NOTICE OF OPEN MEETING OF THE SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Region 12 San Antonio RFPG

03/03/2022
1:00 PM

TAKE NOTICE that a meeting of the San Antonio Regional Flood Planning Group as established by the Texas Water Development Board, will be held on Thursday, March 3, 2022, at 1:00 PM, in-person at the San Antonio River Authority Board room, located at 201 W. Sheridan St. and virtually on GotoMeeting at https://global.gotomeeting.com/join/224429605.

Agenda:

1. (1:00 PM) Roll-Call
2. Public Comments – limit 3 minutes per person
3. Approval of the Minutes from the Previous San Antonio Regional Flood Planning Group Meeting (Region 12)
4. Communications from the Texas Water Development Board (TWDB)
5. Chair Report
6. Updates from Region 12 Subcommittees
7. Presentation from David Skuodas, Colorado Mile High Flood District
8. Discussion and Appropriate Action Regarding the Submission of March 7th Technical Memorandum Supplement to TWDB
9. Officer Elections
10. Regional Liaison Update
11. Public Comments - limit 3 minutes per person
12. Date and Potential Agenda Items for Next Meeting
13. Adjourn

If you wish to provide written comments prior to or after the meeting, please email your comments to khayes@sariverauthority.org or physically mail them to the attention of Kendall Hayes at San Antonio River Authority, 201 W. Sheridan, San Antonio, TX, 78204 and include"Region 12 San Antonio Flood Planning Group Meeting" in the subject line of the email.

Additional information may be obtained from: Kendall Hayes (210) 302-3641, khayes@sariverauthority.org, San Antonio River Authority, 201 W. Sheridan, San Antonio, TX.

Agenda Item No.3: Approval of the Minutes from the Previous San Antonio Regional Flood Planning Group Meeting (Region 12)

Meeting Minutes
Region 12 San Antonio Regional Flood Planning Group Meeting
Tuesday, January 4, 2022
10:00 AM
San Antonio River Authority

Roll Call:

Voting Member	Interest Category	Present (x) /Absent ( ) / Alternate Present (*)
Brian Yanta	*Agricultural interests*	X
David Wegmann	*Counties*	X
Derek Boese	*River authorities*	*Melissa Bryant
Doris Cooksey	*Electric generating utilities*	X
Deborah (Debbie) Reid	*Environmental interests*	X
Nefi M. Garza	*Flood districts*	X
Cara C. Tackett	*Industries*	X
Jeffrey Carroll	*Municipalities*	X
John Paul Beasley	*Public*	X
Suzanne B. Scott	*Nonprofit*	X
Steve Gonzales	*Small business*	X
David Mauk	*Water districts*	X
Steve Clouse	*Water utilities*	

Non-voting Member	Agency	Present(x)/Absent( )/ Alternate Present (*)
Marty Kelly	Texas Parks and Wildlife Department	X
James Guin	Texas Division of Emergency Management	
Jami McCool	Texas Department of Agriculture	X
Jarod Bowen	Texas State Soil and Water Conservation Board	X
Kris Robles	General Land Office	X
Anita Machiavello	Texas Water Development Board (TWDB)	X
Susan Roberts	Texas Commission on Environmental Quality	X

Quorum:
Quorum: **Yes**
Number of voting members or alternates representing voting members present: **12**
Number required for quorum per current voting positions of 12: 7

All meeting materials are available for the public at: http://www.region12texas.org.

AGENDA ITEM NO.1: ROLL CALL
Ms. Kendall Hayes, San Antonio River Authority, called the role and confirmed a quorum.

AGENDA ITEM NO.2: PUBLIC COMMENT – LIMIT 3 MINUTES PER PERSON

No public comments.

AGENDA ITEM NO.3: APPROVAL OF THE MINUTES FROM THE PREVIOUS SAN ANTONIO REGIONAL FLOOD PLANNING GROUP MEETING (REGION 12)

Ms. Scott motioned to approve the minutes. Ms. Bryant seconded the motion, motion passed.

AGENDA ITEM NO.4: COMMUNICATIONS FROM THE TEXAS WATER DEVELOPMENT BOARD (TWDB)

Ms. Machiavello provided an update. The Technical Memo is due to TWDB on January 07th. Additional information is due in early March.

AGENDA ITEM NO.5: CHAIR REPORT

Chair Garza provided an update on the COSA Bond Committees. Ms. Scott provided supplemental information on the Bond Committee for flood planning. The committee is planning an overall master plan for the city's flood control and mitigation. The plan will have applications in green infrastructure and other aspects of the city's planning.

AGENDA ITEM NO.6: UPDATES FROM REGION 12 SUBCOMMITTEES

Neither the Technical nor the Outreach Committees met since the previous meeting.

AGENDA ITEM NO.7: DISCUSSION REGARDING THE CONSULTANT'S WORK AND SCHEDULE

Mr. Ron Branyon, HDR, provided an update on the current efforts of the consulting team and presented the draft Technical Memo. HDR's presentation and the recording for this meeting can be found on the Region 12 website at *http://www.region12texas.org.*

Ms. Reid motioned to approve the SARFPG Draft Technical Memo and associated back-up documentation as amended by the Planning Group today. Ms. Tackett seconded the motion, the roll call vote passed.

AGENDA ITEM NO.8: REGIONAL LIAISON UPDATES

Ms. Tackett provided an update on Region 10. They approved their Tech Memo. Ms. Scott provided an update on Region 11. They approved their Tech Memo. Mr. Mauk had no update for Region 13.

AGENDA ITEM NO.9: PUBLIC COMMENTS:

No public comments.

AGENDA ITEM NO.10: DATE AND POTENTIAL AGENDA ITEMS FOR NEXT MEETING

The next planning group meeting date is February 24, 2022, at 2:00 PM.

AGENDA ITEM NO.11: ADJOURN

Ms. Tackett motioned to adjourn the meeting. Ms. Reid seconded the motion, motion passed. Meeting adjourned.

Agenda Item No.4: Communications from the Texas Water Development Board (TWDB)

Regional Flood Planning
Flood Risk Reduction Project Types Overview

March 3, 2022
1:00 – 2:00 pm

You can also dial in using your phone (audio only)
Call: +
Phone Conference ID: #

RFP Flood Risk Reduction Project Types Overview

Agenda Overview:

1. Flood Management Evaluations (FME)
2. Flood Mitigation Projects (FMP)
3. Flood Management Strategies (FMS)
4. FME, FMP, FMS Flow Chart
5. Questions

Flood Management Evaluations (FME)

- Definition:
  - is a proposed flood study of a specific, flood-prone area that is needed in order to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs.
  - will not have construction capital cost
- Examples:
  - Watershed Planning: (e.g., hydrologic and hydraulic modeling, flood mapping updates, regional watershed studies)
  - Engineering Project Planning (Feasibility assessments)
  - Preliminary Engineering (Alternative analysis and up to 30 percent design)
  - Studies on Flood Preparedness

Flood Mitigation Projects Evaluations (FMP)

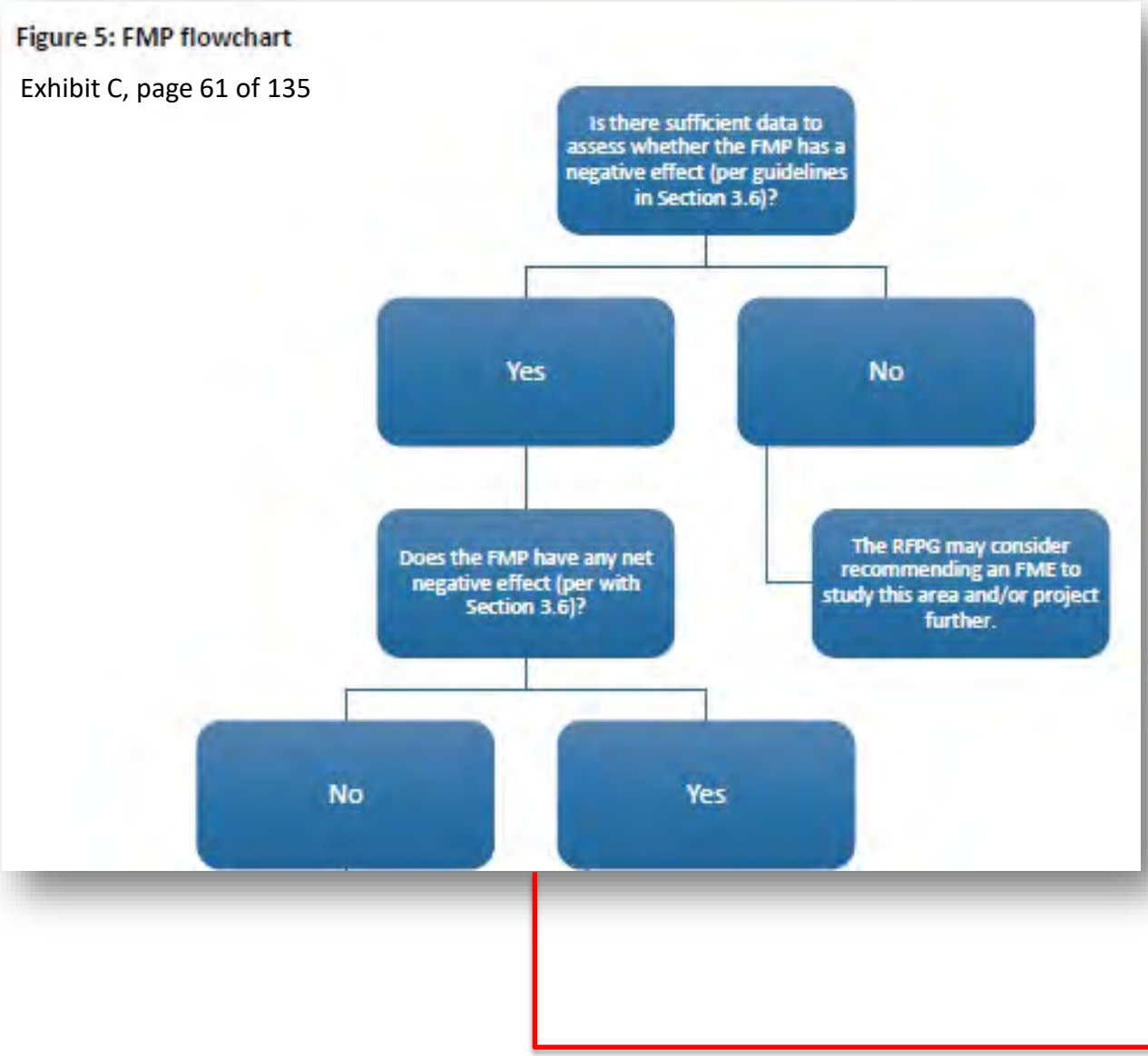
- Definition:
  - is a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring cost and when implemented will reduce flood risk, mitigate flood hazards to life or property. The RFPGs are strongly encouraged to consider nature-based flood risk reduction solutions in their overall approach.
  - FMPs shall be permittable, constructable and implementable.

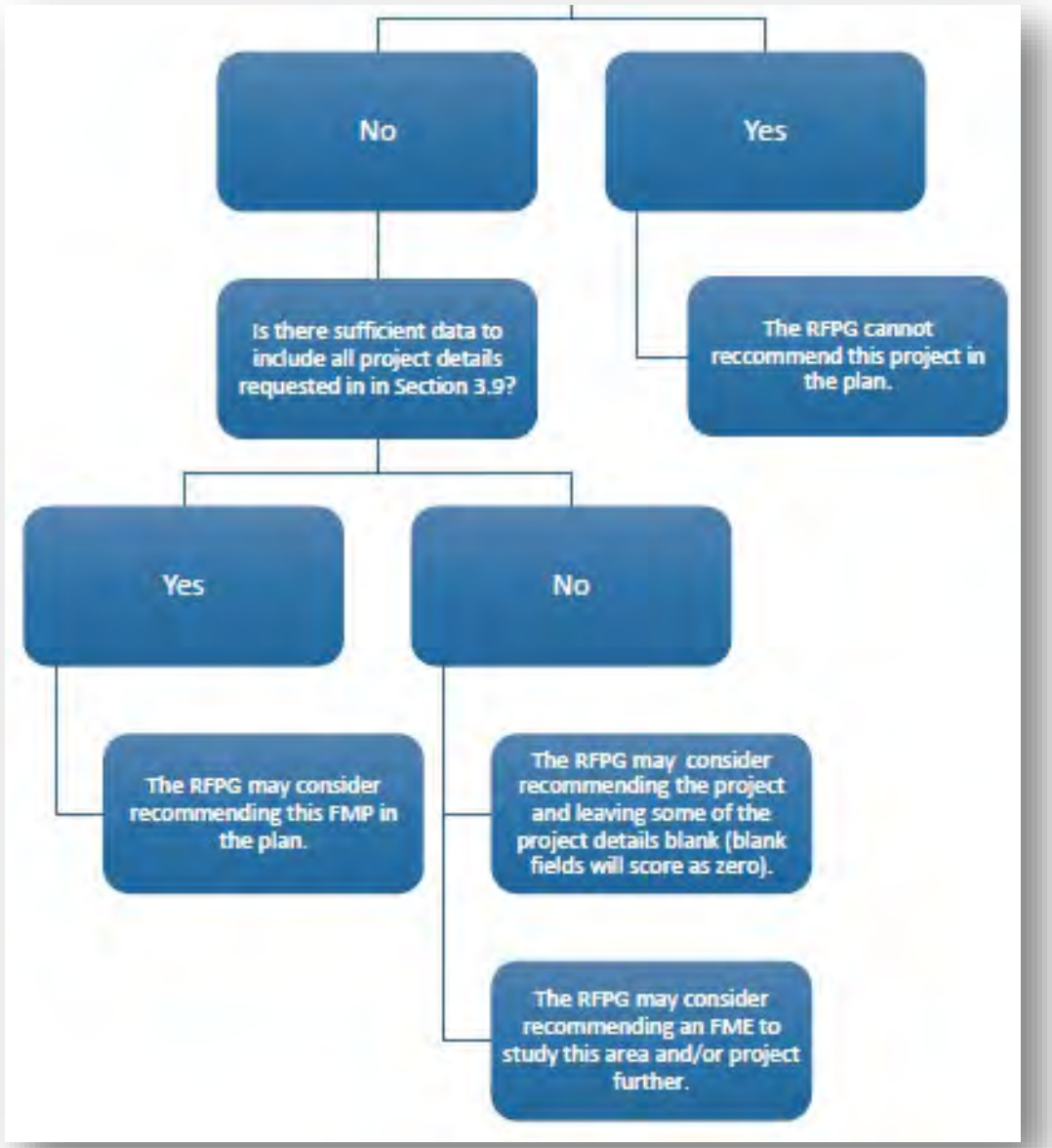
- Structural Examples:
  - Low water crossings or bridge Improvements
  - Infrastructure (channels, ditches, ponds)
  - Natural-based projects
  - Regional Detention

- Non-Structural Examples:
  - Property or easement acquisition
  - Flood Early Warning Systems
  - Elevation of individual structures
  - Flood-proofing

Figure 5: FMP flowchart

Exhibit C, page 61 of 135

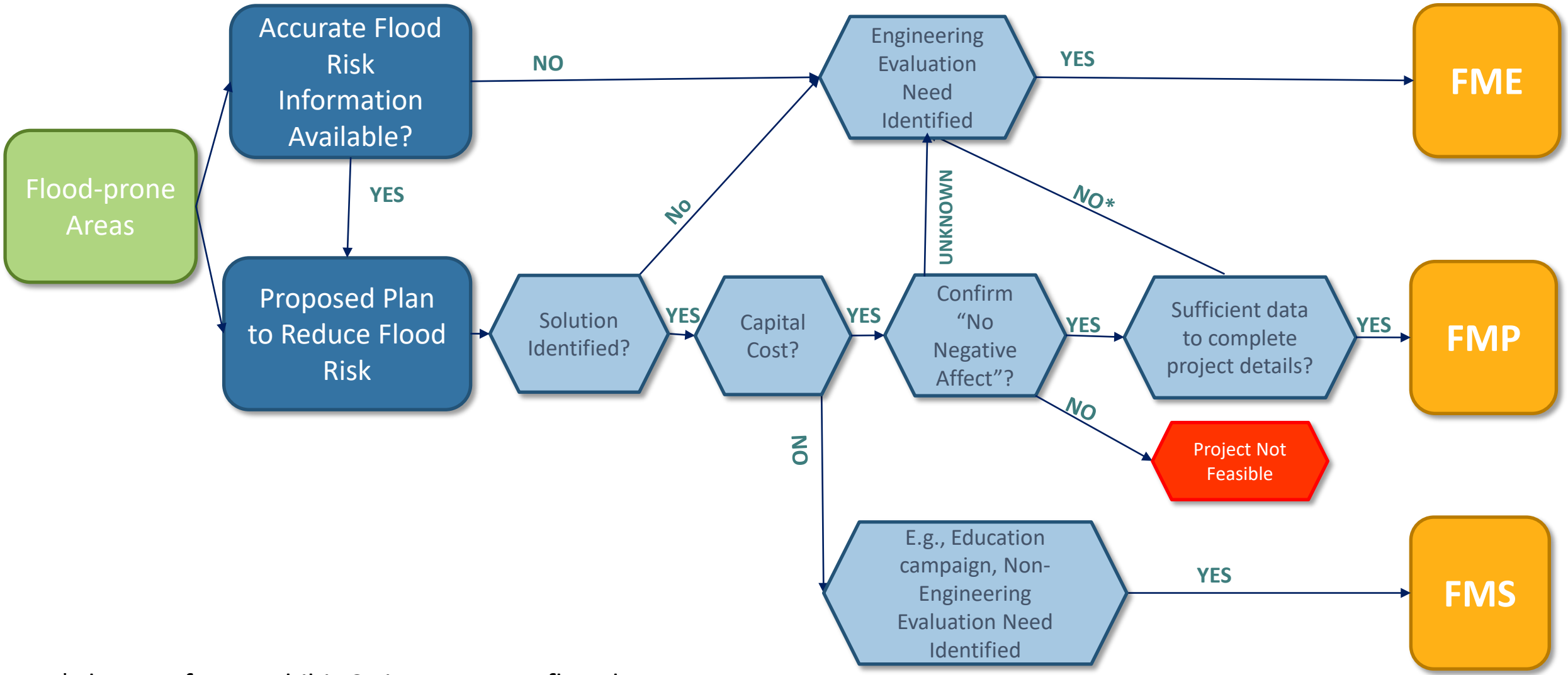




Flood Management Strategies (FMS)

- Definition:
  - is a proposed plan to reduce flood risk or mitigate flood hazards to life or property. The RFPG has some flexibility on how they choose to utilize FMSs in the regional flood planning process. For example, RFPGs could choose not to recommend any FMSs.
  - utilize FMS when a flood risk reduction item does not fit into FME or FMP
  - will not have construction or other capital cost
- Examples:
  - Non-engineering studies: (e.g., floodplain regulation development; flood authority or revenue raising studies; public awareness program)
  - RFPGs may include a strategy that has no cost
- **As an FMS, non-recurring non-capital costs are the only costs that will be potentially eligible for funding.**

FME, FMP, FMS Flow Chart



*Please refer to Exhibit C Figure 5: FMP flowchart.

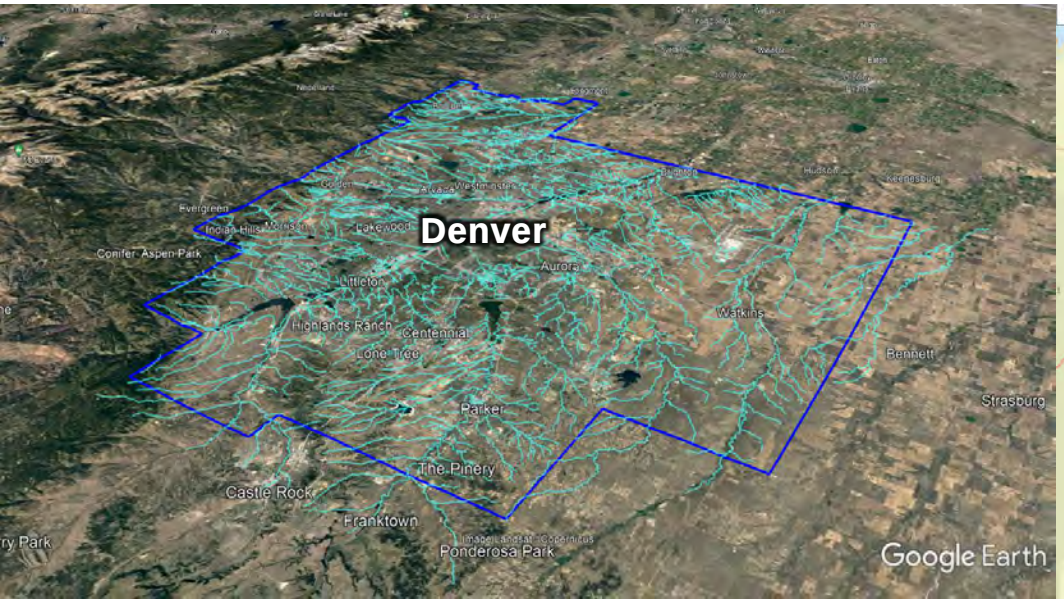
Questions & Comments?

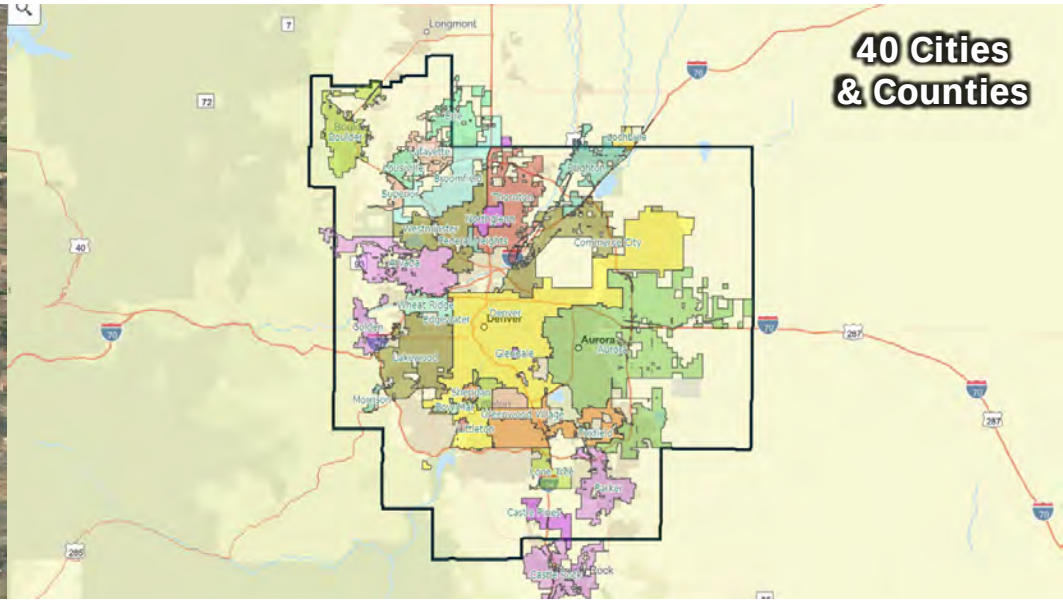
Image: Brent Hanson, U.S. Geological Survey. Public domain.

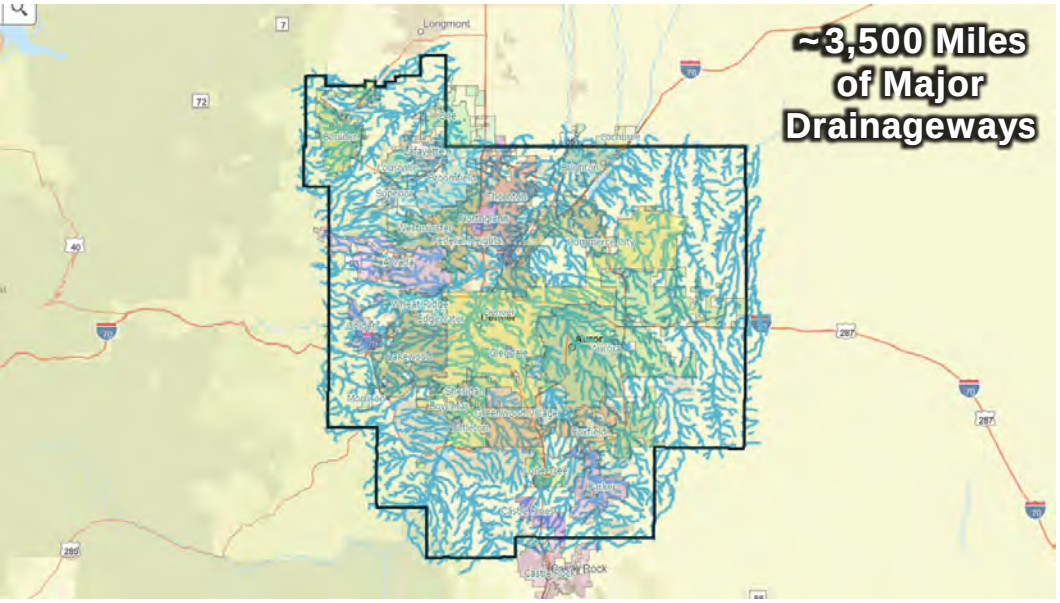
Agenda Item No.5: Chair Report

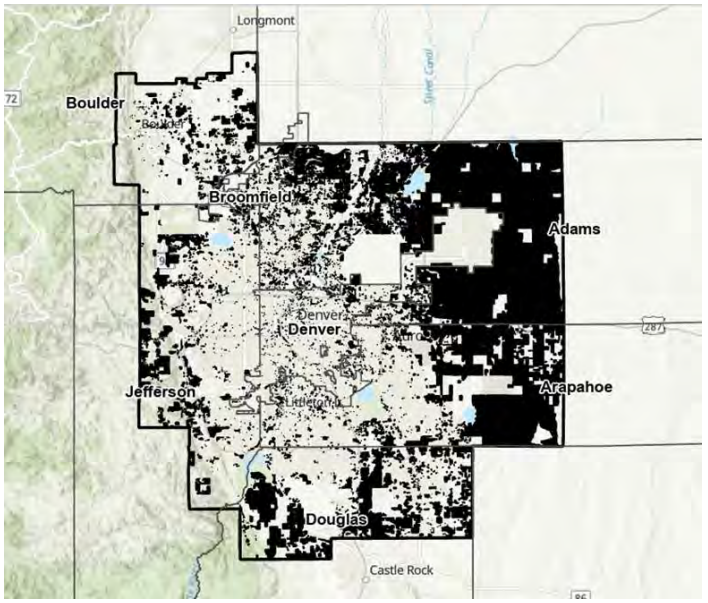
Agenda Item No.6: Updates from Region 12 Subcommittees

Agenda Item No.7: Presentation from David Skuodas, Colorado Mile High Flood District


Denver
Evergreen
Conifer
Aspen Park
Lakewood
Littleton
Aurora
Highlands Ranch
Centennial
Lone Tree
Watkins
Bennett
Strasburg
Parker
The Pinery
Castle Rock
Franktown
Ponderosa Park
Google Earth


40 Cities
& Counties
Longmont
Aurora
Parker


~3,500 Miles
of Major
Drainageways
Longmont

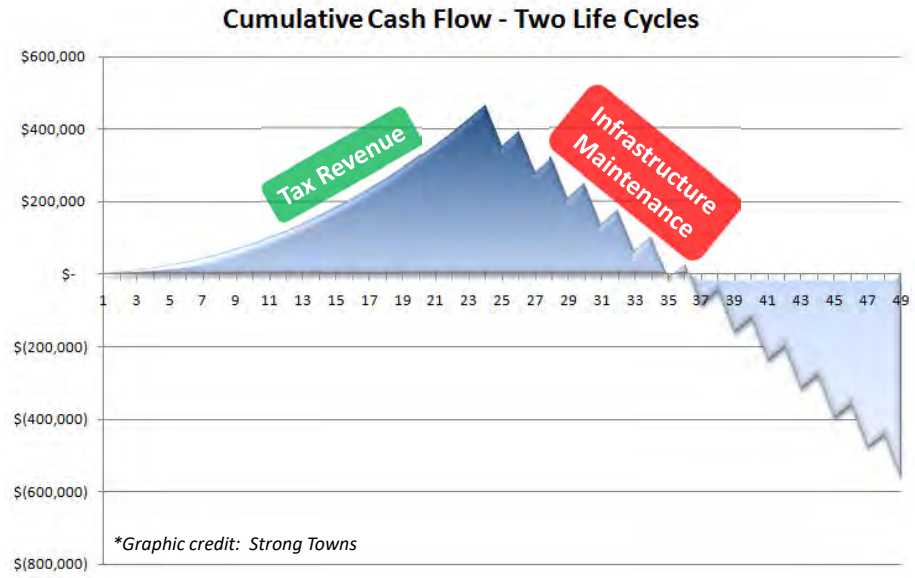

Longmont
Boulder
Broomfield
Adams
Denver
Jefferson
Arapahoe
Douglas
Castle Rock


Google Earth


Google Earth


KOMATSU
NO PARKING ANY TIME


Inheriting Infrastructure


Cumulative Cash Flow - Two Life Cycles
$600,000
$400,000
$200,000
$-
$(200,000)
$(400,000)
$(600,000)
$(800,000)
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49
Tax Revenue
Infrastructure Maintenance
*Graphic credit: Strong Towns

Inheriting Infrastructure

*Image by Omaha World Herald


I-70 Viaduct


I-70 Viaduct

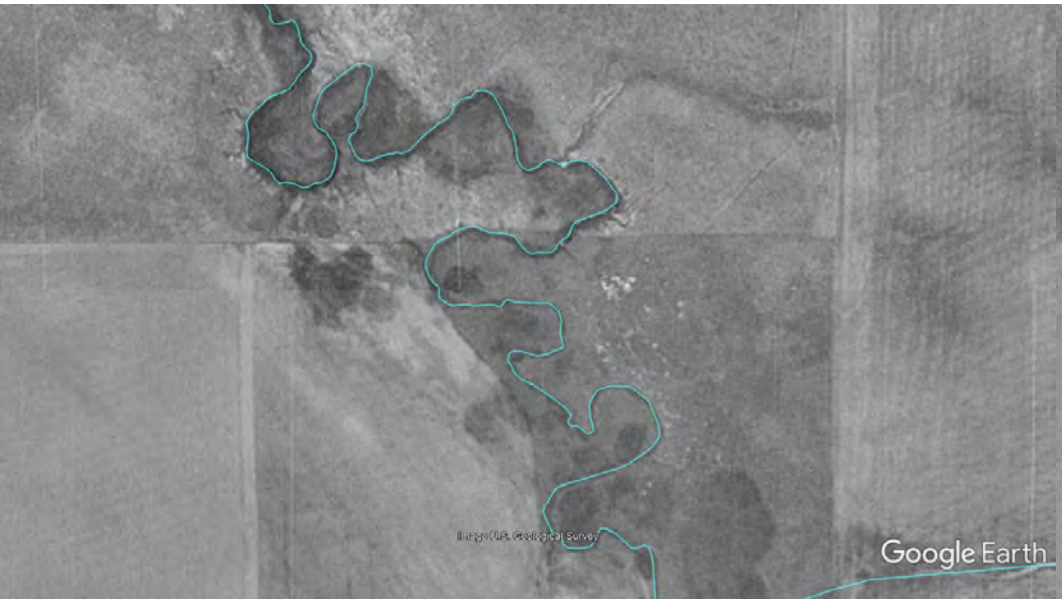


Image U.S. Geological Survey
Google Earth

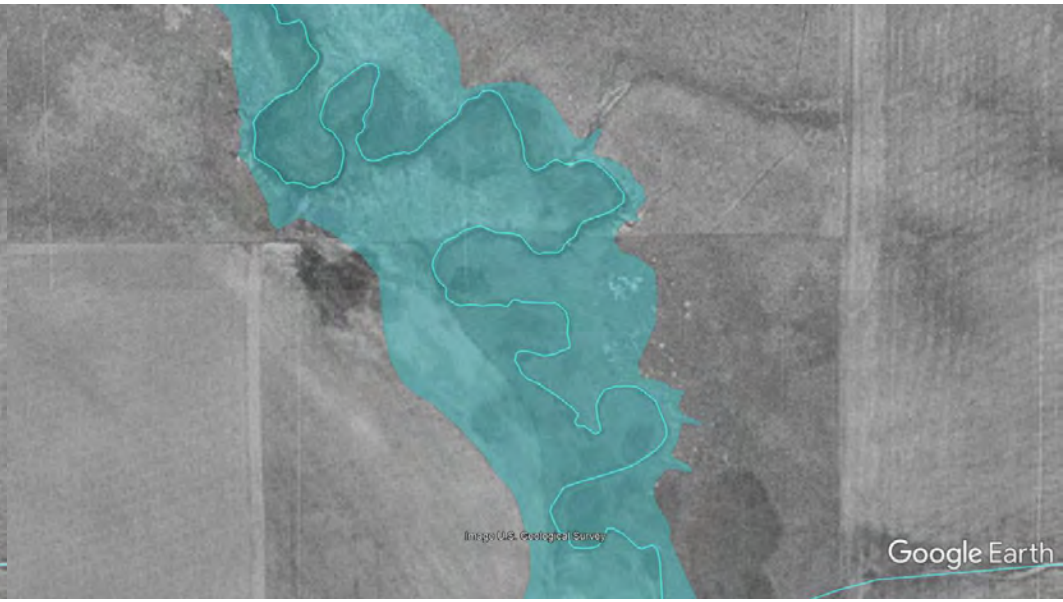
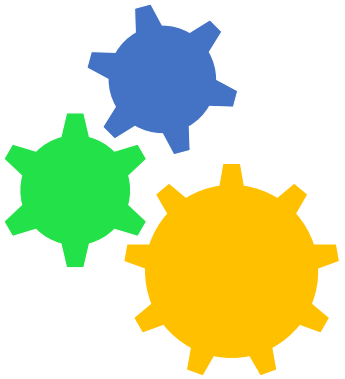
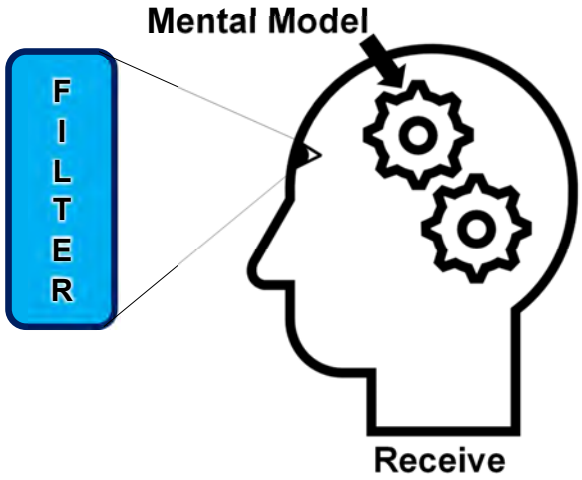


Image U.S. Geological Survey
Google Earth

Mental Models

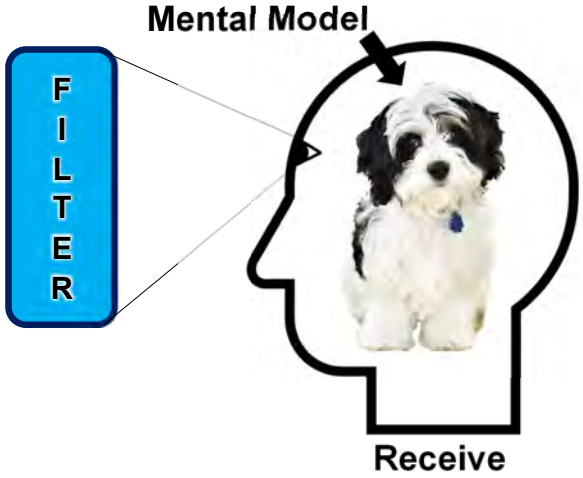


System or Situation



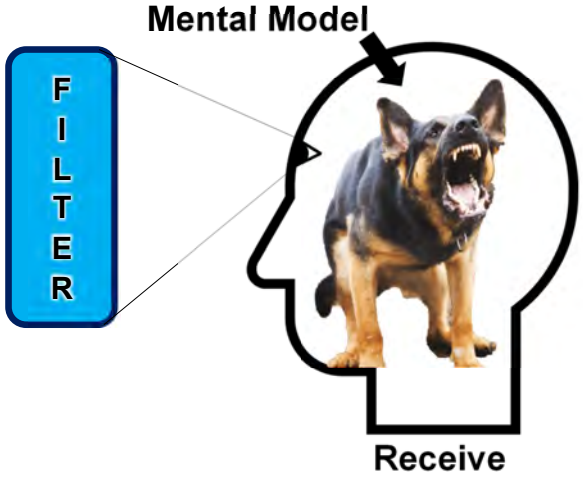
Mental Models

Dog



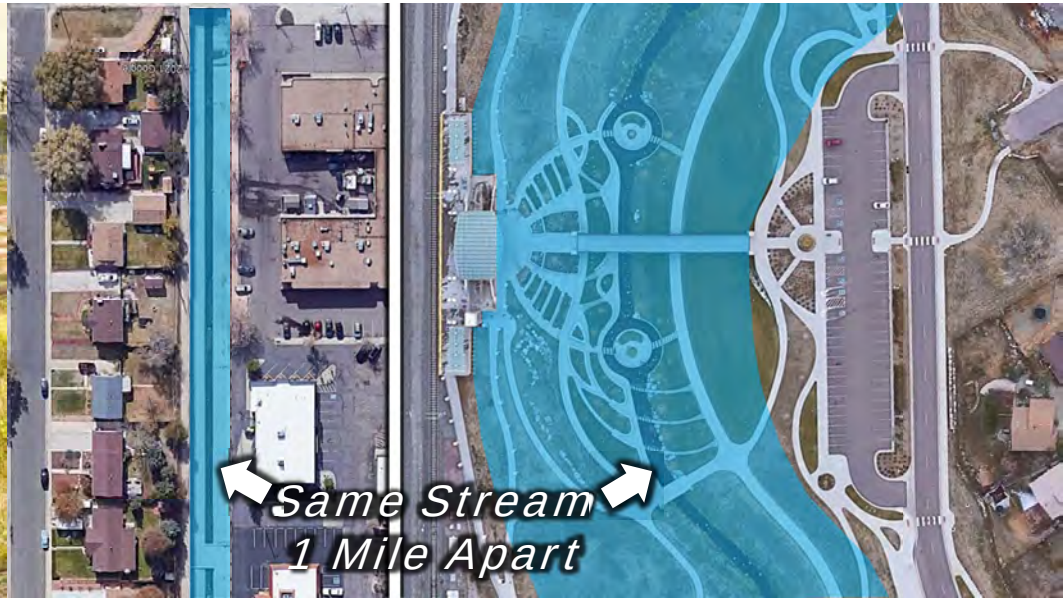
Mental Models

Dog



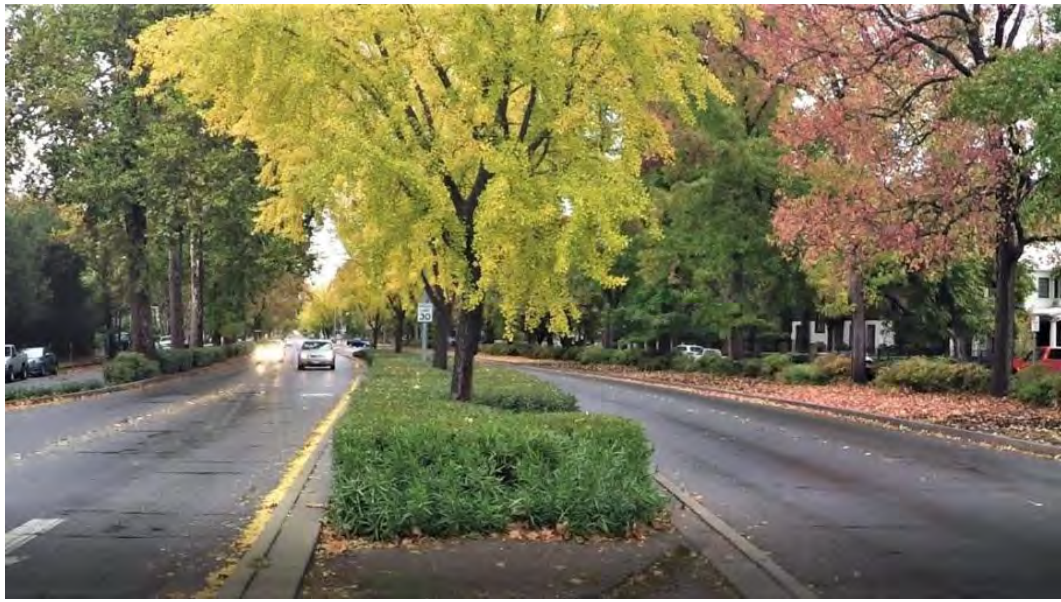

1986 Project

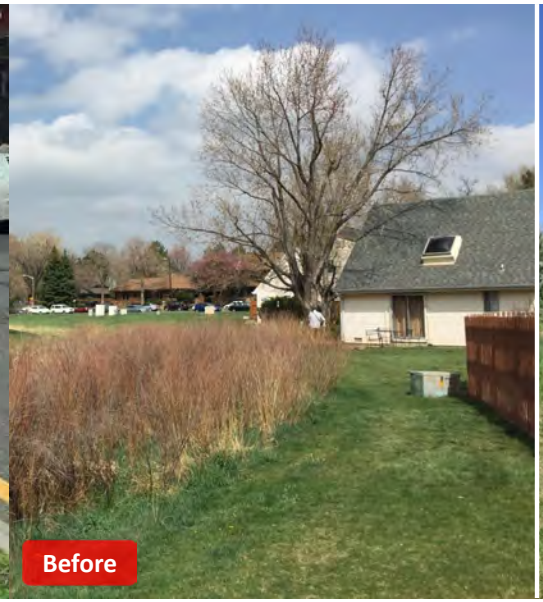

2017 Project

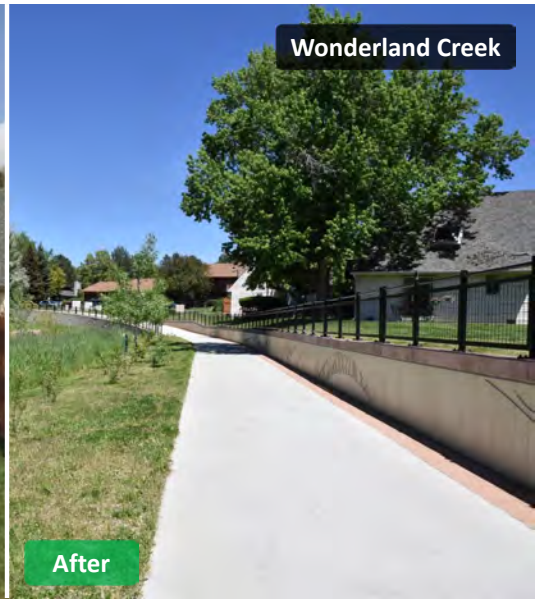

Same Stream
1 Mile Apart

Think Beyond Your Own Expertise or Department


Finance
Social
Services
Public
Works
Legal
Police
Planning
Parks




Before


Wonderland Creek
After

Consider the Full Life Cycle Cost


Lena Gulch
17,000 YEARS


Maxwell Tributary


Maxwell Tributary


Maxwell Tributary
MHFD Funding = $10,000/yr


Maxwell Tributary
© 2016 Google
Google earth


Maxwell Tributary
600 YEARS


Newlin Gulch
Google earth


Newlin Gulch
Stonegate

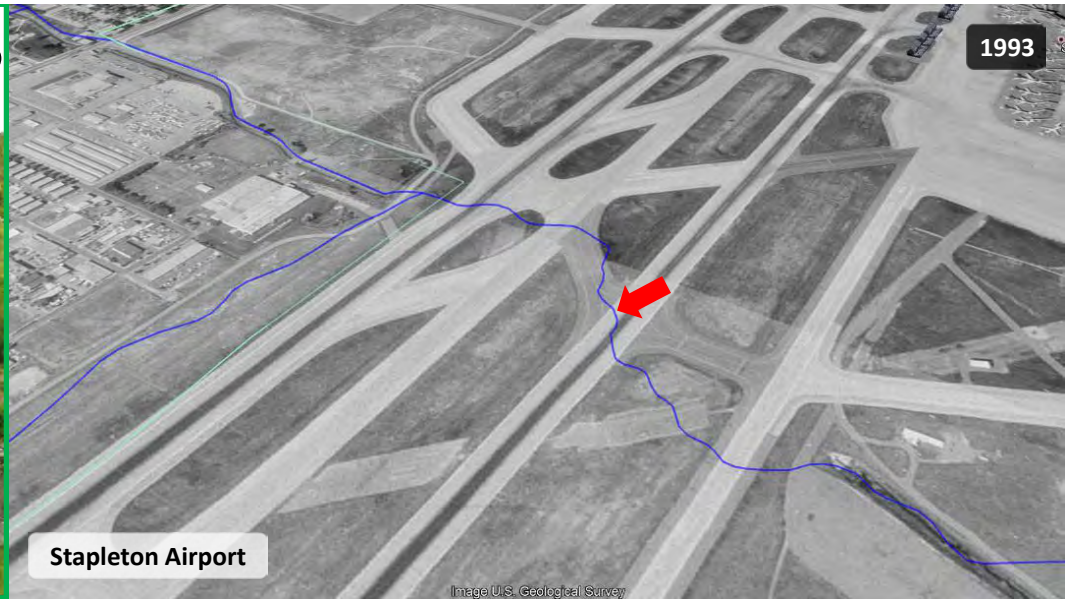

Newlin Gulch
Stonegate
MHFD Funding = $38,000/yr


Newlin Gulch
300 YEARS


$$$


$$


$


1993
Stapleton Airport
Image U.S. Geological Survey

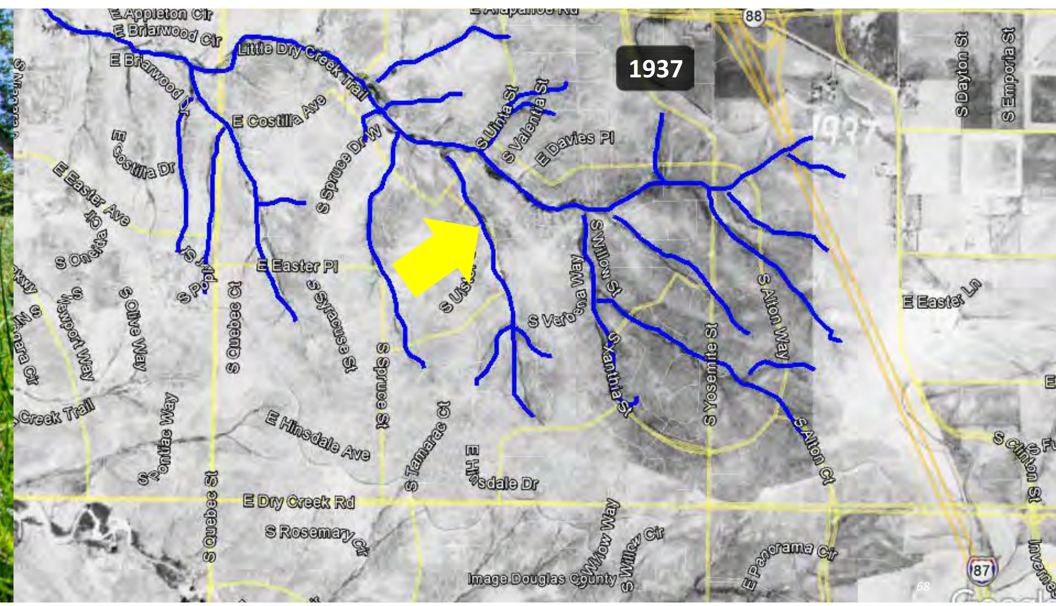

2017
Stapleton Redevelopment
© 2018 Google

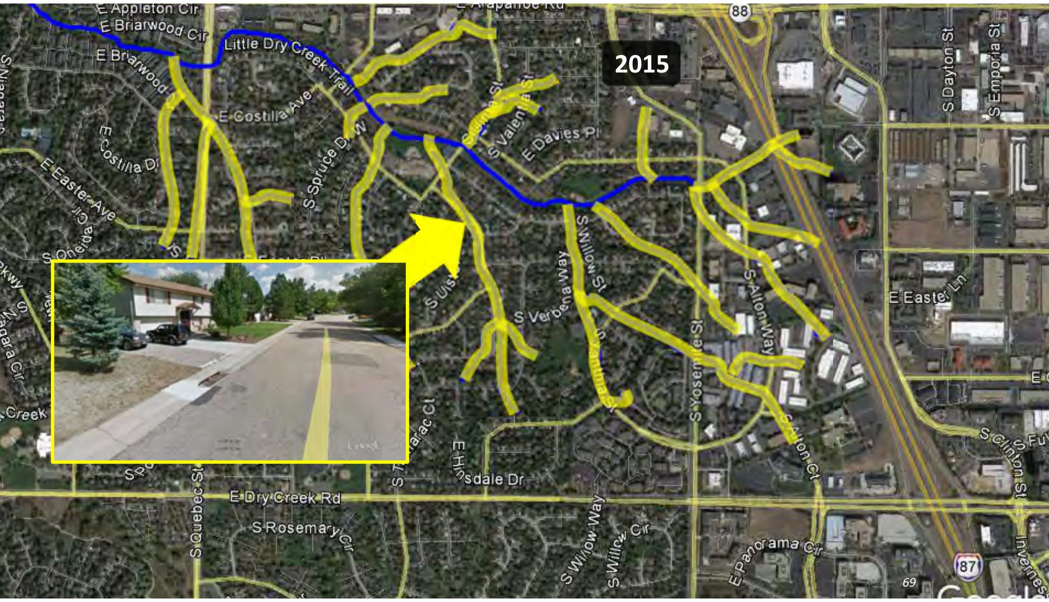

Same Bridge

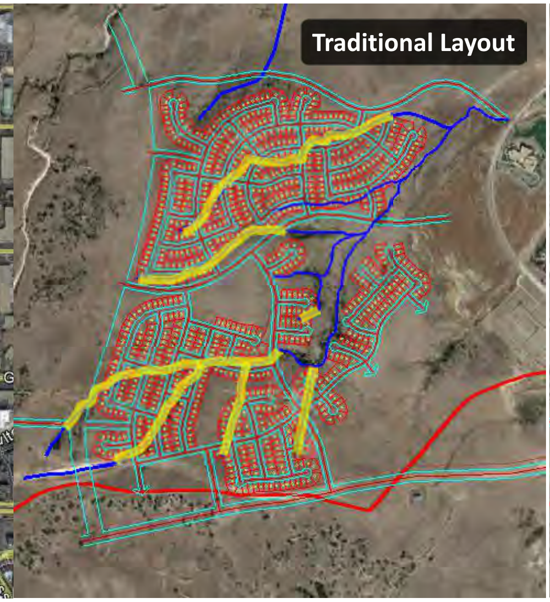

Same Bridge
2013 Flood

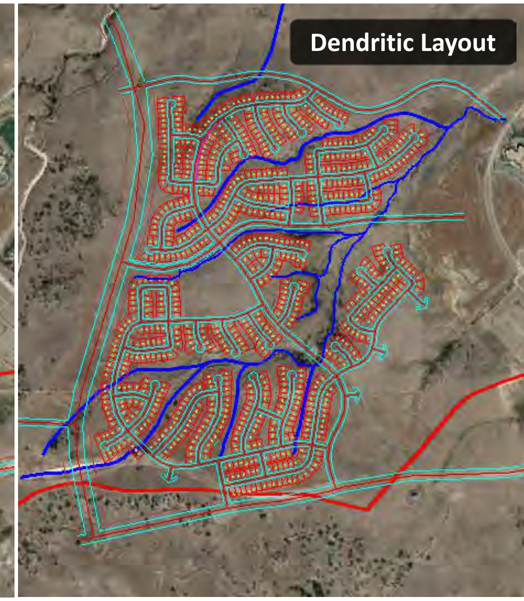

Same Bridge
1 Day Later

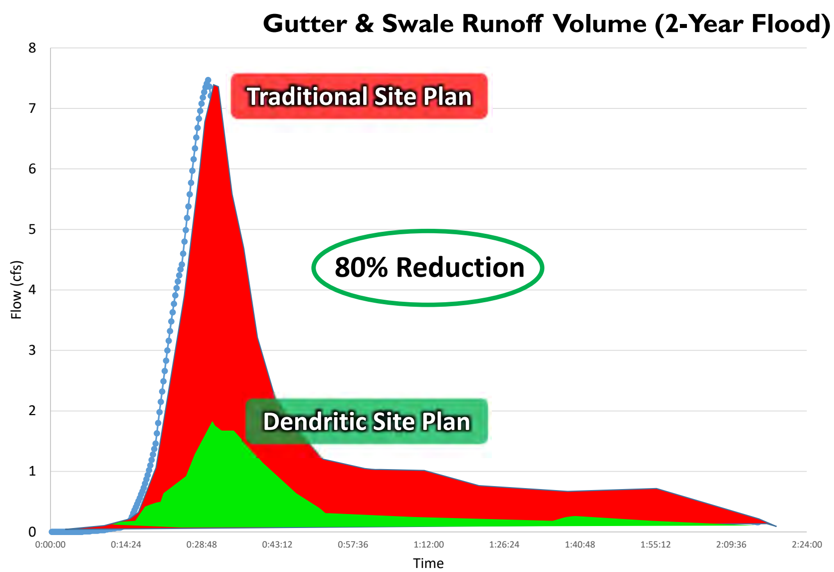

Same Bridge
8 Months Later


1937
Little Dry Creek Trail
E Briarwood Cir
E Costilla Ave
E Costilla Dr
E Easter Ave
E Easter Pl
E Davies Pl
S Spruce Dr W
S Uinta St
S Valentia St
S Willow St
S Verbena Way
S Yosemite St
S Alton Way
S Alton Ct
S Quebec Ct
S Quebec St
S Syracuse St
S Spruce St
S Tamarac Ct
S Olive Way
S Pontiac Way
S Newport Way
E Hinsdale Ave
E Dry Creek Rd
S Rosemary Cir
E Easter Ln
E Panorama Cir
S Dayton St
S Emporia St
Image Douglas County

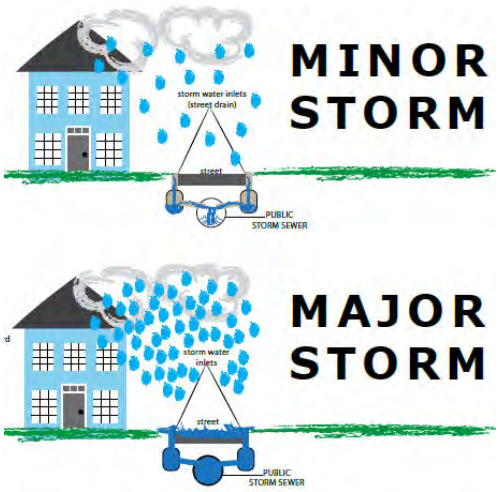

2015
Little Dry Creek Trail
E Dry Creek Rd
S Rosemary Cir


Traditional Layout

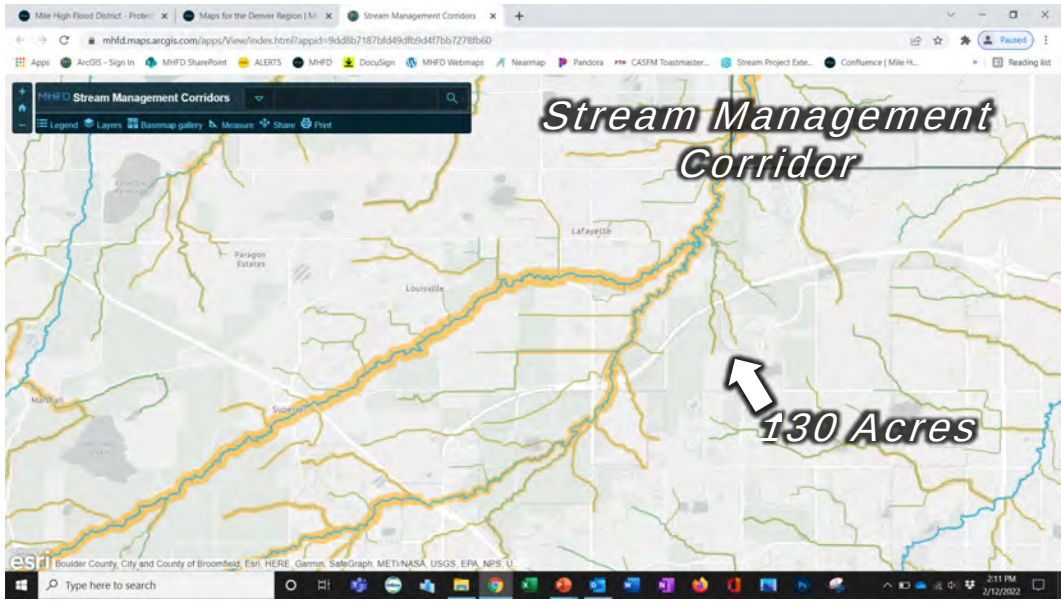

Dendritic Layout

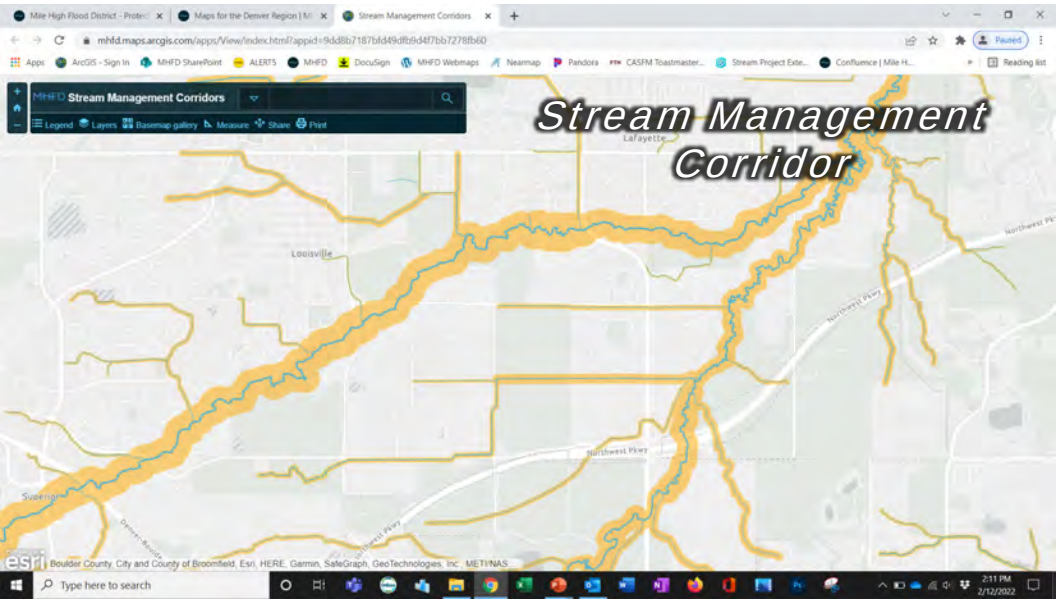

Gutter & Swale Runoff Volume (2-Year Flood)
Traditional Site Plan
80% Reduction
Dendritic Site Plan
Flow (cfs)
Time
0
1
2
3
4
5
6
7
8
0:00:00
0:14:24
0:28:48
0:43:12
0:57:36
1:12:00
1:26:24
1:40:48
1:55:12
2:09:36
2:24:00


Google Earth


MINOR STORM
storm water inlets (street drain)
street
PUBLIC STORM SEWER
MAJOR STORM
storm water inlets
street
PUBLIC STORM SEWER


>130 Acres = Open Channel


MHFD Stream Management Corridors
Stream Management Corridor
130 Acres


MHFD Stream Management Corridors
Stream Management Corridor

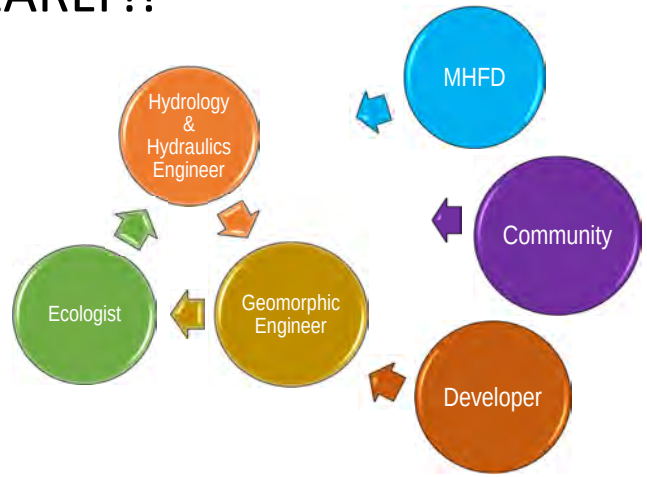

THE FIVE ELEMENTS OF URBAN STREAM FUNCTION
GEOMORPHOLOGY
VEGETATION
PHYSICAL CONDITION & COMMUNITY VALUES
HYDRAULICS
COMMUNITY VALUES
HYDROLOGY

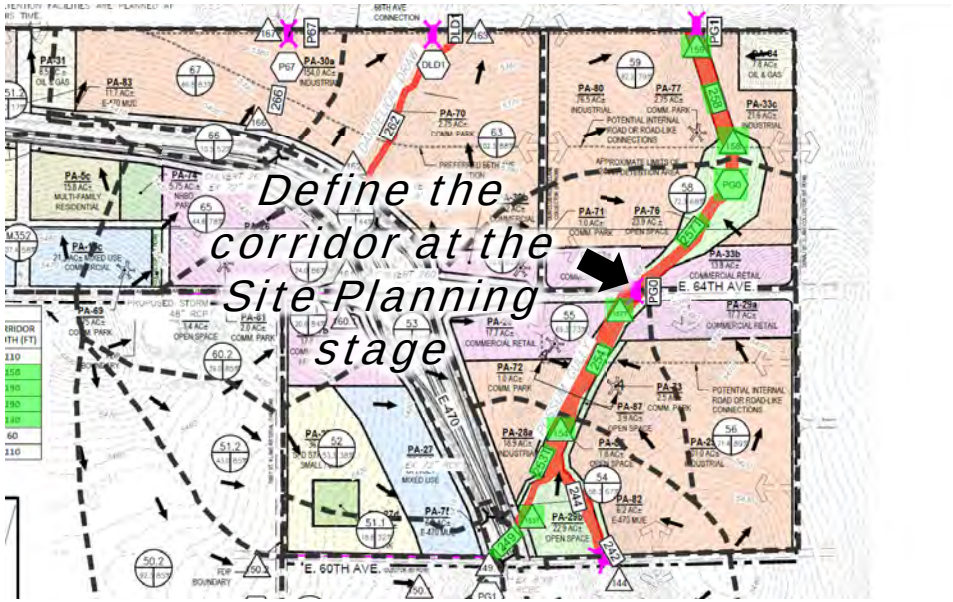

High Functioning & Low Maintenance Streams


Pre-Development

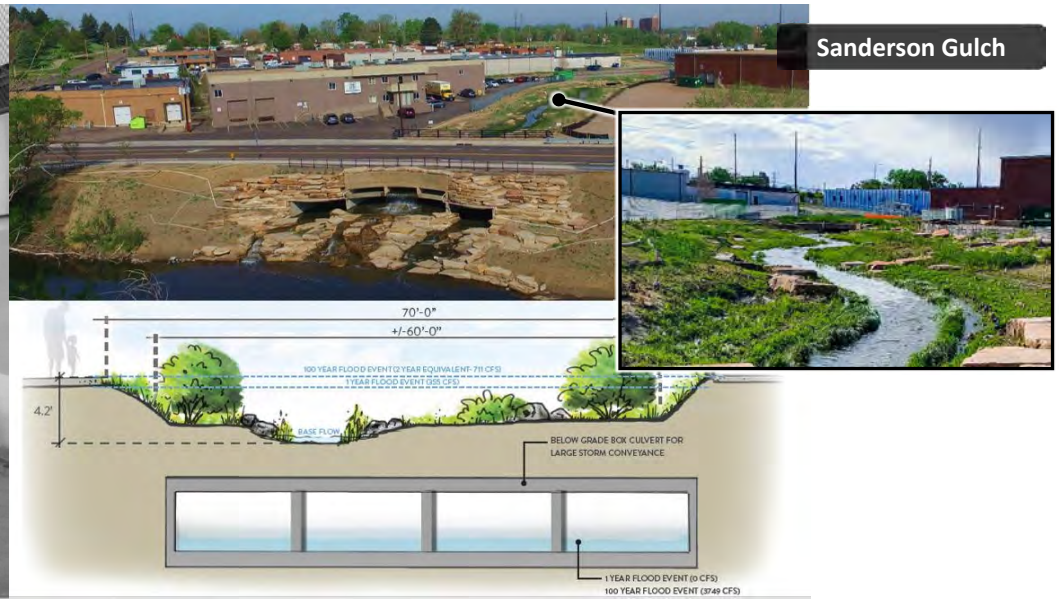

Post-Development

Plan EARLY!!


MHFD
Hydrology & Hydraulics Engineer
Community
Ecologist
Geomorphic Engineer
Developer

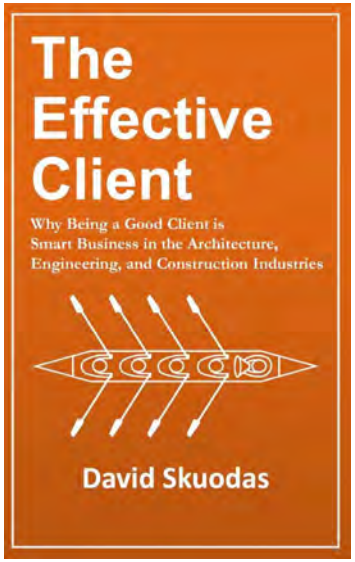

Define the corridor at the Site Planning stage
E. 64TH AVE.
E. 60TH AVE.


West Fork of Kenney's Run



David Skuodas
dskuodas@mhfd.org
www.linkedin.com/in/davidskuodas/

MILE HIGH FLOOD DISTRICT



Book available on Amazon, Kindle, Audible, iTunes

Agenda Item No.8: Discussion and Appropriate Action Regarding the Submission of March 7th Technical Memorandum Supplement to TWDB

SARFPG Meeting

March 3rd, 2022

Agenda

- Schedule
- Public Outreach Update – Virtual Meeting
- Technical Memo Update – Comments from TWDB
- March 7th Deliverable

Critical Path Schedule

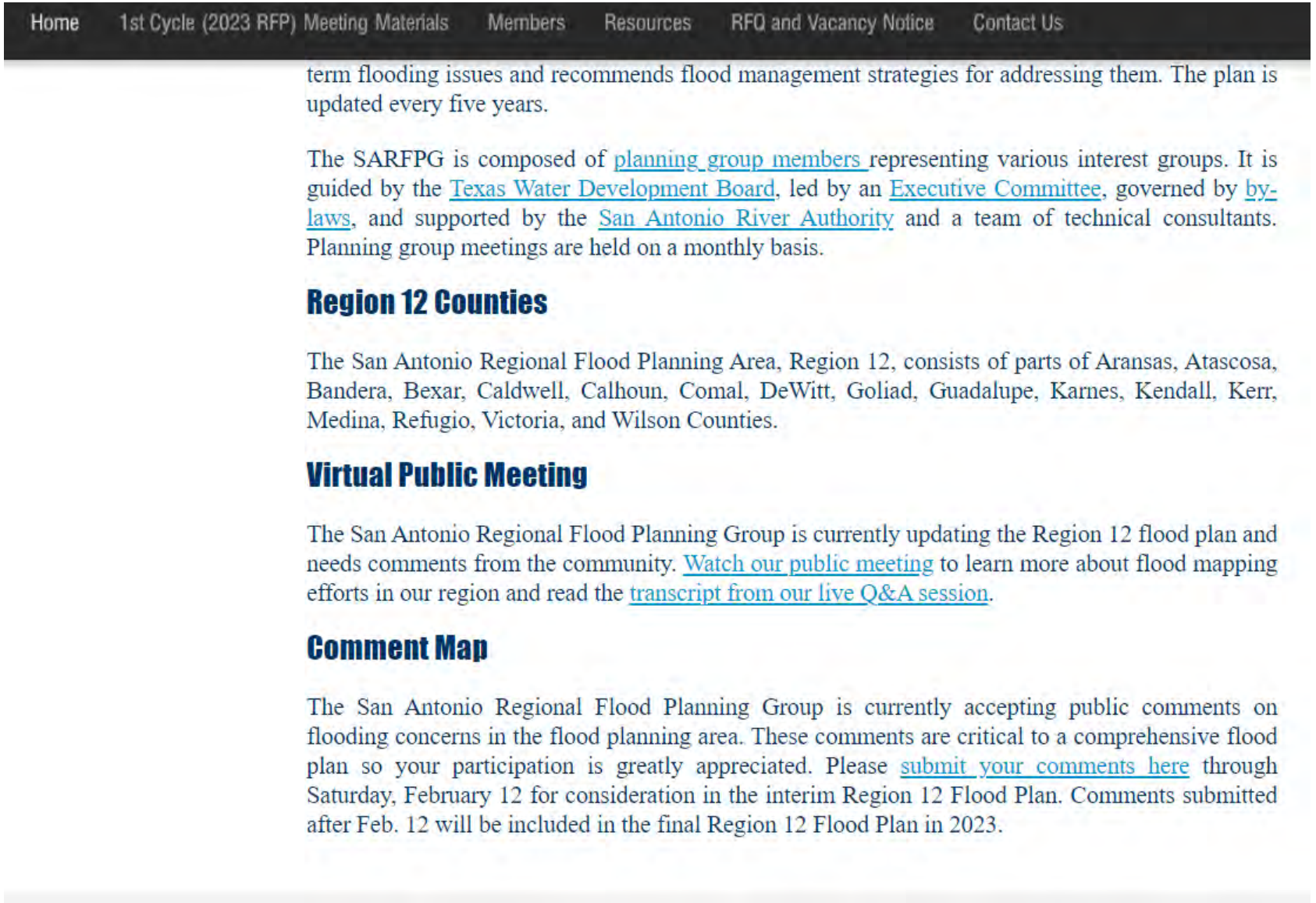
Approve Updated Draft Memo – **March 3rd Meeting**

Approve Updated Geodatabase– **March 3rd Meeting**

Updated Technical Memo and Geodatabase Due to TWDB – **March 7, 2022**

Outreach Update

- Virtual Meetings
  - February 7th, 2022



Home 1st Cycle (2023 RFP) Meeting Materials Members Resources RFQ and Vacancy Notice Contact Us

term flooding issues and recommends flood management strategies for addressing them. The plan is updated every five years.

The SARFPG is composed of planning group members representing various interest groups. It is guided by the Texas Water Development Board, led by an Executive Committee, governed by by-laws, and supported by the San Antonio River Authority and a team of technical consultants. Planning group meetings are held on a monthly basis.

Region 12 Counties

The San Antonio Regional Flood Planning Area, Region 12, consists of parts of Aransas, Atascosa, Bandera, Bexar, Caldwell, Calhoun, Comal, DeWitt, Goliad, Guadalupe, Karnes, Kendall, Kerr, Medina, Refugio, Victoria, and Wilson Counties.

Virtual Public Meeting

The San Antonio Regional Flood Planning Group is currently updating the Region 12 flood plan and needs comments from the community. Watch our public meeting to learn more about flood mapping efforts in our region and read the transcript from our live Q&A session.

Comment Map

The San Antonio Regional Flood Planning Group is currently accepting public comments on flooding concerns in the flood planning area. These comments are critical to a comprehensive flood plan so your participation is greatly appreciated. Please submit your comments here through Saturday, February 12 for consideration in the interim Region 12 Flood Plan. Comments submitted after Feb. 12 will be included in the final Region 12 Flood Plan in 2023.

Technical Memo Update

- Received 1 comment from TWDB
  - Comment Letter received (1/26/2022)
  - Submitted response letter to TWDB (2/4/2022)
    - Updated Table Attached

March 7th Deliverable

- Draft Technical Memo
  - Update for TPWD comment
  - Update maps and appendices with new information
  - Updated Technical Memorandum will be on StoryMap
- Geodatabase Update
  - Discuss checklist – Attached
  - StoryMap Review – Link provided by SARA

March 7th Deliverable

- Approve the submittal of the updated draft Technical Memorandum and Geodatabase

Next Steps

- Update Regional Goals Metrix
- Collect and Evaluate FMP,’s FME’s, FMS’s

Any Questions

Contact info: Ron Branyon
Email: Ronald.branyon@hdrinc.com
Phone: 210.912.7105

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

January 26, 2022

Brian Mast
Manager of Government Affairs
San Antonio River Authority
201 W. Sheridan
San Antonio, TX

RE: Request for Information: Regional Flood Planning Grant Contract with San Antonio River Authority; Contract No. 2101792497, Technical Memorandum

Dear Mr. Mast:

Thank you for submitting the Technical Memorandum to the Texas Water Development Board (TWDB) under the above referenced contract. Staff members have completed their review and have found the following items that require your attention before the Technical Memorandum may be found administratively complete and a notice to proceed for Regional Flood Planning Grant Contract Scope of Work Task 5 is issued.

1. RFI for Entities Table— Exhibit C: Technical Guidelines for Regional Flood Planning Task 4C requires RFPGs to submit a list of existing political subdivisions within the Flood Planning Region (FPR) that have flood-related authorities or responsibilities. Please submit a written list of existing political subdivisions within the FPR that have flood-related authorities or responsibilities for this item to be considered administratively complete.

Please email your Planner with a response to the above request(s) for revision by 02/09/2022.

If you have any questions, do not hesitate to contact Anita Machiavello of our Flood Planning staff at 512-463-5158 or via email at anita.machiavello@twdb.texas.gov.

Sincerely,

Reem Zoun

Reem J. Zoun, PE, CFM, ENV SP
Director
Flood Planning

cc: Nefi Garza, RFPG Chair
Ronald Branyon, HDR, Inc.
Troy Dorman, Halff Associates, Inc.
Jessica Peña, TWDB
Matt Nelson, TWDB
Anita Machiavello, TWDB
James Bronikowski, TWDB
Morgan White, TWDB

SAN ANTONIO
RIVER AUTHORITY

February 4, 2022

Reem J. Zoun, PE, CFM, ENV SP
Director of Flood Planning
Flood Planning
Texas Water Development Board

RE: Request for Information: Regional Flood Planning Grant Contract with San Antonio River Authority; Contract No. 2101792497, Technical Memorandum

Director Zoun,

In response to your request for additional information, the San Antonio Regional Flood Planning Group submits the enclosed documents for your review. We hope the list meets the Texas Water Development Board request for additional information. If you have any questions, please don't hesitate to contact Kendall Hayes at (210) 302-3641 or via email at khayes@sariverauthority.org.

Thank you,

Derek Boese, JD, PMP

Cc: Anita Machiavello, TWDB

Existing Political Subdivisions Within The Region 12 RFPG That Have Flood-Related Authorities

Entity	Type	Entity ID	NFIP Participant (Yes/ No)
Medina	County	00000005	Yes
Bexar	County	00000007	Yes
Guadalupe	County	00000010	Yes
Bandera	County	00000011	Yes
Comal	County	00000014	Yes
Kendall	County	00000017	Yes
Kerr	County	00000022	Yes
Aransas	County	00000083	Yes
Refugio	County	00000084	Yes
Calhoun	County	00000088	Yes
Goliad	County	00000090	Yes
Victoria	County	00000094	Yes
Karnes	County	00000095	Yes
Atascosa	County	00000096	Yes
De Witt	County	00000099	Yes
Wilson	County	00000100	Yes
San Antonio River Authority	River Authority	00000282	No
Nueces River Authority	River Authority	00000290	No
Guadalupe-Blanco River Authority	River Authority	00000291	No
Upper Guadalupe River Authority	River Authority	00000297	No
Bexar-Medina-Atascosa Counties WCID 1	River Authority	00000299	No
Bandera County River Authority	Other	00000339	No
Alamo Area Council of Governments	Other	00000255	No
Coastal Bend Council of Governments	Other	00000260	No
Golden Crescent Regional Planning Commission	Other	00000264	No
Canyon Regional Water Authority	Other	00000392	No
Falcon Point WCID 1	Other	12000480	No
Escondido Watershed District	Other	00000519	No
Hondo Creek Watershed Improvement District	Other	00000526	No
West Side Calhoun County Navigation District	Other	00000538	No
Medina County WCID 1	Other	12000546	No
Victoria County Navigation District	Other	00000588	No
Wilson County FWSD 1 of Wilson County Texas	Other	12000592	No
Westside 211 Special Improvement District	Other	12000648	No
Refugio County WCID 2	Other	00000714	No
Crosswinds at South Lake Special Improvement District	Other	12000731	No
Refugio County Navigation District	Other	00000758	No
Green Valley SUD	Other	00000821	No
Medina County FWSD 1	Other	12000874	No
Kendall County WCID 2	Other	00000936	No
Kendall County WCID 2A	Other	12000937	No

Cibolo Canyon Conservation and Improvement District 1	Other	12000959	No
Ecleto Creek Watershed District	Other	00001006	No
Refugio County WCID 1	Other	12001057	No
La Salle WCID 1-A	Other	12001130	No
La Salle WCID 1-B	Other	12001132	No
Lerin Hills MUD	Other	12001324	No
San Antonio MUD 1	Other	12001484	No
Cibolo Creek Municipal Authority	Other	00001485	No
Bexar County WCID 10	Other	12001486	No
Flying L PUD	Other	12001520	No
Bandera County FWSD 1	Other	12001521	No
Northeast Medina County WCID 1	Other	12001530	No
Johnson Ranch MUD	Other	12001578	No
East Central SUD	Other	12001595	No
Refugio County Drainage District 1	Other	00001608	No
Espada Development District	Other	12001650	No
Port O'Connor MUD	Other	00001672	No
Comal County WCID 6	Other	00002121	No
Kendall County WCID 4	Other	12002226	No
Kendall County WCID 3	Other	12002367	No
Nordheim	Municipality	00002402	No
Fair Oaks Ranch	Municipality	12002436	Yes
Alamo Heights	Municipality	12002437	Yes
Balcones Heights	Municipality	12002438	Yes
Castle Hills	Municipality	12002439	Yes
China Grove	Municipality	12002440	Yes
Converse	Municipality	12002441	Yes
Elmendorf	Municipality	12002442	Yes
Terrell Hills	Municipality	12002475	Yes
Windcrest	Municipality	12002476	Yes
Grey Forest	Municipality	12002506	Yes
Hill Country Village	Municipality	12002507	Yes
Hollywood Park	Municipality	12002508	Yes
Kirby	Municipality	12002510	Yes
Leon Valley	Municipality	12002511	Yes
Live Oak	Municipality	12002512	Yes
Cibolo	Municipality	00002615	Yes
Bulverde	Municipality	00002669	Yes
New Braunfels	Municipality	00002670	Yes
Schertz	Municipality	00002671	Yes
Karnes City	Municipality	12002756	Yes
Runge	Municipality	12002757	Yes
Boerne	Municipality	12002855	Yes
Olmos Park	Municipality	12002889	Yes
Floresville	Municipality	12002925	Yes
LaCoste	Municipality	12002954	Yes
Marion	Municipality	12002966	Yes

Universal City	Municipality	12002967	Yes
New Berlin	Municipality	00002973	Yes
Falls City	Municipality	12002974	Yes
Kenedy	Municipality	12002975	Yes
Goliad	Municipality	12002986	Yes
Shavano Park	Municipality	12003000	Yes
Helotes	Municipality	12003002	Yes
Somerset	Municipality	12003003	Yes
St. Hedwig	Municipality	12003004	Yes
Austwell	Municipality	12003103	Yes
Seadrift	Municipality	12003175	Yes
La Vernia	Municipality	12003180	Yes
Poth	Municipality	12003181	Yes
Stockdale	Municipality	12003182	Yes
Sandy Oaks	Municipality	12003220	No
Garden Ridge	Municipality	00003235	Yes
Selma	Municipality	12003258	Yes
Santa Clara	Municipality	00003276	Yes
Von Ormy	Municipality	12003318	Yes
San Antonio	Municipality	12003327	Yes
Castroville	Municipality	12003377	Yes
Bandera	Municipality	12003414	Yes

Draft Technical Memorandum

2023 Regional Flood Plan – Flood Planning
Region 12 – San Antonio

Texas Water Development Board
March 7, 2022

Contents

Tables

Figures

Appendices

List of Abbreviations

BCRAGD	Bandera County River Authority and Groundwater District
BLE	Base Level Engineering
CoSA	City of San Antonio
DFirm	Digital Flood Insurance Rate Map
FEMA	Federal Emergency Management Agency
FME	Flood Management Evaluations
FMP	Flood Management Projects
FMS	Flood Management Strategies
FPR	Flood Planning Region
GIS	Geographic Information Systems
HUC	Hydrologic Unit Code
LOMC	Letters of Map Change
LOS	Level-of-Service
LWC	Low Water Crossing
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
RFP	Regional Flood Plan
RFPG	Regional Flood Planning Group
SARA	San Antonio River Authority
SARB	San Antonio River Basin
TFMA	Texas Floodplain Management Association
TNRIS	Texas Natural Resources Information System
TWDB	Texas Water Development Board
USGS	United States Geological Survey

This page is intentionally left blank.

1 Political Subdivisions with Flood-Related Authority

1.a - A list of existing political subdivisions within the FPR that have flood-related authorities or responsibilities.

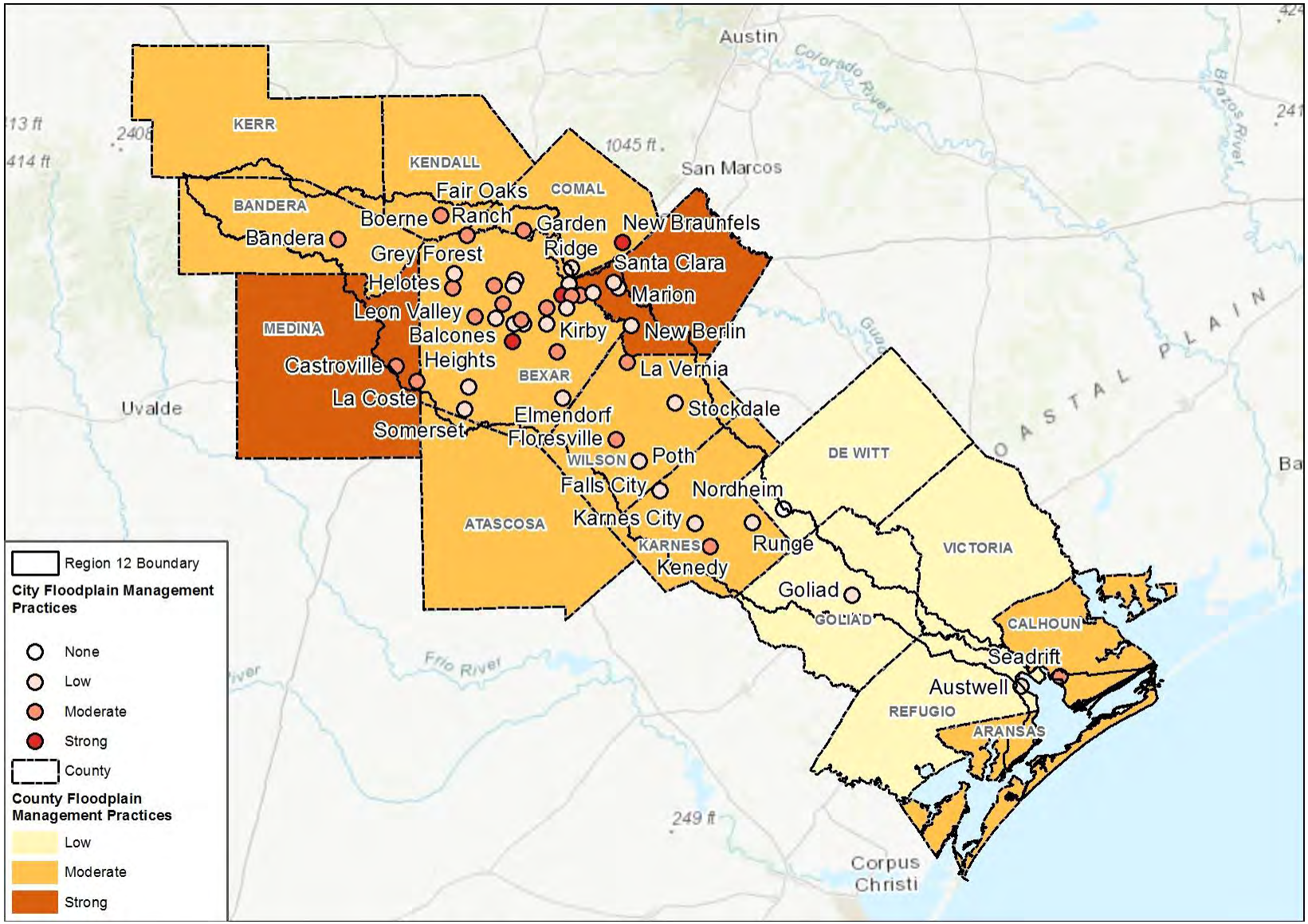
A list of existing political subdivisions within the San Antonio FPR that have flood-related authority is provided in **Appendix A-1, Exhibit C, Table 6**. The list contains 110 entities including cities, counties, river authorities, and additional entities with flood-related authority. The TWDB provided a list of the FEMA NFIP participants in the region; a total of 63 entities were identified. All entities participating in the NFIP have floodplain management regulations and have adopted minimum regulations pursuant to Texas Water Code Section 16.3145. Out of the 63 entities identified, a total of 32 entities have adopted higher standards according to the TFMA 2016 higher standards survey.

Utilizing the data described above and through entity outreach efforts, a draft level of floodplain management practices was determined. The level of floodplain management practices was identified as 'strong', 'moderate', 'low', or 'none' based on the following criteria provided by the TWDB.

- 'Strong' Level – Significant regulations that exceed NFIP standard with enforcement, or community belongs to the Community Rating System.
- 'Moderate' Level – Some higher standards adopted.
- 'Low' Level – Regulations meet the minimum NFIP standards.
- 'None' Level – No floodplain management practices in place.

Based on the above criteria, out of the 110 entities, 5 entities are classified as having a 'strong' level, 28 entities are classified as having a 'moderate' level, and 30 entities are classified as having a 'low' level of floodplain management practices. However, also based on the above criteria, some of the 'moderate' level entities could be 'strong' level, further examination is needed as more data is collected. **Figure 1-1** below shows the municipalities and counties and their level of floodplain management practices.

Figure 1-1. Entity Floodplain Management Practices Level



2 Previous Relevant Flood Studies

1.b - A list of previous flood studies considered by the RFPG to be relevant to development of the RFP.

A list of previous watershed flood studies considered by RFPG to be relevant to the development of the RFP is being developed. The studies that have been identified to this point are provided in **Table 2-1** below and more studies are anticipated to be included as stakeholder outreach continues.

Table 2-1. Previous Local and Regional Relevant Flood Plans

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Base Level Engineering	BLE is an efficient modeling and mapping approach that aims to provide technically credible flood hazard data at various geographic scales such as community, county, watershed, and/or state level. This data is meant to complement the current effective FIRM data, but not replace it.	All jurisdictions within the SARB	Bandera, Bexar, Karnes, Kendall, Kerr, Goliad, Refugio, Wilson	Ongoing
City of Boerne Drainage Master Plan	The City of Boerne updated their drainage masterplan and updated development Code Changes.	City of Boerne	Kendall	2021
Upper Cibolo Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Upper Cibolo watershed. The results are being incorporated into the draft National Flood Hazard Layer (NHFL).	City of Bulverde, City of Boerne, City of Fair Oaks Ranch, City of San Antonio, Bandera County, Bexar County, Comal County, Kendall County	Bandera, Bexar, Comal, Kendall	2021

Table 2-1. Previous Local and Regional Relevant Flood Plans

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Lower San Antonio Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Upper Cibolo watershed. The results are being incorporated into the draft National Flood Hazard Layer (NHFL).	City of Floresville, City of Kenedy, City of Runge, City of Northeim, City of Goliad, City of Falls City, City of Karnes, City of Poth, City of San Antonio, Bexar County, Dewitt County, Wilson County, Karnes County, Goliad County	Bexar, Guadalupe, DeWitt, Wilson, Karnes, Goliad	2021
San Geronimo Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the San Geronimo watershed. The results are being incorporated into the draft National Flood Hazard Layer (NHFL).	City of San Antonio, Bandera County, Bexar County, Medina County	Bandera, Bexar, Medina	2021
Coastal Resiliency Master Plan	Developed by the Texas General Land Office (GLO), the 2019 Texas Coastal Resiliency Master Plan is the second installment of a statewide plan to protect and promote a vibrant and resilient Texas coast that supports and sustains a strong economy and healthy environment for all who live, work, play or otherwise benefit from the natural resources and infrastructure along the Texas coast.	All jurisdictions within the Texas Coastal Counties	Aransas, Refugio,	2020
Aransas County Multi-Jurisdictional Floodplain Management Plan	The focus of the mitigation action plan is to reduce future losses within Aransas County by identifying mitigation strategies based on a detailed hazard risk analysis, including both an assessment of regional hazards and vulnerability. The mitigation strategies seek to identify potential loss-reduction opportunities. The goal of this effort is to work towards more disaster-resistant and resilient communities throughout Aransas County.	Aransas County	Aransas	2020

Table 2-1. Previous Local and Regional Relevant Flood Plans

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Calaveras Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Calaveras watershed. The results have been incorporated into the preliminary National Flood Hazard Layer (NHFL). FEMA's Flood Datasets are available through the **Map Service Center** (full link in **Appendix A-8**). Flood risk data can be viewed on the **SARA Risk MAP Viewer** (full link in **Appendix A-8**).	City of China Grove, City of Elmendorf, City of San Antonio, Bexar County, Wilson County	Bexar, Wilson	2019
Bandera County River Authority and Groundwater District Flood Plan	The Bandera County River Authority and Groundwater District (BCRAGD) Flood Plan defines lines of communication, personnel assignments, safety, special flood conditions and post-flood operations for Bandera County.	All jurisdictions within the BCRAGD	Bandera	2019
Development of Flood Warning Tool Set for Medina River, Bandera County (TWDB Final Report: Contract No. 1600012035)	The study area encompassed a 23-mile reach of the Medina River from the confluence of Winans Creek to English Crossing Road above Medina Lake. The USGS developed a Hydrologic Engineering Center-River Analysis System (HEC-RAS) model, which applied data from existing streamflow-gaging stations and installed two additional 'stage only' streamflow-gaging stations along the headwaters of the North and West Prongs of the Medina River. A flood atlas, consisting of a library of flood-inundation maps for a range of streamflow conditions, was developed and included on the **USGS Flood Inundation Mapping Program (FIMP) Website** (full link in **Appendix A-8**). The Flood Inundation Maps (FIMS) depict estimates of the areal extent and depth of flooding corresponding to selected water levels (stages) at the USGS streamflow-gaging station 08178880 Medina River at Bandera, Texas.	All jurisdictions within BCRAGD	Bandera	2019
Aransas County Texas Multi-Jurisdictional Hazard Mitigation Action Plan	Plan covering two counties, 8 cities, and 2 school districts. The purpose of the Plan is to minimize or eliminate long-term risks to human life and property from known hazards and to break the cycle of high-cost disaster response and recovery within the planning area.	Aransas County	Aransas	2019

Table 2-1. Previous Local and Regional Relevant Flood Plans

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Medina Risk MAP Study	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Medina River watershed. The results have been incorporated into the effective National Flood Hazard Layer (NHFL). FEMA's Flood Datasets are available through the **Map Service Center** (full link in **Appendix A-8**). Flood risk data can be viewed on the **SARA Risk MAP Viewer** (full link in **Appendix A-8**).	City of Bandera, City of Castroville, Kerr County, Bandera County, Medina County	Bandera, Kendall, Kerr, Medina	2018
Hazard Identification, Risk Assessment and Consequence Analysis	The Hazard Identification Risk Assessment (HIRA) is the first step in evaluating natural and technological hazards that exist. It serves as a basis for the development plans, public education programs, responder training and exercises. It also lays foundation to begin mitigation efforts to minimize these identified potential threats.	Bexar County, City of San Antonio	Bexar	2017
City of San Antonio Local Drainage Master Plan	In 2016, SARA teamed with the CoSA to develop a Drainage Master Plan of previously documented potential projects within the city limits, in order to identify candidates for the 2017 bond program.	City of San Antonio	Bexar	2016
Bexar Risk MAP Study – Ft Sam Trib, Airport Trib, and UNT 1 to Martinez A	Floodplain physical map revisions based on updated hydrologic and hydraulic analysis within the San Antonio River Basin in the Medina River watershed. The results have been incorporated into the effective National Flood Hazard Layer (NHFL). FEMA's Flood Datasets are available through the **Map Service Center** (full link in **Appendix A-8**). Flood risk data can be viewed on the **SARA Risk MAP Viewer** (full link in **Appendix A-8**).	City of San Antonio, City of Terrell Hills, Bexar County	Bexar	2015

Table 2-1. Previous Local and Regional Relevant Flood Plans

Previous and Relevant Flood Study	Description	Jurisdictions Covered	Region 12 Locations (Counties)	Year
Holistic Watershed Masterplans	The San Antonio River Authority (SARA) has worked with partner agencies since 2009 to complete Watershed Master Plans for the Upper San Antonio River, Leon Creek, Salado Creek, Medina River, Lower San Antonio River, and Cibolo Creek watersheds. The Master Plans have two primary objectives: • Identify needs and opportunities related to flood risk, water quality issues, low impact development, stream restoration, nature based park planning, mitigation banking, and conservation easements. • Develop and assess proposed projects to address the identified needs and preserve identified opportunities. The **Watershed Master Plan Viewer** (full link in **Appendix A-8**) displays data produced in the various Master Plan reports, as well as other useful reference data. It is intended to be used as a visualization tool to assist the public, stakeholders, and decision-makers in understanding both watershed issues and potential solutions.	All jurisdictions within Bexar, Karnes, Wilson, and Goliad Counties	Bexar, Goliad, Karnes, Wilson	2009-2015
Bexar, Wilson, Karnes, and Goliad County-Wide 2010 FIS Studies	The FEMA NFHL data was digitized and updated with new terrain, survey, hydrologic, and hydraulic data. FEMA's Flood Datasets are available through the **Map Service Center** (full link in **Appendix A-8**).	All jurisdictions within Bexar, Wilson, Karnes, and Goliad Counties	Bexar, Wilson, Karnes, Goliad	2010
Alamo Area Council of Governments Regional Muti-Hazard Mitigation Plan	In 2005, CoSA and Bexar County participated in the development of the Alamo Area Council of Government's (AACOG) Regional Multi-Hazard Mitigation Plan. This plan looked at a range of hazards and provided some basic risk and vulnerability information for those identified.	All jurisdictions within AACOG Area	Bexar, Kerr, Kendall, Comal, Bandera, Guadalupe, Medina, Atascosa, Wilson, Karnes	2005

3 Inundation Boundaries

1.c - A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that the RFPG considers to be best representation of the region-wide 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in its risk analysis, including indications of locations where such boundaries remain undefined.

3.1 Existing Flood Hazard

The 1.0% and 0.2% annual chance flood inundation boundaries were compiled for all waterways with contributing drainage areas larger than one-tenth of a square mile for the entire basin. This complete coverage was due in part to the availability of 'Fathom' flood inundation boundaries for the entire basin. The most accurate inundation boundaries were applied when multiple inundation data sets were available.

The 'floodplain quilt' was obtained from TWDB. The 'floodplain quilt' consists of multiple layers of data from various sources available throughout the state to 'quilt' together a single flood hazard dataset. The 'floodplain quilt' does not typically include localized flooding or complex urban flooding problems. Additionally, new preliminary inundation boundaries were obtained from SARA, which is currently the only detailed flood data that uses the latest NOAA Atlas 14 rainfall. In addition, flood prone areas identified through public comments will be evaluated as the data becomes available.

The following list summarizes the various flood inundation data sets used in their order of accuracy from most accurate to least accurate, with data sets including the BLE data and above considered accurate.

1. SARA Preliminary Data (Submitted to FEMA for review)
2. NFHL Preliminary Data
3. NFHL Detailed Effective Data
4. Base Level Engineering Studies
5. NFHL Approximate Effective Data
6. Fathom Draft Data – October 29th, 2021
7. Public Comments

A portion of the Regional Flood Planning Area contains 'approximate' 1.0% annual chance flood inundation boundaries but no 0.2% annual chance flood inundation boundaries (i.e. NFHL Approximate Study Areas). Thus, for these approximate areas, the Fathom 1.0% and 0.2% annual chance data was used to define flood hazard extents. In 2022, additional preliminary data will be provided by SARA and the entire San Antonio River basin will have complete BLE coverage. Therefore, existing flood hazard mapping will be updated in its entirety to include Preliminary, Detailed Effective or BLE quality data.

The existing condition 1.0% and 0.2% annual chance flood inundation boundaries are provided in the geodatabase (i.e. 'ExFldHazard') and are available for viewing in the Regional Flood Planning ArcGIS Online Interactive Map (full link in **Appendix A-8**). **Figure 3-1** below provides a region-wide depiction of the 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in the risk analysis.

As required per the TWDB Technical Memorandum Administrative Completeness Checklist, the following maps regarding the Existing Condition Flood Hazard are included in the **Appendix A-2.**

- Map 4: Existing Condition Flood Hazard
- Map 6: Existing Condition Flood Exposure
- Map 7: Existing Condition Vulnerability and Critical Infrastructure

Figure 3-1. Inundation Boundary Sources

3.2 Future Flood Hazard

Future flood conditions represent projected conditions 30 years into the future, or year 2050, and assumes no change to current floodplain ordinances and development regulations. Future conditions can be influenced by several factors, such as:

- Precipitation increases due to climate change
- Rising sea levels
- Population growth and associated development increases (impervious cover)
- Natural stream migration changes to existing waterways
- Implementation of constructed drainage infrastructure

For the 2020 – 2023 planning cycle, the development of future floodplains for riverine systems (inland areas) will be established for the:

- 1.0% annual chance future conditions floodplain – Set to the 0.2% annual chance existing conditions floodplain
- 0.2% annual chance future conditions floodplain – Floodplain buffer based on previous studies

For the 0.2% annual chance future conditions floodplain, HDR utilized the 2018 San Antonio River Basin ***Future Precipitation Study***, done by SARA, which estimates the 0.2% annual chance rainfall total will increase 3.8 inches in 20 years and 5.1 inches in 40 years. HDR recently used this previous precipitation study to update the effective hydrology models for the major watersheds within the SARB to estimate peak discharges. This analysis showed that the average increase in the 0.2% annual chance storm water flow rate throughout the basin was between 30% and 40% for the 20- and 40-year future projections respectively. From this data HDR can estimate a 35% increase in 0.2% annual chance storm water flow rate for a 30-year future event. With this estimated flow increase HDR evaluated the horizontal increase in 0.2% annual chance floodplain top-widths using selected HEC-RAS (RAS) models in various locations throughout the watershed.

Results proved similar trends based on location. The location boundaries are defined as; *Upper* - north of North Loop 1604 from Culebra Road to I35; *Mid* - south of North Loop 1604 to south of Karnes County; *Coastal* - from south Karnes County to the sea; and *Medina* - the Medina reach and its tributaries. Medina was separated out due to the reaches unusually low top-width differences and high WSE differences comparatively to the rest of the region. The buffer criteria was established based on these locations. The buffer is the horizontal top-width increase applied to the 0.2% annual chance existing conditions floodplain to create the 0.2% annual chance future conditions floodplain. The final criteria set is as follows in **Table 3-1**.

Table 3-1. 0.2% Annual Chance Future Conditions Floodplain Buffer Criteria

Criteria	Type	Buffer (ft)
Location	Medina	80
	Upper	120
	Mid	150
	Coastal	160

The future condition 1.0% and 0.2% annual chance flood inundation boundaries are provided in the geodatabase (i.e. 'FutFldHazard') and are available for viewing in the Regional Flood Planning ArcGIS Online Interactive Map (full link in **Appendix A-8**).

As required per the TWDB Technical Memorandum Administrative Completeness Checklist, the following maps regarding the Future Condition Flood Hazard are included in the **Appendix A-2.**

- Map 8: Future Condition Flood Hazard
- Map 10: Extent of Increase of Flood Hazard Compared to Existing Condition Future Condition Flood Exposure
- Map 11: Future Condition Flood Exposure - *Pending*
- Map 12: Future Condition Vulnerability and Critical Infrastructure – *Pending*

All future floodplain limits are approximate and for State Flood Planning purposes only, they are not intended for regulatory use.

4 Additional Flood-Prone Areas

1.d - A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that identifies additional flood-prone areas not described in (c) based on location of hydrologic features, historic flooding, and/or local knowledge.

Additional flood-prone areas are being identified based on the location of hydrologic features, historic flooding, and/or local knowledge. Additional flood-prone areas are being added for the following:

- Local Knowledge (Stakeholders / Citizens)
- Low Water Crossings (TNRIS)
- USGS Gages
- Historical Flood Data (National Weather Service, FEMA, TxDOT, CoSA 311 complaints)

Local Knowledge, TxDOT, and CoSA 311 complaints data is still being collected, additional flood-prone areas will be evaluated and added as data become available.

The San Antonio Flood Planning Area was sub-divided into four subregions to facilitate stakeholder engagement amongst the varying geographic areas of the basin. The additional flood prone areas are shown for each of these subregions in **Figure 4-1** through **Figure 4-4** below. These flood prone points are also available for viewing in the Regional Flood Planning ArcGIS Online Interactive Map (full link in **Appendix A-8**).

Figure 4-1. Additional Flood-Prone Areas San Antonio – Upper Basin

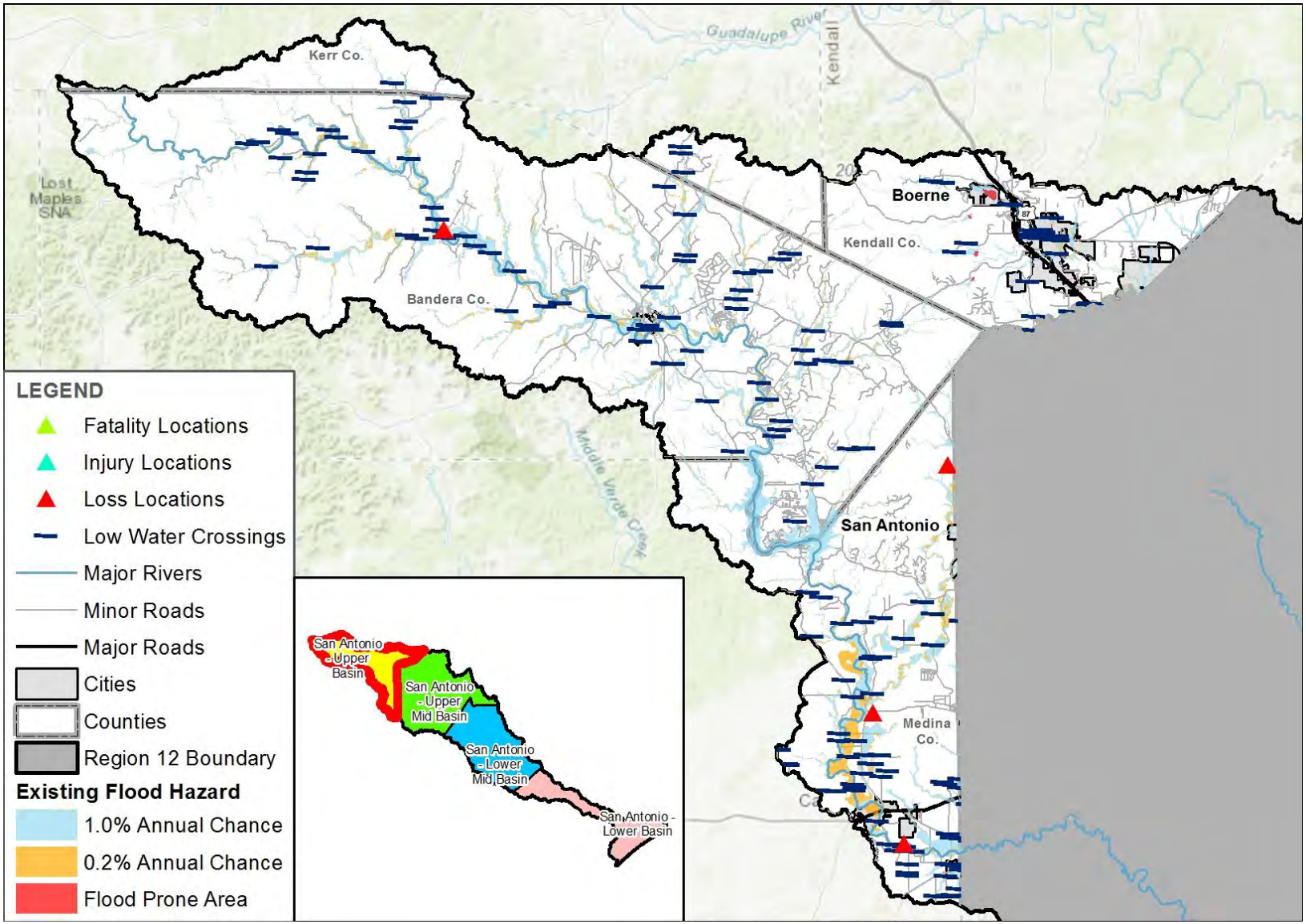


Figure 4-2. Additional Flood-Prone Areas San Antonio – Upper Mid Basin

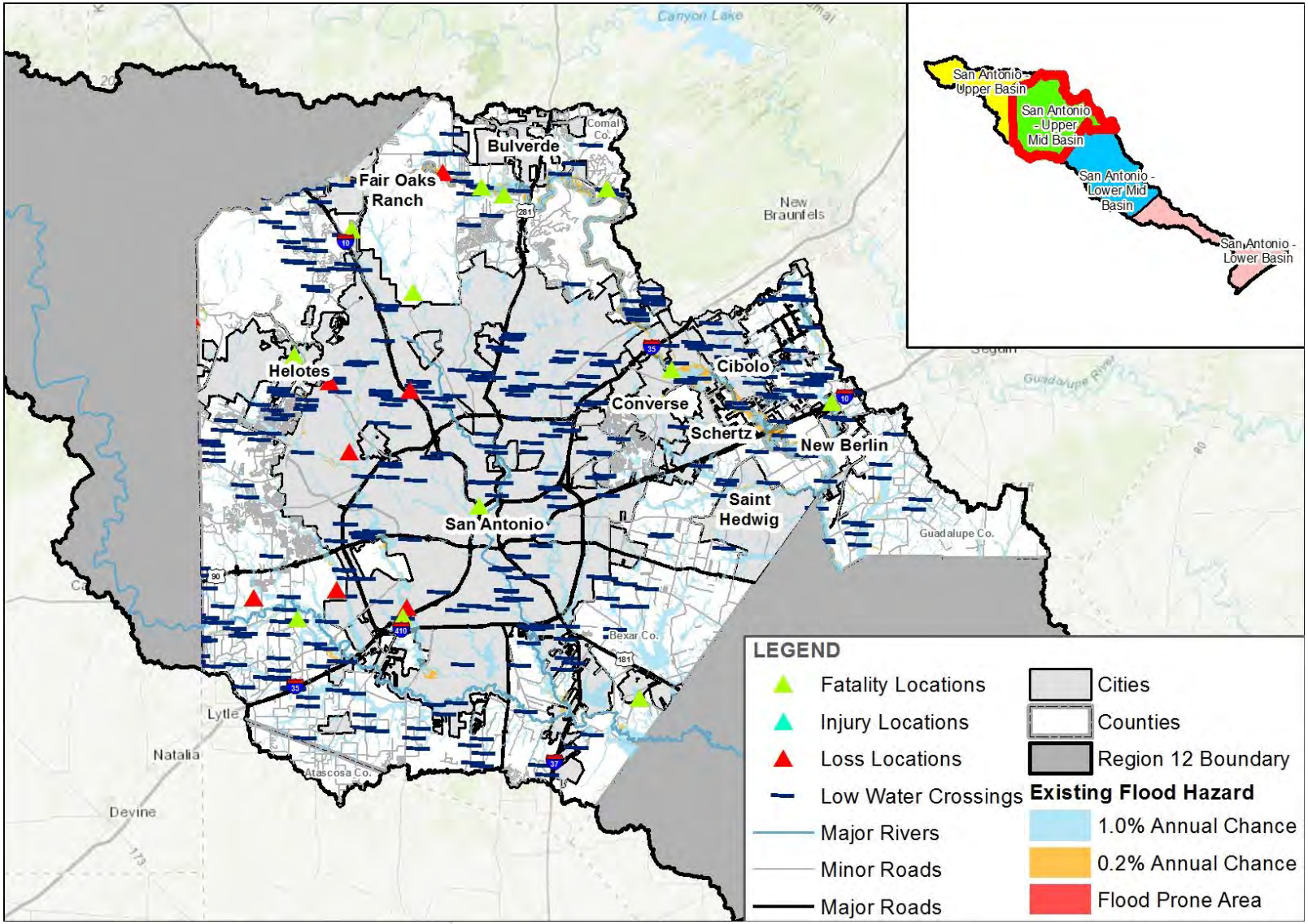


Figure 4-3. Additional Flood-Prone Areas San Antonio – Lower Mid Basin

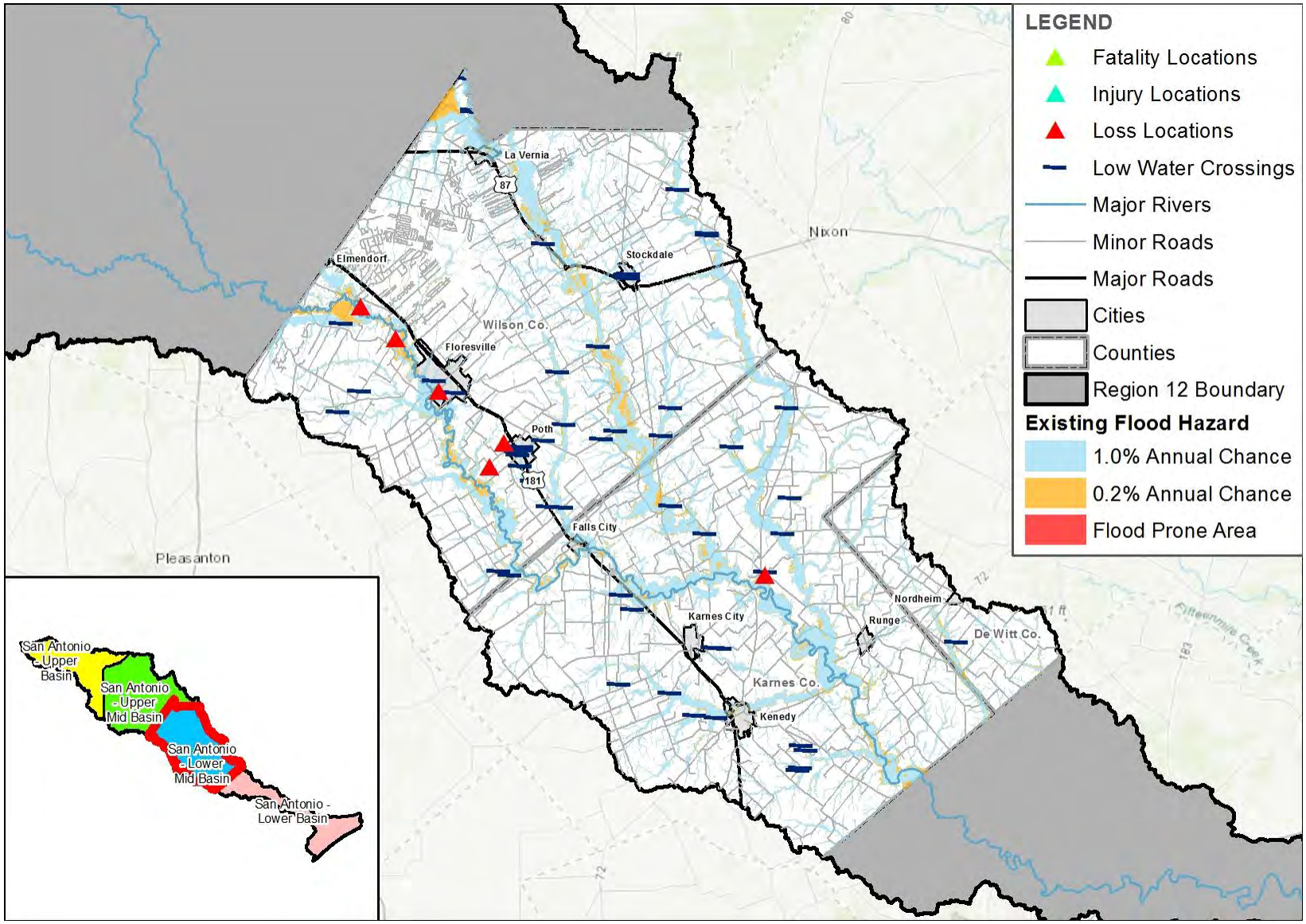
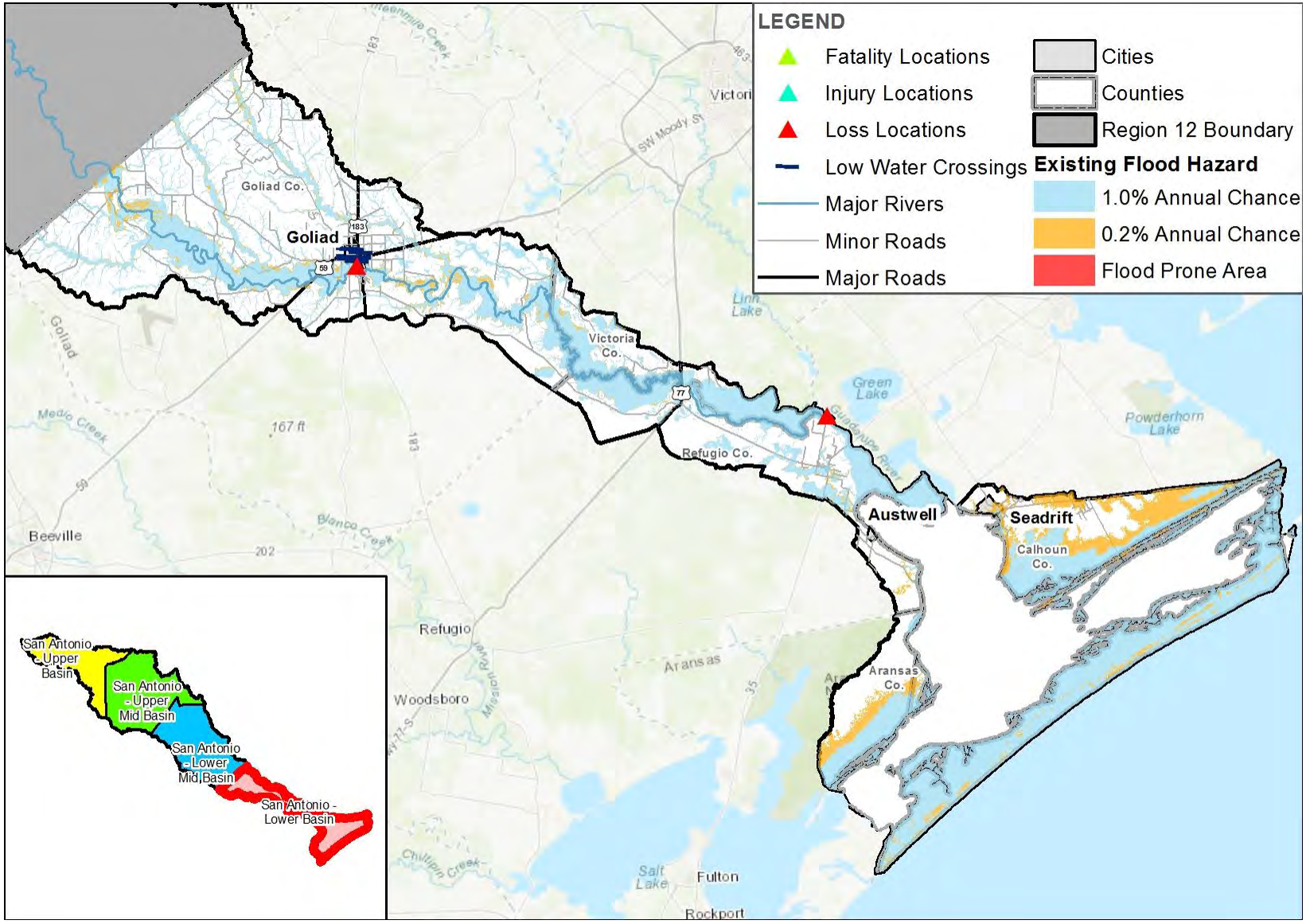


Figure 4-4. Additional Flood-Prone Areas San Antonio – Lower Basin



4.1 Local Knowledge

The Regional Flood Planning Area is subdivided into four subregions as shown in the **Figure 4-1** through **Figure 4-4** above to facilitate stakeholder and citizen engagement in the varying geographic areas of the basin. The first round of in-person meetings are to introduce the regional flood planning process and to gather local knowledge of flood-prone areas, historical flooding, flood mitigation projects and needs. Additionally, an interactive on-line comment map is used to allow stakeholders and citizens the opportunity to identify flood-prone areas for consideration in the Regional Flood Plan. These flood-prone points are also viewable in the Regional Flood Planning ArcGIS Online Interactive Map (full link in **Appendix A-8**). The first public meeting was held on December 8, 2021 in the City of Bandera within the Upper Basin subregion. The remaining public meetings are expected to be conducted in early 2022.

4.2 Low Water Crossings

Low water crossings are considered potential flood-prone areas due to their inherent life loss risk during flood conditions. Low water crossings are defined where a creek crosses a road that is low enough to be subject to frequent flooding during storm events or during a 50% annual chance (2-year) storm event.

A total of 589 low water crossings have been identified as part of the Regional Flood Plan. These low water crossings are from TNRIS and were last updated in March 2021. The TNRIS data includes locations monitored by the Bexar Flood Website, Bexar County Highwater Alert Lifesaving Technology (HALT) and San Antonio Flood Emergency (SAFE) Route System (full links in **Appendix A-8**). During the first planning cycle for the Regional Flood Planning, the Advisory Groups can utilize the community feedback to identify additional problematic low water crossings not already included in the plan. Low water crossing locations are shown in **Figure 4-1** through **Figure 4-4** above and are also viewable at Regional Flood Planning ArcGIS Online Interactive Map (full link in **Appendix A-8**).

4.3 USGS Gage Data

USGS gage information was used to identify flood prone areas and evaluate historical flood events. A few key locations were identified along the major rivers and tributaries within the basin. The gages in these locations were evaluated for crucial historic flood events, these events are summarized in **Table 4-1** below. USGS gage locations are viewable at Regional Flood Planning ArcGIS Online Interactive Map (full link in **Appendix A-8**).

4.4 Historical Flooding

Past flood events provide insight on the location of flood-prone areas within the basin. **Table 4-1** below provides a list and brief description of historical events within the basin.

Table 4-1. List of Historic Floods

Flood Event	Description
2021 Coastal Flash Floods	Early summer 2021, a series of storms hit the Texas Mid Costal Counties and caused flash flooding. Victoria and Karnes County USGS gages along the San Antonio River saw record discharge amounts. As a result of this flash flooding, the NWS reports one injury and one death in Victoria.
2017 Hurricane Harvey	Hurricane Harvey is one of the most expensive storms on record, costing an estimated $24 million dollars in damages to Region 12 counties.
2016 Floods	Texas was hit by a series of large storms in 2016. Historic USGS gage discharge rates were recorded in Karnes and Victoria counties along the San Antonio River. NWS reports two flash flood related casualties recorded this year within the region.
2015 Memorial Day Flood	May 2015, a slow-moving storm swept Oklahoma and Texas causing flash flooding throughout the region. Bandera and Victoria County USGS gages along the Medina and San Antonio River recorded historic discharge rates. As a result of this flash flooding, the NWS reports one death in Bexar County and one in Medina County.
2015 October Flood	In October of 2015, a tornado and a large storm ravaged Central Texas. Wilson County USGS gage on the Cibolo Creek saw record discharge amounts. As a result of this flash flooding, the NWS reports one death in Bexar and one in Comal counties.
2013 May Floods	May 2013 brought flash floods that affected the whole region. Historic discharge rates were recorded along the San Antonio River in Bexar and Karnes County. These flash floods resulted in 3 reported casualties by the NWS in Bexar and Guadalupe counties.
2010 June Floods	Flash floods hit Central Texas in June 2010, making it one of the more costly events the region has endured. An estimated $20 million dollars in damages were reported for Bexar, Comal, and Guadalupe counties. As a result, the NWS reports one death in Comal County.
Water Year 2007	A 6-month period where there was nearly continuous flooding in Texas from March to September. In August, Tropical Storm Erin hit the regions coastal counties. 2007 was one of the costliest years ever recorded for flood damage. Just in Region 12, there was $20 million reported in damages by the NWS. June through August NWS reports historic USGS gage discharge rates for the San Antonio River and Cibolo Creeks in Bexar and Wilson County. NWS reports that Region 12 had 10 fatalities within this 6-month span.
2004 November Flash Flood	November 2004, the region was hit by a costly flash flood that resulted in 2 deaths in Bexar County and set historic peak discharge rates at the USGS gage on Salado Creek in Bexar County.
2002 Flash Floods	July 2002 Flash Floods hit the region. Historic USGS discharge rates were recorded all across the region; Medina River in Bandera County, Salado Creek in Bexar County, and San Antonio River in Karnes and Goliad counties. As a result of these floods the NWS reports 5 deaths from Bexar and Kendall counties. Later that year extreme flash flooding in November resulted in 18 injuries in Bexar County.
1998 October Flood	South central Texas experienced record-breaking rainfall in October 1998, making it the costliest flood event for the region. NWS reports $446 million in damages across the region. NWS reports 11 casualties in Bexar County and 4,040 injuries total for the region, most of them being in Bexar, Comal, Guadalupe, and De Witt counties. Historic USGS gage discharge rates were recorded throughout the region, from Medina River in Bandera County all the way down to the coast on the San Antonio River in Goliad. Per the San Antonio River Authority, the completion of the San Antonio River Flood Tunnels in January 1998 significantly reduced the impacts of these flash floods in San Antonio.

Table 4-1. List of Historic Floods

Flood Event	Description
1997June Flash Flood	Heavy rainfall in June 1997 caused flash flooding in South Central Texas. As a result, the NWS reports 4 casualties and 115 injuries across Bexar, Medina, Bandera, Guadalupe, Comal, and Kendall counties. Historic USGS gage discharge rates were recorded along the Medina River in Bandera and Bexar County. This is one of the more costly events for the region, the NWS reports $29 million in damages resulting this event.
1990 July Flood	July 1990 w\as known as the "wettest" July in San Antonio. One of the largest USGS gage discharge rates was recorded for San Antonio River in Bexar County.
1987 June Flood	The upper counties were hit by a storm in June 1987, setting historic USGS gage discharge rates for the Medina River in Bandera and Bexar County.
1978 Hurricane Amelia	Hurricane Amelia hit Texas and stalled over the region's upper counties. This storm devastated Bandera County and surrounding areas. Due to this event, the USGS gage on the Media River in Bandera County recorded the highest discharge rate and water level ever recorded for the region, at 281,000 cfs and 50 ft.
1946 San Antonio Flood	A September flood hit Bexar and Karnes counties. This event set a historic USGS discharge rate along the San Antonio River in Karnes county. As a result, the San Antonio River Authority reports 4 casualties in San Antonio.
1921 San Antonio Flood	On September 9, 1921, a tropical depression stalled just north of San Antonio and within hours flooded the creek networks in San Antonio. Due to this event, the San Antonio River Authority reports a total of 3.7 million in damages and more than 51 casualties in San Antonio. This flood sparked the construction of Olmos Dam.
1913 October Flood	A record rainfall of over 7 inches in 24-hours caused major flooding along the San Antonio River. The City of San Antonio reports flooding along San Pedro and Alazan creeks. Historic USGS gage levels were recorded in Goliad and Karnes County.

4.4.1 National Weather Service Flood Data

The NWS has documented fatalities, injuries, and property damage as the result of past flood events since 1996.

Data is shown in the following figures below; **Figure 4-5** property damage, **Figure 4-6** fatalities, and **Figure 4-7** injuries.

A summary of flood damage data gathered from the NWS can be seen in **Table 4-2** and **Table 4-3**. **Table 4-2** reports flood damage in dollars, injuries, and fatalities by year. **Table 4-3** uses the same base data as **Table 4-2** but is summarized based on counties. To generate **Table 4-2** and **Table 4-3**, raw yearly damage data in Texas was downloaded from the NWS website. Then, a filter on counties is used so that only damage data of Region 12 counties remain in the dataset. Finally, types of damages that are non-essential to this study, such as wind and fire damage, were filtered out, leaving only damages such as rain, storm and flood related.

Figure 4-5. National Weather Service Property Damage from Flooding, since 1996

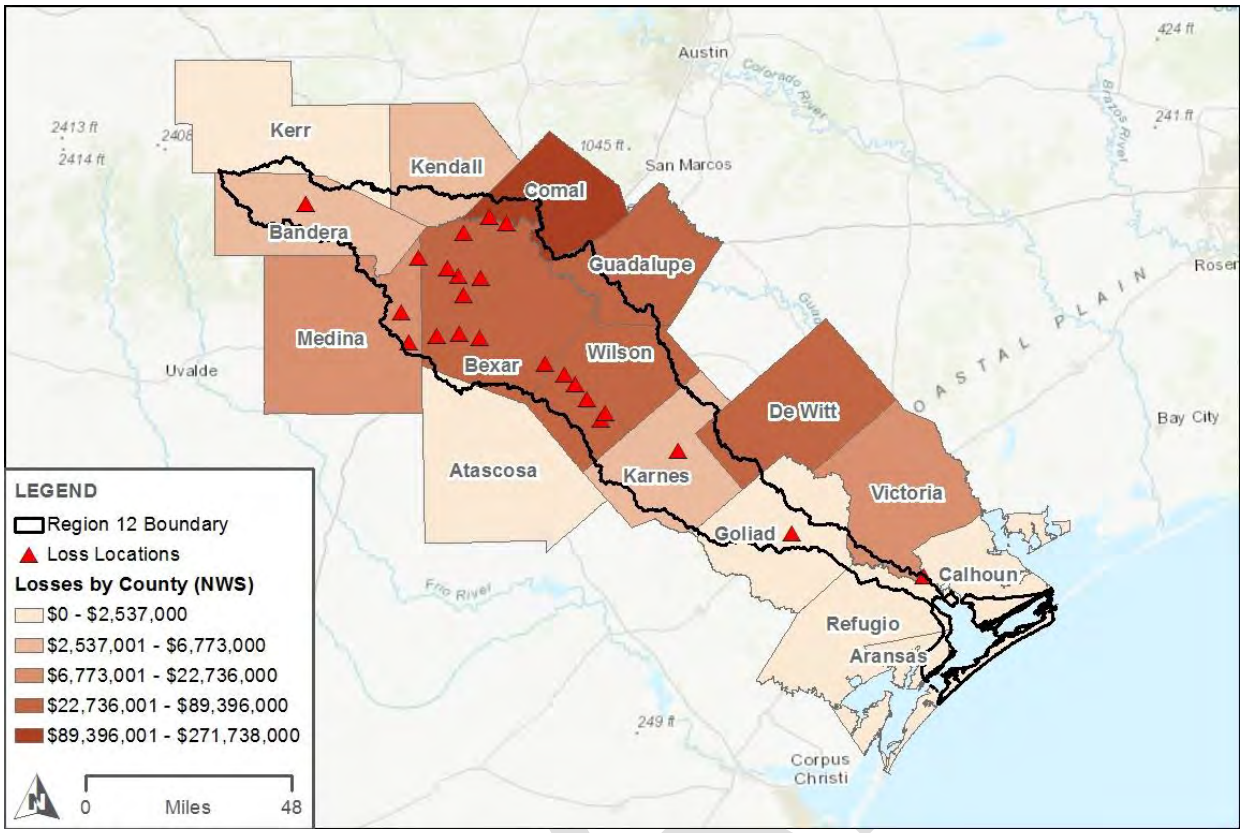


Figure 4-6. National Weather Service Fatalities from Flooding, since 1996

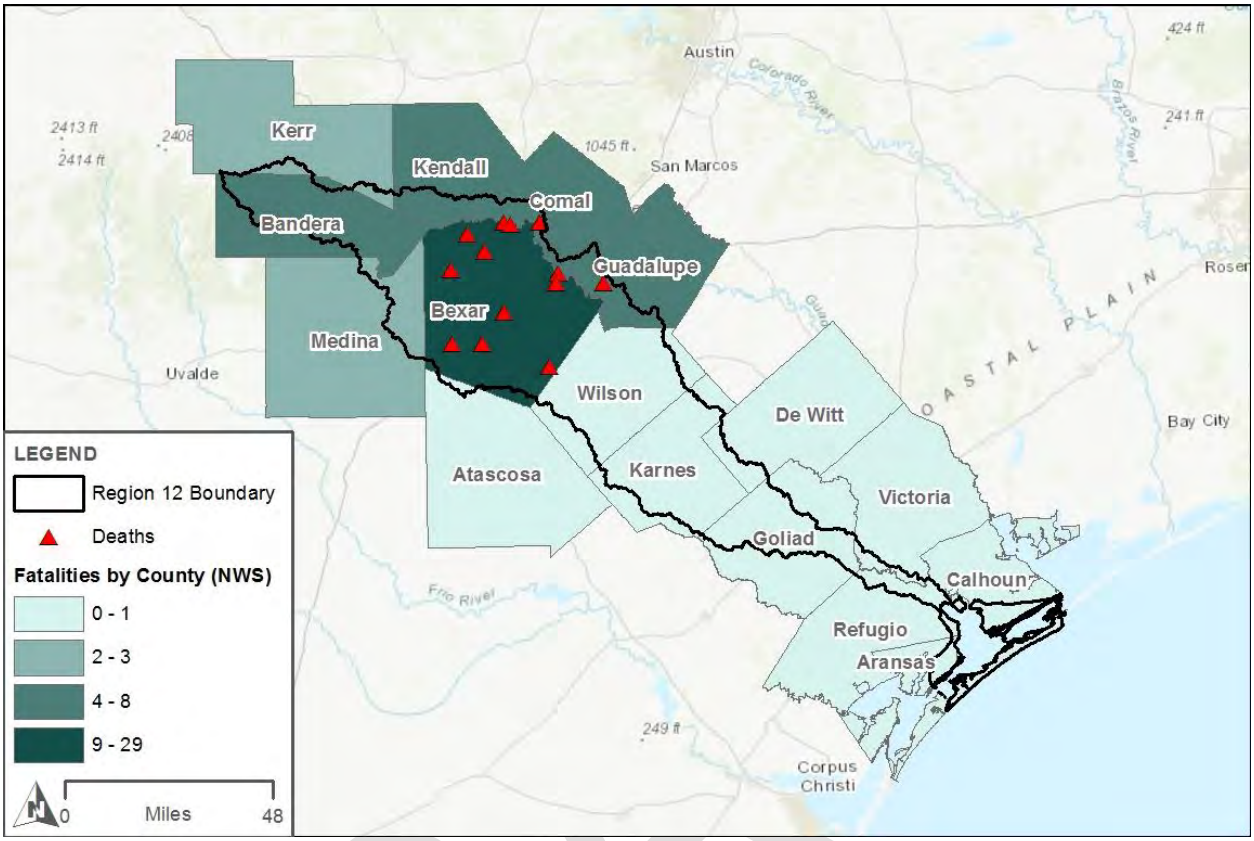


Figure 4-7. National Weather Service Injuries from Flooding, since 1996

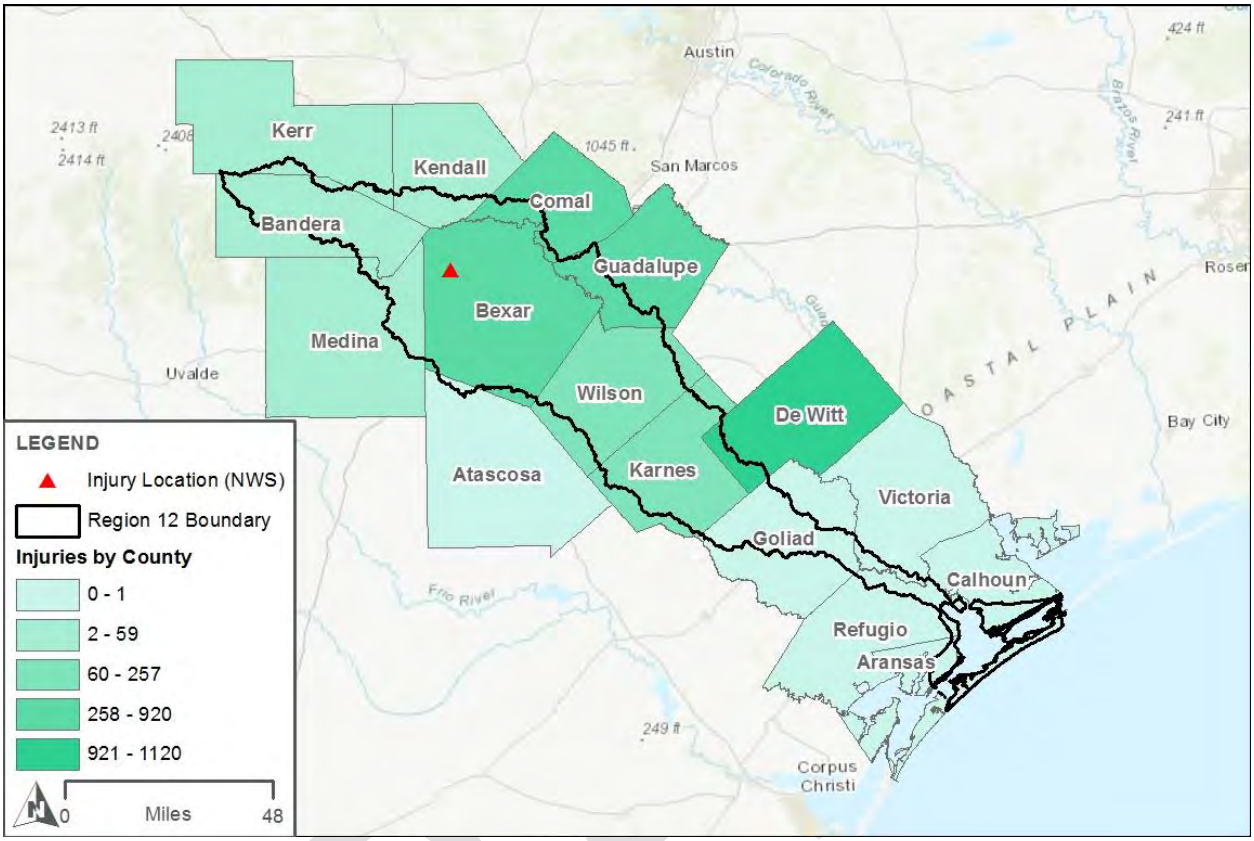


Table 4-2. Losses associated with Flooding in Region 12 counties since 1996 as reported by the National Weather Service

Flood Year	Damages (in Dollars)	Injuries	Fatalities
1996	76,000	2	1
1997	32,173,000	115	6
1998	452,054,000	4063	17
1999	446,000	0	0
2000	1,208,000	8	1
2001	4,969,000	63	1
2002	2,300,000	22	5
2003	528,000	0	0
2004	1,572,000	1	4
2005	0	0	0
2006	2,000,000	0	0
2007	21,920,000	1	10
2008	20,000	0	0
2009	0	0	0
2010	20,900,000	0	4
2011	0	0	0
2012	110,000	0	0
2013	100,000	0	4
2014	200,000	0	0
2015	155,000	0	4
2016	250,000	0	2
2017	24,000,000	0	1
2018	50,000	0	0
2019	5,000	0	0
2020	1,455,000	0	0
2021 [1]	690,000	1	1
Total	***567,181,000***	***4276***	***61***

[1] Data as of December 2021.

Table 4-3. Losses associated with Flooding from 1996-2021 as reported by the National Weather Service

Counties	Percentage of County Area in Region 12	Damages (in Dollars)	Injuries	Fatalities
Aransas	13%	2,537,000	0	0
Atascosa	1%	1,267,000	0	0
Bandera	66%	7,783,000	26	5
Bexar	97%	44,390,000	852	29
Calhoun	27%	1,110,000	0	0
Comal	17%	272,468,000	920	6
De Witt	9%	43,265,000	1120	0
Goliad	39%	25,000	0	1
Guadalupe	24%	52.083.000	829	8
Karnes	80%	4.584.000	170	0
Kendall	19%	6.846.000	20	6
Kerr	5%	1.253.000	22	3
Medina	15%	17.148.000	59	2
Refugio	13%	0	0	0
Victoria	5%	22,736,000	1	1
Wilson	82%	89,686,000	257	0
Total	-	***567,181,000***	***4276***	***61***

4.4.2 FEMA Flood Damage Data

FEMA data on disaster funding for flood damages was obtained from 1996 to June 2021. Data is shown in the following **Figure 4-8** below.

Table 4-4 includes flood related damages by county. Unlike the gross damage data in **Table 4-2** and **Table 4-3**, data in **Table 4-4** is summarized from various federal programs. First, raw data of all program funds in the Region 12 counties was downloaded from the FEMA website. Then, programs that are non-related to flood damages are filtered out. Finally, FEMA funding of four federal programs is summarized by county: Public Assistance Funded Project Summaries, Individuals and Households Program – Valid Registrations, Individual Assistance Housing Registrants – Large Disasters, and Housing Assistance Program.

Figure 4-8. FEMA Flood Assistance to Owners and Renters for Flood Damages, since 1996

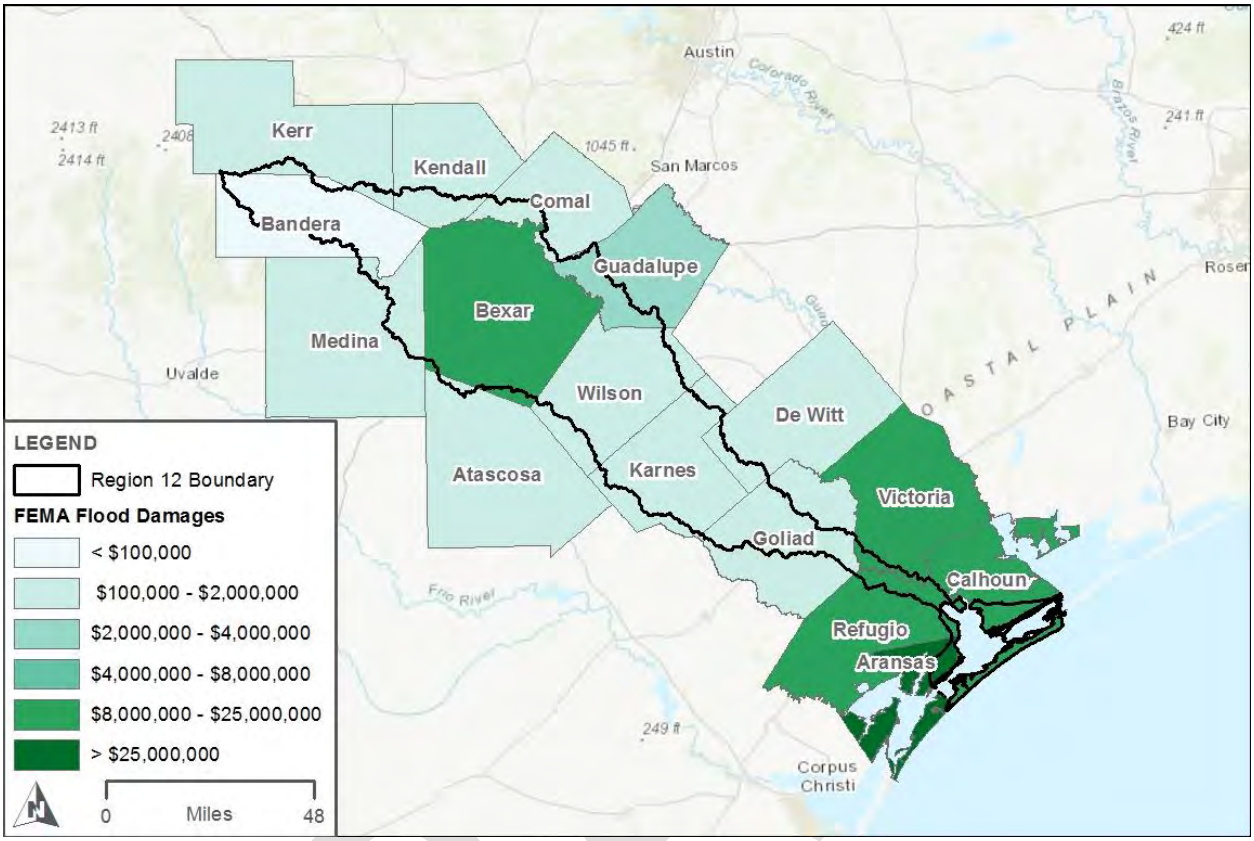


Table 4-4. FEMA Funding for Flood Related Damages by Program (1996 – June 2021)

Counties	Percentage of County Area in Region 12	Public Assistance Funded Project Summaries	Individuals and Households Program - Valid Registrations		Individual Assistance Housing Registrants - Large Disasters	Housing Assistance Program
		Federal Share Obligated	Flood Damage Amount	Repair Amount	Real Property Damage Amount Observed by FEMA	Owners and Renters Combined Amount
Aransas	13%	75,463,478	7,328,541	12,488,979	55,009,113	50,412,810
Atascosa	1%	1.663.563	94.935	280.715	226.154	875.027
Bandera	66%	2,080,777	0	0	79,676	97,212
Bexar	97%	50.005.333	2.045.533	1.317.967	4.605.858	19.501.737
Calhoun	27%	23,004,779	588,398	3,278,010	3,723,571	9,217,394
Comal	17%	6,525,770	585,521	172,868	549,725	1,539,102
De Witt	9%	4,320,705	484,243	435,925	1,137,800	1,499,327
Goliad	39%	625,031	22,554	636,172	577,051	1,554,971
Guadalupe	24%	5.118.692	741.266	402.861	325.694	2.089.239
Karnes	80%	754,616	4,580	530,048	372,964	1,128,253
Kendall	19%	712.625	118.970	29.522	160.589	264.451
Kerr	5%	1,224,307	0	0	140,710	228,894
Medina	15%	2.679.089	1.421.149	843.199	208.545	1.484.783
Refugio	13%	28,969,743	195,479	2,816,461	6,029,616	8,192,161
Victoria	5%	34,618,575	2,070,202	6,387,900	9,538,865	22,614,208
Wilson	82%	2.081.921	0	18.564	218.166	360.002
Totals	-	***239,849,004***	***15,701,370***	***29,639,191***	***82,904,099***	***121,059,571***

5 Availability of Existing Hydrologic and Hydraulic Models

1.e - A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available.

Hydraulic models are available for areas where the following flood inundation boundary source data is provided:

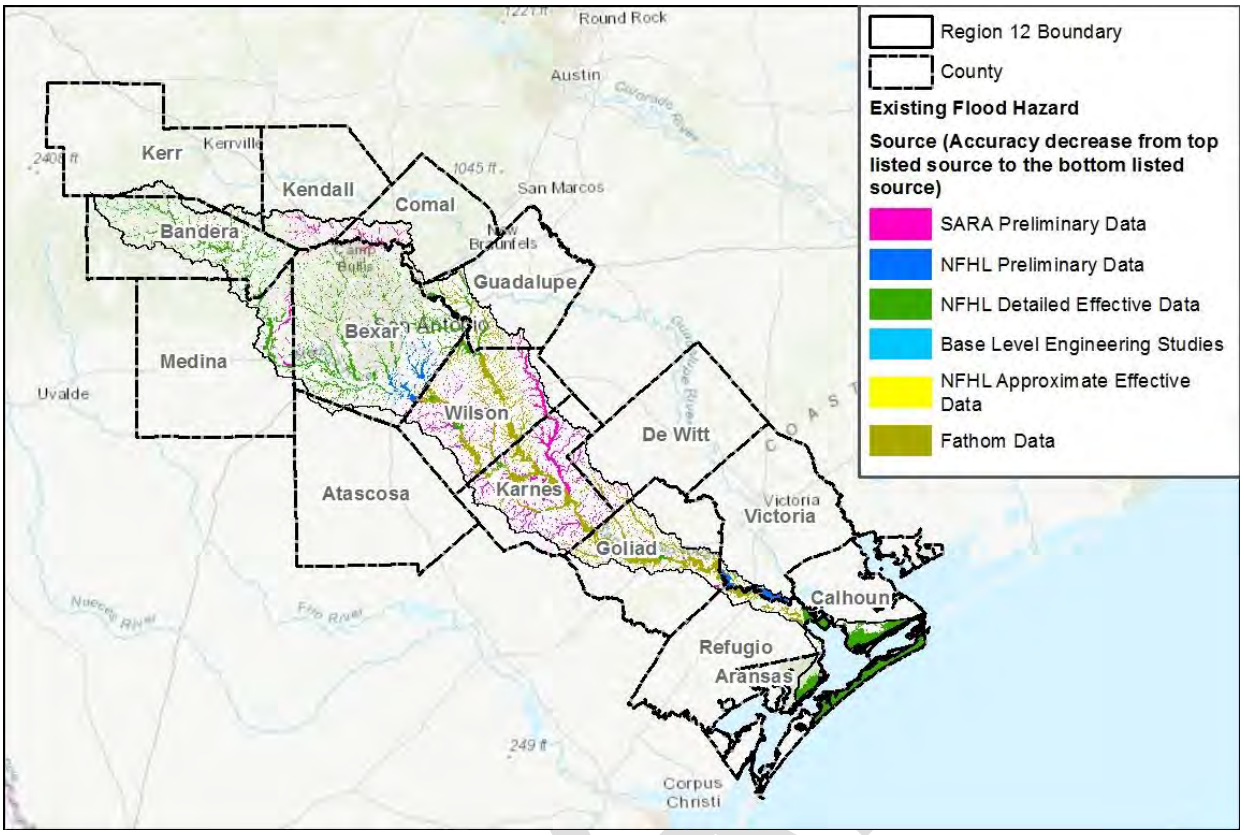
- San Antonio River Authority
- National Flood Hazard Layer
- Base Level Engineering Studies

The SARA Preliminary data was provided by the San Antonio River Authority, a FEMA Cooperating Technical Partner. Under SARA Risk MAP Viewer (full link in **Appendix A-8**) Mapping Activity Statements, revised mapping and modeling has been completed for various areas within the San Antonio River basin which incorporates NOAA Atlas 14 rainfall data and the latest modeling standards. The SARA Preliminary data was provided for the RFP efforts but has not been made public for use at the time of this memorandum.

The NFHL detailed study reaches' hydrologic and hydraulic (H&H) models for Bexar, Wilson, Karnes, and Goliad counties are made available through the SARA Digital Data and Model Repository (D2MR) Website (full link in **Appendix A-8**), where H&H models and data related to FEMA DFIRM is stored and managed. The SARA D2MR serves as a centralized location for the storage, management, and dissemination of H&H models and data related to the FEMA DFIRM and subsequent updates. The D2MR website provides the public with standard web tools to navigate and access information related to the effective FEMA DFIRMs and supporting models. The D2MR also serves as a document management system to control and track the information being provided to and edited by consulting engineers as part of the FEMA LOMR Review Partnership. The mapping component of the D2MR application provides users the ability to search by address, cross streets, stream name, watershed name, FEMA panel, or LOMC. The D2MR application empowers the public to get involved with the regional flood control strategies and interact with SARA to better prepare for and respond to flooding.

Additional studies with available H&H models identified through public comments will be evaluated as the data becomes available.

Figure 5-1. Hydrologic and Hydraulic Model Availability



6 List of Available Flood-Related Models of Most Value

1.f - A list of available flood-related models that the RFPG considers of most value in developing its plan.

The following provides a list of available flood-related models, in order of most valuable to least valuable, that are available to define the extents of the 1.0% and 0.2% annual chance flood event boundaries.

1. SARA Preliminary Data
2. NFHL Preliminary Data
3. NFHL Detailed Effective Data
4. Base Level Engineering Studies (BLE)

The following lists other inundation boundary data sources, which were not based on detailed hydrologic and hydraulic models.

1. NFHL Approximate Effective Data
2. Fathom Draft Data
3. Public Comments

Fathom Draft Data was pulled from the TWDB Cursory Floodplain Page (full link in **Appendix A-8**), the page was last updated on October 29, 2021.

BCRAGD was awarded grant funds from the TWDB for the installation of a Flood Early Warning System (FEWS) on the Medina River. The USGS developed a flood warning tool set for use by Bandera County Emergency Services and the public during rainfall events. The hydraulic model was calibrated to historical floods and the model was used to create a flood atlas and an interactive flood inundation map that has predictive properties.

7 Adopted Flood Mitigation and Floodplain Management Goals

1.g - The flood mitigation and floodplain management goals adopted by the RFPG per §361.36.

The RFPG is to define overarching flood mitigation and floodplain management goals for the Flood Planning Area. These goals will serve as a guide to the overall approach and recommendations in the plan.

The overarching goal is "to protect against the loss of life and property" as set forth in the Guidance Principles in 31 TAC §362.3. Other overarching goals defined are "enhancing floodplain management and "funding" within the Flood Planning Area.

The goals must be specific and achievable flood mitigation and floodplain management goals that when implemented will demonstrate progress towards the overarching goal. Both short-term goals (10 years) and long-term goals (30 years) were identified.

The following were considered in the development of the goals:

- Guidance Principles as listed in 31 TAC §362.3
- The existing condition flood risk analyses
- The future condition flood risk analyses
- The consideration of current floodplain management and land use approaches
- Input from the public
- Understanding of the residual risk of each goal (i.e. the remaining risk)

Refer to **Appendix A-3, Exhibit C, Table 11** for the list of flood mitigation and floodplain management goals developed by the Region 12 Technical Subcommittee and adopted by the San Antonio RFPG at the Planning Group Meeting on November 16, 2021.

8 Documented Process to Identify Feasible Flood Projects (FMPs) and Strategies (FMSs)

1.h - The documented process used by the RFPG to identify potentially feasible FMSs and FMPs.

The process for identifying potential Flood Management Evaluations, Strategies, and Projects for the 2023 San Antonio Regional Flood Plan was prepared by a Region 12 subcommittee and presented at the December 17, 2021 Regional Flood Planning Meeting. Refer to **Appendix A-7** for the documented process.

9 Potential Flood Evaluations (FMEs) and Potential Feasible Flood Projects (FMPs) and Strategies (FMSs)

1.i - A list of potential FMEs and potentially feasible FMSs and FMPs identified by the RFPG, if any.

Based on the process defined in **Section 8 Documented Process to Identify Feasible Flood Projects (FMPs)** and Strategies a list of potential Flood Management Evaluations (FMEs) and potentially feasible Flood Mitigation Projects (FMPs) and Flood Mitigation Strategies (FMSs) has been prepared by the Regional Flood Planning Group and will continue to be updated in 2022. The associated tables are provided in **Appendix A-4, A-5, and A-6**.

The list was obtained by reviewing a list of projects funding through the Texas Water Development Board Flood Infrastructure Fund (FIF), stakeholder engagement, and through the review of relevant studies.

The definitions for FMEs, FMPs, and FMSs are as follows:

A Flood Management Evaluation (FME) is a proposed flood study of a specific, flood-prone area that is needed in order to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs. Types of FMEs include, but not limited to:

- Watershed Planning
  - Hydrologic and hydraulic modeling
  - Flood mapping updates
  - Regional watershed studies
- Engineering Project Planning
  - Feasibility assessments
  - Preliminary engineering
  - Studies on flood preparedness

A Flood Mitigation Project (FMP) is a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring cost and when implemented will reduce flood risk, mitigate flood hazards to life or property. The RFPGs are strongly encouraged to consider nature-based flood risk reduction solutions in their overall approach. Types of FMPs include, but not limited to:

- Structural Flood Mitigation Projects
  - Low water crossings or bridge improvements
  - Stormwater infrastructure (channels, ditches, ponds, storm drains)
  - Regional detention
  - Reservoirs

  - Dam improvements, maintenance and repair
  - Flood walls / levees
  - Coastal protections
  - Natural based projects (i.e. living levees, increasing storage, increasing channel roughness, increasing losses, de-synchronizing peak flows, dune management, river restoration, riparian restoration, run-off pathway management, wetland restoration, Low Impact Development, Green Infrastructure)
  - Comprehensive regional project – includes a combination of projects intended to work together
- Non-Structural Flood Mitigation Projects
  - Property or easement acquisition
  - Elevation of individual structures
  - Flood readiness and resilience
  - Flood early warning systems
  - Flood proofing
  - Regulatory requirements for reduction of flood risk

A Flood Management Strategy (FMS) is a proposed plan to reduce flood risk or mitigate flood hazards to life or property. A FMS may or may not require associated FMPs to be implemented. FMS at a minimum to include any proposed action that the group would like to identify, evaluate, and recommend that does not qualify as either a FME or FMP.

10 Identified Flood Projects (FMPs) and Strategies (FMSs) determined Infeasible

1.j - A list of FMSs and FMPs that were identified but determined by the RFPG to be infeasible, including the primary reason for it being infeasible.

At this time no FMSs or FMPs have been determined infeasible by the Regional Flood Planning Group.

Appendix A-1

Exhibit C, Table 6

Existing Floodplain Management Practices

Exhibit C, Table 6
Existing Floodplain Management Practices

Entity[A, E]	Entity ID	Floodplain Management Regulations (Yes/ No/ Unknown)[A]	Adopted minimum regulations pursuant to Texas Water Code Section 16.3145? (Yes/ No)[A]	NFIP Participant (Yes/ No)[A,D]	Higher Standards Adopted (Yes/ No)[B]	Floodplain Management Practices (Strong/Moderate / Low/None)[B]	Level of Enforcement of Practices (High/ Moderate/ Low/ None)[B,C]	Existing Stormwater or Drainage Fee (Yes/ No)[B]	Web Link to Entity Regulations
Medina County	00000005	Yes	Yes	Yes	Yes	Strong	High	No	medinacountytexas.org
Bexar County	00000007	Yes	Yes	Yes	Yes	Moderate	Moderate	No	Not Available online
Guadalupe County	00000010	Yes	Yes	Yes	Yes	Strong			
Bandera County	00000011	Yes	Yes	Yes	Yes	Moderate	Moderate	No	www.banderacounty.org
Comal County	00000014	Yes	Yes	Yes	Yes	Moderate			
Kendall County	00000017	Yes	Yes	Yes	Yes	Moderate			
Kerr County	00000022	Yes	Yes	Yes	Yes	Moderate	Moderate	No	https://www.co.kerr.tx.us/engineer/floodplain.html
Aransas County	00000083	Yes	Yes	Yes	Yes	Moderate	Moderate	No	https://www.aransascountytx.gov/main/docs/ordinances/OAmended%20Aransas%20County%20Floodplain%20Management%20Watershed%20Protection%20Order%20O-23-2019.pdf
Refugio County	00000084	Yes	Yes	Yes	No	Low	Low	No	
Calhoun County	00000088	Yes	Yes	Yes	Yes	Moderate			
Goliad County	00000090	Yes	Yes	Yes	No	Low			
Victoria County	00000094	Yes	Yes	Yes	No	Low			
Karnes County	00000095	Yes	Yes	Yes	No	Moderate	Moderate	No	none
Atascosa County	00000096	Yes	Yes	Yes	Yes	Moderate			
DeWitt County	00000099	Yes	Yes	Yes	No	Low			
Wilson County	00000100	Yes	Yes	Yes	Yes	Moderate	Moderate	No	http://www.co.wilson.tx.us/upload/page/2300/docs/Dawn/Ordinances/WC_Flood_Order_Final_10272010.pdf
San Antonio River Authority	00000282	Unknown	No	No	No	None			
Nueces River Authority	00000290	Unknown	No	No	No	None			
Guadalupe-Blanco River Authority	00000291	Unknown	No	No	No	None			
Upper Guadalupe River Authority	00000297	Unknown	No	No	No	None			
Bexar-Medina-Atascosa Counties WCID 1	00000299	Unknown	No	No	No	None			
Bandera County River Authority	00000339	Unknown	No	No	No	None			
Alamo Area Council of Governments	00000255	Unknown	No	No	No	None			
Coastal Bend Council of Governments	00000260	Unknown	No	No	No	None			
Golden Crescent Regional Planning Commission	00000264	Unknown	No	No	No	None			
Canyon Regional Water Authority	00000392	Unknown	No	No	No	None			
Falcon Point WCID 1	12000480	Unknown	No	No	No	None			
Escondido Watershed District	00000519	Unknown	No	No	No	None			
Hondo Creek Watershed Improvement District	00000526	Unknown	No	No	No	None			
West Side Calhoun County Navigation District	00000538	Unknown	No	No	No	None			
Medina County WCID 1	12000546	Unknown	No	No	No	None			
Victoria County Navigation District	00000588	Unknown	No	No	No	None			
Wilson County FWSD 1 of Wilson County Texas	12000592	Unknown	No	No	No	None			
Westside 211 Special Improvement District	12000648	Unknown	No	No	No	None			
Refugio County WCID 2	00000714	Unknown	No	No	No	None			
Crosswinds at South Lake Special Improvement District	12000731	Unknown	No	No	No	None			
Refugio County Navigation District	00000758	Unknown	No	No	No	None			
Green Valley SUD	00000821	Unknown	No	No	No	None			
Medina County FWSD 1	12000874	Unknown	No	No	No	None			
Kendall County WCID 2	00000936	Unknown	No	No	No	None			
Kendall County WCID 2A	12000937	Unknown	No	No	No	None			
Cibolo Canyon Conservation and Improvement District 1	12000959	Unknown	No	No	No	None			
Ecleto Creek Watershed District	00001006	Unknown	No	No	No	None			
Refugio County WCID 1	12001057	Unknown	No	No	No	None			
La Salle WCID 1-A	12001130	Unknown	No	No	No	None			
La Salle WCID 1-B	12001132	Unknown	No	No	No	None			
Lerin Hills MUD	12001324	Unknown	No	No	No	None			
San Antonio MUD 1	12001484	Unknown	No	No	No	None			
Cibolo Creek Municipal Authority	00001485	Unknown	No	No	No	None			
Bexar County WCID 10	12001486	Unknown	No	No	No	None			
Flying L PUD	12001520	Unknown	No	No	No	None			
Bandera County FWSD 1	12001521	Unknown	No	No	No	None			
Northeast Medina County WCID 1	12001530	Unknown	No	No	No	None			
Johnson Ranch MUD	12001578	Unknown	No	No	No	None			
East Central SUD	12001595	Unknown	No	No	No	None			
Refugio County Drainage District 1	00001608	Unknown	No	No	No	None			
Espada Development District	12001650	Unknown	No	No	No	None			

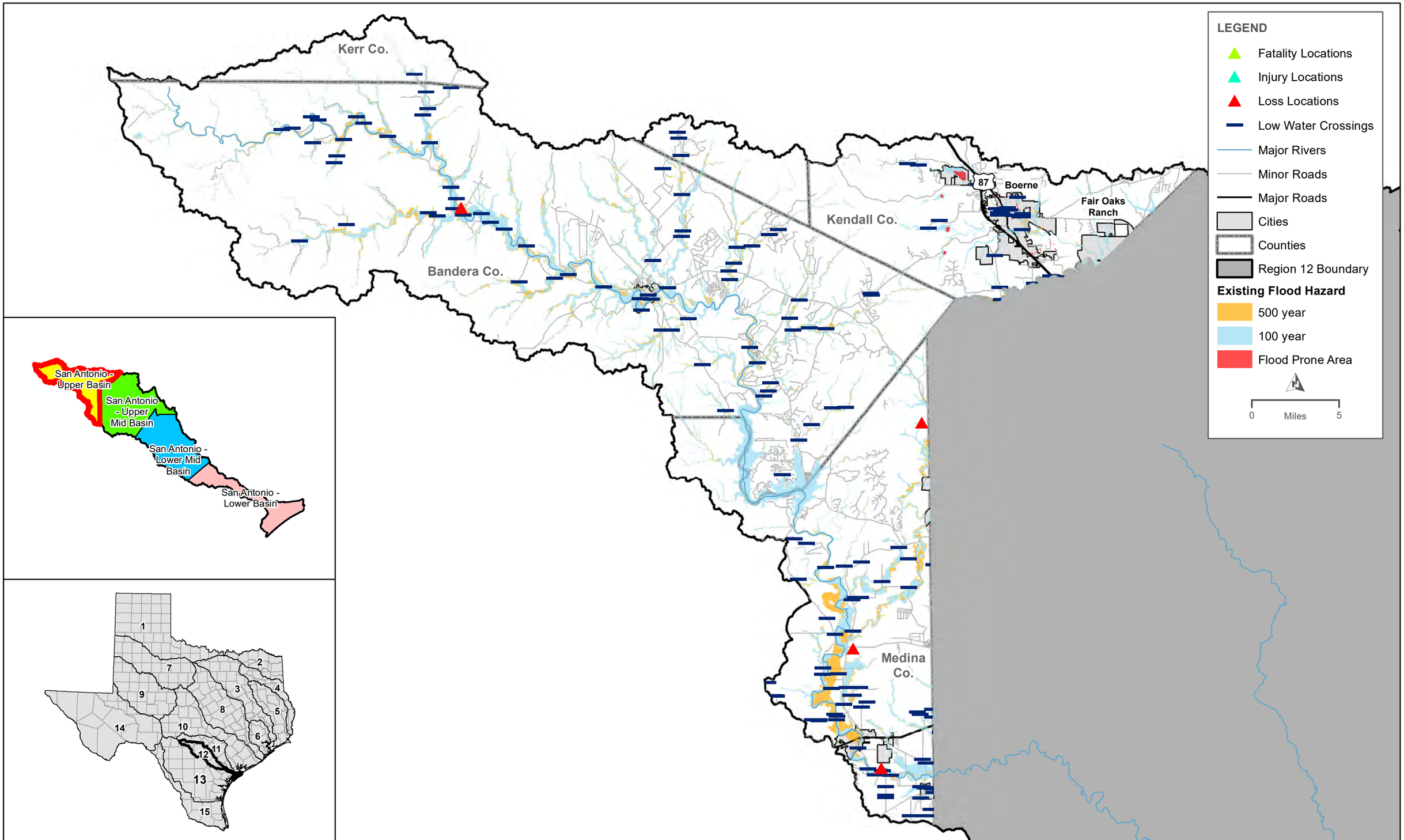
Exhibit C, Table 6
Existing Floodplain Management Practices

Port O'Connor MUD	00001672	Unknown	No	No	No	None			
Comal County WCID 6	00002121	Unknown	No	No	No	None			
Kendall County WCID 4	12002226	Unknown	No	No	No	None			
Kendall County WCID 3	12002367	Unknown	No	No	No	None			
Nordheim	00002402	No	No	No	No	None			
Fair Oaks Ranch	12002436	Yes	Yes	Yes	Yes	Moderate			
Alamo Heights	12002437	Yes	Yes	Yes	Yes	Moderate			
Balcones Heights	12002438	Yes	Yes	Yes	No	Low			
Castle Hills	12002439	Yes	Yes	Yes	Yes	Moderate			
China Grove	12002440	Yes	Yes	Yes	Yes	Moderate			
Converse	12002441	Yes	Yes	Yes	No	Low			
Elmendorf	12002442	Yes	Yes	Yes	No	Low			
Terrell Hills	12002475	Yes	Yes	Yes	No	Low			
Windcrest	12002476	Yes	Yes	Yes	Yes	Moderate			
Grey Forest	12002506	Yes	Yes	Yes	No	Low			
Hill Country Village	12002507	Yes	Yes	Yes	No	Low			
Hollywood Park	12002508	Yes	Yes	Yes	No	Low			
Kirby	12002510	Yes	Yes	Yes	No	Low			
Leon Valley	12002511	Yes	Yes	Yes	Yes	Moderate			
Live Oak	12002512	Yes	Yes	Yes	Yes	Strong			
Cibolo	00002615	Yes	Yes	Yes	No	Low			
Bulverde	00002669	Yes	Yes	Yes	Yes	Moderate			
New Braunfels	00002670	Yes	Yes	Yes	Yes	Strong			
Schertz	00002671	Yes	Yes	Yes	Yes	Moderate			
Karnes City	12002756	Yes	Yes	Yes	No	Low			
Runge	12002757	Yes	Yes	Yes	No	Low			
Boerne	12002855	Yes	Yes	Yes	Yes	Moderate			
Olmos Park	12002889	Yes	Yes	Yes	No	Low			
Floresville	12002925	Yes	Yes	Yes	Yes	Moderate			
La Coste	12002954	Yes	Yes	Yes	Yes	Moderate			
Marion	12002966	Yes	Yes	Yes	No	Low			
Universal City	12002967	Yes	Yes	Yes	Yes	Moderate			
New Berlin	00002973	Yes	Yes	Yes	No	Low			
Falls City	12002974	Yes	Yes	Yes	No	Low			
Kenedy	12002975	Yes	Yes	Yes	Yes	Moderate			
City of Goliad	12002986	Yes	Yes	Yes	No	Low			
Shavano Park	12003000	Yes	Yes	Yes	Yes	Moderate			
Helotes	12003002	Yes	Yes	Yes	Yes	Moderate			
Somerset	12003003	Yes	Yes	Yes	No	Low			
St. Hedwig	12003004	Yes	Yes	Yes	No	Low			
Austwell	12003103	Yes	Yes	Yes	No	Low			
Sea Drift	12003175	Yes	Yes	Yes	Yes	Moderate			
La Vernia	12003180	Yes	Yes	Yes	Yes	Moderate			
Poth	12003181	Yes	Yes	Yes	No	Low			
Stockdale	12003182	Yes	Yes	Yes	No	Low			
Sandy Oaks	12003220	No	No	No	No	None			
Garden Ridge	00003235	Yes	Yes	Yes	No	Low			
Selma	12003258	Yes	Yes	Yes	No	Low			
Santa Clara	00003276	Yes	Yes	Yes	No	Low			
Von Ormy	12003318	Yes	Yes	Yes	No	Low			
San Antonio	12003327	Yes	Yes	Yes	Yes	Strong			
Castroville	12003377	Yes	Yes	Yes	Yes	Moderate			
City of Bandera	12003414	Yes	Yes	Yes	Yes	Moderate			

[A] At a minimum, the RFPGs must list all counties, cities and districts in the region with flood related authority in the region and identify whether entity they have any established floodplain management practices.
[B] This field may be left blank during the 1st planning cycle. However, RFPGs are strongly encouraged to provide this information when applicable and available.
[C] The following may serve as a guide for evaluating enforcement:
high – actively enforces the entire ordinance, performs many inspections throughout construction process, issues fines, violations, and Section 1316s where appropriate, and enforces substantial damage and substantial improvement;
moderate – enforces much of the ordinance, performs limited inspections and is limited in issuance of fines and violations;
low – provides permitting of development in the floodplain, may not perform inspections, may not issue fines or violations;
none – does not enforce floodplain management regulations.
[D] Communities Participating in the National Flood Program- Texas, FEMA Community Status Book Report, May 15, 2021. FEMA NFIP Participation Book – TX 5-15-21.pdf
[E] Entity will be a city unless otherwise stated.

Appendix A-2

TWDB Technical Memorandum Required Maps

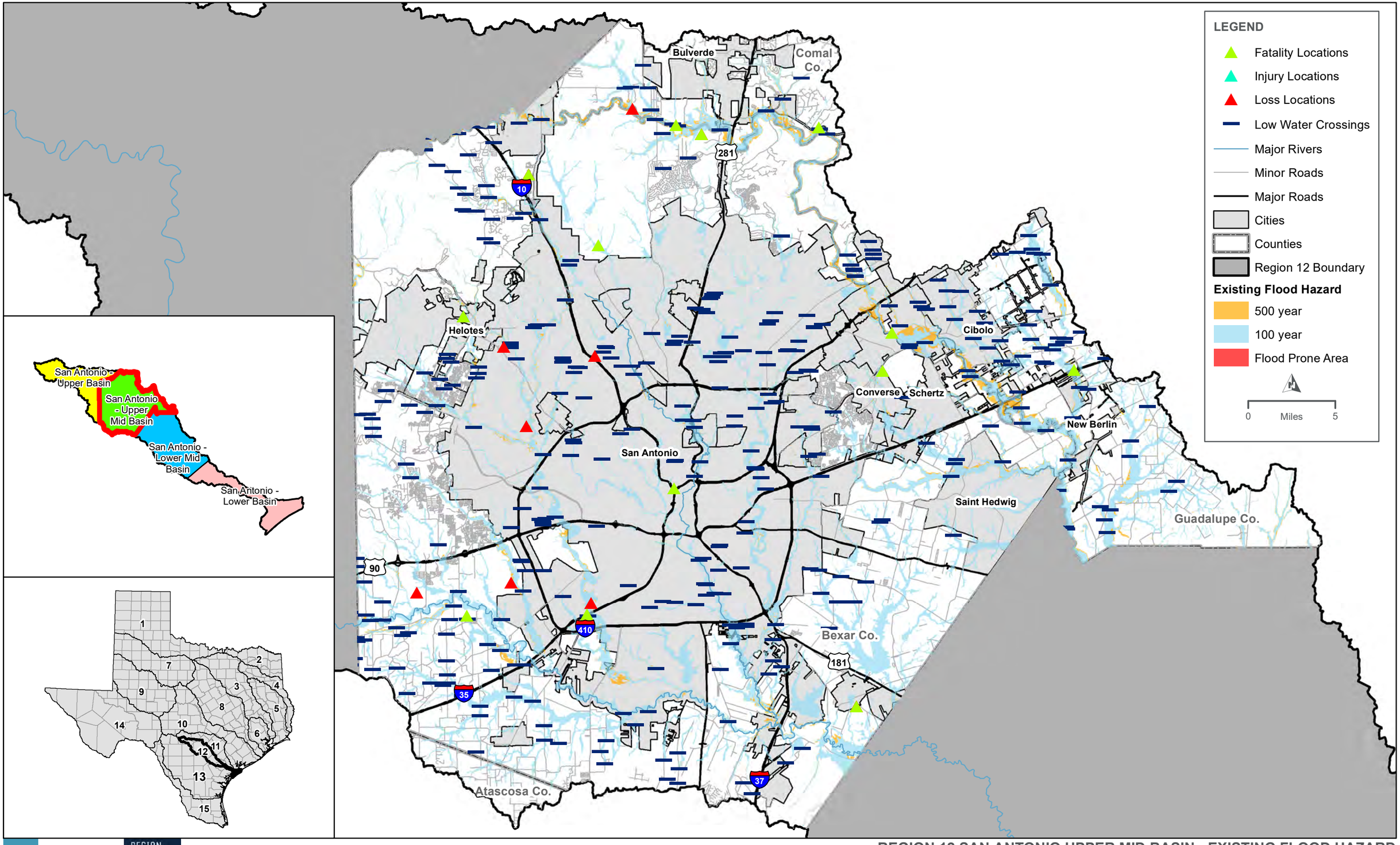


REGION 12 SAN ANTONIO UPPER BASIN - EXISTING FLOOD HAZARD

DRAFT

FIGURE 1

PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION12_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\STATIC_MAPS\EXISTINGFLDHAZARD_GROUPA_11X17_FIG1.MXD - USER: PDUNNING - DATE: 2/21/2022

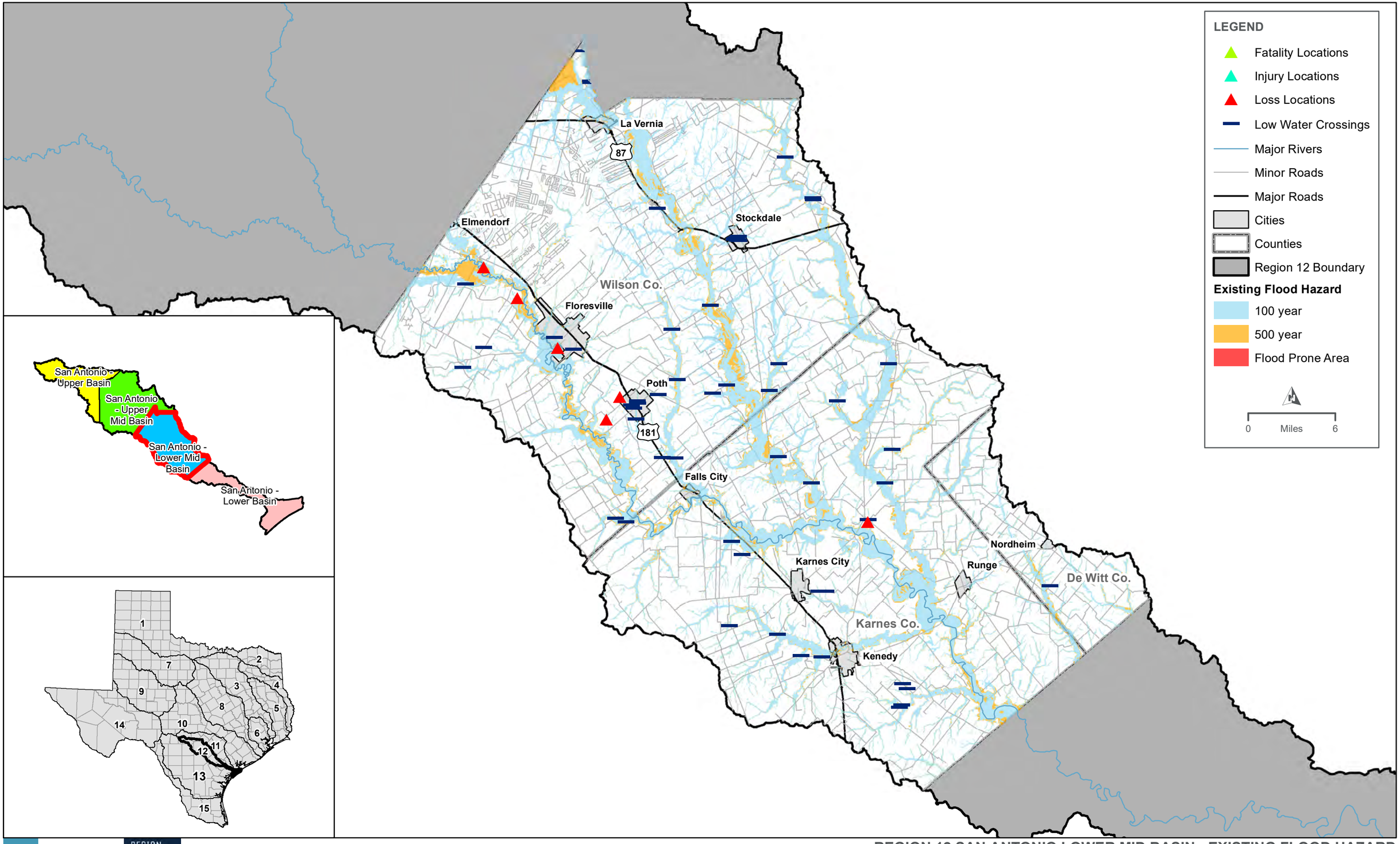


REGION 12 SAN ANTONIO UPPER MID BASIN - EXISTING FLOOD HAZARD

DRAFT

FIGURE 2

PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION12_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\STATIC_MAPS\EXISTINGFLDHAZARD_GROUPB_11X17_FIG2.MXD - USER: PDUNNING - DATE: 2/21/2022

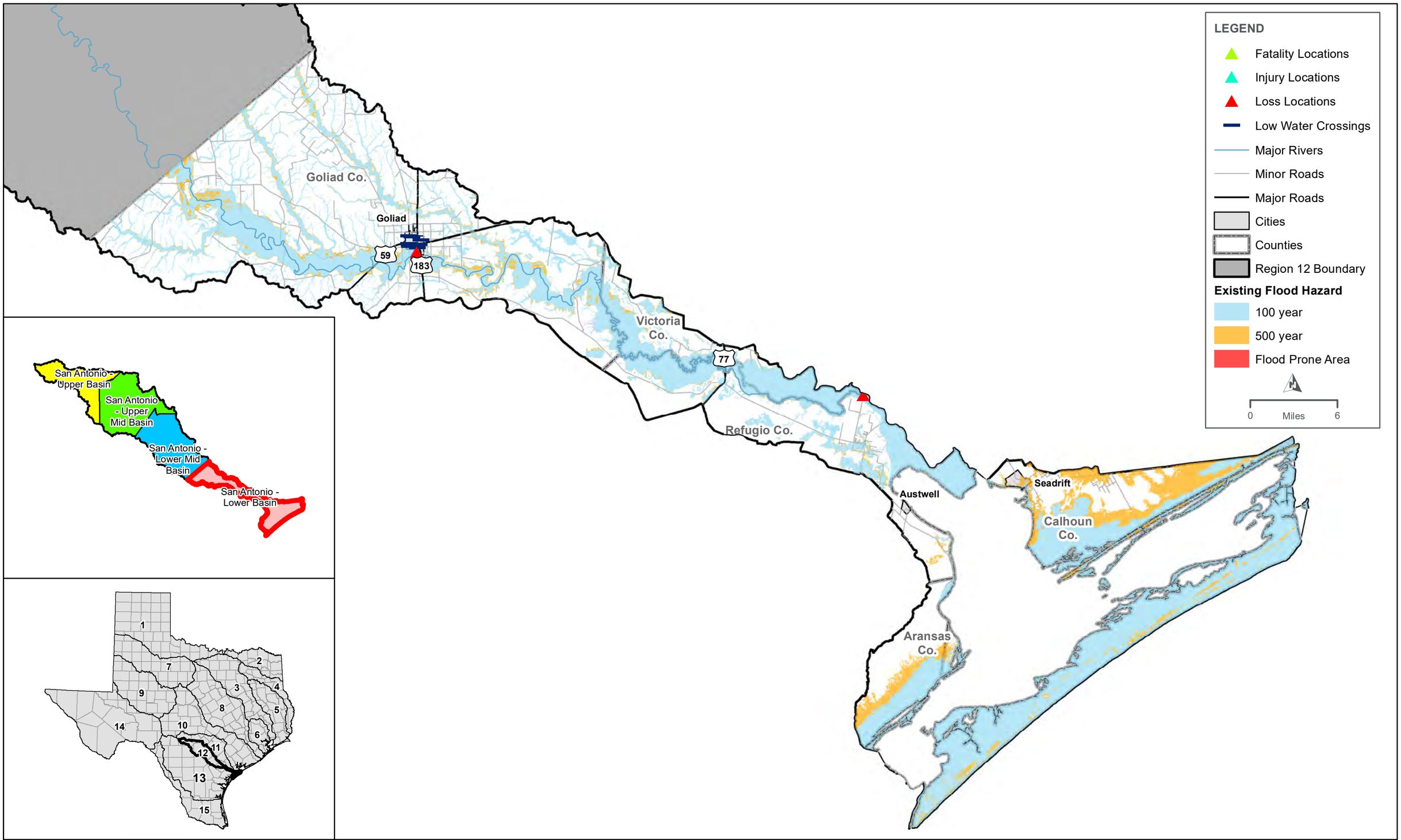


REGION 12 SAN ANTONIO LOWER MID BASIN - EXISTING FLOOD HAZARD

DRAFT

FIGURE 3

PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION12_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\STATIC_MAPS\EXISTINGFLDHAZARD_GROUPC_11X17_FIG3.MXD - USER: PDUNNING - DATE: 2/21/2022

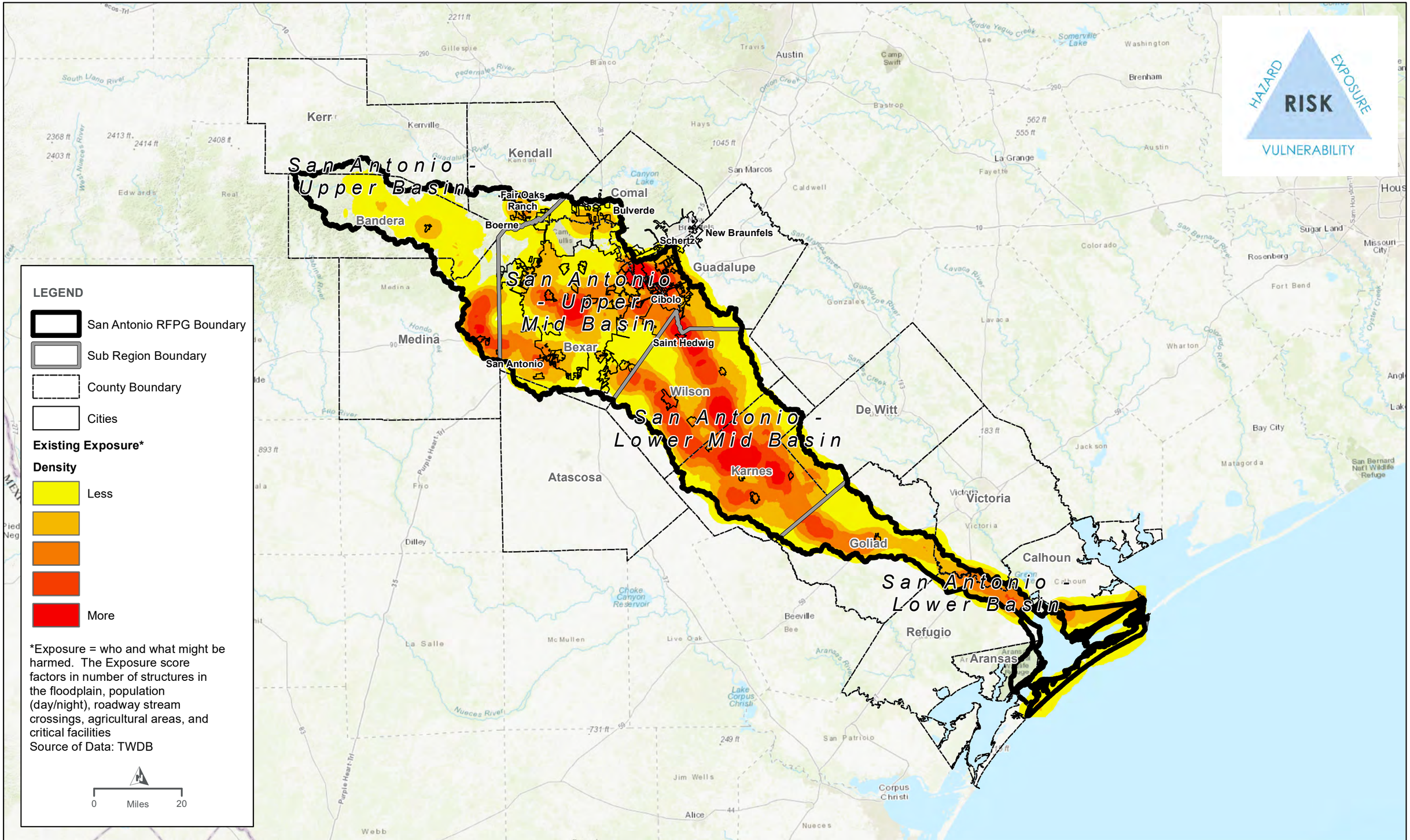


REGION 12 SAN ANTONIO LOWER BASIN - EXISTING FLOOD HAZARD

DRAFT

FIGURE 4

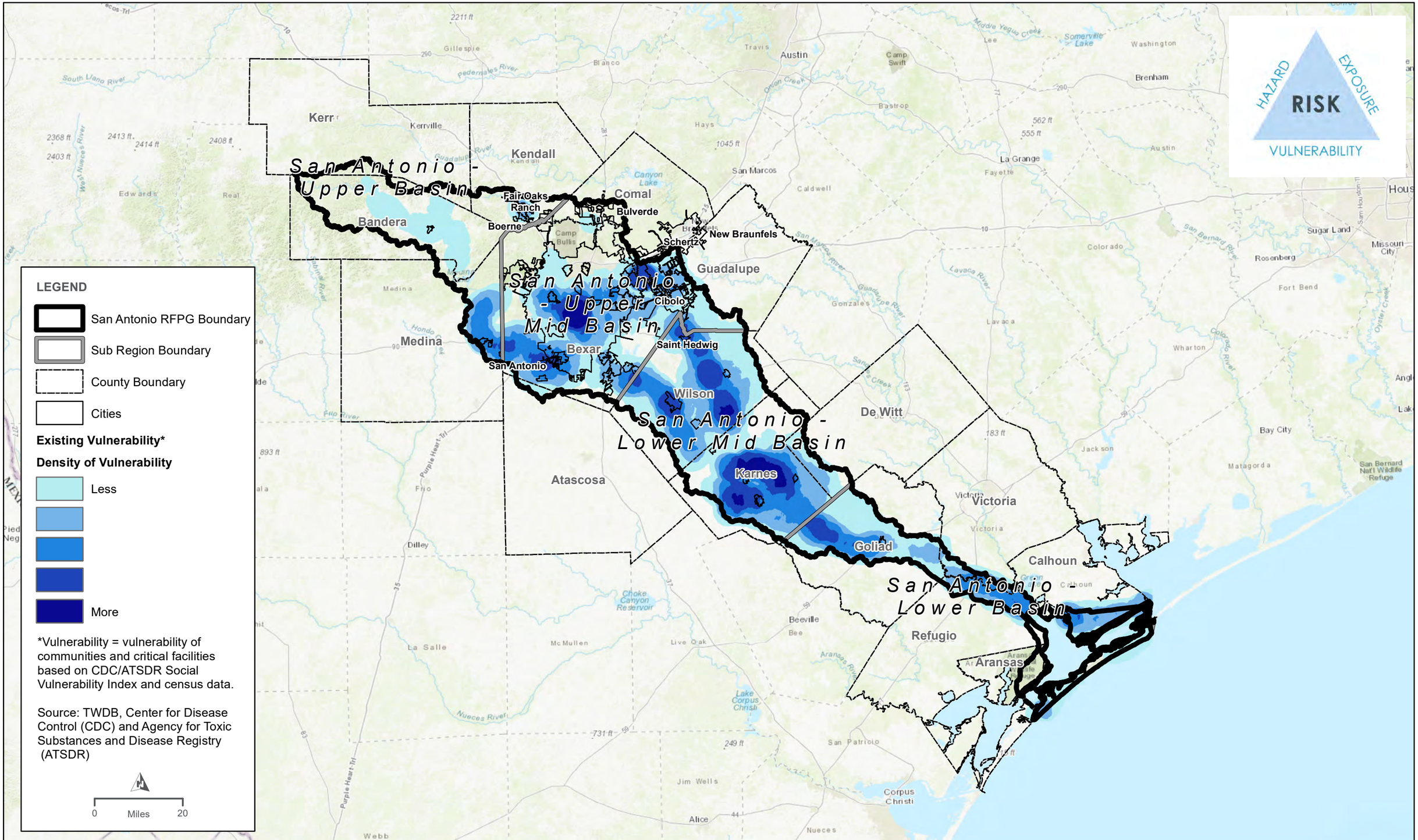
PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION12_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\STATIC_MAPS\EXISTINGFLDHAZARD_GROUPD_11X17_FIG4.MXD - USER: PDUNNING - DATE: 2/21/2022



REGION 12 - EXISTING CONDITION EXPOSURE ANALYSIS

DRAFT

DOCUMENT PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION12_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\TECHNICALGUIDELINES\REGIONAL_HEATMAP_EXISTING_EXPOSURE_11X17.MXD



REGION 12 - EXISTING CONDITION VULNERABILITY ANALYSIS

DRAFT

DOCUMENT PATH: Z:\PROJECTS\TWDB\TWDB_RFPG\RFP2023_REGION12_ELECTRONICFILES_HDR_WORKING\MAP_DOCS\EXHIBITS\TECHNICALGUIDELINES\REGIONAL_HEATMAP_EXISTING_VULNERABILITY_11X17.MXD

Appendix A-3

Exhibit C, Table 11

Flood Mitigation and Floodplain Management Goals

Exhibit C, Table 11
Regional Flood Plan, Flood Mitigation, and Floodplain Management Goals

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Residual Risk	How will the Goal be Measured	Overarching Goal(s)	Associated Goal IDs
12000001	12	San Antonio	Increase the number of public outreach and education activities to improve awareness of flood hazards and benefits of flood planning in the FPR by X occurrences, and nature base solution training and receive certificate enabling greater participation in flood risk/mitigation decisions.	Short Term (10 year)	2033	Entire RFPG			Education and Outreach	
12000002	12	San Antonio	Increase the number of public outreach and education activities to improve awareness of flood hazards and benefits of flood planning in the FPR by X occurrences, and nature base solution training and receive certificate enabling greater participation in flood risk/mitigation decisions.	Long Term (30 year)	2053	Entire RFPG			Education and Outreach	
12000003	12	San Antonio	Increase the proficiency of floodplain managers across the region through training from TFMA, ASFPM and FEMA. Improve FPM knowledge of nature based solutions, floodplain preservation, and cost/benefit of traditional structural solutions.	Short Term (10 year)	2033	Entire RFPG			Education and Outreach	
12000004	12	San Antonio	Increase the proficiency of floodplain managers across the region through training from TFMA, ASFPM and FEMA. Improve FPM knowledge of nature based solutions, floodplain preservation, and cost/benefit of traditional structural solutions.	Long Term (30 year)	2053	Entire RFPG			Education and Outreach	
12000005	12	San Antonio	Support the development of a regionally coordinated warning and emergency response program that can detect the flood threat and provide timely warning of impending flood danger to reduce flood deaths and high water rescues across the region.	Short Term (10 year)	2033	Entire RFPG			Flood Warning and Readiness	12000009
12000006	12	San Antonio	Support the development of a regionally coordinated warning and emergency response program that can detect the flood threat and provide timely warning of impending flood danger to reduce flood deaths and high water rescues across the region.	Long Term (30 year)	2053	Entire RFPG			Flood Warning and Readiness	12000010
12000007	12	San Antonio	Increase the number of flood gauges (rainfall, stream, reservoir, etc.) in the region by X gauges to provide localized information to emergency responders, and storage and accessibility of data to agencies.	Short Term (10 year)	2033	Entire RFPG			Flood Warning and Readiness	12000009
12000008	12	San Antonio	Increase the number of flood gauges (rainfall, stream, reservoir, etc.) in the region by X gauges to provide localized information to emergency responders, and storage and accessibility of data to agencies.	Long Term (30 year)	2053	Entire RFPG			Flood Warning and Readiness	12000010
12000009	12	San Antonio	Increase the number of entities that communicate real time flood warnings to the public. Leverage mobile phone navigation apps to provide real time rerouting for the public.	Short Term (10 year)	2033	Entire RFPG			Flood Warning and Readiness	12000007
12000010	12	San Antonio	Increase the number of entities that communicate real time flood warnings to the public. Leverage mobile phone navigation apps to provide real time rerouting for the public.	Long Term (30 year)	2053	Entire RFPG			Flood Warning and Readiness	12000008
12000011	12	San Antonio	Increase the number of entities which utilize/adopt Atlas 14 (Volume 11) or best available data from NOAA revised rainfall data as part of revisions to design criteria and flood prevention regulations by X percent. (region specific)	Short Term (10 year)	2033	Entire RFPG			Flood Studies and Analysis	
12000012	12	San Antonio	Increase the number of entities which utilize/adopt Atlas 14 (Volume 11) or best available data from NOAA revised rainfall data as part of revisions to design criteria and flood prevention regulations by X percent. (region specific)	Long Term (30 year)	2053	Entire RFPG			Flood Studies and Analysis	
12000013	12	San Antonio	Increase the number of entities that conduct detailed studies to update their local flood risk by X.	Short Term (10 year)	2033	Entire RFPG			Flood Studies and Analysis	
12000014	12	San Antonio	Increase the number of entities that conduct detailed studies to update their local flood risk by X.	Long Term (30 year)	2053	Entire RFPG			Flood Studies and Analysis	
12000015	12	San Antonio	Decrease the average age of FEMA Flood Insurance Rate Maps (NFHL/FIRMs/FIS) by X years.	Short Term (10 year)	2033	Entire RFPG			Flood Studies and Analysis	
12000016	12	San Antonio	Decrease the average age of FEMA Flood Insurance Rate Maps (NFHL/FIRMs/FIS) by X years.	Long Term (30 year)	2053	Entire RFPG			Flood Studies and Analysis	
12000017	12	San Antonio	Increase the number of entities which have completed an analysis for using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements.	Short Term (10 year)	2033	Entire RFPG			Flood Studies and Analysis	
12000018	12	San Antonio	Increase the number of entities which have completed an analysis for using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements.	Long Term (30 year)	2053	Entire RFPG			Flood Studies and Analysis	
12000019	12	San Antonio	Increase the number of participating Community Rating System (CRS) entities in the FPR by X.	Short Term (10 year)	2033	Entire RFPG			Flood Prevention	12000020
12000020	12	San Antonio	Increase the rating of participating entities within Community Rating System (CRS) in the FPR by X.	Short Term (30 year)	2053	Entire RFPG			Flood Prevention	12000019
12000021	12	San Antonio	Increase the number of entities which regulate to the 1% annual chance future conditions floodplains as part of new development and redevelopment by X.	Short Term (10 year)	2033	Entire RFPG			Flood Prevention	
12000022	12	San Antonio	Increase the number of entities which regulate to the 1% annual chance future conditions floodplains as part of new development and redevelopment by X.	Long Term (30 year)	2053	Entire RFPG			Flood Prevention	

Exhibit C, Table 11
Regional Flood Plan, Flood Mitigation, and Floodplain Management Goals

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Residual Risk	How will the Goal be Measured	Overarching Goal(s)	Associated Goal IDs
12000023	12	San Antonio	Increase the number of entities that have adopted a holistic watershed approach using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements for flood risk reduction as a basis for comprehensive subdivision regulations.	Short Term (10 year)	2033	Entire RFPG			Flood Prevention	
12000024	12	San Antonio	Increase the number of entities that have adopted a holistic watershed approach using existing Natural Flood Mitigation Features (NFMF) such as headwaters, buffers, and conservation easements for flood risk reduction as a basis for comprehensive subdivision regulations.	Long Term (30 year)	2053	Entire RFPG			Flood Prevention	
12000025	12	San Antonio	Increase the number of acres of publicly protected open space by X as part of land conservation and acquisitions to reduce future impacts of flooding.	Short Term (10 year)	2033	Entire RFPG			Non-Structural Flood Infrastructure Projects	12000026
12000026	12	San Antonio	Increase the number of restored acres of publicly protected open space land in the region.	Long Term (30 year)	2053	Entire RFPG			Non-Structural Flood Infrastructure Projects	12000025
12000027	12	San Antonio	Reduce the number of NFIP repetitive-loss properties in the FPR by X.	Short Term (10 year)	2033	Entire RFPG			Non-Structural Flood Infrastructure Projects	
12000028	12	San Antonio	Reduce the number of NFIP repetitive-loss properties in the FPR by X.	Long Term (30 year)	2053	Entire RFPG			Non-Structural Flood Infrastructure Projects	
12000029	12	San Antonio	Reduce the number of residential properties in the future 1% annual chance floodplain by X.	Short Term (10 year)	2033	Entire RFPG			Non-Structural Flood Infrastructure Projects	
12000030	12	San Antonio	Reduce the number of residential properties in the future 1% annual chance floodplain by X.	Long Term (30 year)	2053	Entire RFPG			Non-Structural Flood Infrastructure Projects	
12000031	12	San Antonio	Reduce the number of vulnerable critical facilities located within the existing and future 1% annual chance (100-year) floodplain by X.	Short Term (10 year)	2033	Entire RFPG			Structural Flood Infrastructure Projects	
12000032	12	San Antonio	Reduce the number of vulnerable critical facilities located within the existing and future 1% annual chance (100-year) floodplain by X.	Long Term (30 year)	2053	Entire RFPG			Structural Flood Infrastructure Projects	
12000033	12	San Antonio	Reduce the number of vulnerable roadway segments and low water crossings located within the existing and future 1% annual chance (100-year) floodplain by X.	Short Term (10 year)	2033	Entire RFPG			Structural Flood Infrastructure Projects	
12000034	12	San Antonio	Reduce the number of vulnerable roadway segments and low water crossings located within the existing and future 1% annual chance (100-year) floodplain by X.	Long Term (30 year)	2053	Entire RFPG			Structural Flood Infrastructure Projects	
12000035	12	San Antonio	Increase the number of structural projects that include a NBS or Green Infrastructure (GI) component.	Short Term (10 year)	2033	Entire RFPG			Structural Flood Infrastructure Projects	

Appendix A-4

Exhibit C, Table 12

Potential Flood Management Evaluations (FMEs) Identified by the Regional Flood Planning Group

Exhibit C, Table 12
Potential Flood Management Evaluations (FMEs) Identified by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Associated Goals	Counties	HUC8s	HUC12s[A]	Watershed Name[A]	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources and Amount	Estimated number of structures at flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm & ranch land at flood risk (Acres)	Existing or Anticipated Models (Year)	Existing or Anticipated Maps (Year)	RFPG Recommendation (Y/N)	Reason for Recommendation

[A] Leave blank if too many for text field length (254 characters).

Appendix A-5

Exhibit C, Table 13

Potentially Feasible Flood Mitigation Projects (FMPs) Identified by the Regional Flood Planning Group

Exhibit C, Table 13
Potentially Feasible Flood Mitigation Projects (FMPs) Identified by RFPG

FMP ID	RFPG No.	RFPG Name	FMP Name	Description	Associated Goals (ID)	Counties	HUC12s[B]	Watershed Name[B]	Project Type	Project Area (Sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Project Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk														Pre-Project Level-of-Service	Post-Project Level-of-Service	Cost/ Structure removed	Percent Nature-based Solution (by cost)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Social Vulnerability Index (SVI)	Water Supply Benefit (Y/N)	Traffic Count for Low Water Crossings[E]	Benefit-Cost Ratio
																	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk[A]	Residential structures at 100-year flood risk[C]	Estimated Population at 100-year flood risk	Critical facilities at 100-year flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at 100-year flood risk (Miles)	Estimated farm & ranch land at 100-year flood risk (Acres)[D]	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated farm & ranch land removed from 100yr flood risk (Acres)[D]	Estimated reduction in fatalities (if available)[E]	Estimated reduction in injuries (if available)[E]										

[A] Estimated number of structures at 100-year flood risk will require consideration WSE and estimated finished flood elevation of buildings.
[B] Leave blank if too many for text field length (254 characters).
[C] For planning purpose, residential structures at flood risk will include residential buildings at flood risk that are greater than 500 square feet unless the RFPGs have more specific information.
[D] Estimated farm & ranch land at 100-year flood risk (acres) should only include farm and ranch land that are negatively impacted by flooding events and should not include land that benefits from floodplains for example rice fields.
[E] This field may be left blank during the 1st planning cycle. However, RFPGs are strongly encouraged to provide this information when applicable and available.

Appendix A-6

Exhibit C, Table 14

Potentially Feasible Flood Management Strategies (FMSs) Identified by the Regional Flood Planning Group

Exhibit C, Table 14
Potentially Feasible Flood Management Strategies (FMSs) Identified by RFPG

FMS ID	RFPG No.	RFPG Name	FMS Name	Description	Associated Goals (ID)	Counties	HUC10s[B]	Watershed Name[B]	Strategy Type	Strategy Area (Sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Entities with Oversight	Emergency Need (Y/N)	Estimated Project Cost ($)	Potential Funding Sources and Amount	Flood Risk										Reduction in Flood Risk												Cost/ Structure removed	Consideration of Nature-based Solution (Y/N)	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Water Supply Benefit (Y/N)
																	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk[A]	Residential structures at 100-year flood risk[C]	Estimated Population at 100-year flood risk	Critical facilities at 100-year flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at 100-year flood risk (Miles)	Estimated farm & ranch land at 100-year flood risk (Acres)[D]	Number of structures with reduced 100yr (1% annual chance) Flood risk	Number of structures removed from 100yr (1% annual chance) Flood risk	Number of structures removed from 500yr (0.2% annual chance) Flood risk	Residential structures removed from 100yr (1% annual chance) Flood risk	Estimated Population removed from 100yr (1% annual chance) Flood risk	Critical facilities removed from 100yr (1% annual chance) Flood risk (#)	Number of low water crossings removed from 100yr (1% annual chance) Flood risk (#)	Estimated reduction in road closure occurrences	Estimated length of roads removed from 100yr flood risk (Miles)	Estimated farm & ranch land removed from 100yr flood risk (Acres)[D]	Estimated reduction in fatalities (if available)[E]	Estimated reduction in injuries (if available)[E]					

[A] Estimated number of structures at 100-year flood risk will require consideration WSE and estimated finished flood elevation of buildings.
[B] Leave blank if too many for text field length (254 characters).
[C] For planning purpose, residential structures at flood risk will include residential buildings at flood risk that are greater than 500 square feet unless the RFPGs have more specific information.
[D] Estimated farm & ranch land at 100-year flood risk (acres) should only include farm and ranch land that are negatively impacted by flooding events and should not include land that benefits from floodplains for example rice fields.
[E] This field may be left blank during the 1st planning cycle. However, RFPGs are strongly encouraged to provide this information when applicable and available.

Appendix A-7

Proposed Process for Identifying Potential Flood Management Evaluations (FMEs), Strategies (FMSs), and Projects (FMPs) for the 2023 San Antonio Regional Flood Plan

Task 4B – Identification and Evaluation of Potential Flood Management Evaluations and Potentially Feasible Flood Management Strategies and Flood Mitigation Projects

TWDB requirements for Task 4B state that each RFPG is to develop and receive public comment on a "…proposed process to be used by the RFPG to identify and select flood management evaluations, flood mitigation strategies, and flood mitigation projects". This process, once adopted by the RFPG, is to be documented and such documentation is to be included in the Technical Memorandum, the Initial Draft Regional Flood Plan, and the adopted Regional Flood Plan.

The following describes the proposed process being considered by the RFPG and on which public comment will be taken, both during the December RFPG meeting and via written comments submitted through the RFPG's website. The process, as described below, was designed to conform with TWDB requirements as expressed in the rules, the scope-of-work for the regional flood planning process, and technical guidelines.

Step 1: Conduct an initial screening of Projects, Evaluations, and Strategies that were received by or developed in conjunction with floodplain management communities/project sponsors:

In this first step, screening is conducted based on minimum TWDB requirements. The screening criteria applied in this step are:

- The evaluation/strategy/project is related to a flood mitigation or floodplain management goal.
- The evaluation /strategy/project meets an emergency need.
- The evaluation /strategy/project addresses a flood problem with drainage area of 1 square mile or greater.
- The evaluation /strategy/project reduces flood risk for the 100-year (1% annual chance) flood.
- Exceptions for level of flood risk reduction or problem area size include instances of flooding of critical facilities, transportation routes, or other factors as determined by the RFPG.

Step 2-1: Screening of Projects (FMPs):

In the second step, potential Flood Mitigation Projects

(FMPs) are subjected to a screening-level evaluation based on the TWDB Technical Guidelines for Regional Flood Planning (April 2021) and specifically Figure 5 FMP flowchart (Attachment A). If a potential FMP does not satisfy the screening criteria in this step, it will then become a potential Flood Management Evaluation. There are three criteria that are applied in this step are: "sufficient data", "no negative effect", and "project details".

- Sufficient data - The data upon which an assessment of no negative effect has been made must be reliable and have minimal uncertainty. H&H modeling, mapping, and basis for mitigation analysis must generally meet Section 3.5 of TWDB technical guidelines.
- No negative effect - The potential Project must not have negative impact on the 100-year (1% annual chance) flood event. It must not raise the flood elevation or increase discharge of the

100-year flood event. Any of the following will disqualify the potential project in this screening step:

- Potential project increases inundation on homes, commercial buildings, critical facilities, and other structures.
- Potential project increases inundation beyond existing or proposed ROW or easements.
- Potential project increases inundation beyond existing drainage infrastructure capacity.

- Project details – Data used to define the potential project must include sufficient project details as described in Section 3.9 of TWDB technical guidelines, including but not limited to the following:
  - Flood severity level metrics
  - Flood risk/damage reduction metrics
  - Estimated capital and O&M costs
  - Benefit/Cost ratios
  - Environmental benefits/impacts
  - Potential for natural flood mitigation components
  - Implementation constraints
  - Water supply benefits

Step 2-2: Screening of Evaluations (FMEs):

Flood Management evaluations may fall into one of three general categories:

1. Potential projects (FMPs) that did not meet screening criteria Step 2-1.
2. Planned flood studies or flood risk reduction alternatives analyses provided by or developed in conjunction with floodplain management communities/project sponsors.
3. Potential flood studies or flood risk reduction alternatives analysis needs identified by the technical consultant in Task 4A.

In this step potential studies are screened based on the following criteria from TWDB technical guidelines and illustrated in the flowchart in Attachment B:

- Potential evaluation must identify structures, population, and critical facilities at risk within the flood problem area being studied.
- Potential evaluation must identify roadways impacted by flooding within the flood problem area being studied, if applicable.
- Potential evaluation must quantify area of agricultural land at risk within the flood problem area being studied, if applicable.
- Potential evaluation must have willing sponsor(s) identified that are willing to commit resources and some level of potential cost sharing.
- Potential evaluation must have reasonable planning-level cost estimate.

If there is sufficiently detailed H&H analysis and flood mitigation alternatives analysis, then the Evaluation may be considered as Project (FMP) or Strategy (FMS)

Step 2-3: Screening of Strategies (FMSs):

Strategies are proposed plans or actions that reduce flood risk or mitigate flood hazards to life or property. Any proposed action that doesn't meet the criteria to qualify as an evaluation or as a project can potentially be considered as a strategy. Strategies can also be flood studies or flood risk reduction alternatives analysis needs that are identified in Task 4A. In general, RFPG has flexibility with what qualifies as Strategies.

In this step, Strategies are screened based on the following criteria from the TWDB technical guidelines:

- Potential strategies must include a planning-level cost estimate.
- Potential strategies must have an identified sponsor(s) that are willing to commit resources and some level of potential cost sharing.
- Potential strategies must quantify the estimated flood risk being addressed and potential level of flood risk reduction.

Step 3: Sorting of Projects, Evaluations and Strategies by Flood Mitigation and Floodplain Management Goals:

In the third step, the projects, evaluations, and strategies identified will be assigned to one of more of the goals defined in Task 3B.

Step 4: Detailed assessment of selected Projects, Evaluations, and Strategies:

In the fourth step, potential evaluations, strategies, and projects that meet the criteria in the initial screening processes described in Steps 1 and 2 are to be evaluated further for potential feasibility and must meet the following:

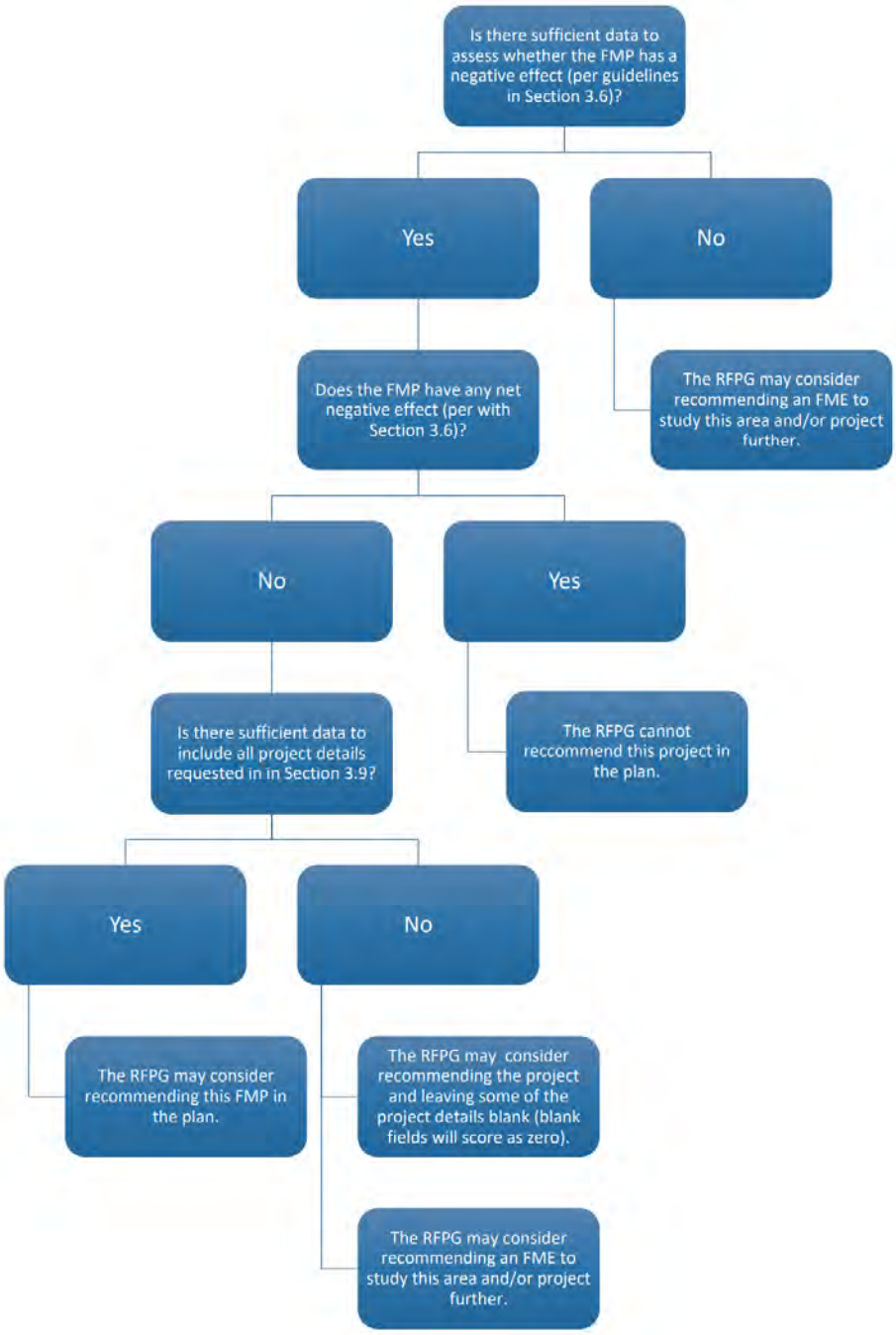
- Potential projects must have an estimated benefit-cost ratio greater than 1.0.
- Potential evaluations, strategies, and projects must have a willing sponsor(s) that has been verified.
- There must be no known insurmountable implementation constraints or hurdles, such as ROW acquisitions, utility conflicts, and/or permitting issues.
- Potential evaluations, strategies, and projects will be evaluated to identify maintenance requirements and their costs.

Step 5: Final recommendation of Projects, Evaluations, and Strategies:

In this final step recommended studies, strategies, and projects are to be incorporated in the initial draft and final regional flood plan. The regional flood plan must also include:

- Public comments and RFPG response on the recommended FMPs, FMEs and FMSs
- Initial and final adoption

Attachment A – FMP Flowchart



*From TWDB Technical Guidelines Figure 5: FMP Flowchart

Attachment B – FME Flowchart

Appendix A-8

Full Reference Links

Appendix A-8 – Full Reference Links

Full web addresses listed for the hyperlinks cited in the Technical Memorandum.

Section 2

- Watershed Master Plan Viewer: https://sara-tx.maps.arcgis.com/apps/webappviewer/index.html?id=1cc5aae56ef145b69aab7dc1b6e52597
- FEMA's Map Service Center: https://msc.fema.gov/portal/advanceSearch
- USGS Flood Inundation Mapping Program (FIMP) Website: https://www.usgs.gov/mission-areas/water-resources/science/flood-inundation-mapping-fim-program

Section 3

- Regional Flood Planning ArcGIS Online Interactive Map: https://hdr.maps.arcgis.com/apps/MapSeries/index.html?appid=4bf56a7abed44fe9b07a450d1f95404b

Section 4

- Bexar Flood Website https://www.bexarflood.org/
- Bexar County Highwater Alert Lifesaving Technology (HALT) https://www.bexarflood.org/#!/main/map
- San Antonio Flood Emergency (SAFE) Route System https://gis.sanantonio.gov/OEM/SAFE/index.html
- Regional Flood Planning ArcGIS Online Interactive Map: https://hdr.maps.arcgis.com/apps/MapSeries/index.html?appid=4bf56a7abed44fe9b07a450d1f95404b

Section 5

- San Antonio River Authority's Risk MAP Viewer: https://www.arcgis.com/apps/webappviewer/index.html?id=0b13614f13124257bfe589a459ba84fe
- SARA Digital Data and Model Repository (D2MR) Website: https://d2mr.sara-tx.org/Login?ReturnUrl=%2F#/

Section 6

- TWDB Cursory Floodplain Page: https://twdb-flood-planning-resources-twdb.hub.arcgis.com/pages/cursory-flood

Texas Water Development Board

Regional Flood Planning

Technical Memorandum (March 7 Deadline) Administrative Completeness Checklist

The Technical Memorandums reflect draft materials and interim RFPG decisions as of the date of submission and do not constitute final decisions, complete information, or data etc. These submissions reflect a set of working information that is intended to demonstrate significant progress in developing each regional flood plan but that will likely change prior to final adoption and, in some cases, will be only partially complete at the time of this submission.

Regional Flood Planning Group Name: San Antonio

The Technical Memorandum must be in accordance with the contract requirements when submitted to the Texas Water Development Board (TWDB). A list of the required items with check boxes has been provided below to assist regional flood planning groups and their consultants in completing the Technical Memorandum submissions. This checklist will be used, internally, by TWDB staff to verify that the basic submission requirements are met and is being provided to the flood planning regions and their consultants for convenience and to assist in the process**. We suggest that those preparing Tech Memo submissions use this checklist and include a completed checklist with the Technical Memorandum.**

TECHNICAL MEMO ITEMS DUE MARCH 7, 2022

Please note that the required deliverables have been organized below by Task 4C - Technical Memorandum scope of work (SOW) items 4C.1.c-e.

Map deliverables are numbered according to the maps list in Exhibit C Section 3.10 and include in parentheses the reference to the specific Exhibit C section which provides detailed guidance related to the map and associated data requirements. TWDB recognizes that like other Technical Memorandum components, submitted maps are only an indicator of progress to date, and may change before draft Regional Flood Plan submission.

Please use the 'Submission Notes' text box as necessary to notate file names, locations, or other information that might be useful to know during the TWDB review.

4C.1.c: A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that the RFPG considers to be best representation of the region-wide 1.0% annual chance flood event and 0.2% annual chance flood event inundation boundaries, and the source of flooding for each area, for use in its risk analysis, including indications of locations where such boundaries remain undefined.

☑ 1. Completed Feature class: ExFldHazard. This feature class should identify location and magnitude of both 1% and 0.2% annual chance floods in addition to flood prone areas. The feature class should be complete with a Polygon shapefile and conform to the **Table 9** template provided in **Exhibit D**.

Submission Notes:

☑ 2. Completed feature class: Fld_Map_Gaps. This feature class should show areas without sufficient or outdated mapping data. It should be complete with a Polygon shapefile, and conform to the **Table 10** template provided in **Exhibit D**.

Submission Notes:

San Antonio River Basin has extensive mapping coverage and no areas were identified as having not sufficient or outdated mapping data.

☑ 3. Completed feature class: ExFldExpPol. This polygon feature class should show the results of existing condition flood exposure analyses, identifying who and what might be harmed within the region for, at a minimum, both 1.0% annual chance and 0.2% annual chance flood events. It should conform to conform to the **Table 11** template provided in **Exhibit D**.

Submission Notes:

☑ 4. Completed feature class: ExFldExpLn. This line feature class should show the results of existing condition flood exposure analyses, identifying who and what might be harmed within the region for, at a minimum, both 1.0% annual chance and 0.2% annual chance flood events. It should conform to the **Table 12** template provided in **Exhibit D**.

Submission Notes:

☑ 5. Completed feature class: ExFldExpPt. This point feature class should show the results of existing condition flood exposure analyses, identifying who and what might be harmed within the region for, at a minimum, both 1.0% annual chance and 0.2% annual chance flood events. It should conform to the **Table 13** template provided in **Exhibit D**.

Submission Notes:

☑ 6. Completed feature class: ExFldExpAll. This layer combines the existing condition exposure polygon, line, and point data into a single point layer that identifies whether the exposure is a critical facility and provides the Social Vulnerability Index for each point. It should conform to the **Table 14** template in **Exhibit D**.

Submission Notes:

☑ 7. Completed feature class: FutFldHazard. This feature class should include the locations and magnitudes of both future 1.0% annual chance and 0.2% annual chance floods. It should conform to the **Table 15** template in **Exhibit D**.

Submission Notes:

☑ 8. Completed feature class: FutFldExpPol. This polygon feature class should show the results of future condition flood exposure analyses, identifying who and what might be harmed within the region for, at a minimum, both 1.0% annual chance and 0.2% annual chance flood events. It should conform to the **Table 16** template provided in **Exhibit D**.

Submission Notes:

☑ 9. Completed feature class: FutFldExpLn. This line feature class should show the results of future condition flood exposure analyses, identifying who and what might be harmed within the region for, at a minimum, both 1.0% annual chance and 0.2% annual chance flood events. It should conform to the **Table 17** template provided in **Exhibit D**.

Submission Notes:

☑ 10. Completed feature class: FutFldExpPt. This point feature class should show the results of future condition flood exposure analyses, identifying who and what might be harmed within the region for, at a minimum, both 1.0% annual chance and 0.2% annual chance flood events. It should conform to the **Table 18** template provided in **Exhibit D**.

Submission Notes:

☑ 11. Completed feature class: FutFldExpAll. This layer combines the future condition exposure polygon, line, and point data into a single point layer that identifies whether the exposure is a critical facility and provides the Social Vulnerability Index for each point. It should conform to the **Table 19** template provided in **Exhibit D**.

Submission Notes:

☑ 12. Map 4: Existing Condition Flood Hazard (Exhibit C 2.2.A.1)

Submission Notes:

☑ 13. Map 5: Existing Condition Flood Hazard – Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.A.1)

Submission Notes:

San Antonio River Basin has extensive mapping coverage and no areas were identified as having not sufficient or outdated mapping data. No flood prone areas were identified outside of the floodplain mapping boundaries.

☑ 14. Map 6: Existing Condition Flood Exposure (Exhibit C 2.2.A.2)

Submission Notes:

☑ 15. Map 7: Existing Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.A.3)

Submission Notes:

☑ 16. Map 8: Future Condition Flood Hazard (Exhibit C 2.2.B.1)

Submission Notes:

☑ 17. Map 9: Future Condition Flood Hazard - Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.B.1)

Submission Notes:

San Antonio River Basin has extensive mapping coverage and no areas were identified as having not sufficient or outdated mapping data. No flood prone areas were identified outside of the floodplain mapping boundaries

☑ 18. Map 10: Extent of Increase of Flood Hazard Compared to Existing Condition (Exhibit C 2.2.B.1)

Submission Notes:

☑ 19. Map 11: Future Condition Flood Exposure (Exhibit C 2.2.B.2)

Submission Notes:

☑ 20. Map 12: Future Condition Vulnerability and Critical Infrastructure (Exhibit C 2.2.B.3)

Submission Notes:

4C.1.d: A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that identifies additional flood-prone areas not described in 4C.1.d(c) based on location of hydrologic features, historic flooding, and/or local knowledge.

☑ 21. Completed Feature class: ExFldHazard. This feature class should identify location and magnitude of both 1% and 0.2% annual chance floods in addition to flood prone areas. The feature class should be complete with a Polygon shapefile and conform to the **Table 9** template provided in **Exhibit D**.

NOTE: *This feature class is also included under SOW Task 4C.1.c. above, as it relates to both SOW Task 4C.1.c and 4C.1.d. Please check the boxes in both places if the deliverable is complete.*

Submission Notes:

None identified

☑ 22. Map 5: Existing Condition Flood Hazard – Gaps in Inundation Boundary Mapping and Identify known Flood Prone Areas (Exhibit C 2.2.A.1).

NOTE**:** *This associated map is also included under SOW Task 4C.1.c above, as it relates to both SOW Task 4C.1.c and 4C.1.d. Please check the box in both places if the deliverable is complete.*

Submission Notes:

None identified

4C.1.e: A geodatabase and associated maps in accordance with TWDB Flood Planning guidance documents that identifies areas where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available.

☑ 23. This polygon feature class should show the boundaries of where existing hydrologic and hydraulic models needed to evaluate FMSs and FMPs are available.

NOTE: *Exhibit D does not prescribe a specific format or other guidelines for this deliverable. Please include the name/location of this deliverable in the 'Submission Notes' column.*

TWDB is working on a template feature class with associated field names and will disseminate shortly.

Please identify each model with a unique Model ID. Each 12-digit model ID (MODEL_ID) shall start with two-digit region number, example 01, 02, 03 etc. (Region No. + 10 Digits).

Submission Notes:

Stakeholder outreach is underway, still receiving FMPs/FMSs.

☐ 24. Map(s) showing where existing hydrologic and hydraulic models needed to evaluate FMSs FMPs are available.

***NOTE**: This map is not specifically mentioned or assigned a number in Exhibit C Section 3.10; however, the general mapping guidelines therein shall be followed for the creation of this map.*

Submission Notes:

Stakeholder outreach is underway, still receiving FMPs/FMSs.

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

February 25, 2022

Brian Mast
Manager of Government Affairs
San Antonio River Authority
201 W. Sheridan
San Antonio, TX

RE: Regional Flood Planning Grant Contract with San Antonio River Authority; Contract No. 2101792497, Technical Memorandum Administratively Complete and Notice to Proceed for Task 5

Dear Mr. Mast:

Staff members of the Texas Water Development Board (TWDB) have completed their review of the Technical Memorandum under the above referenced contract and found the deliverable to be administratively complete. The Region 12 San Antonio Regional Flood Planning Group (RFPG) is hereby notified to proceed with work set forth in the Regional Flood Planning Grant Contract Scope of Work Task 5 - Recommendation of Flood Management Evaluations and Flood Management Strategies and Associated Flood Mitigation Projects.

TWDB staff will be performing a more detailed technical review of the Technical Memorandum. This will result in informal comments for the RFPG to consider during the remainder of the planning cycle. These informal comments and feedback will not require formal responses unless specifically requested by staff. Instead, they will be provided to support each region in producing a complete draft Regional Flood Plan that will meet all requirements. You will receive these informal comments in late Spring 2022. The TWDB recognizes that the Technical Memorandum is a midpoint deliverable and progress report, and that many aspects of Regional Flood Plan development may change after its receipt and up until final adoption.

Additionally, as the Region 12 San Antonio RFPG continues to evaluate flood management evaluations, flood management strategies, and flood mitigation projects, we encourage you to coordinate with your neighboring regions to proactively identify and resolve elements of your Regional Flood Plan that could potentially negatively affect a neighboring area in a different region.

If you have any questions, do not hesitate to contact Anita Machiavello of our Flood Planning staff at 512-463-5158 or via email at anita.machiavello@twdb.texas.gov.

Sincerely,

Reem Zoun

Reem J. Zoun, PE, CFM, ENV SP
Director
Flood Planning

cc: Nefi Garza, RFPG Chair
Ronald Branyon, HDR, Inc.
Troy Dorman, Halff Associates, Inc.
Matt Nelson, TWDB
Anita Machiavello, TWDB
James Bronikowski, TWDB
Morgan White, TWDB

Agenda Item No.9: Officer Elections

Agenda Item No.10: Regional Liaison Update