October 2015 Flood Event and Mitigation Study

November 10, 2016

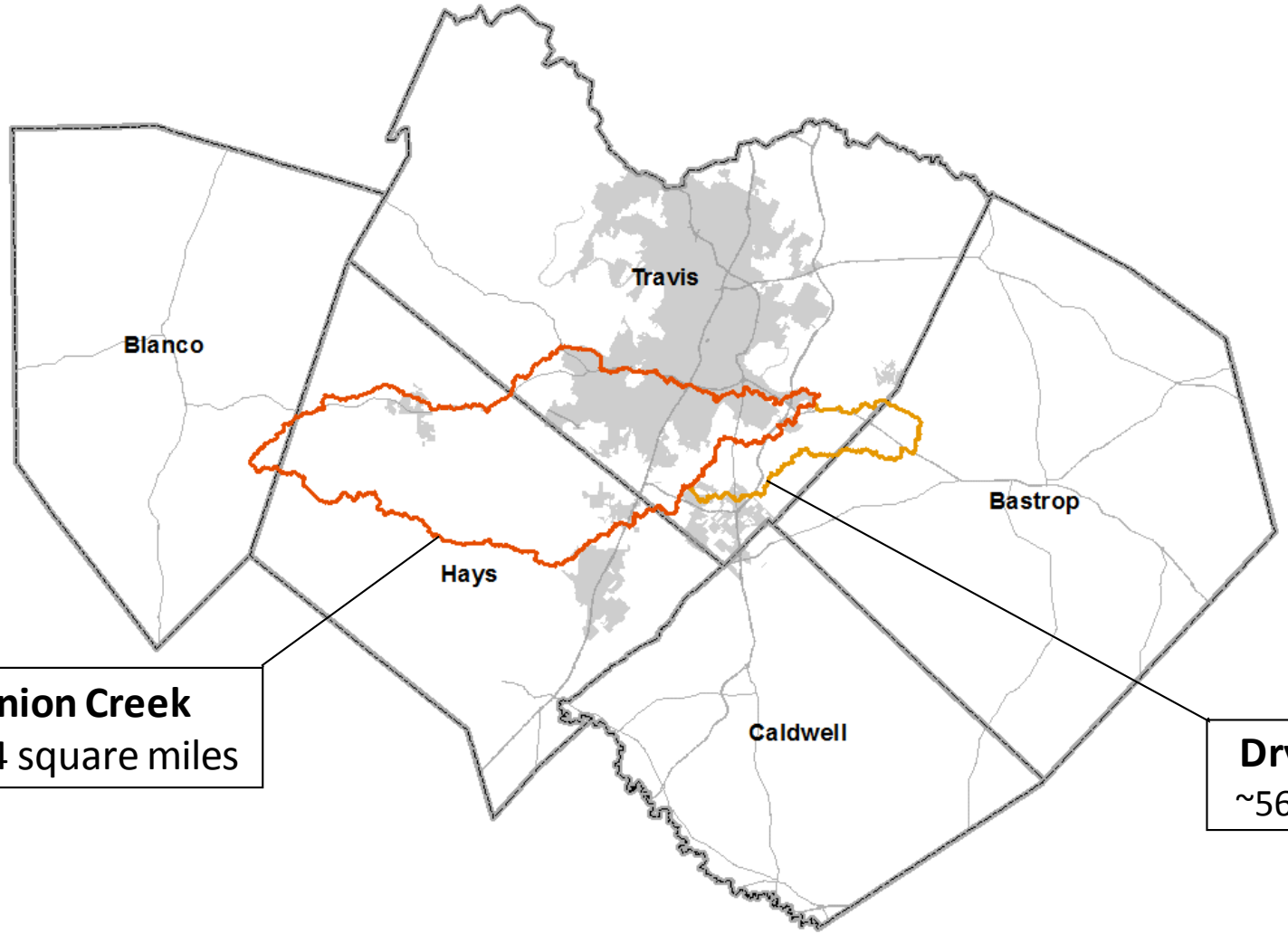
Study Purpose

Travis County is conducting a comprehensive study of recent flood events to:

- Better understand what happened
- Plan for the future
- Explore flood mitigation options

Project Limits – Study Areas

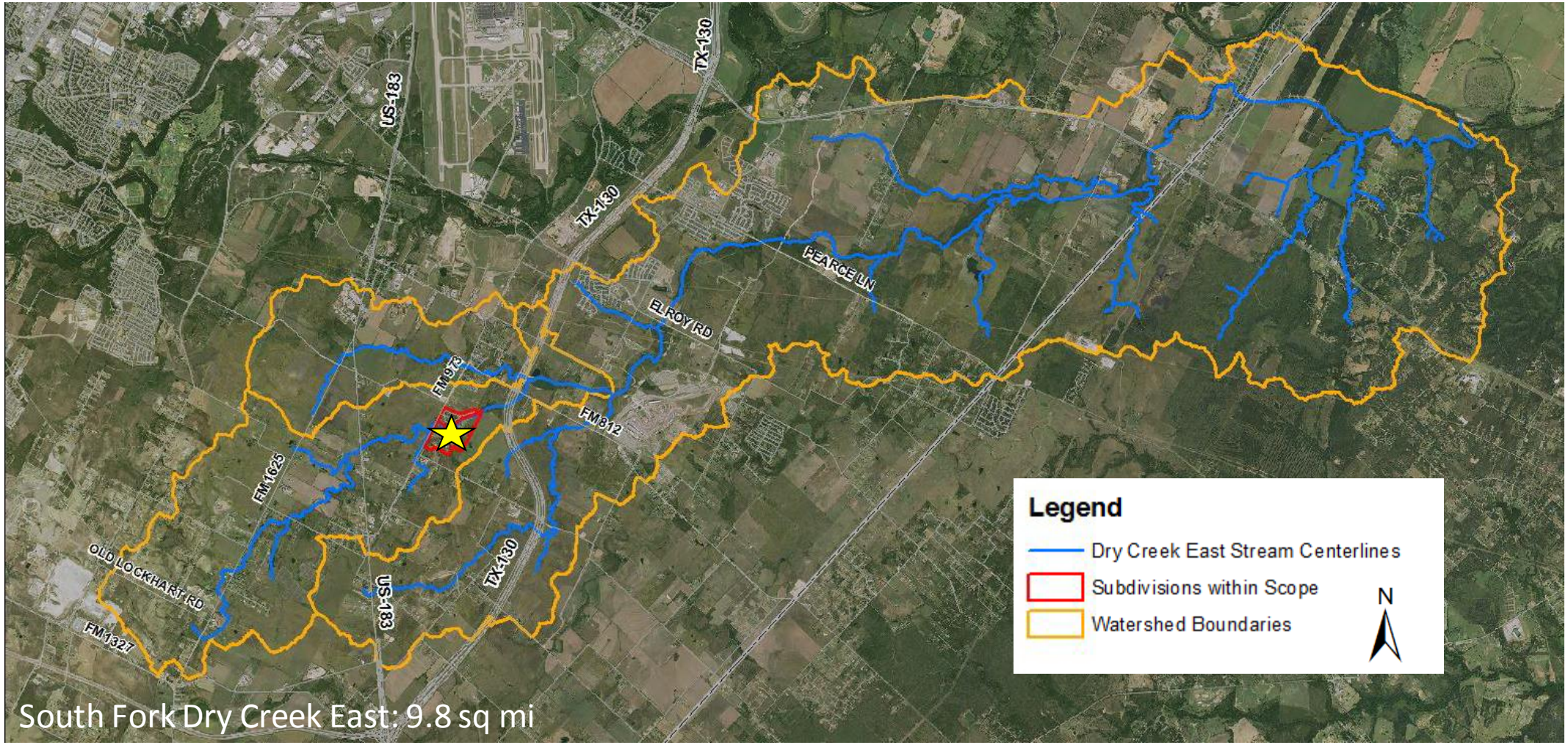
Watersheds:



Onion Creek
~344 square miles

Dry Creek East
~56 square miles

Project Study Area - Dry Creek East



How is the study conducted?

Gather Technical Data

(topography, rainfalls, flow rates)

Gather Resident Data

(high water marks, testimony)

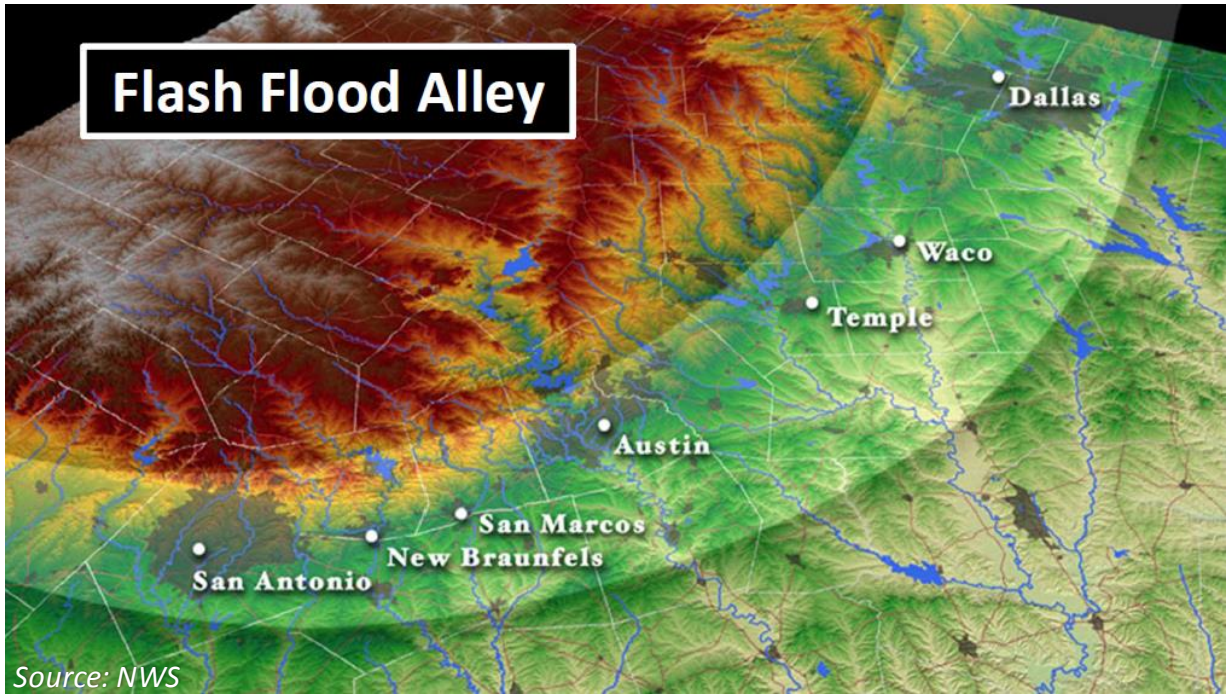
Thoroughbred Farms
August 31, 2016

Develop Model of Flood Event

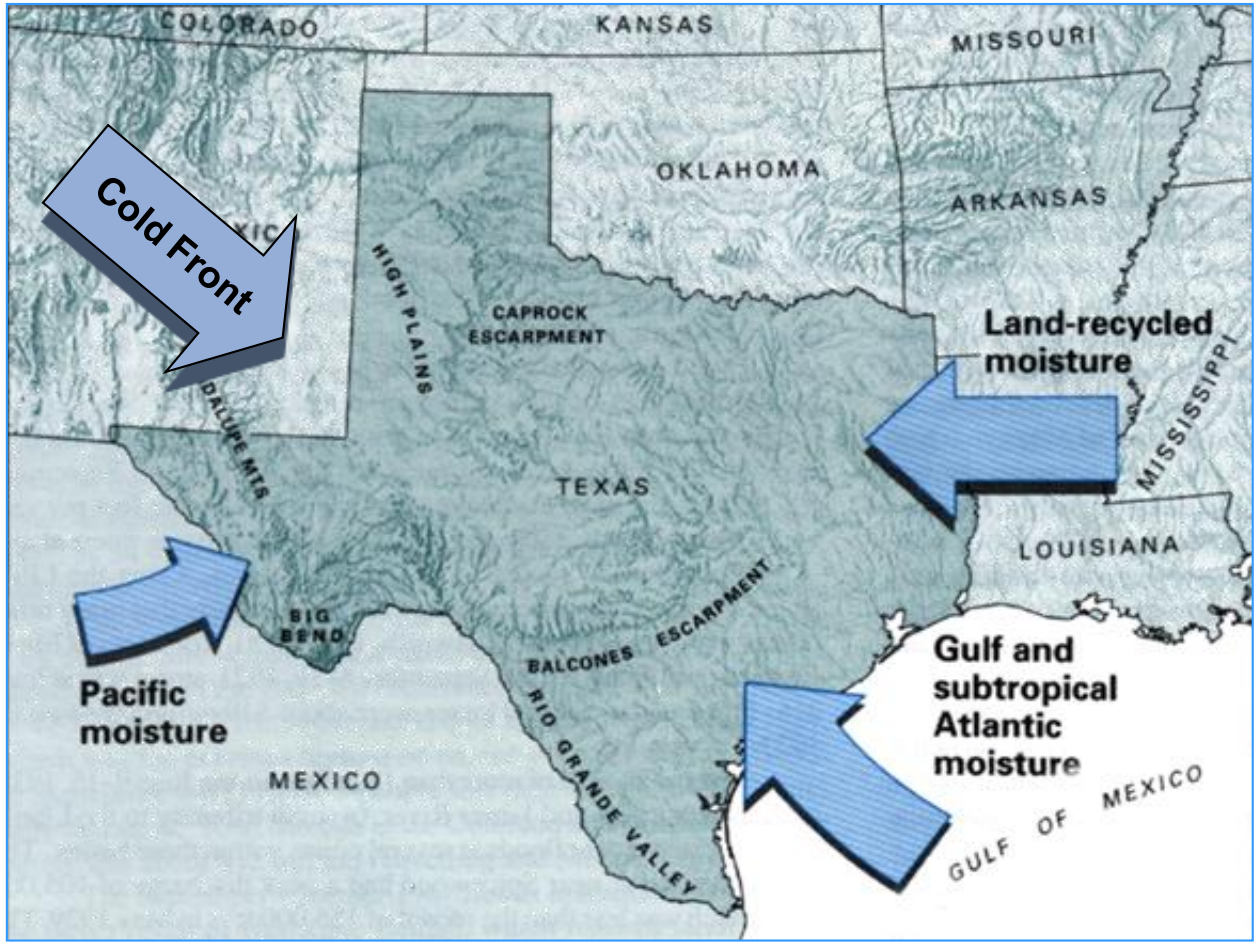
Evaluate Options to Reduce Flooding

Factors for Flash Flooding

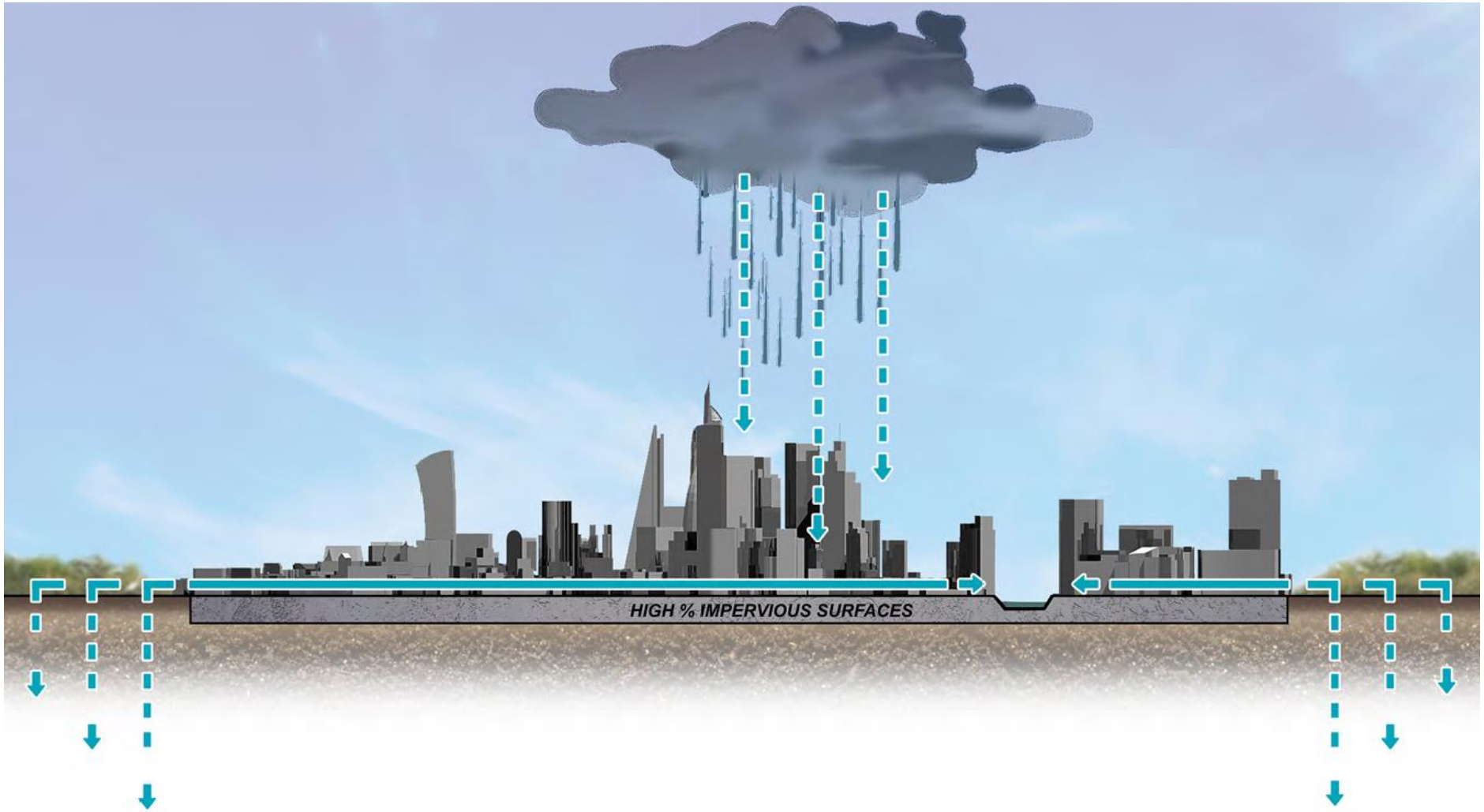
- Steep Terrain
- Shallow Soil
- High Rain Fall Rates



Source: NWS

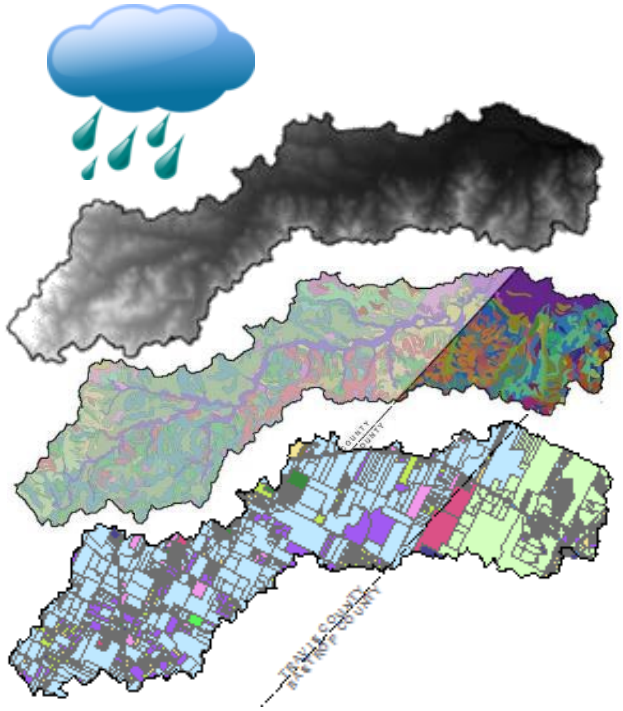


Hydrologic Cycle

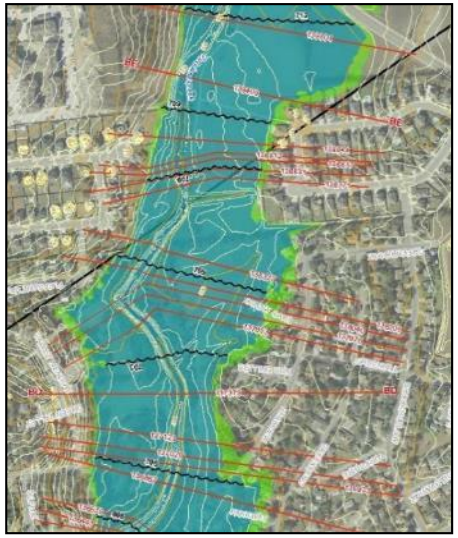


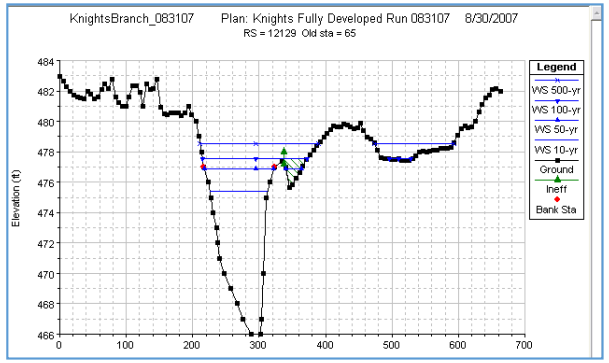
Floodplain Management Overview

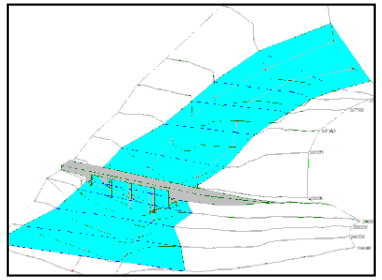
- **Hydrology** – Water movement to creek
  - Rainfall
  - Topography
  - Soils
  - Land Use



Hydraulics – Water movement in creek
  - Hydrology
  - Topography
  - Cross-Sections
  - Creek Crossings







Probability of Flooding

Flood Events	Probability of Occurrence in ANY given year	Percent Chance of Occurrence in ANY given year
500 Year	1 in 500	0.2 %
100 Year	1 in 100	1 %
50 Year	1 in 50	2 %
10 Year	1 in 10	10 %

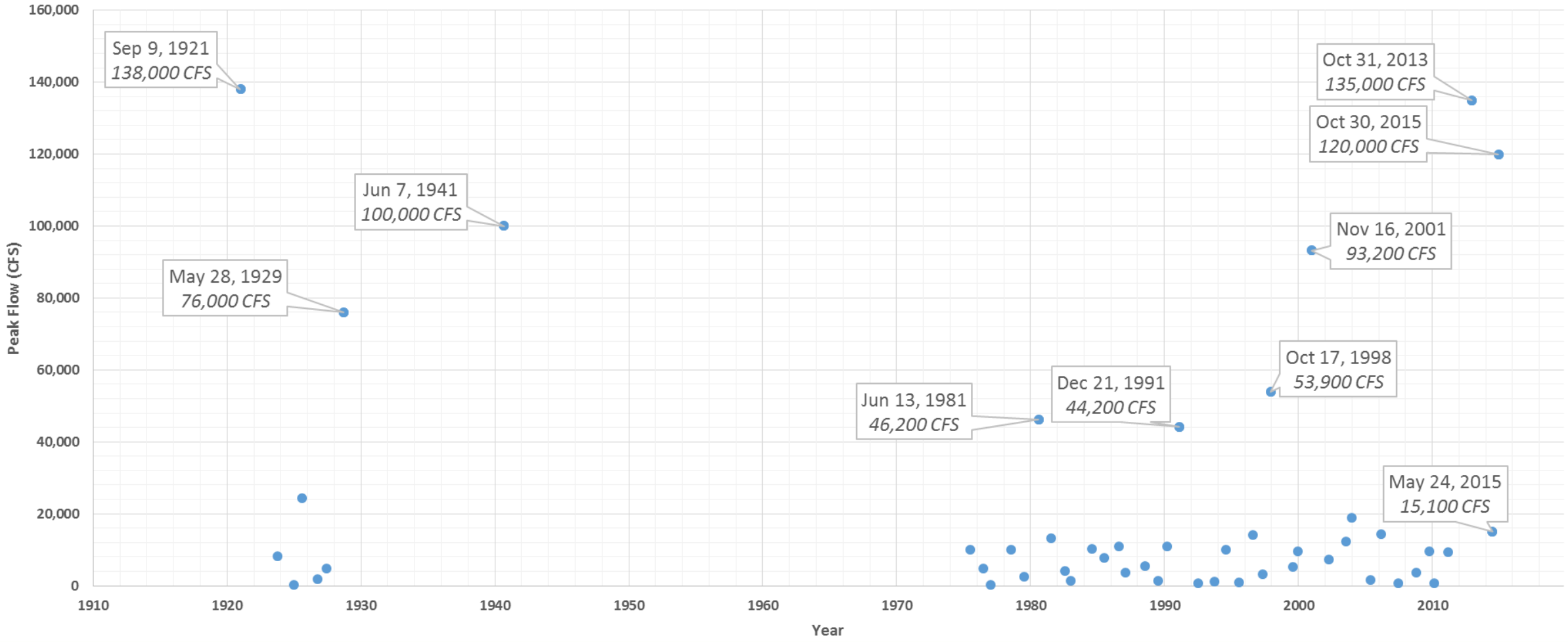
Dry Creek East EXTREME Weather Events

	Flow (cubic feet per second)			
	1% ACE	0.2% ACE	Oct 30, 2015	May 26, 2016
South Fork of Dry Creek East at Thoroughbred Farms	11,800 cfs	16,200 cfs	18,000 cfs*	16,200 cfs*

	Rainfall (inches)			
	1% ACE	0.2% ACE	Oct 30, 2015	May 26, 2016
South Fork of Dry Creek East at Thoroughbred Farms	6.5 (4 hr)	9.0 (4 hr)	11-14 (2 hr)	8-11 (4 hr)

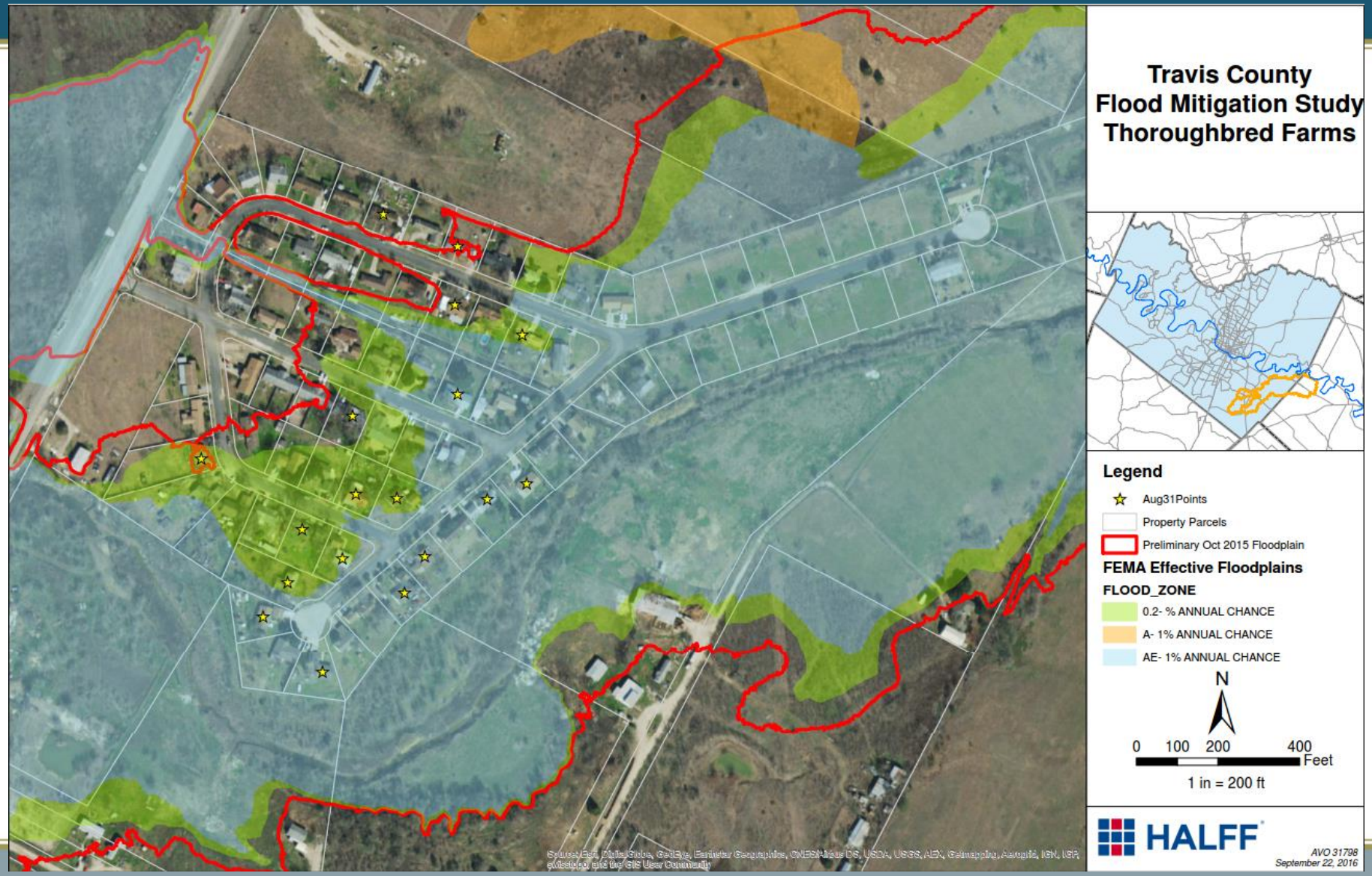
*Preliminary Data from models

USGS Gage 08159000: Onion Creek at US-183



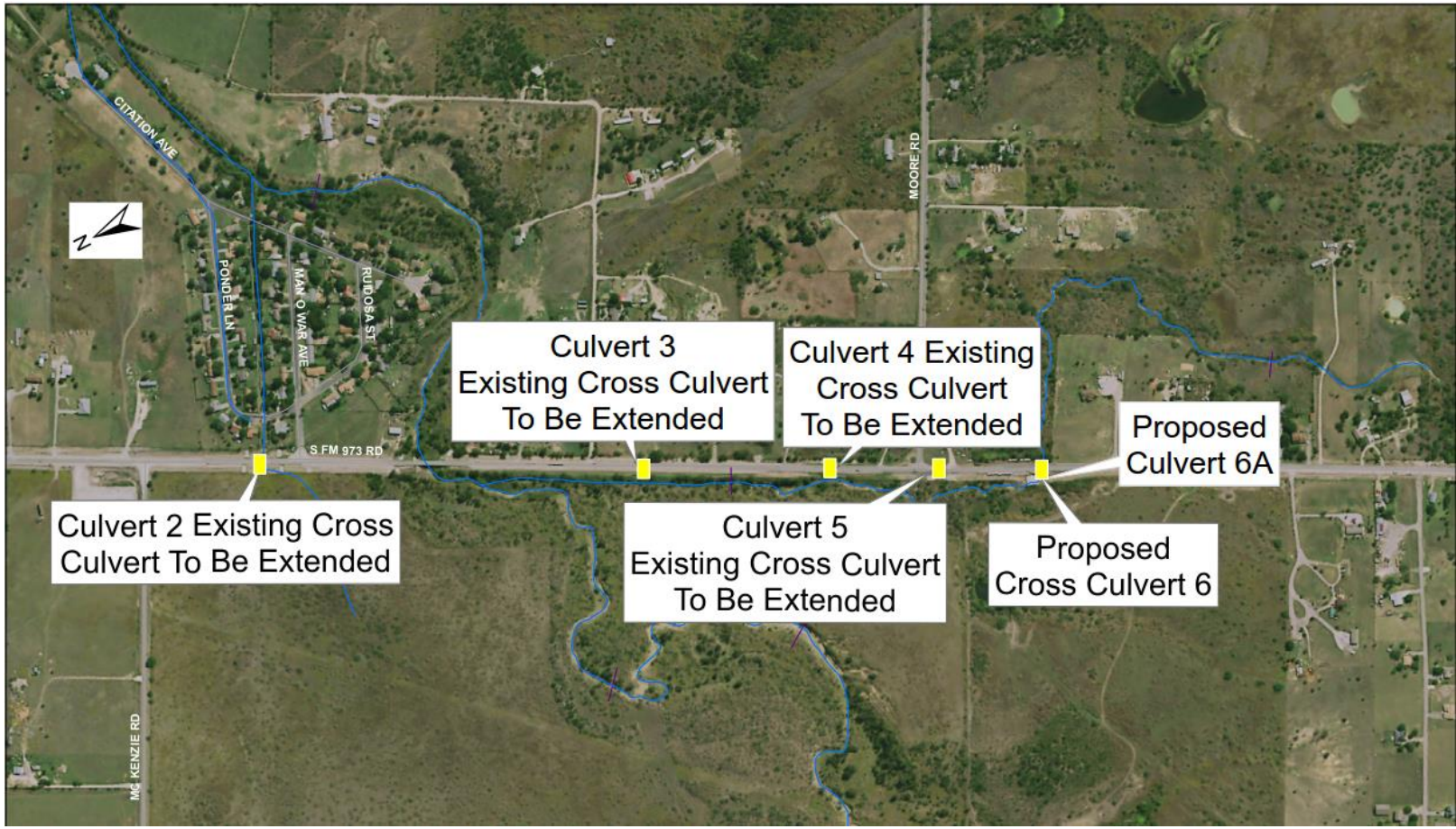
Dry Creek East High Water Marks

Dry Creek East Model Validation

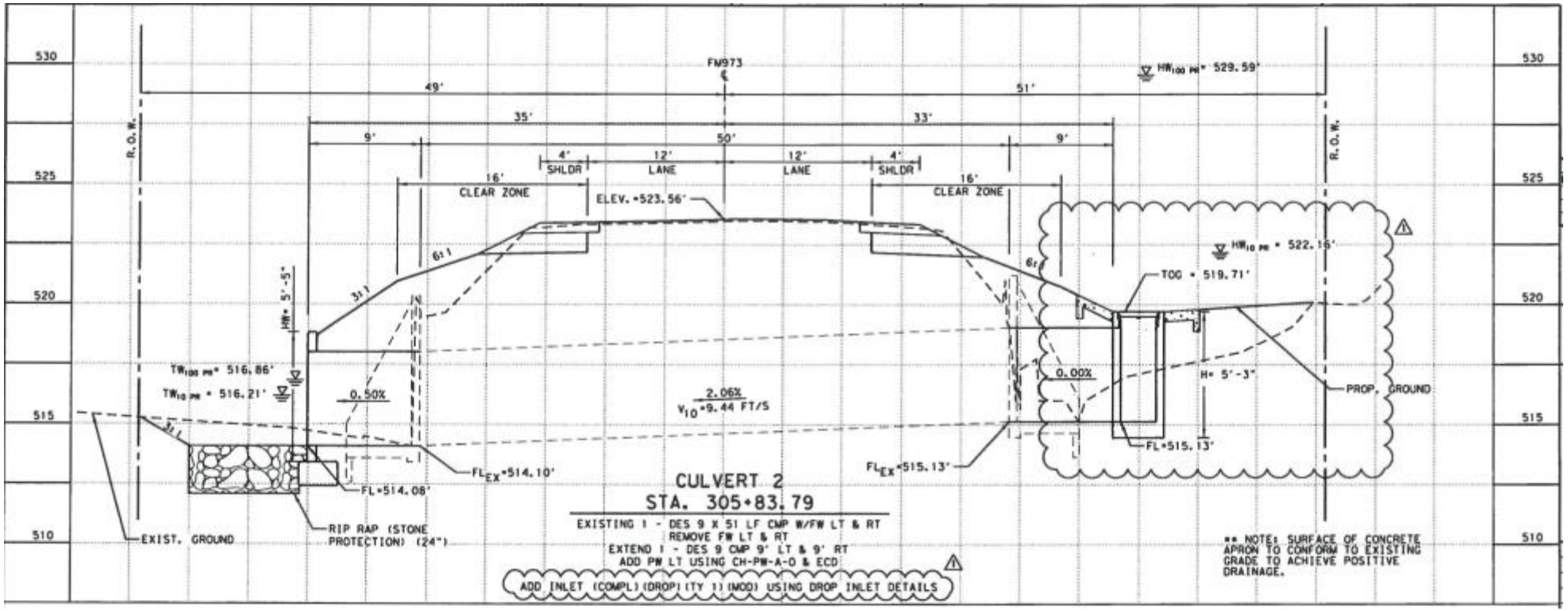


TxDOT FM 973 Improvements of Interests

- 5 Areas of Interests
  - 4 Culverts Extended
  - 1 Replacement



Culvert 2



FM 973

CULVERT LAYOUT
CULVERT 2

STA. 305+83.79

SHEET 1OF 1

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			110
STATE	DIST.	COUNTY	
TEXAS	AUS	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
1200	05	016	FM 973

TxDOT Culvert 2 Upstream Views

Original

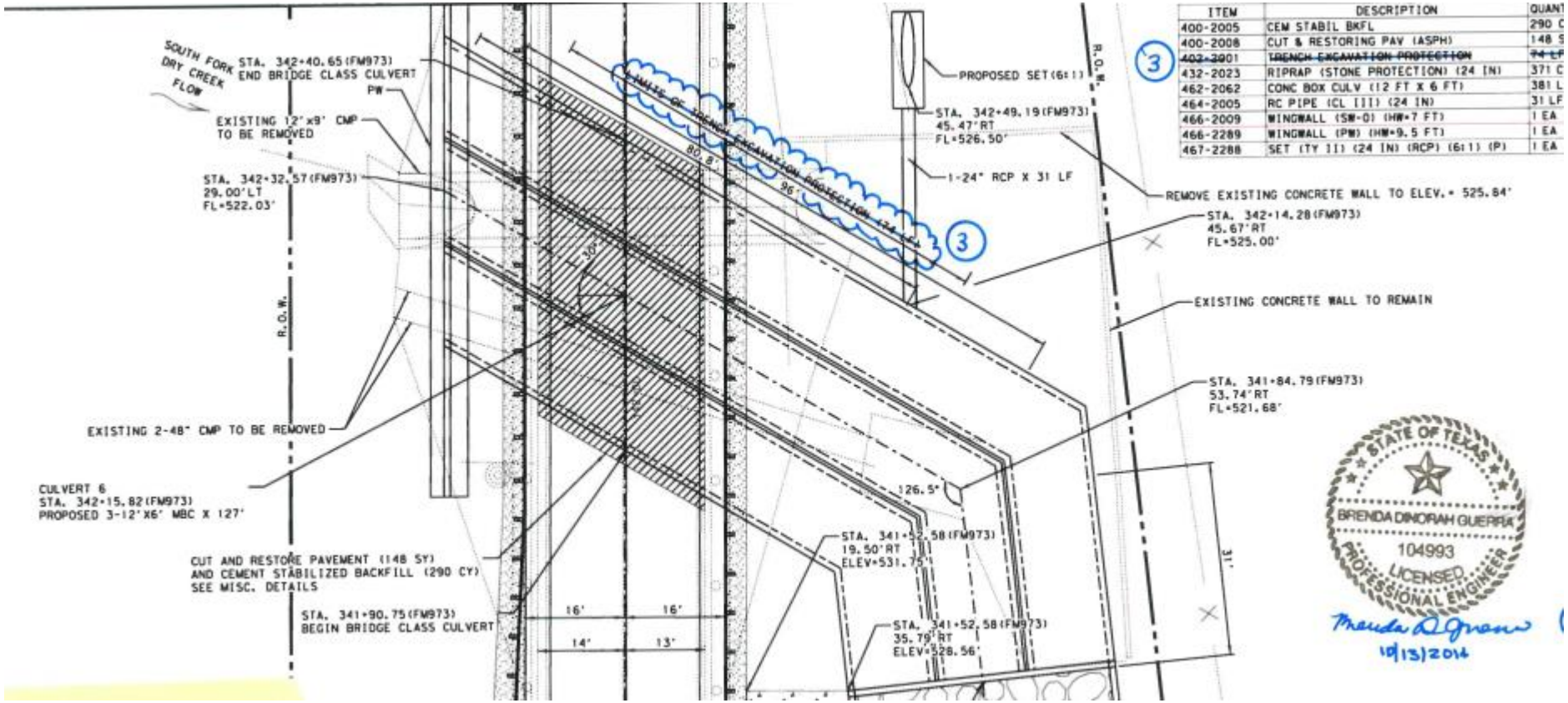
Improvements

TxDOT Culvert 2 Downstream

Original

Improvements

Culvert 6 &6A



ITEM	DESCRIPTION	QUANT
400-2005	CEM STABIL BKFL	290 C
400-2008	CUT & RESTORING PAV (ASPH)	148 S
~~402-2001~~	~~TRENCH EXCAVATION PROTECTION~~	~~74 LF~~
432-2023	RIPRAP (STONE PROTECTION) (24 IN)	371 C
462-2062	CONC BOX CULV (12 FT X 6 FT)	381 L
464-2005	RC PIPE (CL III) (24 IN)	31 LF
466-2009	WINGWALL (SW-0) (HW=7 FT)	1 EA
466-2289	WINGWALL (PW) (HW=9.5 FT)	1 EA
467-2288	SET (TY II) (24 IN) (RCP) (6:1) (P)	1 EA

HYDRAULIC DATA			
UPSTREAM		DOWNSTREAM	
Q_{50}=	1290 cfs	Q_{50}=	1290 cfs
V_{50}=	8.54 fps	V_{50}=	7.67 fps
$WSEL_{10}$ =	527.92 ft	$WSEL_{10}$ =	526.17 ft
Q_{100}=	2760 cfs	Q_{100}=	2760 cfs
V_{100}=	8.87 fps	V_{100}=	8.13 fps
$WSEL_{100}$=	528.96 ft	$WSEL_{100}$=	526.99 ft

FM 973

CULVERT LAYOUT
CULVERT 6

STA. 342+15.82

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			115
STATE	DIST.	COUNTY	
TEXAS	AUS	TRAVIS	
CONT.	SECT.	JOB	HIGHWAY NO.
1200	05	016	FM 973

TxDOT Culvert 6 & 6A Downstream

Original

Improvements

Flood Mitigation Analysis

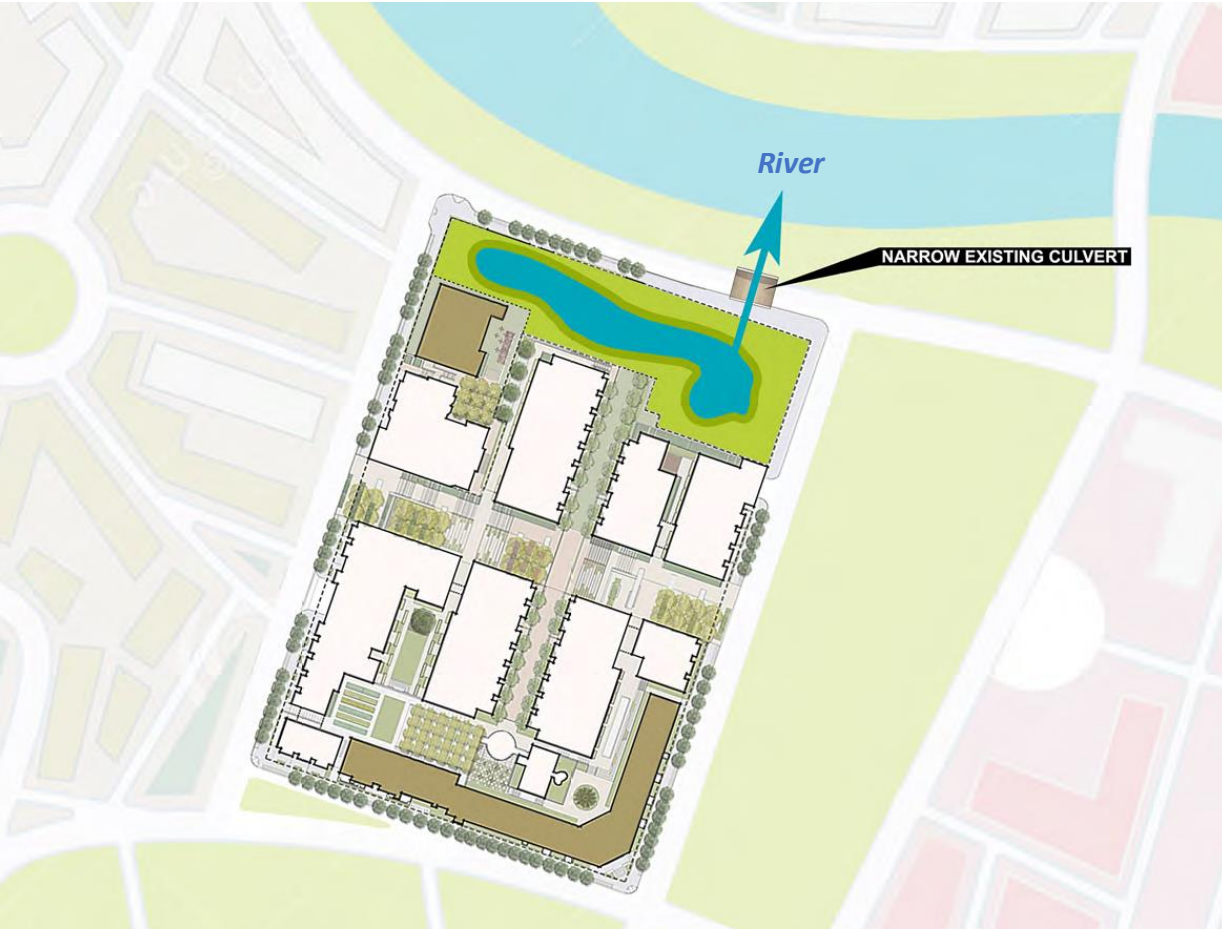
Conceptual Analysis

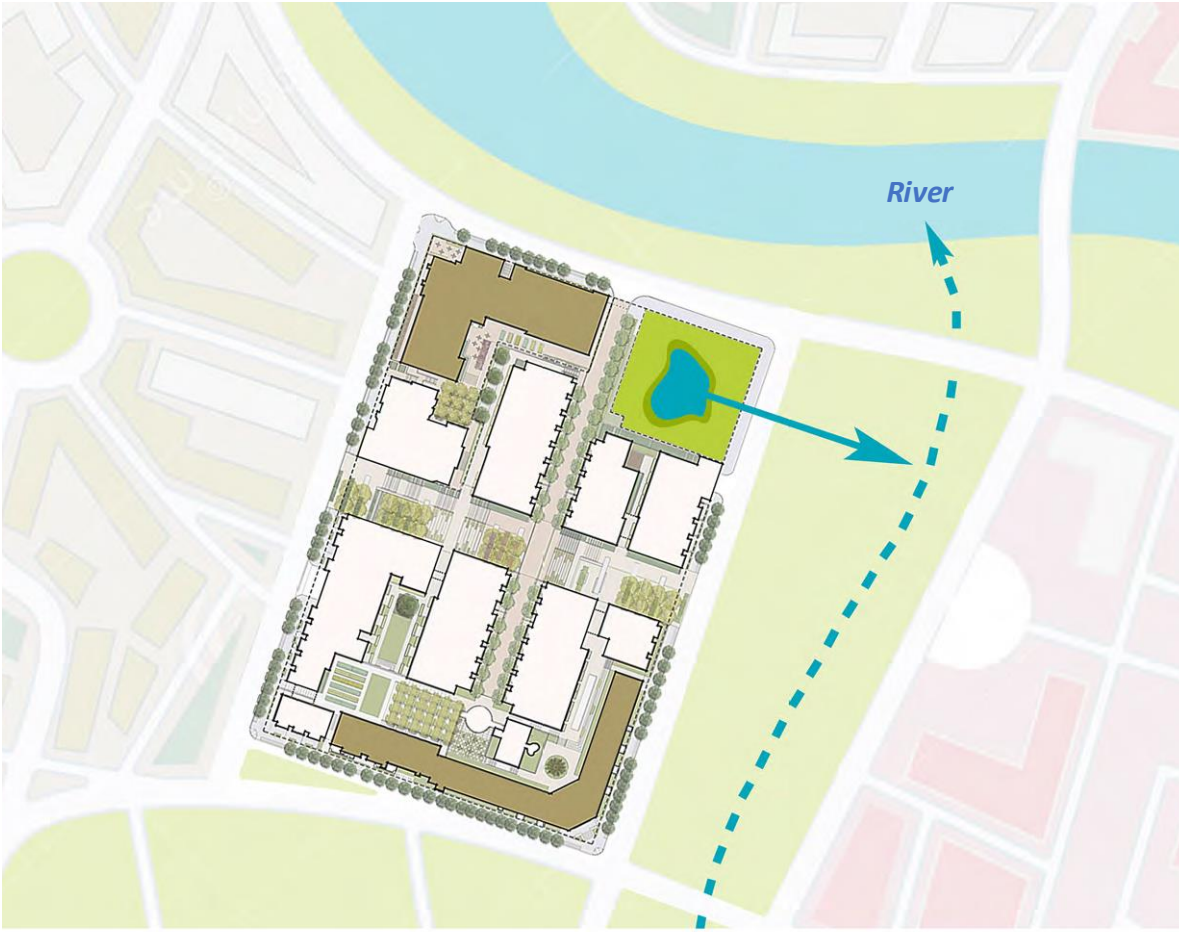
- Stakeholder Coordination
- Funding Sources
- Permitting Considerations

Flood Mitigation Alternatives

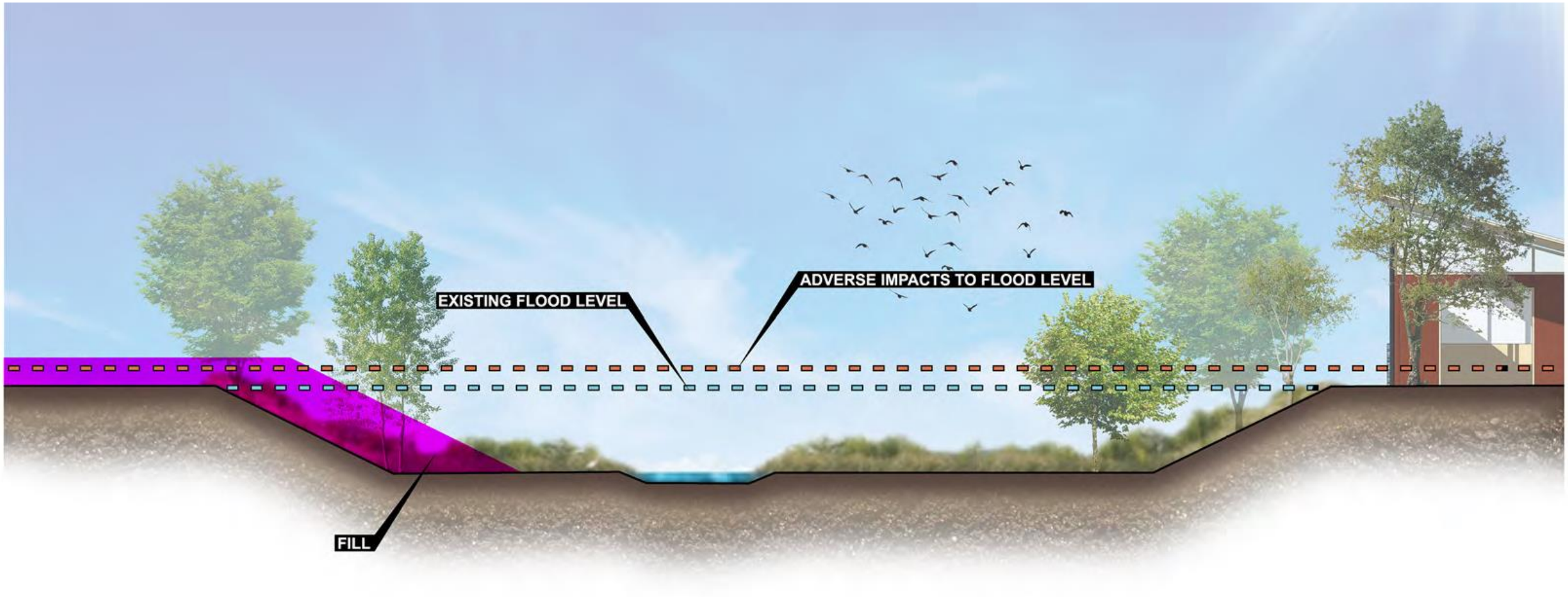
- Structural
  - Channel Clearing
  - Channel benching
  - Floodwall
  - Detention
- Non-Structural
  - Property Acquisition
  - Regulation Changes
  - Flood Awareness Outreach

Detention

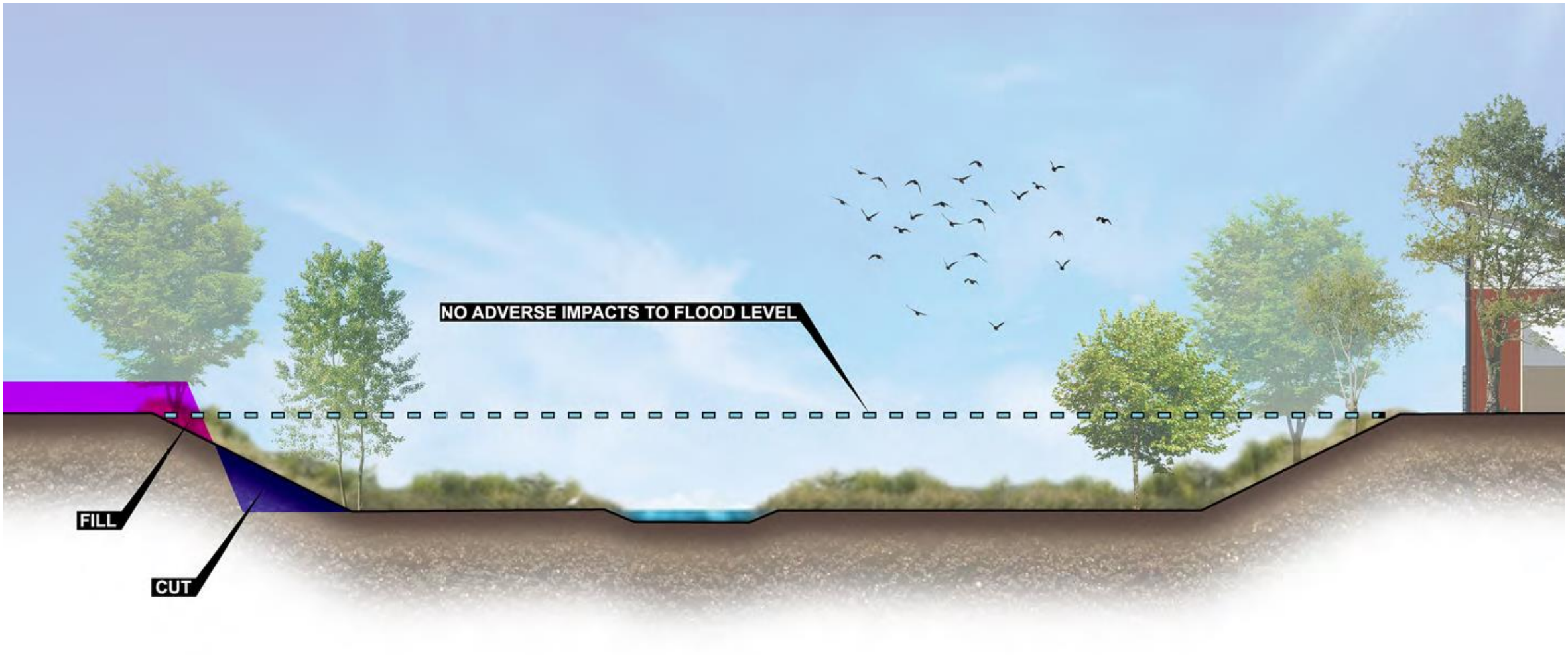




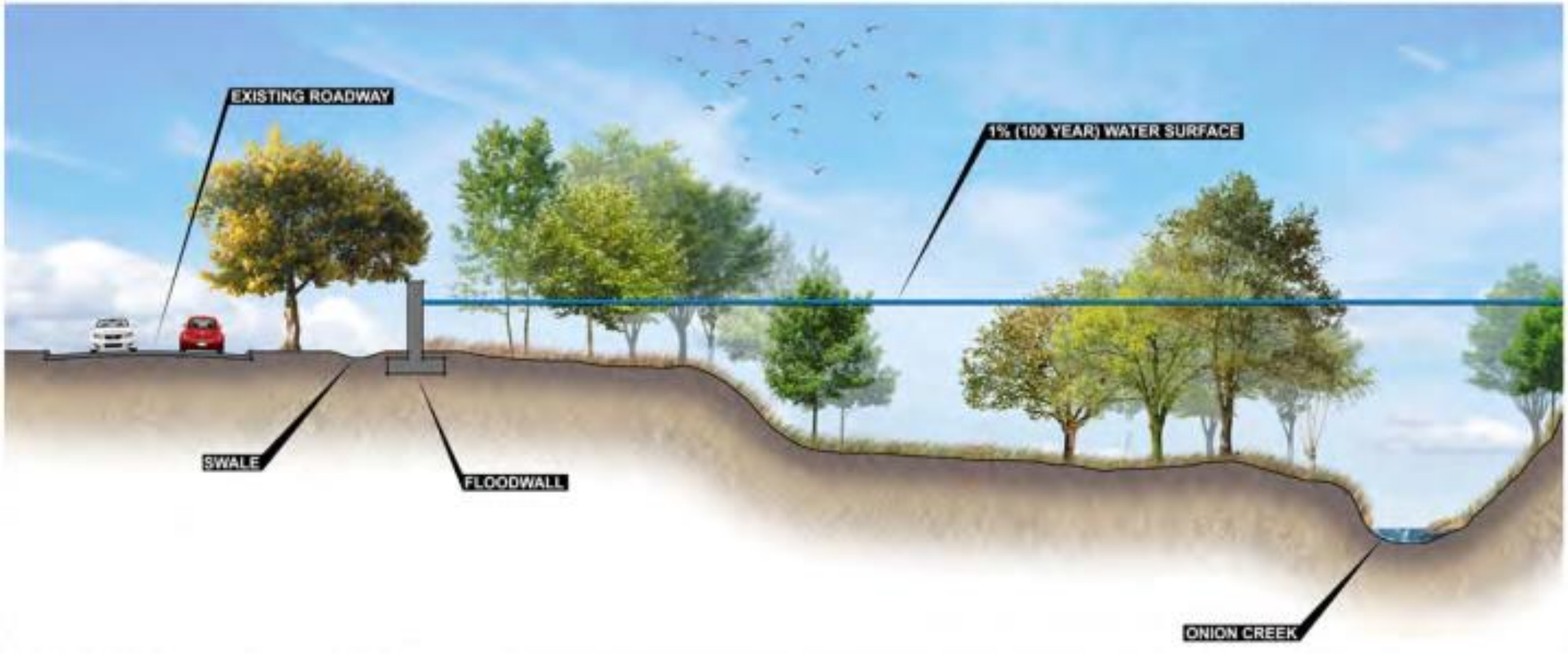
Channel Modifications



Channel Modifications



Floodwall


EXISTING ROADWAY
1% (100 YEAR) WATER SURFACE
SWALE
FLOODWALL
ONION CREEK

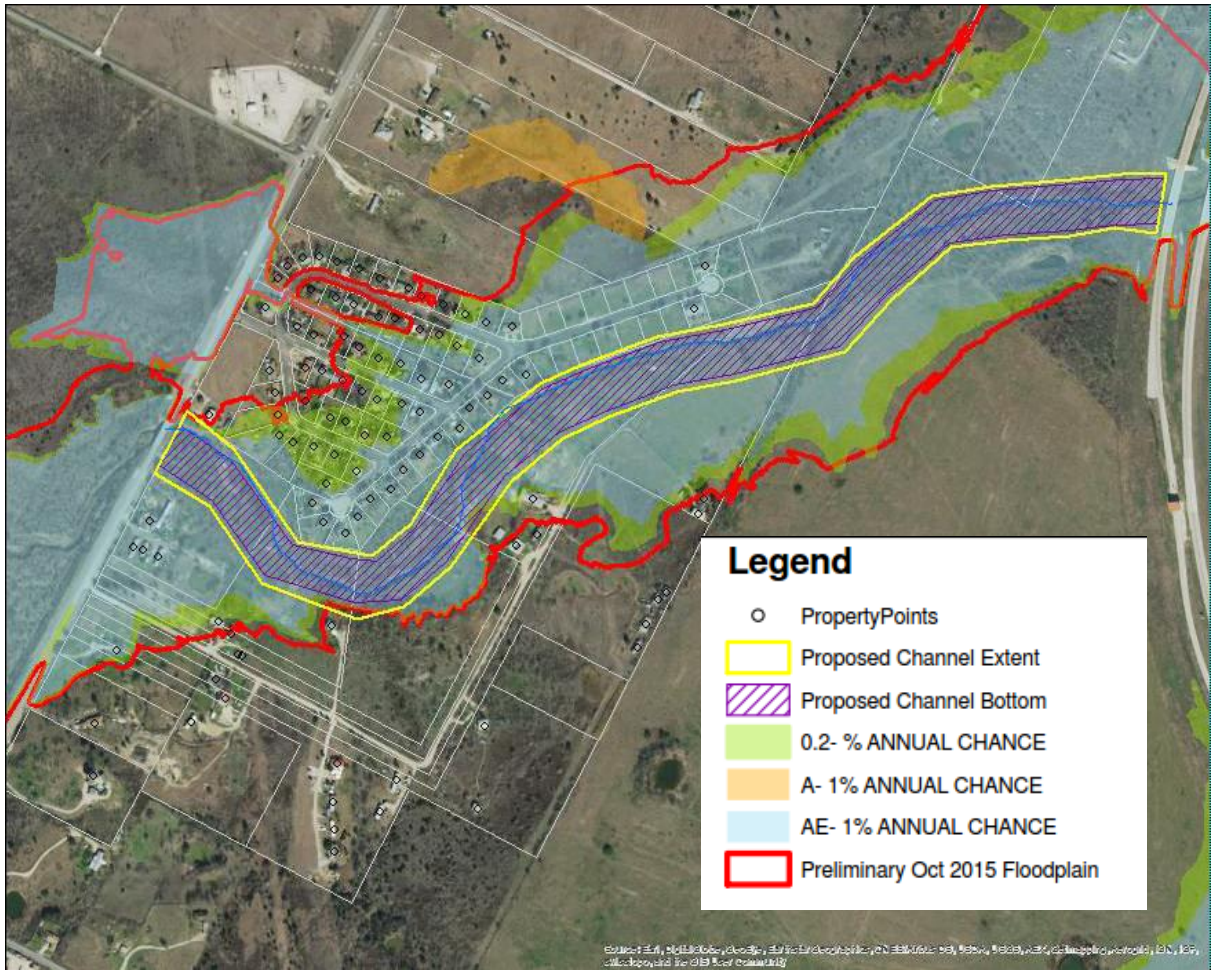
Dry Creek East Mitigation Alternatives

Preliminary Analysis

- Property Acquisition within the 1% ACE floodplain
- Potential Storm Drainage Improvements: 2009 TWDB FPP
- Clearing & channel benching

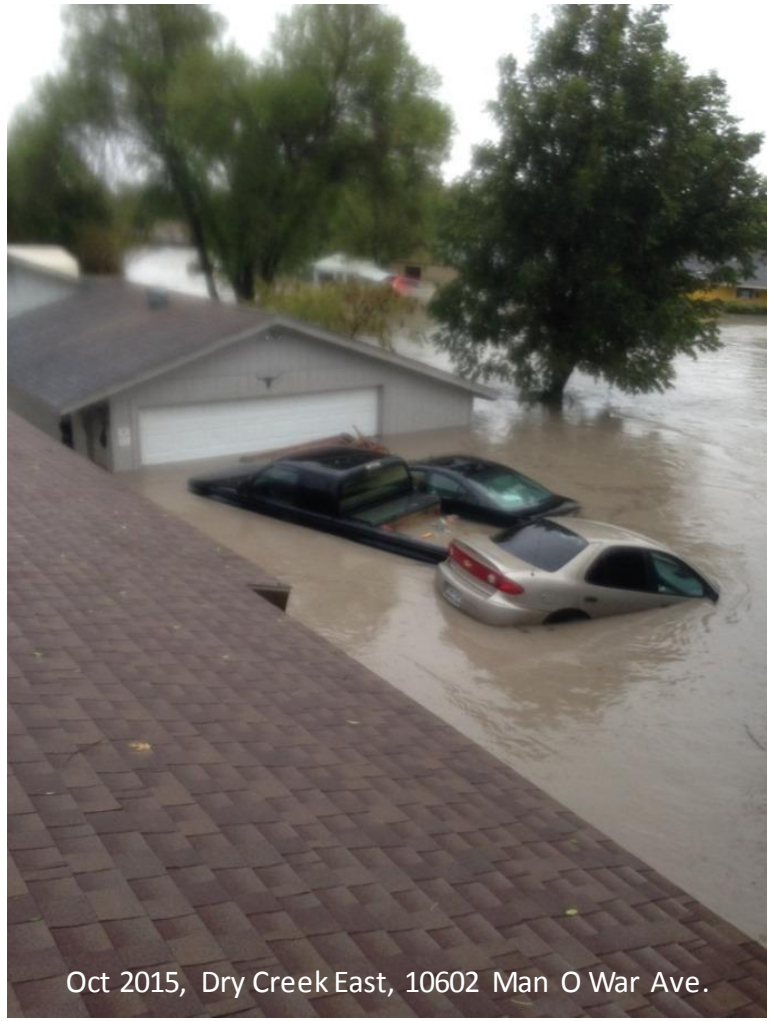
  ~200 ft channel bench
- Regional detention

  ~1700 ac-ft (takes 1% ACE to 10% ACE)



Mitigation Challenges

- Recent extreme flooding
- Technical challenges – Hydrology and Hydraulics
- Valuable updates to flood risk data / floodplains
- Anxious residents looking for solutions… quickly



Oct 2015, Dry Creek East, 10602 Man O War Ave.