Projects *Structural*

Before



After



David Moore Roadway Improvements

**Low-water crossing upgrades:**  
*culverts, bridges*

18

## Flood Mitigation Projects

### *Structural*

Main  
Creek  
Channel



Overflow  
Detention  
Storage

Northwest Park detention facility

**Detention and retention ponds:** *Online, offline*

19

## Flood Mitigation Projects

### *Structural*



Storm Drain Improvements 09/20/2012



Inlets

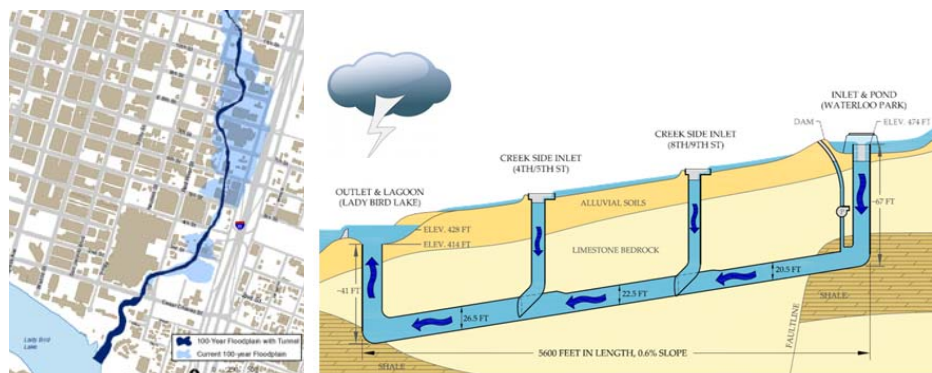
**Conveyance:**

*channel modifications, pipes, inlets, ditches*

20

## Flood Mitigation Projects

### Structural



Waller Creek Tunnel

**Diversion:** *tunnels*

21

## Flood Mitigation Projects

### Structural



Crystalbrook Floodwall

**Barriers:** *floodwalls, levees*

22

## Flood Mitigation Projects

### *Nonstructural*



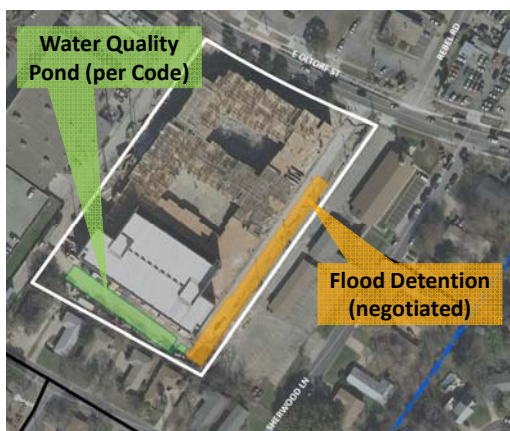
Bayton Loop Property Buyouts

### **Nonstructural projects:**

*buyouts, permanent road closures*

23

## Regulations for Redevelopment Projects



*CodeNEXT is considering requirements that redevelopment mitigate its share of downstream flooding.*

24

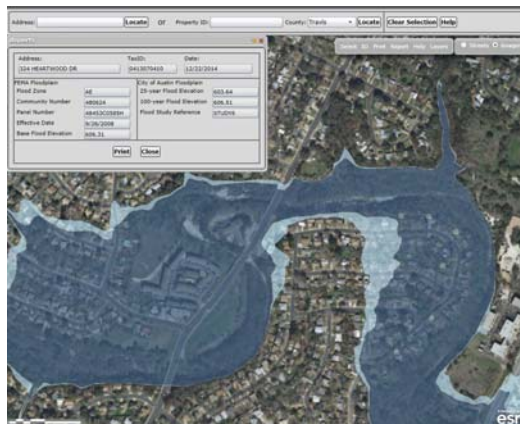


## Flood Prevention Strategies

- How do we ensure that new development minimizes its flood risk and the risk to others?
  - Drainage criteria and floodplain regulations
  - FEMA floodplain regulations vs. Austin floodplain regulations
  - Austin floodplain regulations

## Austin Floodplain Regulations

- Existing conditions vs. fully developed conditions
- No adverse impact
- Freeboard
- Safe access



27

## Master Planning Process

Problem Identification, Prioritization, Solution  
Identification, & Solution Implementation

*Flood Mitigation Task Force*

## 2001 Master Plan and Watershed Protection Department Mission

Flooding	Erosion	Water Quality Degradation
		
Public Safety	Property Protection	Environmental Protection

29

## Master Plan: Primary Mission Goals

1. **Flood Mitigation:** Protect lives and property by reducing the impact of flood events.
2. **Erosion Control:** Protect channel integrity and prevent property damage resulting from erosion.
3. **Water Quality Protection:** Protect and improve Austin's waterways and aquifers for citizen use and the support of aquatic life.

30

## Master Plan Common Goals

- **Public Use & Natural Character:** Improve the urban environment by fostering additional beneficial uses of waterways and drainage facilities.
- **Regulatory Compliance:** Meet or exceed all local, state & federal permit and regulatory requirements
- **Assets Maintenance:** Maintain the integrity and function of Utility Assets
- **Optimization/Mission Integration:** Optimize City resources by integrating flood, erosion, and water quality control measures.

31

## Master Plan Flood Mitigation Objectives

1. Reduce the depth and frequency of flooding for all 100-year floodplain structures.
2. Reduce the depth and frequency of flooding on all roads in the 100-year floodplain.
3. Reduce the danger at road crossings subject to any flooding by the 100-year flood.
4. Provide mitigation for flood damage.
5. Prevent the creation of future flood hazards to human life and property.

(Continued next slide) <sup>32</sup>

## Master Plan Flood Mitigation Objectives

*(Continued from previous)*

6. Reduce the depth and frequency of local flooding for buildings.
7. Reduce the depth and frequency of local flooding for yards.
8. Reduce the danger of street flooding created by substandard storm drains.
9. Reduce standing water in public rights-of-way and drainage easements outside the 100-year floodplain.

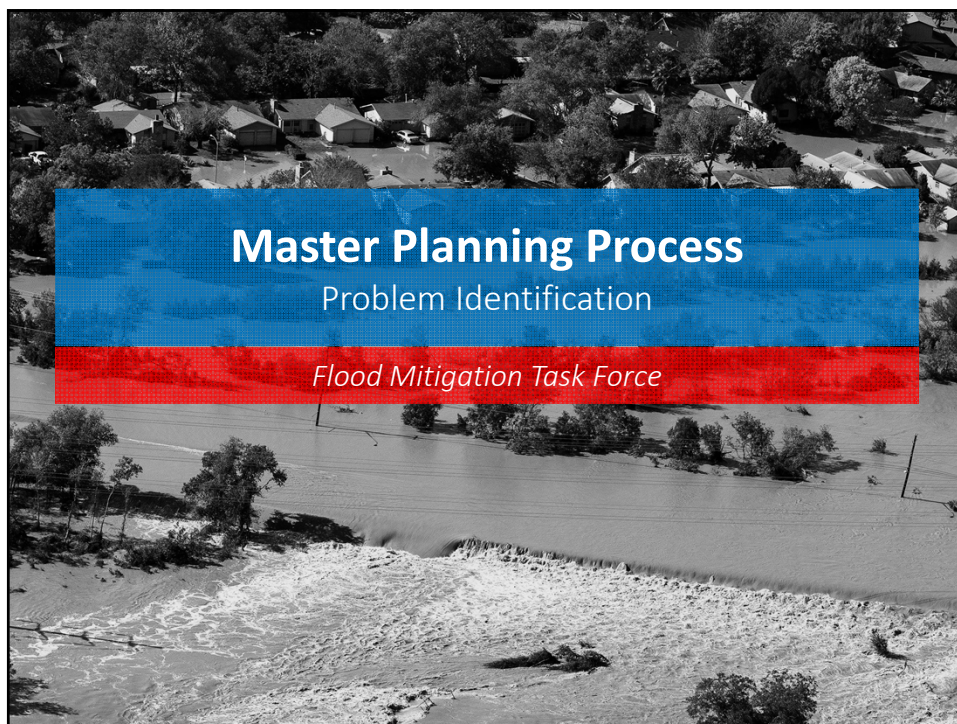
33

## Master Planning Process

- Identify the problem
- Prioritize the problem
- Identify the solution
- Implement the solution



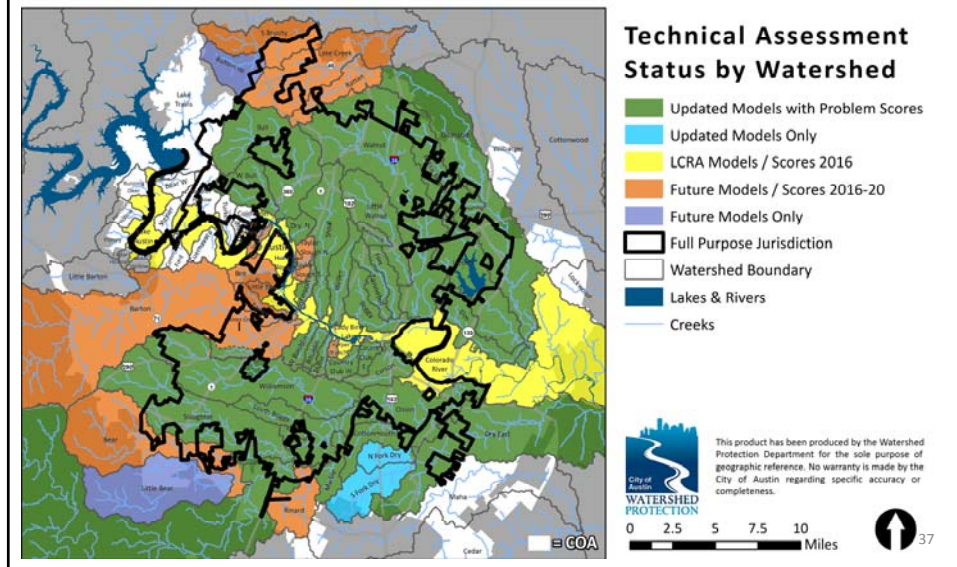
34



## Identifying Flood Risk in Austin

- Flood risk identification through known flood damages vs. theoretical determination
- Flooding knowledge
- Engineering models
- Citizen complaints
- Creek Flood vs. Local Flood

## Watersheds with Engineering Models



## Determining the Level of Risk

- Storm events (2-, 5-, 10-, 25-, 100-year)
- Building flood depths
- Roadway flood depths & velocity
- Resource values

## Creek Flood Risk

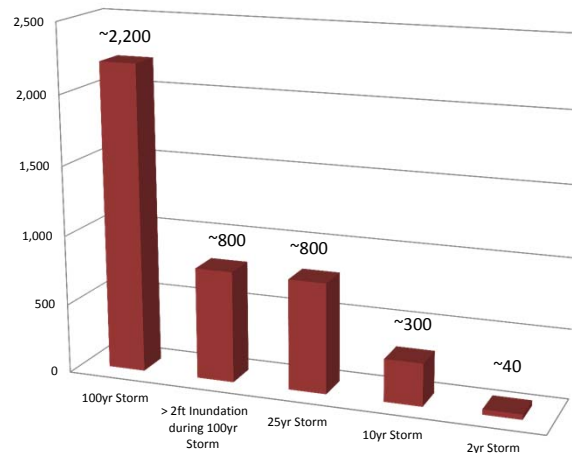
- Building Flooding Risk
  - ~ 5,100 buildings in 100-year floodplain
- Roadway Crossing Flooding Risk
  - Greatest threat to public safety
  - ~400 roadway crossings in 100-year floodplain



39

## Creek Flood Risk

Buildings at Risk of 100-year Inundation



~5,100 total buildings in 100-year floodplain

40

## Local Flood Risk

### Local Flood Complaints

- ~2,100 building complaints
- ~2,600 yard complaints
- ~1,450 street complaints
- ~6,150 **TOTAL**

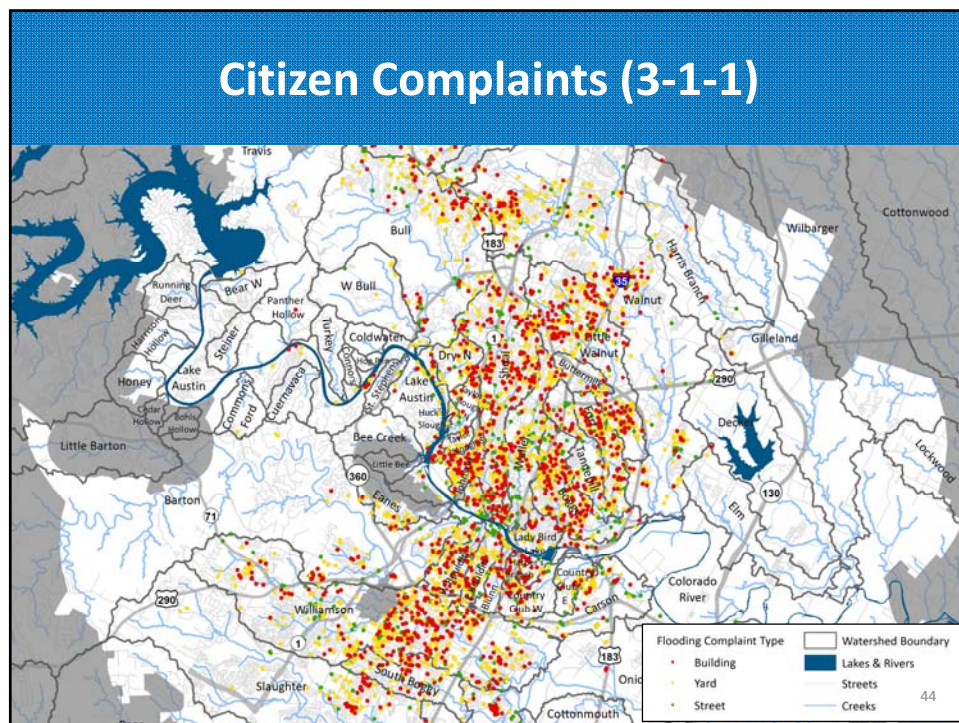
41

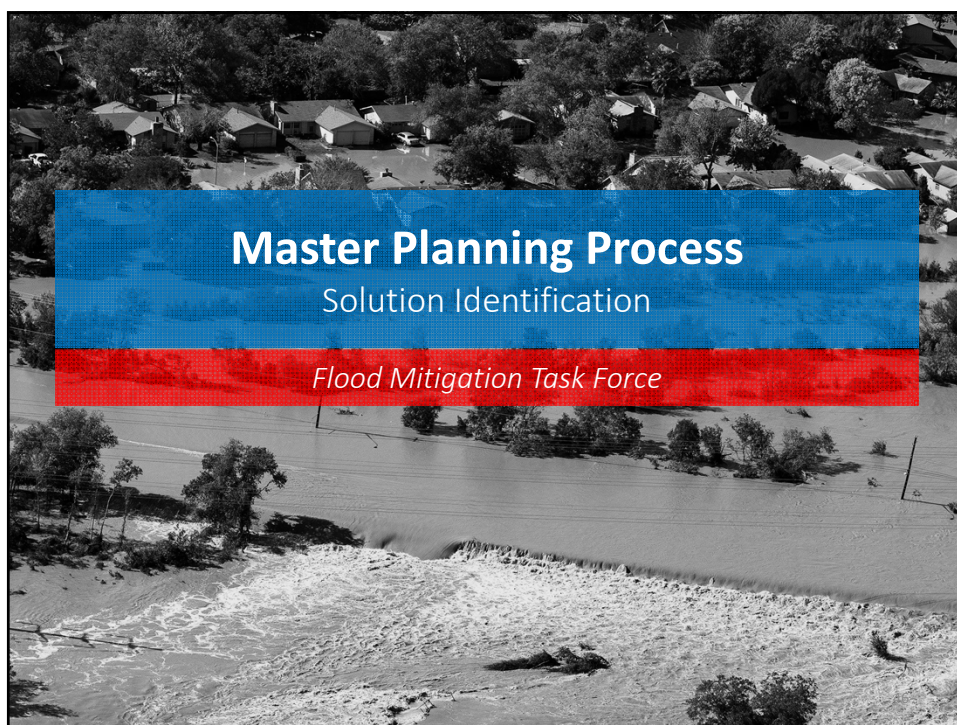
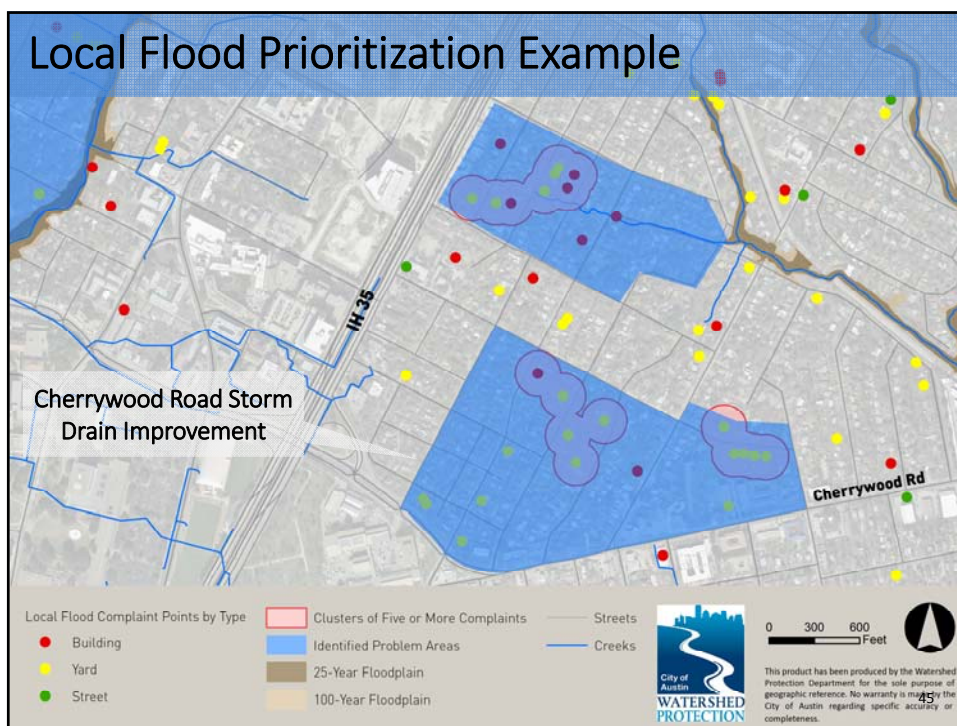


## Master Planning Process

Prioritization of Problems

*Flood Mitigation Task Force*





## Flood Solution Identification

- Feasibility studies
  - Detailed evaluation of the elevation and expected inundation depths
  - Evaluations of potential solutions (structural, buyout, elevation, etc.),
  - Preliminary cost estimates
  - Partnership/integration opportunities
- Preliminary Engineering Study
  - Preliminary design for alternatives
- Funding Plan/Schedule

47



## Master Planning Process

Solution Implementation

*Flood Mitigation Task Force*

## Capital Improvement Solution Implementation

- Final Design
  - Funding appropriation
- Permitting
- Construction

49

## Contact Information

### Kevin Shunk

Floodplain Office/Flood Warning

(512) 974-9176

[kevin.shunk@austintexas.gov](mailto:kevin.shunk@austintexas.gov)

### Jorge Morales

Local Flood Hazard Mitigation

(512) 974-3345

[jorge.morales@austintexas.gov](mailto:jorge.morales@austintexas.gov)

### Reem Zoun

Creek Flood Hazard Mitigation

(512) 974-3354

[reem.zoun@austintexas.gov](mailto:reem.zoun@austintexas.gov)

### Flood Mitigation Task Force:

<https://www.austintexas.gov/fmtf> Main Webpage

<https://floodmitigationtaskforce.bloomfire.com/> Additional Resources Webpage

50