

# AUSTIN LAND DEVELOPMENT CODE

**Environmental Commission**  
CodeNEXT: Summary of  
Flood Modeling Analysis  
**December 6, 2017**

SHAPING THE AUSTIN WE IMAGINE



**CODENEXT**

# FLOOD MODELING ANALYSIS



# IMPERVIOUS COVER ANALYSIS

Area	Pct. of City Area	Existing Impervious Cover (%)	Allowed Maximum Impervious Cover (%)		Difference in Existing IC vs. Max. Proposed Entitlements	Pct. Unbuilt Impervious Cover
			Current LDC	Proposed LDC		
Single-Family Residential	26%	24%	36%	36%	12%	17%
Commercial/Multifamily	18%	38%	61%	62%	24%	24%
PUDs	13%	8%	62%	62%	53%	38%
F25	12%	29%	56%	56%	27%	18%
Public (e.g., parkland)	12%	2%	14%	7%	5%	3%
No Zoning (e.g., Development Reserve, Unzoned, roadways)	19%	46%	47%	47%	1%	1%
<b>Total</b>	<b>100%</b>	<b>26.8%</b>	<b>45.8%</b>	<b>45.2%</b>	<b>18.4%</b>	<b>100%</b>

- Under the new proposal, all commercial/multifamily properties and most PUDs and F25 tracts would have to provide flood risk reduction relative to undeveloped conditions.



## Proposed Flood Risk Reduction Requirement

- Redevelopment provide their proportionate share of flood risk reduction.
- Site Plan (e.g., commercial, multifamily) and residential subdivision projects limit post-development peak flow rates of stormwater runoff to that with **zero impervious cover**.
- Off-site drainage improvements or a payment-in-lieu of detention will be an option where greater benefits are provided; projects must still prove no adverse downstream impacts.



## Tools for mitigating flood impacts & reducing peak flows include:

- Detention (surface or subsurface)
- Conveyance improvements
- Regional Stormwater Management Program (RSMP)



**Surface Detention**



**Parking Lot  
Detention**



**Underground  
Detention**



**Conveyance**

# FLOOD MODELING

## Primary Questions

1. How do the flood levels for current maximum allowable and CodeNEXT maximum allowable impervious cover scenarios compare?
2. What are the impacts of CodeNEXT redevelopment regulations on flood risk and local drainage infrastructure?
3. What is the impact of maximum residential buildout on creek flood risk?



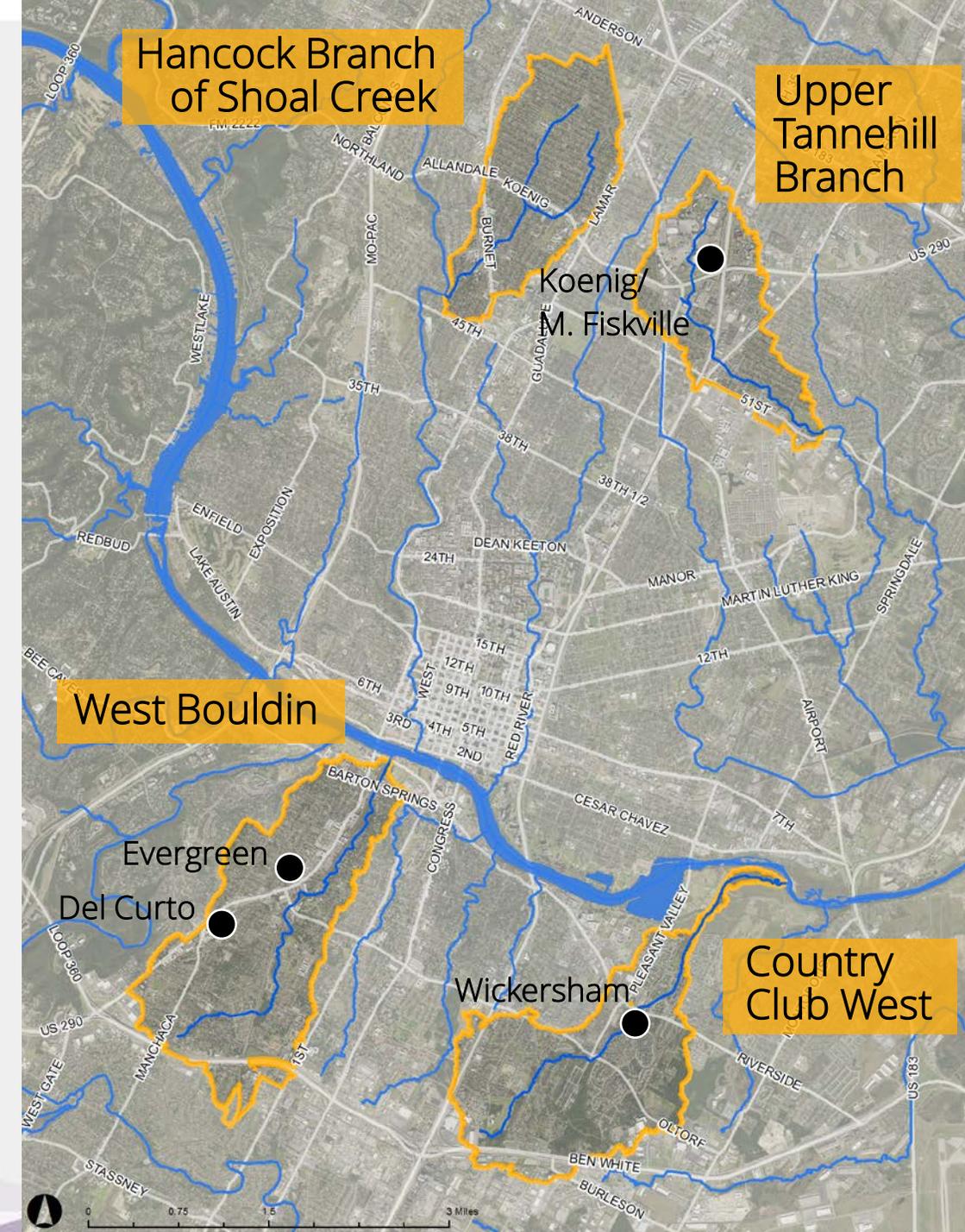
# FLOOD MODELING

## Watersheds Analyzed

- West Bouldin Creek
- Hancock Branch of Shoal Creek
- Country Club West Creek
- Tannehill Branch upstream of Manor Road

## Local Drainage Systems Analyzed

- Del Curto (1D and 2D)
- Wickersham (1D)
- Evergreen (1D)
- Koenig/Middle Fiskville (1D)

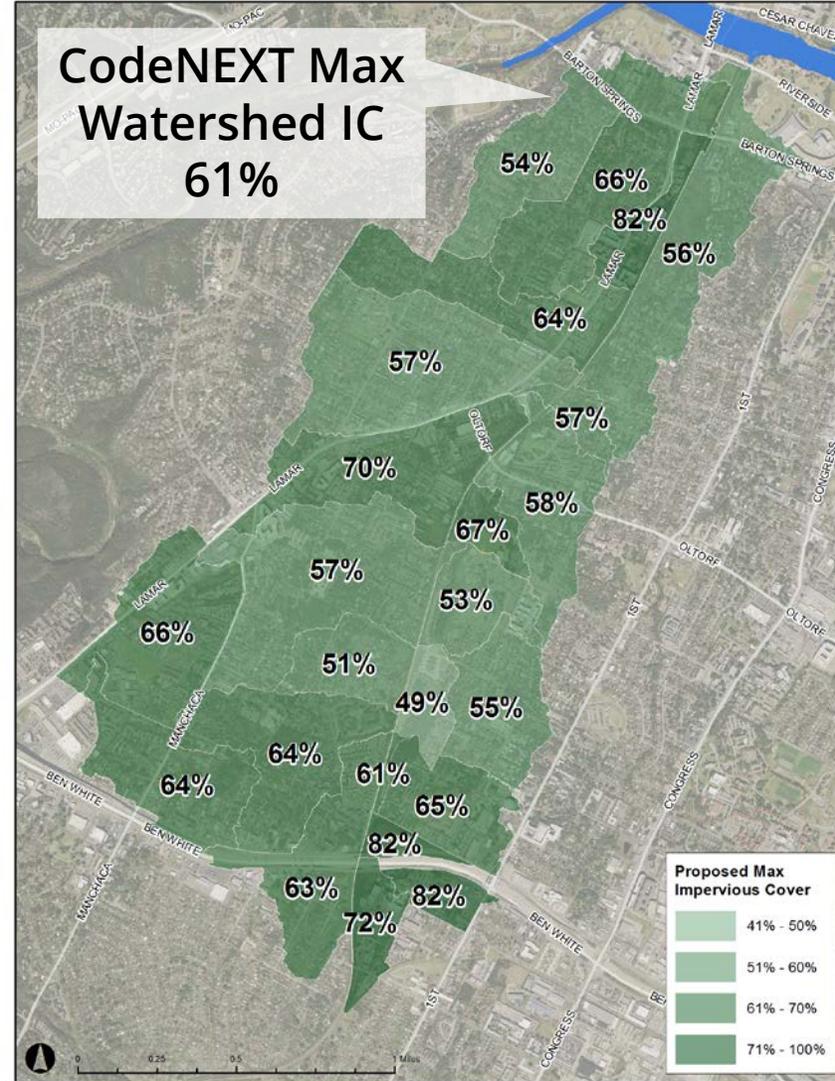
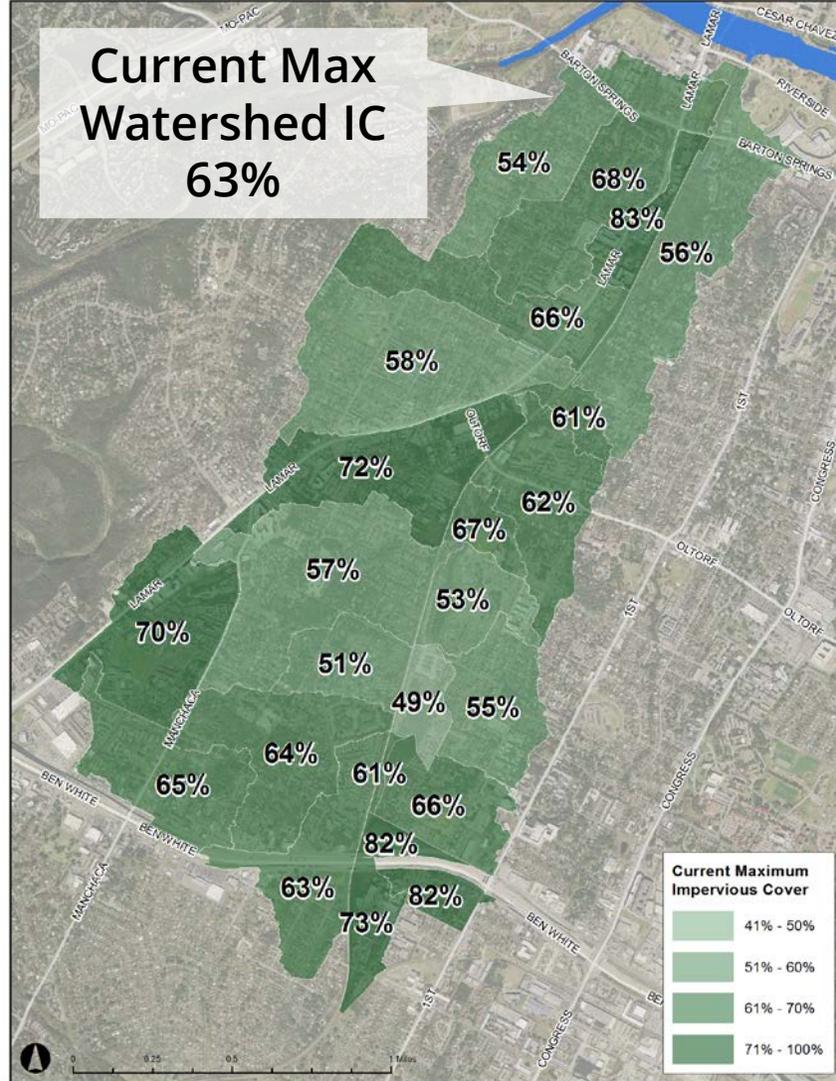
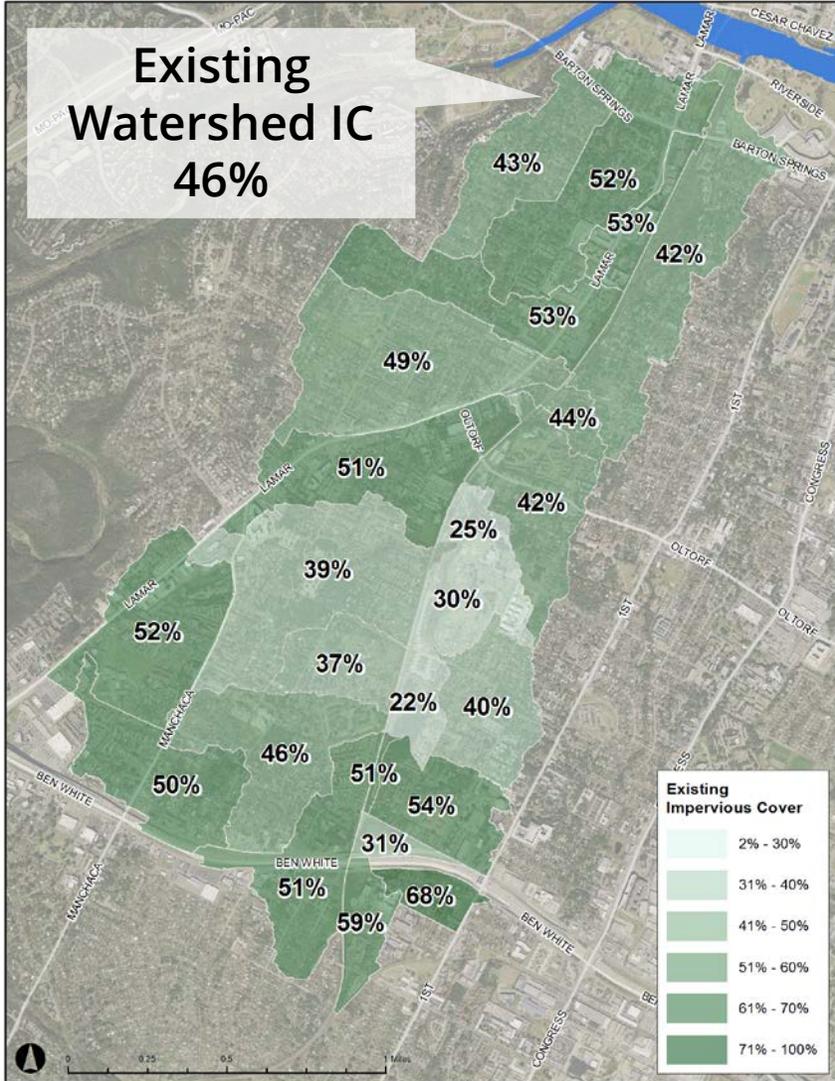


## Assumptions for Redevelopment Flood Risk Reduction Scenario

- All multifamily/commercial properties redevelop (process will take time).
- Redevelopments required to reduce flows back to “greenfield” or undeveloped condition (similar to existing water quality requirement).
  - Detention was selected as the most easily modeled form of mitigation to represent the proposed regulation.
  - In practice, each redevelopment project would be evaluated to determine the most effective strategy to address downstream flooding, e.g., conveyance improvements or payment-in-lieu of detention.



# FLOOD MODELING



Existing Impervious Cover

Current Land Development Code

CodeNEXT

# FLOOD MODELING

1. Compare flood levels for current maximum allowed and CodeNEXT maximum allowed impervious cover.
  - Negligible differences between current and CodeNEXT maximum allowed impervious cover.
  - No significant difference in peak flows or flood depths.



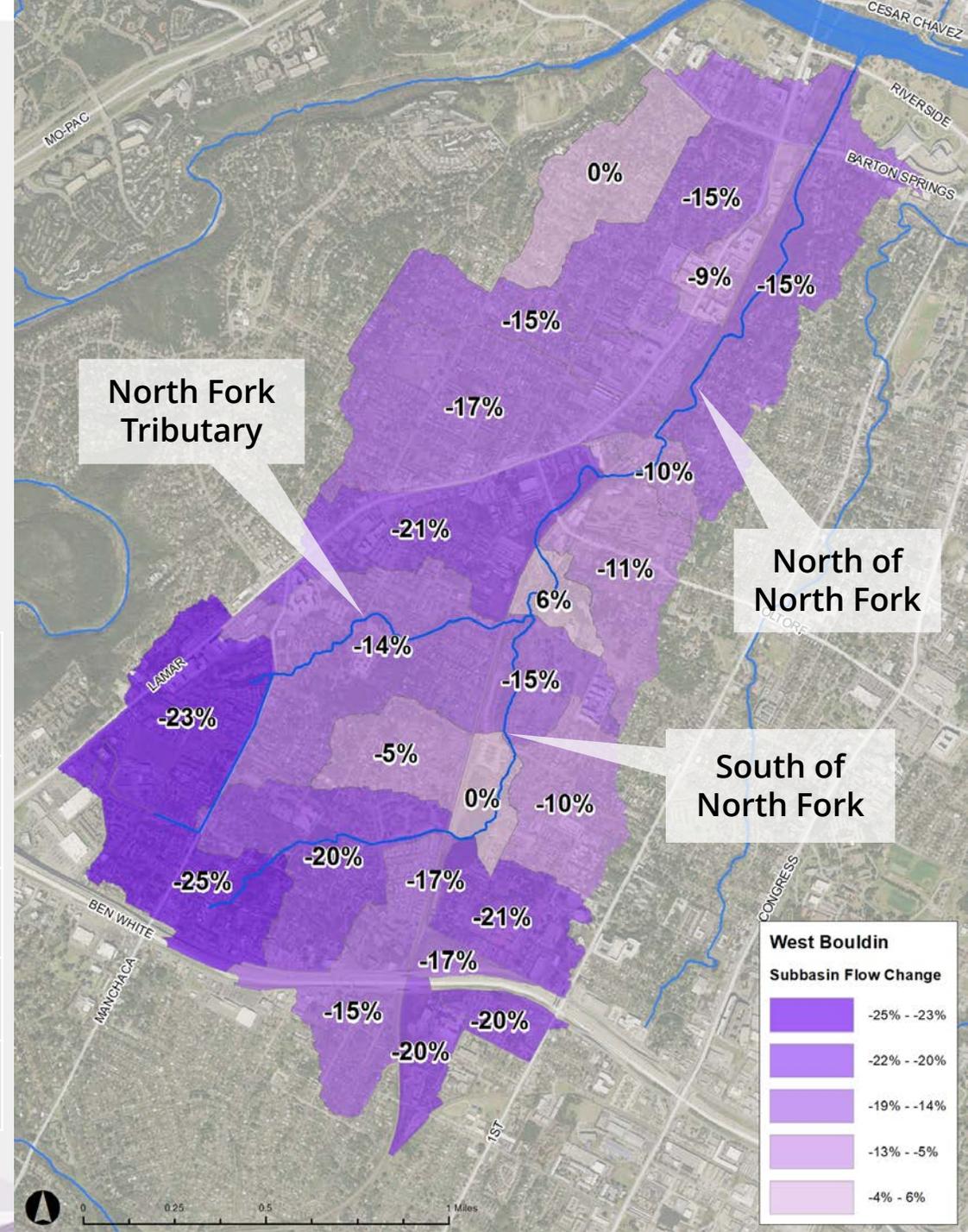
# FLOOD MODELING

## 2. Impact of CodeNEXT flood risk reduction for redevelopment requirement.

- Greatest potential change in upper portions of watershed and smaller drainage areas.

Average change in peak flows from CodeNEXT maximum to CodeNEXT risk-reduction scenario

	<b>2-, 10-, 25-, and 100-year storms</b>
<b>West Bouldin</b>	
South of North Fork	-15%
North of North Fork	-11%
North Fork Tributary	-18%



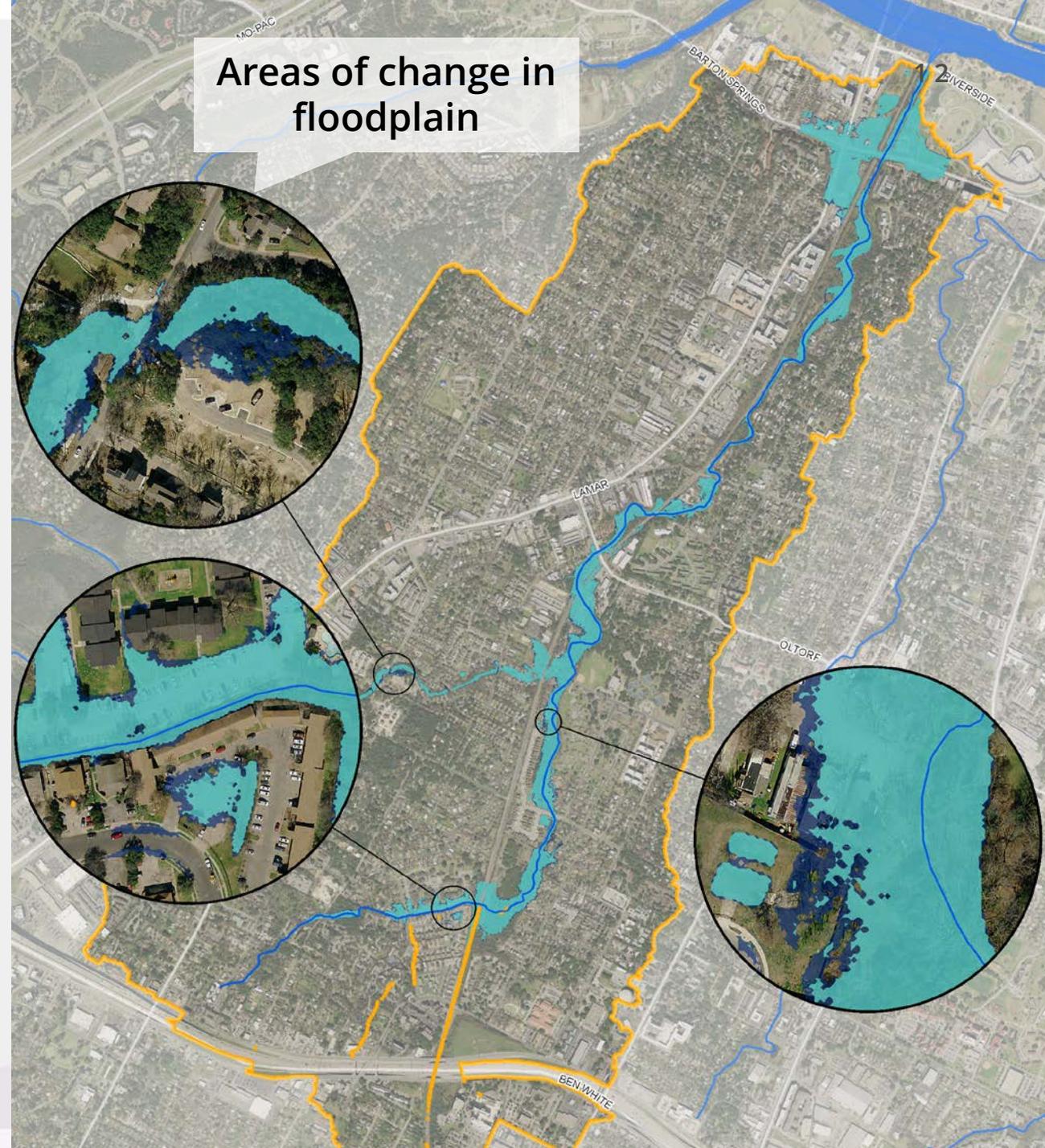
# FLOOD MODELING

## 2. Impact of CodeNEXT flood risk reduction for redevelopment requirement.

- Potentially significant reductions in flood risk
- Generally small reductions in floodplain extent

Average decrease in flood levels from CodeNEXT maximum to CodeNEXT risk reduction scenario (inches)

	<b>2 year</b>	<b>5 year</b>	<b>10 year</b>	<b>25 year</b>	<b>100 year</b>
<b>West Bouldin</b>					
South of North Fork	-2.8	-2.4	-2.5	-2.9	-3.1
North of North Fork	-2.9	-4.4	-3.4	-4.9	-4.0
North Fork Tributary	-2.9	-4.2	-4.0	-4.1	-4.0



# FLOOD MODELING

## 2. Impact of CodeNEXT flood risk reduction for redevelopment requirement. Localized Flooding.

1D StormCAD modeling areas:

- Reduction in water surface elevation in pipe and slight improvement in capacity.

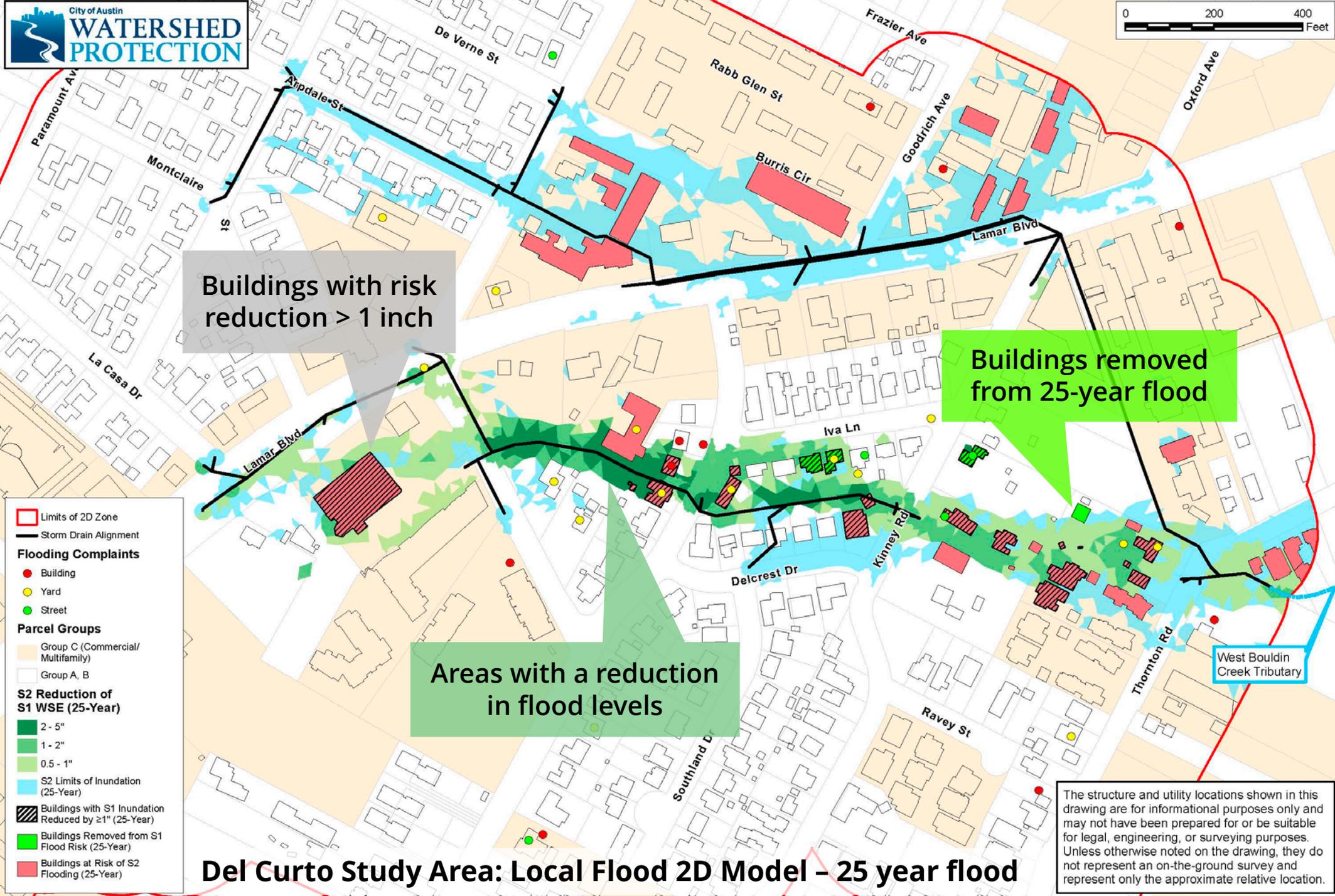
Del Curto Study Area:

- 3 homes potentially removed from local flood risk for 100-year storm
- 50 properties with potential local flood risk reduction for 100-year storm

**Del Curto Study Area: Benefits of Proposed CodeNEXT Mitigation Compared to Existing Conditions**

Storm Event	Number of Buildings Removed from Flood Risk	Buildings with Flood Risk Reduction	Maximum Reduction (inches)	Average Reduction (inches)
2-year	5	16	1.9	1.2
10-year	5	28	3.0	1.7
25-year	4	41	4.8	1.3
100-year	3	50	2.6	1.2





Buildings with risk reduction > 1 inch

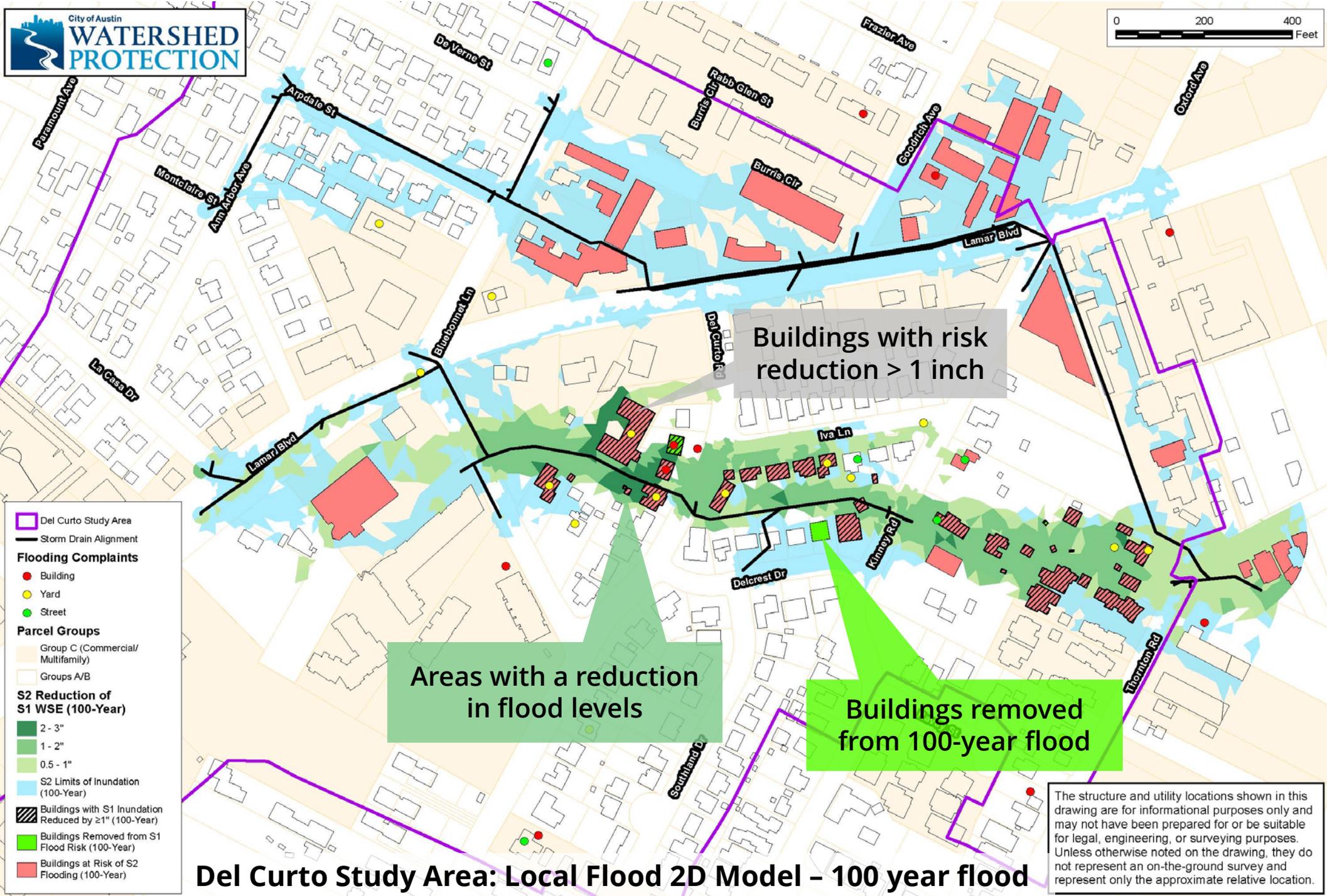
Buildings removed from 25-year flood

Areas with a reduction in flood levels

- Limits of 2D Zone
- Storm Drain Alignment
- Flooding Complaints**
- Building
- Yard
- Street
- Parcel Groups**
- Group C (Commercial/Multifamily)
- Group A, B
- S2 Reduction of S1 WSE (25-Year)**
- 2 - 5"
- 1 - 2"
- 0.5 - 1"
- S2 Limits of Inundation (25-Year)
- Buildings with S1 inundation Reduced by  $\geq 1"$  (25-Year)
- Buildings Removed from S1 Flood Risk (25-Year)
- Buildings at Risk of S2 Flooding (25-Year)

The structure and utility locations shown in this drawing are for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. Unless otherwise noted on the drawing, they do not represent an on-the-ground survey and represent only the approximate relative location.

**Del Curto Study Area: Local Flood 2D Model - 25 year flood**



Buildings with risk reduction > 1 inch

Areas with a reduction in flood levels

Buildings removed from 100-year flood

**Del Curto Study Area: Local Flood 2D Model - 100 year flood**

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# FLOOD MODELING

## 3. Impact of maximum residential buildout on floodplain

- Minimal difference for 100-year events—typically half an inch or less over all study areas.
- Depths of flow in more frequent storms tend to be contained within channel banks, and therefore see greater increases.

**Average increase in flood levels from existing conditions to maximum residential buildout in inches**

<b>West Bouldin Creek</b>	<b>2 year</b>	<b>5 year</b>	<b>10 year</b>	<b>25 year</b>	<b>100 year</b>
South of North Fork	1.0	0.7	0.6	0.5	0.2
North of North Fork	1.5	1.3	1.1	1.0	0.6
North Fork Tributary	0.8	0.5	0.5	0.5	0.4

## Conclusions

- The proposed CodeNEXT regulations produce beneficial reductions in flood risk, but will not provide an immediate solution to the City's flooding problems.
- The magnitude of flood risk reduction depends on the location within the watershed and the amount of land area that is likely to redevelop.
- The observed reduction tends to decrease as the contributing area increases.
- This variation in flood risk reduction illustrates the need for a toolbox of mitigation measures that will allow the approach to be tailored depending on the location within the watershed and the condition of the downstream drainage system.



## Help us get it right.

We invite you to review and comment on the draft code document, ask questions, and stay connected.

[www.austintexas.gov/codenext](http://www.austintexas.gov/codenext)

[codenext@austintexas.gov](mailto:codenext@austintexas.gov)

Review and comment on the draft code  
<https://codenext.civiccomment.org/>

Review and comment on the map  
<http://codenext.engagingplans.org/>

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