

Technical Memorandum No. 1

TO:	Jeff Walker Executive Administrator P.O. Box 13231 Austin, TX 78711-3231	DATE:	November 23, 2021 due to TWDB January 7, 2022
THROUGH:	Chris Brown Executive Director Ark-Tex Council of Government 4808 Elizabeth Street Texarkana, TX 75503	PROJECT:	TWDB Contract No. 2101792501 Halff AVO 43790.001
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SUBJECT:	Lower Red-Sulphur-Cypress Regional Flood Plan Task 4C – Technical Memorandum No. 1		

Process Overview

In 2019, the Texas Legislature enacted Senate Bill 8 directing the creation of the first-ever State Flood Plan — to be prepared by the Texas Water Development Board (TWDB) and to follow a similar region-driven “bottom-up” approach that’s been used for water supply planning in Texas for more than 20 years. As outlined by the Texas Water Code, the purpose of the regional and state flood plans is to:

- Provide for orderly preparation for and response to flood conditions to protect against the loss of life and property;
- Guide state and local flood control policy; and
- Contribute to water development, where possible.

Early in the implementation process TWDB established 15 flood planning regions, based on river basin boundaries, and convened Regional Flood Planning Groups (RFPG) for each region. As depicted in Figure 1, draft Regional Flood Plans (RFP) are to be submitted to TWDB by August 1, 2022 and final adopted RFPs by January 10, 2023. The 15 RFPs will then be used to prepare the first Texas Flood Plan for adoption by TWDB by September 1, 2024. Subsequently, the RFPs and State Flood Plans will be updated on a five-year cycle.

Figure 1: Regional Flood Planning Timeline

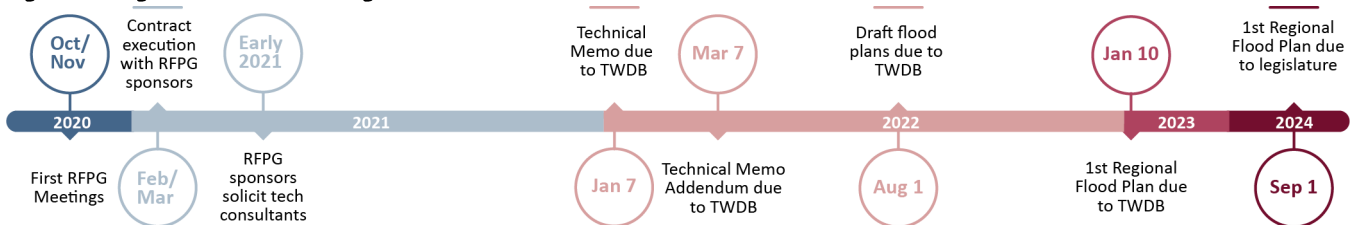
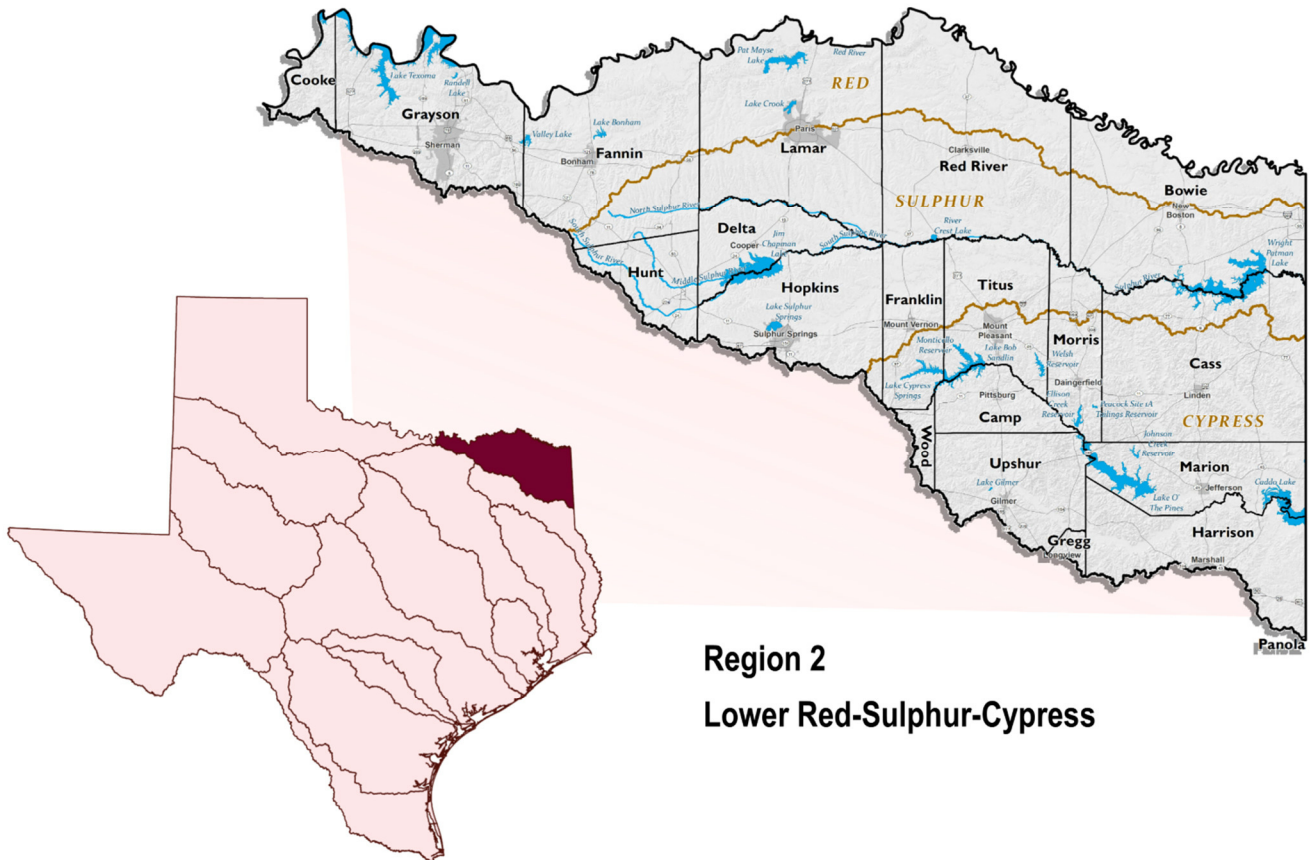


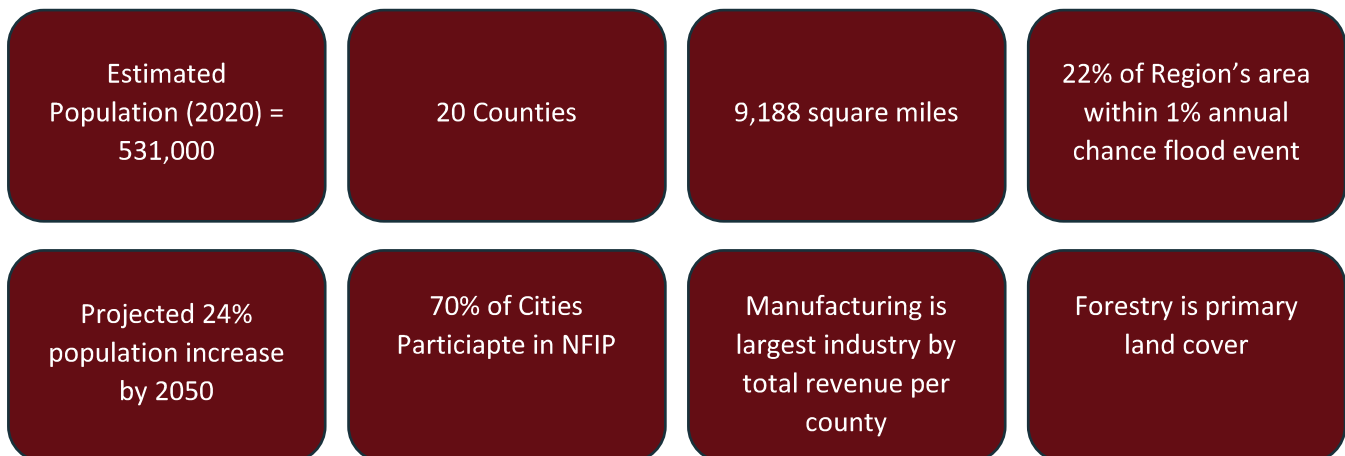
Figure 2 shows the delineation of the 15 flood planning regions, as well as the boundaries of the Lower Red-Sulphur-Cypress (Region 2) flood planning region. This region encompasses the Lower Red, Sulphur, and Cypress River Basins, with an approximate are of 9,188 square miles. Key attributes of the Lower Red-Sulphur-Cypress Flood Planning Region are presented in Figure 3.

Figure 2: Lower Red-Sulphur-Cypress Flood Planning Region



**Region 2
 Lower Red-Sulphur-Cypress**

Figure 3: Region 2 Quick Facts



Who is Preparing the Regional Flood Plans?

TWDB has established RFPGs for each region and has provided funding for preparation of the RFPs. RFPG responsibilities include directing the work of technical consultants, soliciting and considering public input, identifying specific flood risks, and identifying, evaluating, and recommending flood management studies, strategies, and projects to reduce flood risk. To ensure a diversity of perspectives are considered throughout the planning process, TWDB appointed RFPG members representing 11 stakeholder groups:

- Agriculture
- Counties
- Electric Generation Utilities
- Environmental Interests
- Industry
- Municipalities
- Public
- River Authorities
- Small Businesses
- Water Districts
- Water Utilities

TWDB is administering the regional flood planning process through a contractual relationship with a sponsor selected by the RFPG. The Lower Red-Sulphur-Cypress region selected Ark-Tex Council of Governments (ATCOG) to serve as the RFPG’s sponsor. ATCOG provides administrative and logistical support for RFPG meetings and required public meetings, develops and manages the RFPG’s website, and administers a contract with the project technical consultant. The RFPG selected the Halff Associates Team as its technical consultant to assist with the preparation of the Lower Red-Sulphur-Cypress Regional Flood Plan.

Regional Flood Planning Tasks

TWDB rules, scope of work, and technical guidelines for regional flood planning prescribes a process consisting of ten tasks as outlined in *Table 1*.

Table 1: Regional Flood Planning Tasks

Task	Description
1	Planning Area Description
2	Existing and Future Condition Flood Risk Analysis
3	Floodplain Management Practices and Flood Mitigation and Floodplain Management Goals
4	Flood Mitigation Needs Analysis and Identification and Evaluation of Potential Flood Management Evaluations (FMEs), Potentially Feasible Flood Management Strategies (FMSs), and Flood Mitigation Projects (FMPs)
5	Recommendation of FMEs and FMSs and Associated FMPs
6	Impacts of Regional Flood Plan and Contributions to and Impacts on Water Supply Development and the State Water Plan
7	Flood Response Information and Activities
8	Administrative, Regulatory, and Legislative Recommendations
9	Flood Infrastructure Financing Analyses
10	Public Participation and Plan Adoption

Tasks 1 through 4 comprise the initial discovery or data collection phase of regional flood planning, the conclusion of which is preparation this Technical Memorandum which was approved by the RFPG for submittal to TWDB on December 9, 2021. Per TWDB rules and guidelines, the Technical Memorandum is to be submitted to TWDB by January 7, 2022 and is to include:

- List of existing political subdivisions with flood-related authority/responsibility;
- List of previous flood studies and models considered relevant for the plan;
- Adopted flood mitigation and floodplain management goals;
- Documentation of the process to be used to identify potentially feasible FMSs and FMPs;
- List of potential FMEs and potentially feasible FMSs and FMPs;
- List of infeasible FMSs and FMPs with reason of exclusion; and
- Associated geospatial database

To accommodate the delayed release of critical floodplain information, the TWDB extended the deadline for completion and submittal of some elements of the Technical Memorandum to March 7, 2022. Table 6 includes details on which items are included in this Technical Memorandum 1 and which will be include din the Addendum.

Status of Flood Planning for the Lower Red-Sulphur-Cypress Region

The following sections provide a summary of the current progress of the regional flood planning process through November 2021. This summary is further supplemented by information included in Attachments to this Technical Memorandum.

Task 10 – Public Outreach and Engagement

The objective of this task is to address public participation, public meetings, administrative and technical support activities that are required to complete and submit a draft and final adopted Regional Flood Plan by January 10, 2023. A summary of public outreach and engagement activities undertaken to date follows:

Regional Flood Planning Group Meetings (2020 – 2021)

ATCOG as the project sponsor posts all meetings of the RFPG and its Executive Committee on the [Region 2 website](#) and on the Texas Secretary of State website, distributes agendas and meeting materials via email to all voting and non-voting RFPG members, as well as any person or entity who has requested notice of RFPG activities. Registration to receive such notifications is provided via the Region 2 website. All meetings of the RFPG to date have been convened virtually via the Zoom webinar platform or in a hybrid (virtual and in-person) format and are conducted pursuant to the Texas Open Meetings Act (Chapters 551 and 552, Government Code), Public Information Act, and COVID-related disaster proclamations issued by Governor Abbott. Table 2 provides a summary of the RFPG meetings held to date.

Table 2: Meeting Calendar

Year	Date	Meeting	Highlights
2020	October 30	Planning Group Virtual Meeting	RFPG convening hosted by TWDB
2021	January 7	Planning Group Virtual Meeting	ATCOG (sponsor) hosts
	February 4	Planning Group Virtual Meeting	Tech consultant selection process approved
	March 4	Planning Group Virtual Meeting	Added additional non-voting members
	April 1	Planning Group Hybrid Meeting	Consultant Interview and Selection
	May 6	Planning Group Virtual Meeting	First meeting with Technical Consultant
	July 8 ^{A,B}	Planning Group Hybrid Meeting	Pre-planning public comment
	August 8 ^A	Planning Group Hybrid Meeting	Pre-planning public comment and began discussion of Goals and Needs
	September 2	Planning Group Hybrid Meeting	Public comment taken on draft goals and draft process for identification and evaluation of potential studies and potentially feasible strategies and projects.
	October 7	Planning Group Hybrid Meeting	RFPG approves draft goals and process for identification and evaluation of potential studies and potentially feasible strategies and projects.
	November 4	Planning Group Hybrid Meeting	Discussed Tech Memo and use of additional funding
December 9	Planning Group Hybrid Meeting	RFPG approves submittal of Technical Memorandum No. 1	

^APre-Planning Public Input (July and August) – Public input regarding suggestions and recommendations as to issues, provisions, projects, and strategies that should be considered during the flood planning cycle and/or input on the development of the regional flood plan (as required per Texas Water Code §16.062(d) and 31 Texas Administrative Code §361.12(a)(4)).

^BJuly 8, 2021, meeting initiated a hybrid meeting format with the RFPG Chair and Sponsor organization meeting in a published physical location open to the public at various locations in northeast Texas, while continuing to offer the Zoom webinar option for voting members, non-voting members and public participants, in accordance with Texas Government Code §551.127.

Public Virtual, In-Person and Hybrid Meetings

As noted in Table 2, two hybrid pre-planning public input sessions were conducted during RFPG meetings in mid 2021. Depending on status of in-person group gatherings and COVID-19 best practice guidelines, ATCOG and the technical consultant will be planning and conducting required public meetings following adoption and submittal of the draft Regional Flood Plan (by August 1, 2022). It is anticipated at this time, that public meetings could be in-person and held in multiple locations within the region (e.g., upper, middle, and lower portions of the flood planning region).

Public Outreach Strategies and Tools

ATCOG established the required website in January 2021 under the domain name www.texasfloodregion2.org using the Constant Contact hosting platform. The Halff Team created a cohesive visual identity for the basin. The website was also updated to provide more information and education materials about flood planning related topics. The website was updated to allow easy access for the public, with information about the planning process and updates on RFPG meetings. To complement the more in-depth information gathered by the data collection

effort, the website provided a brief survey for site visitors to gain a broad understanding of regional goals and priorities.

As of December 1, 2021, over 400 subscribers have registered (on their own or by the consultant team) on the website to receive notifications and information pertaining to the regional planning activities. Table 3 provides additional website analytics.

Table 3: Website Analytics

Date	Total Visits	Unique Visitors	Page Views
June-July 2021	277	86	395
June-November 2021	1,525	688	2,137

Direct Email Blasts

The RFPG uses Constant Contact to communicate to public and community stakeholders. An email contact list has been developed for a targeted audience that now has 419 contacts and includes the following tags:

- Municipalities
- Counties
- County Judges
- Floodplain administrators
- Directors of development
- Other Districts
- Subscribers through website
- Chambers of Commerce
- Libraries
- NGOs
- RFPG members
- Half technical consultant team

Eleven email blasts have been sent to audiences between June – December 2021, with a click-to-open average rate of 25 percent. For perspective, a click-to-open average rate between 20-30 percent is generally considered a good response goal.

Task 1 – Planning Area Description

TWDB requirements for Task 1, and the resultant Chapter 1 of the Regional Flood Plan, prescribe collection and presentation of a wide array of data and information about the Lower Red-Sulphur-Cypress region. This required information and associated draft Chapter 1 outline include:

Attributes of the Lower Red-Sulphur-Cypress Region

- Social and economic characteristics;
- Flood prone areas and flood risk to life and safety;
- Key historical flood events; and
- Political subdivisions with flood-related authority.

Assessment of Existing Flood Infrastructure

- Natural features;
- Structural flood infrastructure; and
- Condition and functionality of existing flood infrastructure

Proposed and Ongoing Flood Mitigation Activities

- Current flood mitigation activities; and
- Projects under construction

The data and information collection requirements of Task 1 focus on identifying the nature of flood risk in the regions, flood mitigation and management practices, and projects that reduce flood risk without negatively affecting neighboring areas. Key elements included:

- Acquisition and review of available information from secondary sources, such as data available online from TWDB and other agencies (e.g., FEMA, Corps of Engineers), existing watershed models, FEMA Flood Insurance Maps and claims data, reports of previous investigations and studies, city and county flood hazard mitigation plans, and local ordinances related to floodplain management. Technical consultant team experience has also been incorporated.
- Information was also requested directly from key stakeholders (e.g., city and county floodplain administrators, emergency coordinators) and the public through an online survey. The *Region 2 Data Collection Survey Tool and Interactive Webmap* included over 90 questions, data upload requests, and interactive maps addressing the full array of topics and information relevant to regional flood planning. A copy of the survey questionnaire can be viewed on the [Region 2 website](#). In addition to the online survey, the technical consultant team has and will continue to reach out directly to key stakeholders to acquire additional information and input and/or to clarify any questions about information on hand.

Responses to the survey include 25 percent of the region’s counties (5 counties), 27 percent of the region’s communities (23 communities), one river authority, 3 utility districts, and two councils of governments.

Task 1 is substantially complete. The results have been compiled and are presented in a draft of Chapter 1 of the RFP.

Task 2 – Existing and Future Condition Flood Risk

While developing a comprehensive flood risk model of the region is beyond the scope of this planning effort, the TWDB “Floodplain Quilt” that is being used in the planning process is “sewn” together from various sources of data to provide comprehensive coverage of all known existing statewide flood hazard information. The Floodplain Quilt combines numerous data layers from FEMA, including effective floodplain maps, preliminary maps, base level elevation (BLE) maps, as well as data from other federal agencies. Information drawn from local and regional flood studies is being used to refine the region’s Floodplain Quilt “patches” derived from such sources.

Development of Task 2 – Flood Risk Analysis is contingent upon the incorporation of the TWDB provided cursory floodplain dataset, also referred to as the Fathom dataset. The TWDB recommends the use of the Fathom datasets to areas where no other data source has been identified or areas where flood hazard information is outdated or unreliable. The Fathom dataset was provided to the RFPG on October 29, 2021 and therefore has not been fully processed and assessed for incorporation into Technical Memorandum No. 1. Once the datasets are processed, the Floodplain Quilt will be reassembled using updated flood risk patches. As outlined in the TWDB Extension of Time to Complete Technical Memorandum (dated August 17, 2021) and associated Technical Memorandum Data Deliverable Clarification (dated October 29, 2021), the TWDB has extended the submittal deadline of these Task 2 items to March 7, 2022.

Region 2 intends to develop the floodplain quilt using the best available data based on the following prioritization:

1. Local Detailed Studies – Local detailed studies will be included only if they are city/county-wide studies completed to FEMA or TWDB standards. To date, no such studies have been provided that have not already been incorporated into FEMA Zone AE studies.

2. FEMA Zone AE Detailed Studies – These are limited to most of Grayson County and the larger municipalities in the area. Some cities, such as Sherman, Paris, and Texarkana have previously incorporated their own detailed studies.
3. FEMA Zone A Approximate Studies - Zone As make up most of the floodplain mapping that is available in the region.
4. Base Level Engineering (BLE) – Where available, BLE will be utilized. It is expected that, for this first round of the Regional Flood Plan, BLE will only be available in the Lower Red Basin. This will be used in counties with no current FEMA floodplain mapping or to extend the limits of the Zone A/AE floodplain.
 - a. 0.2% AC Floodplain – Where available, the BLE 0.2% AC floodplain will be used where no 0.2% AC Zone X floodplain exists, which is most of the region.
5. Fathom Cursory Floodplain Dataset
 - a. Fluvial - Fathom fluvial (riverine/channel flooding) data will be used where no FIRM or BLE data is available.
 - b. Pluvial – Fathom pluvial (upland/urban flooding) data is being evaluated for use in supplementing all floodplain data to extend into upland areas (drainage areas less than one square mile) not traditionally covered by FEMA floodplain maps.

The methodology for assembling this quilt is under development now that both the BLE and Fathom became available in late October.

Future flood risks are only available in limited areas of the Region. In particular, Region 2 intends to use the current 0.2% AC (500-year) floodplain as the basis for future conditions 1% ACE floodplain in all locations where the 0.2% AC floodplain is available (whether from FEMA, Fathom, or other source); otherwise, the existing 1% AC floodplain will be utilized as the future 1% ACE. The Future 0.2% AC floodplain is mostly unavailable and will be identified as a data gap.

Task 3 – Floodplain Management and Flood Mitigation Practices and Goals

Task 3 consists of two related parts: Task 3A – Evaluation and Recommendations on Floodplain Management Practices and Task 3B - Flood Mitigation and Floodplain Management Goals.

For Task 3A, TWDB requirements include:

- Assessment of current floodplain management and land use practices within the region;
- Consideration as to how the lack of, or insufficient, or ineffective floodplain management and land use practices may increase existing and future flood risk;
- Assessment of how future flood risk may change over time; and
- Consideration of recommendations for forward-looking floodplain management, land use, and economic development policies, practices, standards, and strategies that should be implemented by entities within the region.

Substantial progress has been made on Task 3A with a preliminary draft of Chapter 3 under review by the technical consultant team. This includes a substantially complete draft of TWDB-required Table 3 which provides an at-a-glance overview of the current state of National Flood Insurance Program participation by eligible entities within the region. Information about existing floodplain management practices in the Lower Red-Sulphur-Cypress region was also obtained through the *Region 2 Data Collection Survey Tool and Interactive Webmap* and from

other sources. Refinements and additions to the Task 3A portion of Chapter 3 will be forthcoming as work on other related tasks is completed (e.g., Tasks 2A/B and 5).

Task 3B, also substantially complete and is included as *Attachment 3* to this Technical Memorandum. This table of goals was approved by the Lower Red-Sulphur-Cypress RFPG at its October 7, 2021 meeting. Again, it should be noted that refinements and additions to this portion of Chapter 3 will occur as work progresses on other related tasks. TWDB requires that the RFPG adopt specific and achievable short-term (10 years) and long-term (30 years) goals to guide the regional flood planning process. As adopted, most of the draft goals include specific quantifiable targets or performance measures. These may be revised as work on other related tasks progress, most importantly, the work to be performed under Task 5 - Recommendation of FMEs and FMSs and associated FMPs.

Task 4 – Needs Analysis and Potential FMEs, FMSs, and FMPs

Task 4 consists of two related parts: Task 4A – Flood Mitigation Needs Analysis and Task 4B – Identification and Evaluation of Potential Flood Management Evaluations (FMEs), Potentially Feasible Flood Management Strategies (FMSs), and Flood Mitigation Projects (FMPs).

Task 4A includes the identification of locations that have the greatest flood mitigation and flood study needs by the evaluation of high flood risk or flood prone areas, areas lacking sufficient models or maps, historic flooding, and emergency needs. Task 4A also includes the initial collection and compilation of potential evaluations (FMEs), strategies (FMSs), and projects (FMPs) that will be further advanced through Task 4B and 5 activities as well as RFPG recommendations. Substantial progress has been made on Task 4A related to the initial collection of potential evaluations, studies, and projects. Completion of the Task 4A assessment of areas with the greatest risk and need is contingent upon substantial completion of the Task 2 existing and future flood risk analysis.

Task 4B includes the development of a screening process and initial screening-level evaluation of potential evaluations, studies, and projects identified in Task 4A. The approach developed for Task 4B was approved by the RFPG at the October 7, 2021 meeting and is included in Attachment 4. As of November 2021, flood related studies and plans have been collected, compiled, and initially screened utilizing 19 previous floodplain studies, 14 hazard mitigation plans, three drainage master plans, one flood protection study, and four mitigation or capital improvement studies. Substantial progress has been made on Task 4A related to potentially feasible evaluations, studies, and projects. Substantial completion of draft Chapter 4 is projected by February 2022.

Look-Ahead – Process for August 2022 Draft Regional Flood Plan

The submittal of Technical Memorandum No. 1 marks the conclusion of the data collection phase of the regional flood planning process. However, as noted previously, the substantial completion of Tasks 2A/B and 4A/B are underway and will be documented in the Technical Memorandum Addendum and submitted to TWDB by March 7, 2022. In terms of the schedule for the plan development phase of the process, the driver is the requirement for the RFPG to adopt and submit an initial draft Regional Flood Plan to TWDB by August 1, 2022. Table 4 below presents an overview of the projected work to be completed and the general sequence of actions the RFPG will encounter during this next phase of the process.

Table 4: Projected Progress by Task

Task / Description		Progress as of November 22, 2021	Projected Progress
Task 1	Planning Area Description	Substantially complete – The draft Chapter 1 has been provided to the RFPG and public for review and comment.	The content of draft Chapter 1 will be subject to further refinement, as appropriate, based on comments and suggestions received from the RFPG and the public as well as advancements in the planning process particularly related to refined flood risk information (Task 2).
Task 2A	Existing Condition Flood Risk	Partially complete – Floodplain Quilt patches have been generated using collected and researched information.	The Fathom datasets are being processed to generate additional flood risk patches. Substantial completion is projected by February 2022 with approval by the RFPG to submit to TWDB by March 7, 2022.
Task 2B	Future Condition Flood Risk	Partially complete – Future condition Floodplain Quilt patches have been generated using collected and researched information in addition to the coordination of estimation methodologies with other consultants and regions.	Along with Task 2A, substantial completion is projected by February 2022 with approval by the RFPG to submit to TWDB by March 7, 2022.
Task 3A	Floodplain Management Practices	Substantially complete – The draft Task 3A table will be provided to the RFPG and public for review and comment.	The content of draft Chapter 3 will be subject to further refinement, as appropriate, based on comments and suggestions received from the RFPG and the public as well as advancements in the planning process.
Task 3B	Mitigation & Management Goals	Substantially complete – The draft goal statements have been provided to the RFPG and public for review and comment and were subsequently adopted by the RFPG.	Quantitative short- and long-term performance metrics may be refined and incorporated into draft Chapter 3 as the planning process advances, particularly with substantial completion of Task 5 – Recommendation of FMEs, FMSs, and FMPs.
Task 4A	Needs Analysis	Partially complete – An initial listing of potential FMEs, FMPs, and FMSs have been generated using collected and researched information.	The content of draft Chapter 4 will be refined as the planning process advances particularly with refined flood risk information (Task 2) to identify areas of greatest flood risk and need for mitigation.
Task 4B	Identify FMEs, FMSs, and FMPs	Partially complete – The draft identification and evaluation process has been provided to the RFPG and public for review and comment and was subsequently approved by the RFPG.	Substantial completion of draft Chapter 4 tables and geospatial files is projected by February 2022 with approval by the RFPG to submit to TWDB by March 7, 2022.
Task 4C	Technical Memorandum	Partially complete – The draft Technical Memorandum No. 1 has been provided to the RFPG and public for review and comment.	Seeking RFPG approval on December 9, 2021 for submittal of Technical Memorandum No. 1 to TWDB by January 7, 2022. Substantial completion of draft the Technical Memorandum Addendum is projected by February 2022 with approval by the RFPG to submit to TWDB by March 7, 2022.
Task 5	Evaluate / Recommend FMEs, FMSs, and FMPs	Initial stages – Will advance data collection and refinement of FMEs, FMSs, and FMPs	Substantial completion of evaluations necessary to support RFPG recommendations are projected by March 2022. Substantial completion of draft recommendations and Chapter 5 are projected by

Task / Description		Progress as of November 22, 2021	Projected Progress
			May 2022 with approval by the RFPG to submit to TWDB by August 1, 2022.
Task 6A	Impacts of Regional Plan	Not yet initiated – requires substantial completion of Task 5 – Recommendation of FMEs, FMSs, and FMPs.	Substantial completion of Chapter 6 is projected by May 2022 with approval by the RFPG to incorporate into the draft RFP for submittal to TWDB by August 1, 2022.
Task 6B	Contribution / Impacts of Water Supply	Not yet initiated – requires substantial completion of Task 5 – Recommendation of FMEs, FMSs, and associated FMPs.	Substantial completion of Chapter 6 is projected by May 2022 with approval by the RFPG to submit to TWDB by August 1, 2022.
Task 7	Flood Response Information & Activities	Not yet initiated – Data collection and assessment anticipated to commence in January 2022.	Substantial completion of Chapter 7 is projected by May 2022 with approval by the RFPG to submit to TWDB by August 1, 2022.
Task 8	Admin, Regulatory & Legislative Recommendations	Initial stages – continue to refine list of policy issues of interest based on comments and suggestions received from the RFPG and the public.	Substantial completion of Chapter 8 is projected by May 2022 with approval by the RFPG to submit to TWDB by August 1, 2022.
Task 9	Flood Infrastructure Finance	Not yet initiated – Data collection and assessment anticipated to commence in March 2022.	Substantial completion of Chapter 9 is projected by May 2022 with approval by the RFPG to submit to TWDB by August 1, 2022.
Task 10	Public Involvement & Plan Adoption	Ongoing – Continued public and stakeholder outreach and engagement.	Compilation of draft Chapters 1-9 into an initial draft Regional Flood Plan will be subject to further refinement, as appropriate, based on comments and suggestions received from the RFPG and the public as well as advancement of the planning process. Substantial completion of initial draft Regional Flood Plan is projected by June 2022 with approval by the RFPG in July 2022 and submittal to TWDB by August 1, 2022.

Task 4C – Technical Memorandum No. 1 Deliverables

The following sections introduce the required Technical Memorandum No. 1 deliverables for the initial phase of the regional flood planning process for the Lower Red-Sulphur-Cypress region.

4C.1a – List of existing political subdivisions with flood-related authority/responsibility

TWDB provided a list of 148 political subdivisions, or entities, that were thought to have some degree of flood-related authority in the region. It is important to note that in the broadest sense, “authority” could be any public entity/agency that plans, regulates, constructs, or maintains flood and/or drainage infrastructure. In a more narrow sense, “authority” would only include entities with the authority to enact and enforce floodplain regulations (e.g., municipalities, counties, and river authorities). *Table 5* below provides a summary of the entity types within the region. A complete list of entities is provided in *Attachment 1*.

Table 5: Political Subdivisions with Potential Flood-Related Authority

Entity Types	Number of Entities	NFIP Participants
Municipality	86	60
County	20	16
Council of Governments	4	N/A
River Authority	3	N/A
Water Districts	3	N/A
Water Supply & Utility Districts (MUDs, FWSDs, MWDs, SUDs)	17	N/A
Flood Control Entities (WCIDs, LIDs)	10	N/A
Other	5	N/A

Source: TWDB Data Hub

Input from representatives from each political subdivision in the region has been solicited in an effort to obtain needed information for each entity. Approximately 23 percent of the entities with potential flood related authority, provided at least some measure of response at varying levels of detail in the flood planning process via the *Region 2 Data Collection Survey Tool and Interactive Webmap*. A list of existing floodplain management practices was compiled using collected and researched information as displayed in *Attachment 1*.

Geospatial files for political subdivisions with flood-related authority are provided *Attachment 7*. The geodatabase feature classes titled ‘Entities’ and ‘ExFpMP’ provide a spatial representation of existing political subdivisions with flood-related authorities or responsibilities.

4C.1b and 4C.1f – List of previous flood studies and models relevant to plan development

A list of previous studies has been compiled using collected and researched information and is presented in *Attachment 2*. The previous flood studies and associated models included on the list are those that are being used to refine the region’s Floodplain Quilt and/or studies that are being used to identify/validate potential evaluations, strategies, and/or projects. In addition to provided studies via the *Region 2 Data Collection Survey Tool and Interactive Webmap*, the previous studies were collected through the online searches and consultant team experience in the region. Study reports and communication with study sponsors reveal whether hydrologic and hydraulic models are available or presumed available. As the planning process continues the list of previous studies will be enhanced to document all available sources of information relevant to flood plan development within the Lower Red-Sulphur-Cypress region.

4C.1c, 4C.1d, and 4C.1e – Lists, maps, and geodatabase of existing and future flood risk and gaps

Development of Task 4C.1c-e deliverables is contingent upon full processing of the TWDB provided cursory floodplain dataset, also referred to as the Fathom dataset. The Fathom dataset was provided to the RFPG on October 29, 2021 and therefore has not been fully processed and assessed to incorporate results into Technical Memorandum No. 1. As outlined in the TWDB Extension of Time to Complete Technical Memorandum (dated August 17, 2021) and associated Technical Memorandum Data Deliverable Clarification (dated October 29, 2021), the TWDB has extended the submittal deadline of these items to March 7, 2022.

4C.1g – Flood mitigation and floodplain management goals adopted by the RFPG

One of the critical components of the inaugural regional and state flood planning process is the development of flood mitigation and floodplain management goals. The Lower Red-Sulphur-Cypress RFPG has spent a significant amount of time exploring values and discussing what they felt were the suitable goals for their region. *Attachment 3* presents the adopted draft flood mitigation and floodplain management goals for the Lower Red-Sulphur-

Cypress Region. The associated geospatial table titled 'Goals' is included in the geodatabase located in *Attachment 7*.

As set out in the Guidance Principles in 31 TAC §362.3, the overarching intent of the region's goals must be "to protect against the loss of life and property." This is further defined to:

1. Identify and reduce the risk and impact to life and property that already exists, and
2. Avoid increasing or creating new flood risk by addressing future development within the areas known to have existing or future flood risk.

The goals, when implemented, must demonstrate progress towards the overarching goal set forth by the state. As part of the goal setting process, the RFPG adopted goals covering six focus areas. These focus areas were defined to create a one-to-one connection with the Flood Management Strategy (FMS) types as outlined in TWDB's Exhibit D: Data Submittal Guidelines for Regional Flood Planning.

The adopted goals will guide the development of the strategies (FMSs), evaluations (FMEs), and projects (FMPs) for the Lower Red-Sulphur-Cypress region. They build upon TWDB regional flood planning guidance and provide a comprehensive framework for future strategy development focused on reducing flood risk to people and property, while not negatively affecting neighboring areas.

The six goal focus areas include:

1. Flood Education and Outreach
2. Flood Warning and Readiness
3. Flood Studies and Analysis
4. Flood Prevention
5. Non-Structural Flood Infrastructure Projects
6. Structural Flood Infrastructure Projects

Per Texas Water Development Board (TWDB) requirements and guidelines, the goals adopted by the RFPG must be specific and achievable and include the information listed below:

- Description of the goal
- Term of the goal set at 10 years (short-term) and 30 years (long-term)
- Extent or geographic area to which the goal applies
- Residual risk that remains after the goal is met
- Measurement method that will be used to measure goal attainment
- Association with overarching goal focus areas

Quantitative short- and long-term performance metrics were adopted by the RFPG for incorporation in Chapter 3 but may be revised as the planning process progresses, particularly related to substantial completion of Task 5 – Recommendation of FMEs, FMSs, and FMPs.

4C.1h – Process to identify potentially feasible FMSs and FMPs

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." The proposed process was designed to conform with TWDB requirements as expressed in rules, scope of work, and technical guidelines for regional flood planning.

The proposed process for screening, evaluation, and recommendation of potential evaluations (FMEs), strategies (FMSs), and projects (FMPs) was introduced during the September 2, 2021 RFPG meeting. Subsequently, at the October 7, 2021 meeting, the RFPG reviewed and discussed the proposed process, accepted public comment, and approved the proposed process as provided in *Attachment 4*.

4C.1i – List of potential FMEs and potentially feasible FMSs and FMPs

The TWDB scope of work and technical guidelines state that Task 4 activities include initial collection and assessment of potential evaluations (FMEs), strategies (FMSs), and projects (FMPs) that will be further advanced through Task 5 activities and RFPG recommendations. The FMEs, FMSs, and FMPs included with this Technical Memorandum in Attachment 5 are preliminary and subject to further refinement based on comments and suggestions received from the RFPG and the public as well as advancements in the planning process, particularly through Task 5.

4C.1j – List of FMSs and FMPs that were determined infeasible

No FMSs or FMPs have been determined to be infeasible at this time. This determination will primarily be performed under Task 5.

4C – Technical Memorandum No. 1 Geodatabase

As outlined in the TWDB Extension of Time to Complete Technical Memorandum dated August 17, 2021 and associated Technical Memorandum Data Deliverable Clarification dated October 29, 2021, the following table outlines geodatabase deliverables included with this Technical Memorandum. Specific data deliverables and formatting are in alignment with the TWDB’s Exhibit D: Data Submittal Guidelines for Regional Flood Planning. The digital geodatabase is located in *Attachment 7*.

Table 6: Task 4C Geodatabase

File No.	Item Name	Description	Submittal Milestone	Feature Class Name	Submittal Deadline Notes
1	Entities	Entities with flood-related authority and whether they are actively engaged in flood planning, floodplain management, and flood mitigation activities.	Technical Memo (limited fields)	Entities	Submit on January 7, 2022.
2	Watersheds	The spatial layer for watersheds with associated FME, FMS, and FMPs.	Technical Memo	Watersheds	Submit initial data on January 7, 2022 with limited fields as these will be refined as FMEs, FMSs, and FMPs are advanced.
3	Existing Infrastructure	A general description of the location, condition, and functionality of existing natural flood mitigation features and constructed major flood infrastructure within the FPR.	Technical Memo	ExFldInfraPol	Submit on January 7, 2022.
4			Technical Memo	ExFldInfraLn	Submit on January 7, 2022.
5			Technical Memo	ExFldInfraPt	Submit on January 7, 2022.
6	Proposed or Ongoing Flood Mitigation Projects	Proposed or ongoing flood mitigation projects currently under construction, being implemented; and with dedicated funding to construct and the expected year of completion.	Technical Memo	ExFldProjs	Submit on January 7, 2022.
7*	Existing Flood Hazard	Perform existing condition flood hazard analyses to determine the location and magnitude of both 1.0% annual chance and 0.2% annual chance flood events.	Technical Memo	ExFldHazard	Submit on March 7, 2022 along with Technical Memorandum Addendum.
8*	Flood Mapping Gaps	Gaps in inundation boundary mapping.	Technical Memo	Fld_Map_Gaps	Submit on March 7, 2022 along with Technical Memorandum Addendum.

File No.	Item Name	Description	Submittal Milestone	Feature Class Name	Submittal Deadline Notes
9*	Existing Exposure	Develop high-level, region- wide, and largely GIS-based existing condition flood exposure analyses using the information identified in the flood hazard analysis to identify 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.	Technical Memo	ExFldExpPol	Submit on March 7, 2022 along with Technical Memorandum Addendum.
10*			Technical Memo	ExFldExpLn	Submit on March 7, 2022 along with Technical Memorandum Addendum.
11*			Technical Memo	ExFldExpPt	Submit on March 7, 2022 along with Technical Memorandum Addendum.
12*			Technical Memo	ExFldExpAll	Submit on March 7, 2022 along with Technical Memorandum Addendum.
13*	Future Flood Hazard	Perform future condition flood hazard analyses to determine the location and magnitude of both 1.0% annual chance and 0.2% annual chance flood events.	Technical Memo	FutFldHazard	Submit on March 7, 2022 along with Technical Memorandum Addendum.
14*	Future Exposure	Perform future condition flood exposure analyses using the information identified in the flood hazard analysis to identify 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.	Technical Memo	FutFldExpPol	Submit on March 7, 2022 along with Technical Memorandum Addendum.
15*			Technical Memo	FutFldExpLn	Submit on March 7, 2022 along with Technical Memorandum Addendum.
16*			Technical Memo	FutFldExpPt	Submit on March 7, 2022 along with Technical Memorandum Addendum.
17*			Technical Memo	FutFldExpAll	Submit on March 7, 2022 along with Technical Memorandum Addendum.
18	Existing Floodplain Management Practices	Identify areas with existing floodplain management practices, identify common and compare contrasting practices within the region, and acknowledge locations that may lack floodplain management.	Technical Memo	ExFpMP	Submit on January 7, 2022.
19	Goals	Identify specific and achievable flood mitigation and floodplain management goals along with target years by which to meet those goals.	Technical Memo (limited fields)	Goals	Submit on January 7, 2022.
20	Streams	Shows the streams to be studied by FMEs, and those relevant to FMS and FMPs, when applicable.	Technical Memo	Streams	Submit on January 7, 2022.
21	Flood Management Evaluations	Flood Management Evaluations will identify areas requiring flood risk evaluation.	Technical Memo (limited fields)	FME	Submit initial data on January 7, 2022 with limited fields as these will be refined as the planning process advances.
22	Flood Mitigation Projects	Flood Mitigation Projects reduce flood risk through a variety of approaches. The service area is the region impacted by the project.	Technical Memo (limited fields)	FMP	Submit initial data on January 7, 2022 with limited fields as these will be refined as the planning process advances.
23*	Post-project Hazard	Project specific features showing an updated hazard area that accounts for the impact of the project.	Draft Plan	FMP_HazPost	Not required in Tech Memo, so will be a deliverable on August 1, 2022.

File No.	Item Name	Description	Submittal Milestone	Feature Class Name	Submittal Deadline Notes
24*	Project Details	A table included in the .gdb but built using the Project Details excel template. The table includes more detailed analysis of the project.	Draft Plan	FMP_Details	Not required in Tech Memo, so will be a deliverable on August 1, 2022.
25	Flood Management Strategies	Flood Management Strategies can be a broad array of policy or other strategies that aid in flood management.	Technical Memo (limited fields)	FMS	Submit initial data on January 7, 2022 with limited fields as these will be refined as the planning process advances.

*These features are not included in this Technical Memorandum No. 1 deliverables.

Technical Memorandum Attachments

- Attachment 1. 4C.1a – List of existing political subdivisions with flood-related authority/responsibility
- Attachment 2. 4C.1b, 4C.1e, and 4C.1f – List of previous flood studies and models relevant to plan development
- Attachment 3. 4C.1g – Flood mitigation and floodplain management goals adopted by the RFPG
- Attachment 4. 4C.1h – Process to identify potentially feasible FMSs and FMPs
- Attachment 5. 4C.1i – List of potential FMEs and potentially feasible FMSs and FMPs
- Attachment 6. 4C.1j – List of FMSs and FMPs that were determined infeasible
- Attachment 7. 4C – Geodatabase

Attachment 1

Task 4C.1a – List of existing political subdivisions
with flood-related authority/responsibility

Entry	Floodplain Management Regulations (Yes/No/Unknown)	Adopted Minimum Regulations Pursuant to Texas Water Code Section 16.31457 (Yes/No)	NFP Participant (Yes/No)	Higher Standards-Adopted (Yes/No)	Floodplain Management Practices (Strong/Moderate/Low/None)	Level of Enforcement of Practices (High/Moderate/Low/None)	Existing Stormwater or Drainage Fee (Yes/No)	Web Link to Entry Regulations
Counties								
Bowie	Yes	Yes	Yes		None			http://www.co.bowie.tx.us/Pages/County-Office-of-Emergency-Management
Camp	Unknown	Unknown	No		None			
Cass	Yes	Yes	Yes		None			http://www.co.cass.tx.us/units/cass-county.aspx
Coocke	Yes	Yes	Yes		Low			https://www.co.coocke.tx.us/page/code-ordinance
Dallas	Yes	Unknown	No		None			https://www.dallascounty.com/government.html
Darwin	Yes	Yes	Yes	Yes	Strong	No		http://www.co.darwin.tx.us/Pages/County-Development-Service.aspx
Franklin	Yes	Yes	Yes		None			https://www.co.franklin.tx.us/Pages/Franklin-County-Office.aspx
Groesvenor	Yes	Yes	Yes	Yes	Strong	No		https://www.co.groesvenor.tx.us/units/county-office.html
Gregg	Yes	Yes	Yes		None			https://www.co.gregg.tx.us/units/county-office.html
Harrison	Yes	Yes	Yes		Low			http://harrisoncountytx.com/road-to-code/
Hopkins	Yes	Yes	Yes		Moderate	No		http://www.hopkinscountytx.com/page/hopkins-Environmental-Services
Hunt	Yes	Yes	Yes	Yes	Moderate	No		https://www.huntcountytx.com/units/county-office
Jamaar	Unknown	Unknown	No		None			
Marion	Yes	Yes	Yes		None			https://www.co.marion.tx.us/PM-Emergency-Management/DocumentLibrary/IMP-Volume%20B-07112017.pdf
Monroe	Yes	Yes	Yes		None			https://www.co.monroe.tx.us/page/monroe-Emergency-Management-Coordinator
Panola	Yes	Yes	Yes		None			
Red River	Yes	Unknown	No	Yes	Strong	No		https://www.co.redriver.tx.us/road-to-code/9365.docx/Driver%20County%20Code%20to-Code.pdf
Texas	Yes	Yes	Yes		None			https://www.governor.com/government/department/department-and-mapping-building-permits-floodplain-management.php
Upshur	Yes	Yes	Yes	Yes	Strong			https://www.masoncountytx.com/page/home
Wood	Yes	Yes	Yes		None			
Cities/Towns								
Acmonia	Unknown	Unknown	No					
Albion	Yes	Yes	Yes	Yes	Moderate		No	https://77.franklinipad.net/franklin/22browser2.html?browser=albiipad
Avery	Yes	Yes	Yes					
Austger	Unknown	Unknown	No	Yes	Moderate		No	
Baker	Yes	Yes	Yes					
Bella	Yes	Unknown	No					https://wep1.writing.com/bobby/ps/8548148-7529-df1-41ad-5cf4fe187711/download/Bella%20Planning%20Ordinance%20Manual%2001102009.pdf?v=16244378411
Bloomburg	Yes	Yes	Yes					
Blossman	Yes	Yes	Yes					
Bogota	Yes	Yes	Yes					
Bonham	Yes	Yes	Yes		Strong			https://77.franklinipad.net/franklin/22browser7.html?browser=bonhamipad
Callburg	Yes	Yes	Yes	Yes	Strong	No		
Campbell	Unknown	Unknown	No					
Clarksville	Yes	Yes	Yes		Strong			https://www.cityofclarksville.com/DocumentCenter/View/5035/Stormwater-Management-Manual-2007to-date
Commerce	Yes	Yes	Yes		None		No	https://www.cibola.com/News/NewsDocument?id=1816
Como	Yes	Yes	Yes	Yes				
Conger	Unknown	Unknown	No	Yes			No	
Danzerfeld	Yes	Yes	Yes					https://library.municode.com/tx/danzerfeld/codes/code_of_ordinances?nodeId=PTICODR_CH180
De Kalb	Yes	Unknown	No	Yes			No	https://www.dekalb.org/code-enforcement
Denison	Yes	Yes	Yes		Strong			https://library.municode.com/tx/denison/codes/code_of_ordinances?nodeId=COOR_CH81DAPR
Deport	Yes	Yes	Yes					
Detroit	Yes	Yes	Yes	Yes			No	
Dodd City	Unknown	Unknown	No					
Domino	Yes	Yes	Yes					
Dorchester	Unknown	Unknown	No					
Douglassville	Unknown	Unknown	No					
East Mountain	Unknown	Unknown	No					
Erby	Yes	Yes	Yes					
Gilmer	Yes	Yes	Yes		Low			https://library.municode.com/tx/gilmer/codes/code_of_ordinances?nodeId=PTICODR_CH421PRP
Honey Grove	Yes	Yes	Yes				No	
Hooks	Yes	Yes	Yes	Yes				
Howe	Yes	Yes	Yes					
Hughes Springs	Yes	Yes	Yes					
Jefferson	Yes	Yes	Yes		Low			https://library.municode.com/tx/jefferson/codes/code_of_ordinances?nodeId=COOR_CH492
Knottwood	Unknown	Unknown	No					
Ladonia	Yes	Yes	Yes					
Leary	Yes	Yes	Yes					
Leonard	Yes	Yes	Yes					
Lincolnton	Yes	Yes	Yes		Low			https://finden.municipalcode.com/book?open=andreas&name=11_FLOOD_DAMAGE_PREVENTION
Lone Star	Yes	Yes	Yes					https://longviewtx.gov/2837/Floodplain-Administration
Longview	Yes	Yes	Yes				No	
Marquette	Unknown	Unknown	No	Yes			No	https://longviewtx.gov/2837/Floodplain-Administration
Marshall	Yes	Yes	Yes				No	https://library.municode.com/tx/marshall/codes/code_of_ordinances?nodeId=PTICODR_CH76L_ART181DAPR
Mead	Yes	Yes	Yes					
Miller's Cove	Yes	Yes	Yes					
Mount Pleasant	Yes	Yes	Yes	Yes	Low	No		https://codeoflibrary.amnpl.com/codes/ordinances/adopted/implemented-tw/0-0-20869
Mount Vernon	Yes	Yes	Yes	Yes	Low	Yes		https://library.municode.com/tx/mount-vernon/codes/code_of_ordinances?nodeId=COOR_CH81UCORAG_ART181DAPR
Nash	Yes	Yes	Yes	Yes			No	
Nash	Yes	Yes	Yes					
New Boston	Yes	Yes	Yes		Low			https://library.municode.com/tx/new-boston/codes/code_of_ordinances?nodeId=COOR_CH81PRC
Newlandville	Unknown	Unknown	No					
Omaha	Yes	Yes	Yes					
One City	Yes	Yes	Yes		Strong			https://library.municode.com/tx/one-city/codes/code_of_ordinances?nodeId=CH10B-0181-ART181DAPR
Pars	Yes	Yes	Yes	Yes	Strong	No		https://77.franklinipad.net/franklin/22browser7.html?browser=parsipad
Pecan Gap	Unknown	Unknown	No					
Pittsburg	Yes	Yes	Yes		Low			https://77codes.franklinipad.net/franklin/22browser2.html?browser=pittsburgipad
Pottsboro	Yes	Yes	Yes					
Queen City	Yes	Yes	Yes	Yes		No		
Ravenna	Unknown	Unknown	No				No	
Red Oak	Unknown	Unknown	No					
Redwater	Yes	Yes	Yes					
Reno (Lamar)	Yes	Yes	Yes					
Rocky Mount	Unknown	Unknown	No					
Roxton	Yes	Yes	Yes	Yes		No		
Sadler	Unknown	Unknown	No					
Sandy	Yes	Yes	Yes					
Scottville	Unknown	Unknown	No					
Sherman	Yes	Yes	Yes		Strong	Yes		https://77codes.franklinipad.net/franklin/22browser2.html?browser=sherasipad
Sulphur Springs	Yes	Yes	Yes					
Sulphur Springs	Yes	Yes	Yes	Yes	Strong	No		http://www.sulphursprings.org/business-resources/engineering.php
Sun Valley	Unknown	Unknown	No					
Talco	Unknown	Unknown	No					
Texarkana	Yes	Yes	Yes	Yes	Moderate	No		https://library.municode.com/tx/texarkana/codes/code_of_ordinances?nodeId=PTIBL-DECO_CH1101DAPR
Tira	Yes	Yes	Yes					
Toca	Unknown	Unknown	No					
Tom Bean	Yes	Unknown	No					https://tom-bean.tx.gov/government/ordinances/
Trenton	Yes	Yes	Yes					
Uptonville	Yes	Yes	Yes					
Wake Village	Yes	Yes	Yes	Yes	Strong	No		https://codeoflibrary.amnpl.com/codes/ordinances/adopted/wakevillage-tw/0-0-3943
Waskom	Yes	Yes	Yes					
Wicksboro	Yes	Unknown	No					https://codeoflibrary.amnpl.com/codes/ordinances/adopted/wicksborotw/0-0-3319
Whiteburg	Yes	Yes	Yes		Strong			https://library.municode.com/tx/whiteburg/codes/code_of_ordinances?nodeId=COOR_CH14EN_ART181PRC
Whitewright	Yes	Yes	Yes					
Wisdom	Yes	Yes	Yes					
Wright	Unknown	Unknown	No					
Wynnsboro	Yes	Yes	Yes					
Wylie City	Unknown	Unknown	No					

Attachment 2

Task 4C.1b, 4C.1e and 4C.1f – List of previous flood studies
and models relevant to plan development

Study ID	RFPG No.	RFPG Name	Study Name	Description	Counties	Cities	HUC8s	HUC12s	Watersheds	Study Sponsor ¹	Study Date	Study Conditions ²	Frequencies Studied ³	Hydrology Models Available ⁴	Hydraulic Models Available ⁴	How Was Study Used in RFP ⁵	FEMA Status ⁶	Can Study be Used in Evaluating FMPs?	Can Study be Used in Evaluating FMSs?	Most Valuable Model?
48097CV000A	2	Lower Red Sulphur Cypress	Cooke County FIS		Cooke					FEMA	1/16/2008	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV001B	2	Lower Red Sulphur Cypress	Grayson County FIS		Grayson					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV002B	2	Lower Red Sulphur Cypress	Grayson County FIS		Grayson					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV003B	2	Lower Red Sulphur Cypress	Grayson County FIS		Grayson					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV004B	2	Lower Red Sulphur Cypress	Grayson County FIS		Grayson					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48147CV000A	2	Lower Red Sulphur Cypress	Grayson County FIS		Grayson					FEMA	2/18/2011	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48181CV000A	2	Lower Red Sulphur Cypress	Grayson County FIS		Grayson					FEMA	9/29/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48147CV000A	2	Lower Red Sulphur Cypress	Fannin County FIS		Fannin					FEMA	2/18/2011	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48181CV000A	2	Lower Red Sulphur Cypress	Fannin County FIS		Fannin					FEMA	9/29/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV001B	2	Lower Red Sulphur Cypress	Hunt County FIS		Hunt					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV002B	2	Lower Red Sulphur Cypress	Hunt County FIS		Hunt					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV003B	2	Lower Red Sulphur Cypress	Hunt County FIS		Hunt					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48085CV004B	2	Lower Red Sulphur Cypress	Hunt County FIS		Hunt					FEMA	6/7/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48231CV000A	2	Lower Red Sulphur Cypress	Hunt County FIS		Hunt					FEMA	1/6/2012	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48397CV000A	2	Lower Red Sulphur Cypress	Hunt County FIS		Hunt					FEMA	9/26/2008	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48277CV000A	2	Lower Red Sulphur Cypress	Lamar County FIS		Lamar					FEMA	8/16/2011	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48223CV000A	2	Lower Red Sulphur Cypress	Hopkins County FIS		Hopkins					FEMA	3/17/2011	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48499CV000A	2	Lower Red Sulphur Cypress	Hopkins County FIS		Hopkins					FEMA	9/3/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48223CV000A	2	Lower Red Sulphur Cypress	Wood County FIS		Wood					FEMA	3/17/2011	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48379CV000A	2	Lower Red Sulphur Cypress	Wood County FIS		Wood					FEMA	4/17/2012	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48499CV000A	2	Lower Red Sulphur Cypress	Wood County FIS		Wood					FEMA	9/3/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48449CV000A	2	Lower Red Sulphur Cypress	Titus County FIS		Titus					FEMA	9/29/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48183CV001A	2	Lower Red Sulphur Cypress	Upshur County FIS		Upshur					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48183CV002A	2	Lower Red Sulphur Cypress	Upshur County FIS		Upshur					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48459CV000A	2	Lower Red Sulphur Cypress	Upshur County FIS		Upshur					FEMA	10/19/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
480263V000	2	Lower Red Sulphur Cypress	Gregg County FIS		Gregg					FEMA	8/16/1996	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48183CV001A	2	Lower Red Sulphur Cypress	Gregg County FIS		Gregg					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48183CV002A	2	Lower Red Sulphur Cypress	Gregg County FIS		Gregg					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48203CV000A	2	Lower Red Sulphur Cypress	Gregg County FIS		Gregg					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48401CV000A	2	Lower Red Sulphur Cypress	Gregg County FIS		Gregg					FEMA	9/29/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48459CV000A	2	Lower Red Sulphur Cypress	Gregg County FIS		Gregg					FEMA	10/19/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48037CV000B	2	Lower Red Sulphur Cypress	Bowie County FIS		Bowie					FEMA	12/21/2017	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48067CV000A	2	Lower Red Sulphur Cypress	Cass County FIS		Cass					FEMA	4/3/2012	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48183CV001A	2	Lower Red Sulphur Cypress	Harrison County FIS		Harrison					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48183CV002A	2	Lower Red Sulphur Cypress	Harrison County FIS		Harrison					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48203CV000A	2	Lower Red Sulphur Cypress	Harrison County FIS		Harrison					FEMA	9/3/2014	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
48459CV000A	2	Lower Red Sulphur Cypress	Harrison County FIS		Harrison					FEMA	10/19/2010	Existing	1% AC, 0.2% AC	Presumed Yes	Presumed Yes	Mapping	Included in FIS	Minimally	Possibly	
S0001	2	Lower Red Sulphur Cypress	Johnson Woods Drainage Improvements	Existing conditions flood study performed by Hayter Engineering, Inc. for City of Paris	Lamar	Paris				City of Paris	10/27/2016	Existing	1% AC, 0.2% AC	Yes	Yes			Yes	Yes	
S0002	2	Lower Red Sulphur Cypress	Big Sandy Creek Tributary 4 & 6	Flood study performed by Cobb Fendley for City of Paris	Lamar	Paris				City of Paris	3/24/2017	Existing	1% AC	Yes	Yes	Projects		Yes	Yes	
S0003	2	Lower Red Sulphur Cypress	City of Paris Comprehensive Plan	Section IV Drainage Study based on Drainage Master Plan prepared in 1993	Lamar	Paris				City of Paris	2/26/2014	Existing	1% AC	No	No	Projects		Minimally	Minimally	
S0004	2	Lower Red Sulphur Cypress	City of Paris Drainage Master Plan	Prepared by Hayter Engineering, Inc.	Lamar	Paris				City of Paris	1/1/1993	Existing	1% AC	No	No	Projects		Minimally	Minimally	
S0005	2	Lower Red Sulphur Cypress	City of Cooper Storm Drainage Study	Prepared by Hayter Engineering, Inc. to establish storm drain needs.	Delta	Cooper				City of Cooper	9/1/2017	Both	10% AC	No	NO	Projects		Minimally	Minimally	
S0006	2	Lower Red Sulphur Cypress	City of Texarkana City-wide Flood Protection Planning Study	Prepared by Halff Associates, Inc. under a TWDB Contract	Bowie	Texarkana				City of Texarkana, TWDB	1/31/2012	Both	1% AC, 0.2% AC	Yes	Yes	Mapping, Projects	Included in FIS	Yes	Yes	
S0007	2	Lower Red Sulphur Cypress	City of Sherman		Grayson	Sherman								Yes	Yes	Mapping, Projects	Included in FIS	Yes	Yes	
S0008	2	Lower Red Sulphur Cypress	USACE Lower Red Studies	CWMS forecasting and dam safety						USACE		Both		Yes	Yes	Possible Evaluations	Not included in FIS	Possibly	Possibly	
S0009	2	Lower Red Sulphur Cypress	USACE Sulphur River Studies	CWMS forecasting and dam safety, Wright Patman reallocation study						USACE		Both		Yes	Yes	Possible Evaluations	Not included in FIS	Possibly	Possibly	
S0010	2	Lower Red Sulphur Cypress	USACE Cypress River Studies	CWMS forecasting and dam safety						USACE		Both		Yes	Yes	Possible Evaluations	Not included in FIS	Possibly	Possibly	
S0011	2	Lower Red Sulphur Cypress	SRBA Sulphur River Basin Instream Flow Study							SRBA				Presumed Yes	Presumed Yes	Possible Evaluations	Not included in FIS	Possibly	Possibly	

1: Sponsors could include FEMA, TWDB, City, County, Developer, etc.
 2: Study Conditions would be Existing, Future, or Both
 3: Frequencies could be 50% AC, 1%AC, 0.2% AC, etc.
 4: Options include: Yes, Presumed Yes, Presumed No, No, Unkown
 5: Options could include: Mapping, Validation, Considered, but not used; FMP, FMS, or FME Development and Eval; etc.
 6: Options could include: Included in FIS, FIS in Progress, Completed LOMC, LOMC in Progress, LOMC to be Pursued, Local Study Only

Attachment 3

Task 4C.1g – Flood mitigation and floodplain
management goals adopted by the RFPG

Goal ID	RFPG No.	RFPG Name	Goal	Term of Goal	Target Year	Applicable To	Overarching Goal	Associated Goal IDs
1001	For each planning cycle, hold 3 public outreach and education activities (in multiple locations within the region) to improve awareness of flood	Short Term (10 year)	2033	Entire RFPG	N/A	Document number of meetings per planning cycle. Keep records of sign in sheets and meeting minutes.	Educate public on risk	1002
1002	For each planning cycle, hold 3 public outreach and education activities (in multiple locations within the region) to improve awareness of flood	Long Term (30 year)	2053	Entire RFPG	N/A	Document number of meetings per planning cycle. Keep records of sign in sheets and meeting minutes.	Educate public on risk	1001
2001	Support the development of a community coordinated warning and emergency response program (including flood gauges) that can detect the flood threat and provide timely warning of impending flood danger. Identify potential areas where flood warning systems would be beneficial.	Short Term (10 year)	2033	Entire RFPG	Areas without flood warning systems would still be at risk of inadequate warning until implemented.	Complete study and provide report with identified areas.	Protect against loss of life and property.	2002
2002	Support the development of a community coordinated warning and emergency response program (including flood gauges) that can detect the flood threat and provide timely warning of impending flood danger. Implement a minimum of 1 flood warning system.	Long Term (30 year)	2053	Entire RFPG	Other areas that would benefit from flood warning systems would remain at risk of inadequate warning.	Number of implemented flood warning system.	Protect against loss of life and property.	2001
3001	Increase the coverage of flood hazard data by completing studies to reduce areas identified as having current gaps in flood mapping by	Short Term (10 year)	2033	Entire RFPG	Flood risk uncertainty remains for 75% of current areas with gaps in flood mapping.	Updates to flood mapping and compare to mapping coverage shown on 2023 Regional Flood Plan.	Protect against loss of life and property.	3002
3002	Increase the coverage of flood hazard data by completing studies to reduce areas identified as having current gaps in flood mapping by	Long Term (30 year)	2053	Entire RFPG	Flood risk uncertainty remains for 10% of current areas with gaps in flood mapping.	Updates to flood mapping and compare to mapping coverage shown on 2023 Regional Flood Plan.	Protect against loss of life and property.	3001
4001	Reduce the percentage of communities that do not have floodplain standards that meet or exceed the NFIP minimum standards by 25%.	Short Term (10 year)	2033	Entire RFPG	Risk to existing structures is not reduced; Risk to new construction in non-	Number of entities participating in NFIP; number of entities with equivalent standards.	Protect against loss of life and property.	4002
4002	Reduce the percentage of communities that do not have floodplain standards that meet or exceed the NFIP minimum standards by 90%.	Long Term (30 year)	2053	Entire RFPG	Risk to existing structures is not reduced; Risk to new construction is minimized.	Number of entities participating in NFIP; number of entities with equivalent standards.	Protect against loss of life and property.	4001
4003	Support the development of minimum stormwater infrastructure design standards applicable across the FPR by the creation of an	Short Term (10 year)	2033	Entire RFPG	Risk to existing structures is not reduced; Risk to new construction in non-	Completion of stormwater infrastructure design standards document.	Protect against loss of life and property.	4004
4004	Support the development of minimum stormwater infrastructure design standards applicable across the FPR by helping local	Long Term (30 year)	2053	Entire RFPG	Risk to existing structures is not reduced; Risk to new construction is minimized.	Document efforts by RFPG in assisting local governments.	Protect against loss of life and property.	4003
5001	Reduce the number of NFIP repetitive-loss properties by 10%.	Short Term (10 year)	2033	Entire RFPG	90% of repetitive loss structures would remain at risk	Number of repetitive loss properties.	Protect against loss of life and property.	5002
5002	Reduce the number of NFIP repetitive-loss properties by 50%.	Long Term (30 year)	2053	Entire RFPG	50% of repetitive loss structures would remain at risk	Number of repetitive loss properties.	Protect against loss of life and property.	5001
5003	Identify at least one (1) non-structural flood mitigation project in the Region.	Short Term (10 year)	2033	Entire RFPG	No change in flood risk	Number of non-structural flood mitigation projects identified in the Regional Flood Plan.	Protect against loss of life and property.	5004
5004	Identify at least three (3) non-structural flood mitigation projects in the Region.	Long Term (30 year)	2053	Entire RFPG	Project areas remain at risk for events that exceed the project's level of service (1%)	Number of non-structural flood mitigation projects identified in the Regional Flood Plan.	Protect against loss of life and property.	5003
6001	Improve the level of service for 10% of vulnerable roadway segments and low water crossings located within the existing and future 1%	Short Term (10 year)	2033	Entire RFPG	Flood risk will remain unchanged for 90% of vulnerable roadway segments.	Take inventory of existing structures and report number of improved structures.	Protect against loss of life and property.	6002
6002	Improve the level of service for 50% of vulnerable roadway segments and low water crossings located within the existing and future 1%	Long Term (30 year)	2053	Entire RFPG	Flood risk will remain unchanged for 50% of vulnerable roadway segments.	Take inventory of existing structures and report number of improved structures.	Protect against loss of life and property.	6001
6003	Repair, rehabilitate, or replace 10% of aged stormwater infrastructure that is at high risk of failure and where failure would increase flood	Short Term (10 year)	2033	Entire RFPG	Flood risk will remain unchanged for 90% of stormwater infrastructure at high risk of	Take inventory of existing structures and report number of improved structures.	Protect against loss of life and property.	6004
6004	Repair, rehabilitate, or replace 50% of aged stormwater infrastructure that is at high risk of failure and where failure would increase flood	Long Term (30 year)	2053	Entire RFPG	Flood risk will remain unchanged for 50% of stormwater infrastructure at high risk of	Take inventory of existing structures and report number of improved structures.	Protect against loss of life and property.	6003

Attachment 4

Task 4C.1h – Process to identify potentially
feasible FMSs and FMPs

TO: Region 2 Lower Red-Sulphur-Cypress Regional Flood Planning Group

CC: Josh McClure, PhD, PE, CFM – Halff Associates, Inc.

FROM: David Rivera, PhD, PE, CFM – Freese and Nichols, Inc.

SUBJECT: Process for Identification and Evaluation of Potential FMEs and Potentially Feasible FMPs and FMSs (Tasks 4A and 4B)

DATE: 9/22/2021

PROJECT: Lower Red-Sulphur-Cypress Regional Flood Plan (FNI Proj. No. HAF21355)

Introduction

Halff Associates, Inc. (Halff) along with Freese and Nichols, Inc. (FNI) has been retained as the Technical Consultant (TC) to the Lower Red-Sulphur-Cypress Regional Flood Planning Group (RFPG) to develop the first ever Regional Flood Plan (RFP) for the basin, as part of the state flood planning process administered by the Texas Water Development Board (TWDB). A major component of the process is to identify, evaluate, and recommend Flood Management Evaluations (FMEs), Flood Mitigation Projects (FMPs), and Flood Management Strategies (FMSs) to be included in the RFP and the cumulative State Flood Plan (SFP).

The *Scope of Work (SOW)* developed by TWDB includes a requirement to “receive public comment on a proposed process to be used by the RFPG to identify and select FMEs, FMSs, and FMPs for the 2023 Regional Flood Plan.” This Technical Memorandum (TM) has been furnished to provide background information about the overall flood planning process and the associated technical requirements and to document the TC’s proposed process for this task. It is intended to comply with the *SOW* and the relevant provisions of *Title 31 of the Texas Administrative Code (TAC) Chapters 361 and 362 (Rules)* which serve as the statute and rules that govern regional flood planning, and to be consistent with the *Exhibit C Technical Guidelines for Regional Flood Planning (Technical Guidelines)* prepared by the TWDB. This memo summarizes the methodology that we recommended the RFPG adopt for use in the following phases of the flood plan.

Definitions

According to the *Technical Guidelines*, definitions of key terms include:

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.

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 and mitigate flood hazards to life or property.

A **Flood Management Strategy (FMS)** is a proposed plan to reduce flood risk or mitigate flood hazards to life or property. At a minimum, RFPGs should include as FMSs any proposed action that they would like to identify, evaluate, and recommend that does not qualify as either an FME or FMP.

Background

Identification and evaluation of FMEs, FMPs, and FMSs occur under *Task 4B* of the *SOW*, with recommendations being developed as part of *SOW Task 5*. Each of these recommendations must tie back to the floodplain management goals adopted by the RFPG and must contribute to the assessment and mitigation of flood risk across the basin.

FMEs, FMSs, and FMPs are broadly categorized as “flood risk reduction projects” (henceforth, “actions”) in the *Technical Guidelines*. The *Technical Guidelines* also list several potential action types for each subcategory, summarized in **Table 1** below:

Table 1: Flood Risk Reduction Action Types

Flood Risk Reduction Action Category	Action Types
Flood Management Evaluation (FME)	<ul style="list-style-type: none"> a. Watershed Planning <ul style="list-style-type: none"> i. H&H Modeling ii. Flood Mapping Updates iii. Regional Watershed Studies b. Engineering Project Planning <ul style="list-style-type: none"> i. Feasibility Assessments c. Preliminary Engineering (alternative analysis and up to 30% design) d. Studies on Flood Preparedness
Flood Mitigation Project (FMP)	<p>Structural</p> <ul style="list-style-type: none"> a. Low Water Crossings or Bridge Improvements b. Infrastructure (channels, ditches, ponds, stormwater pipes, etc.) c. Regional Detention d. Regional Channel Improvements e. Storm Drain Improvements f. Reservoirs g. Dam Improvements, Maintenance, and Repair h. Flood Walls/Levees i. Coastal Protections j. Nature Based Projects – 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 k. Comprehensive Regional Project – includes a combination of projects intended to work together <p>Non-Structural</p> <ul style="list-style-type: none"> a. Property or Easement Acquisition b. Elevation of Individual Structures c. Flood Readiness and Resilience d. Flood Early Warning Systems, including stream gauges and monitoring stations e. Floodproofing f. Regulatory Requirements for Reduction of Flood Risk
Flood Management Strategy (FMS)	None specified; at a minimum, RFPGs should include as FMSs any proposed action that the group would like to identify, evaluate, and recommend that does not qualify as either a FME or FMP.

Particularly during this first round of flood planning, several areas are likely to be identified for potential FMEs due to a lack of sufficiently complete or current flood study data to accurately evaluate and quantify flood risk. Not every conceivable FME can or will be recommended for inclusion in the plan. The RFPG and the TC must decide which potential FMEs will be recommended in the RFP so that limited state and stakeholder resources can be directed efficiently and accordingly to implement those studies.

Similarly, regional stakeholders will likely propose several projects and strategies for managing flood risk that could be candidates for inclusion in the plan and eligible for state funding. Each FMP and FMS identified by the TC will be screened to determine if the FMP or FMS is potentially feasible. At a minimum, FMPs and FMSs must be developed in an adequate level of detail to furnish the required technical information and adhere to the minimum criteria set forth in the *SOW*, the *Rules*, and the *Technical Guidelines*.

For FMPs, these minimum criteria include having appropriate hydrologic and hydraulic (H&H) models required to evaluate that the project adheres to TWDB Mapping and Modeling Guidelines and a requirement that the FMP causes No Negative Impact on a neighboring area. These requirements must also be met for FMSs, as applicable. These standards are described in more detail in *Section 3.5* and *Section 3.6* of the *Technical Guidelines*.

Process for Identification of Potential FMEs and Potentially Feasible FMPs and FMSs

Identification

Identification of potential FMEs and potentially feasible FMPs and FMSs begins with the development of the Flood Mitigation Needs Analysis (*Task 4A*). Generally, this task is meant to guide action, evaluation and recommendation by highlighting:

- The areas with the greatest gaps in flood risk knowledge that should be considered for potential FMEs.
- The areas of greatest known flood risk and flood mitigation needs that should be considered for implementation of potentially feasible FMSs and FMPs.

FNI has developed a process for identifying areas of greatest need based on application of the requirements outlined in the *Rules* and *SOW*. The process is summarized in **Table 2**, below.

Table 2: Guidance for Assessment and Identification of Flood Mitigation Needs

Guidance	Factors to Consider
1. Most prone to flooding that threatens life and property	<ul style="list-style-type: none"> • Area overlapped by inundation mapping and/or included in any historical flooding record • Building footprints / polygons within flood hazard layer • Critical facilities with evacuation routes impacted by flooding • Fully developed flood models (where available) • Low water crossings • Agricultural areas at risk of flooding

Guidance	Factors to Consider
2. Locations, extent and performance of current floodplain management and land use policies and infrastructure	<ul style="list-style-type: none"> • Communities not participating in NFIP and/or without NFIP equivalent or higher standards • Disadvantaged / Underserved communities • City / County design manuals • Community Rating System (CRS) score • Land use policies • Floodplain ordinance(s)
3. Inadequate inundation mapping	<ul style="list-style-type: none"> • No mapping • Presence of Fathom / BLE / FEMA Zone A flood risk data • Detailed FEMA models older than 10 years
4. Lack of H&H models	<ul style="list-style-type: none"> • Communities with zero models • Communities with limited models
5. Emergency need	<ul style="list-style-type: none"> • Damaged or failing infrastructure • Other emergency conditions
6. Existing models, analysis and flood risk mitigation plans	<ul style="list-style-type: none"> • Exclude flood mitigation plans already in implementation • Leverage existing models, analyses, and flood risk mitigation plans • Benefit-Cost Ratio > 1
7. Already identified and evaluated flood mitigation projects	<ul style="list-style-type: none"> • Exclude flood mitigation projects already in implementation • Leverage existing flood mitigation projects • Benefit-Cost Ratio > 1
8. Historic flooding events	<ul style="list-style-type: none"> • Disaster declarations • Flood insurance claim information • Other significant local events
9. Already implemented flood mitigation projects	<ul style="list-style-type: none"> • Exclude areas where flood mitigation projects have already been implemented unless significant residual risk remains
10. Additional other factors deemed relevant by RFPG	<ul style="list-style-type: none"> • Alignment with RFPG goals • Alignment with TWDB guidance principles

After identification of the areas of greatest flood mitigation need, the TC will review the available data to develop a list of potential flood risk reduction actions for addressing the needs in these areas. The data will include information compiled under previous tasks in the *SOW*, including:

- Data collection regarding existing flood infrastructure, flood projects currently in progress, and known flood mitigation needs (*Task 1*);
- Quantification of existing and future flood risk exposure and vulnerability (*Tasks 2A and 2B*);
- Goals and strategies adopted and/or recommended by the RFPG for addressing existing flood hazards and mitigating future flood risk (*Tasks 3A and 3B*); and,
- Stakeholder-provided input throughout the flood planning process.

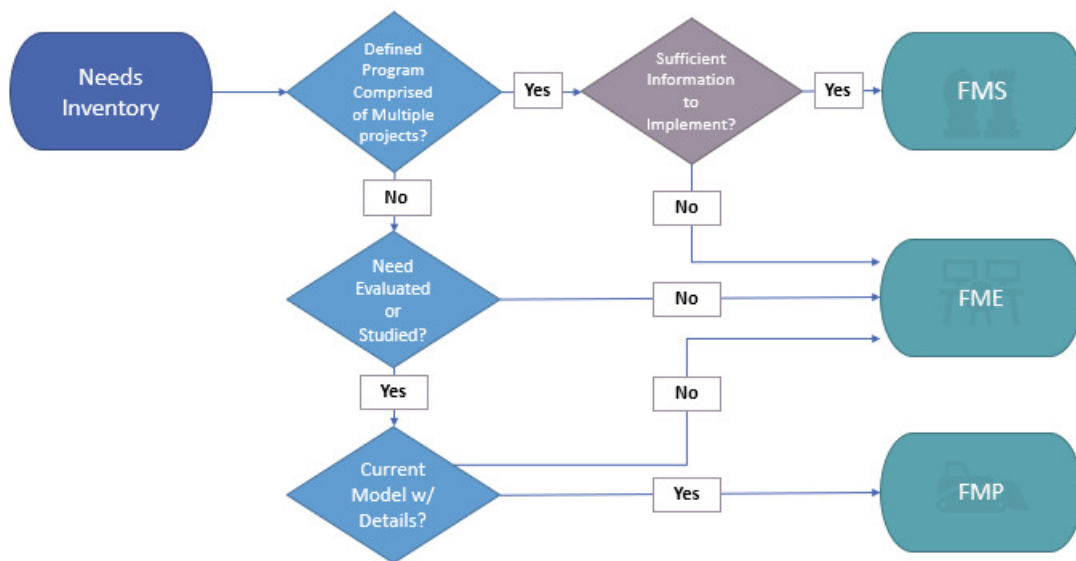
The TC anticipates several potential actions will be identified, primarily FMEs, to address gaps in available flood risk data associated with the first planning cycle. The *Rules* and *SOW* require FMSs and FMPs to be developed in a sufficient level of detail to be included in the RFP and recommended for state funding. The

TC does not anticipate that this first planning cycle will have sufficient data, time, or budget to develop new FMSs and FMPs. For the most part, the list of potentially feasible FMSs and FMPs likely will be compiled based on contributions from the RFPG and other regional stakeholders from sources such as previous flood studies, drainage master plans, and capital improvement programs. However, the TWDB is currently in the process of allocating additional flood planning funding and developing an addendum to the RFP scope of work that may allow TC to develop FMEs into FMPs. This additional source of funding could potentially provide opportunities to increase the number of actions that would qualify as FMPs in the plan’s first cycle.

Evaluation

Once potential flood risk reduction actions are identified, the TC will perform a screening process to sort actions into their appropriate categorization. The screening process is shown below in **Figure 1**.

Figure 1: Potential Flood Risk Reduction Action Screening Process



In addition to falling into the general buckets of action types outlined in **Table 1**, FMPs and FMSs will be screened to determine if they have been developed in enough detail and include current technical data to meet the TWDB’s requirements for these action types as outlined in the *Technical Guidelines*. For instance, one requirement is to prove the project has No Negative Impacts on neighboring areas. Table 21 in Section 3.6 of the *Technical Guidelines* specifies the impacts analysis should include discharge, velocity, valley storage, and downstream conveyance considerations. This detailed analysis is only achievable if hydrologic and hydraulic models are available. Furthermore, a Benefit-Cost Analysis (BCA) is also required to demonstrate that a recommended FMP has a Benefit-Cost Ratio (BCR) greater than one (see Section 3.8 of the *Technical Guidelines*). As part of the FMP evaluation, it is likely that the BCA will need to be revised to reflect updated cost estimates. Therefore, sufficient data must be available to perform the necessary BCA calculations. Actions that were initially considered for FMSs and FMPs that do not meet these requirements may be recommended for future study as part of an FME.

Selection

The TC will seek to identify and recommend a comprehensive list of potential flood risk reduction actions for inclusion in the RFP. In practice, this means that as many FMPs and FMSs as possible will be

recommended which have information available to meet the detailed requirements specified in the *Technical Guidelines*. FMSs will also be recommended for other strategies the RFPG wishes to pursue that do not fit cleanly into the FME or FMP categorizations. One example of a potential FMS is a program of separate FMPs that is part of an overall strategy to reduce flood risk within a particular area, such as a community-wide buyout program to be implemented over several years. Generally, FMEs will be recommended for any remaining areas with potential flood risk and exposure of people and property based on results of *Task 4A*.

All recommended actions must meet the technical requirements of the *Technical Guidelines*, including demonstrating No Negative Impacts and identifying at least one local sponsor. However, some potential actions that meet these baseline requirements may not be appropriate for recommendation. While this is not a comprehensive list, some potential reasons a project may not be recommended include:

- Action does not achieve flood risk reduction
- Action does not align with the flood mitigation goal(s) adopted by the region and/or the guidance principles set forth by the state
- Action does not demonstrate benefits at a scale appropriate for inclusion in a regional plan
- Action duplicates the benefits of another action(s) included in the plan
- Action cannot obtain a Memorandum of Understanding (MOU) or other form of concurrence from impacted entities
- Action does not demonstrate a sensible benefit-cost ratio or other metric
- Public input regarding the action demonstrates a need for further evaluation or consensus building with regional stakeholders
- Action does not receive a simple majority vote from a quorum of the RFPG members for inclusion in the RFP.

Schedule

The process to identify and evaluate FMEs, FMPs, and FMSs must be approved by the RFPG and included in the Technical Memorandum (TM) furnished under *Task 4C.1.h* of the SOW. This deliverable deadline has been set for January 7, 2022 by the TWDB. However, the TWDB has extended the deadline to submit certain portions of the TM deliverables to March 7, 2022 (SOW items 4C.1.c-e). Furthermore, the list of potential FMEs, FMPs, and FMSs that shall be provided by the January 7, 2022 deadline are considered an initial submittal and can be enriched, changed, and enhanced during the latter part of plan development.

After the delivery of the TM, the TWDB will review and provide Notice to Proceed (NTP) on *Task 5*, after which the TC may begin the process of recommending FMEs and FMPs for inclusion in the RFP. The TWDB has not provided an anticipated date for issuance of NTP. As such, the schedule provided in **Table 3** below is the TC's proposed timeline of activities to meet the TM deadline and anticipated schedule of activities after NTP on *Task 5*.

Table 3: Proposed Timeline of Activities

Flood Planning Process Activity	Anticipated Date
TC delivers <i>Process for Identification and Evaluation of Potential FMEs and Potentially Feasible FMPs and FMSs</i> TM to RFPG for review	September 22, 2021
RFPG considers approval of Process at October meeting	October 7, 2021
TC presents identified potential FMEs and potentially feasible FMPs and FMSs to RFPG	November 2021
TC refines list of identified potential FMEs and potentially feasible FMPs and FMSs and deliver TM to RFPG for review	November 2021 – December 2021
RFPG considers approval to submit TM	December 2021
TC delivers TM to TWDB (<i>SOW items 4C.1.a-b, 4C.1.f-j</i>)	January 7, 2022
TWDB review TM; TC continue process to evaluate FMEs, FMPs, and FMSs	January 2022 – TBD
TC delivers TM update to TWDB (<i>SOW items 4C.1.c-e</i>)	March 7, 2022
TWDB issues NTP on Task 5; TC to begin process of recommending FMEs, FMPs, and FMS for inclusion in RFP	TBD (after NTP by TWDB)

When reviewing and considering whether to approve drafts of the TM, the RFPG members should do so with the understanding that the TWDB has established the TM as a “draft, mid-point, work-in-progress deliverable...to demonstrate that [the RFPG] are making appropriate progress towards the development of their regional flood plan and in meeting contract requirements.” On August 17, 2021, the TWDB emailed the TC and further clarified that:

“If RFPGs need to make changes to content that was included in deliverables submitted under the technical memorandum after the submission deadline, RFPGs do not need to resubmit any previously submitted deliverables. The content of the draft and final versions of each regional flood plan will supersede all content included in any previous deliverables.”

As such, the TM does not need to include the final list of potential flood risk reduction actions. Actions can be updated, added, or removed as additional flood risk information or other details are evaluated by the TC and through future engagement with stakeholders. Furthermore, the TWDB is currently planning to authorize additional funds that may contribute to developing additional flood risk reduction actions that may be incorporated in the RFP during the first planning cycle. This authorization is forthcoming and the process for incorporating the outputs of that supplementary effort will be developed at a future date.

Attachment 5

Task 4C.1i – List of potential FMEs and
potentially feasible FMSs and FMPs

FME ID	Watershed Name	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
FME0001	Elm Fork Trinity,Denton,Lake Texoma,Farmers-Mud	FIS	111.178874	Riverine	Cooke County	FEMA, TWDB															
FME0002	East Fork Trinity,Bois D'arc-Island,Elm Fork Trinity,Lake Texoma	FIS	633.936423	Riverine	Grayson County	FEMA, TWDB															
FME0003	East Fork Trinity,Bois D'arc-Island,Sulphur Headwaters,Blue	FIS	853.19628	Riverine	Fannin County	FEMA, TWDB															
FME0004	East Fork Trinity,Sulphur Headwaters,Cedar,Lake Fork,Upper Sabine	FIS	235.006778	Riverine	Hunt County	FEMA, TWDB															
FME0005	Bois D'arc-Island,Sulphur Headwaters,Pecan-Waterhole,Lower Sulpher	FIS	931.795882	Riverine	Lamar County	FEMA, TWDB															
FME0006	Sulphur Headwaters,Lower Sulpher	FIS	277.126705	Riverine	Delta County	FEMA, TWDB															
FME0007	Bois D'arc-Island,Pecan-Waterhole,Lower Sulpher	FIS	543.358461	Riverine	Hopkins County	FEMA, TWDB															
FME0008	Middle Sabine,Sulphur Headwaters,White Oak Bayou,Lake Fork,Lake O'the Pines,Lower Sulpher	FIS	1054.99598	Riverine	Red County	FEMA, TWDB															
FME0009	Middle Sabine,Sulphur Headwaters,White Oak Bayou,Lake O'the Pines,Lower Sulpher	FIS	293.467964	Riverine	Franklin County	FEMA, TWDB															
FME0010	White Oak Bayou,Lake O'the Pines,Lower Sulpher	FIS	425.480337	Riverine	Titus County	FEMA, TWDB															
FME0011	Little Cypress,Lake O'the Pines	FIS	202.655994	Riverine	Camp County	FEMA, TWDB															
FME0012	Middle Sabine,Little Cypress,Lake Fork,Upper Sabine,Lake O'the Pines	FIS	56.766875	Riverine	Wood County	FEMA, TWDB															
FME0013	Middle Sabine,Little Cypress,Lake O'the Pines	FIS	427.787624	Riverine	Upshur County	FEMA, TWDB															
FME0014	Middle Sabine,Little Cypress	FIS	28.436605	Riverine	Gregg County	FEMA, TWDB															
FME0015	Middle Sabine,Caddo Lake,Little Cypress,Lake O'the Pines,Cross Bayou	FIS	532.160643	Riverine	Harrison County	FEMA, TWDB															
FME0016	Caddo Lake,Little Cypress,Lake O'the Pines	FIS	418.818144	Riverine	Marion County	FEMA, TWDB															
FME0017	Caddo Lake,White Oak Bayou,Lake O'the Pines,Cross Bayou,Lower Sulpher	FIS	956.773984	Riverine	Cass County	FEMA, TWDB															
FME0018	McKinney-Posten Bayous,Pecan-Waterhole,Lower Sulpher	FIS	920.100627	Riverine	Bowie County	FEMA, TWDB															
FME0019	Caddo Lake,White Oak Bayou,Lake O'the Pines,Lower Sulpher	FIS	256.934513	Riverine	Morris County	FEMA, TWDB															
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FMP ID	RFGC No.	RFGC Name	FMP Name	Description	Associated Goals (ID)	Counties	HUC12s	Watershed Name	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
FMP0001	2	Lower Red-Sulphur-Cypress	City of Atlanta High School Lane, Project/Phase No. 2	Perform channel improvements between Hwy 77 & Main St (4,210 LF) & Replace culvert at High School Lane and install storm drainage along Miller St, Glass St, and Arney St, Polk St.	6001. 6002. 6003. 6004	Cass	111403060304, 111403020702, 111403040201, 111403040203, 111403040205, 111403060303, 111403040202	Caddo Lake,Cross Bayou,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	44.15474	Riverine/Urban	City of Atlanta		N	\$ 950,000.00	City Stormwater Fee, TWDB
FMP0002	2	Lower Red-Sulphur-Cypress	City of Atlanta Eleanor St and Red Bluff St. Project/Phase No. 3	Replace culvert crossings - from City of Atlanta Proposed Storm Drainage Improvements 2013-2033	6001. 6002. 6003. 6004	Cass	111403060304, 111403020702, 111403040201, 111403040203, 111403040205, 111403060303, 111403040202	Caddo Lake,Cross Bayou,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	44.15474	Urban	City of Atlanta			\$ 50,000.00	
FMP0003	2	Lower Red-Sulphur-Cypress	City of Atlanta Park View St and Jefferson St. Project/Phase No. 4	Install storm culvert crossings - from City of Atlanta Proposed Storm Drainage Improvements 2013-2033	6001. 6002. 6003. 6004	Cass	111403060304, 111403020702, 111403040201, 111403040203, 111403040205, 111403060303, 111403040202	Caddo Lake,Cross Bayou,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	44.15474	Urban	City of Atlanta			\$ 50,000.00	
FMP0004	2	Lower Red-Sulphur-Cypress	City of Paris Big Sandy Cr Tribs 4 and 6 Improvements - Phase 1	Phase 1: downstream of Clarksville, the existing earthen channel will be regraded to a 25-foot wide grass-lined channel with 4:1 side slopes at the existing depth. The channel upstream of Clarksville Avenue up to and including the confluence with Tributary 6 will be replaced with a 15-foot wide concrete channel with vertical walls, cut three to four feet (3' - 4') deeper.	6003. 6004	Lamar	111403010406, 111401010703, 111403010407, 111403010307, 111401010702, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	56.07414	Riverine/Urban	City of Paris		N	\$ 4,635,825.33	
FMP0005	2	Lower Red-Sulphur-Cypress	City of Paris Big Sandy Cr Tribs 4 and 6 Improvements - Phase 2	Phase 2: the upper portion of Tributary 4 will be improved. The channel will be improved from the confluence upstream to Lamar Avenue with a 15-foot wide concrete channel with vertical walls, with a cut ranging from one to four feet (1' - 4'). Upstream of Lamar, no channel improvements need to be made.	6001. 6002. 6003. 6004	Lamar	111403010406, 111401010703, 111403010407, 111403010307, 111401010702, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	Regional Channel Improvements	56.07414	Riverine/Urban	City of Paris		N	\$ 3,778,199.22	
FMP0006	2	Lower Red-Sulphur-Cypress	City of Paris Big Sandy Cr Tribs 4 and 6 Improvements - Phase 3	Phase 3: Tributary 6 will be improved. The existing trapezoidal channel will be replaced with a 25-foot wide, vertical wall concrete channel. The culverts along Tributary 6 will need to be replaced with bridges unless additional right-of-way is acquired.	6001. 6002. 6003. 6004	Lamar	111403010406, 111401010703, 111403010407, 111403010307, 111401010702, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	56.07414	Riverine/Urban	City of Paris		N	\$ 1,823,405.60	
FMP0007	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 1			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 2,207,653.00	
FMP0008	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 2			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 1,042,537.00	
FMP0009	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 3			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 337,325.00	
FMP0010	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 4			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 439,457.00	
FMP0011	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 5			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 526,137.00	
FMP0012	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 6			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 1,036,026.00	
FMP0013	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 7			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 581,191.00	
FMP0014	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 8			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 327,179.00	
FMP0015	2	Lower Red-Sulphur-Cypress	City of Paris Compr. Plan Project 9			Lamar	111401010701, 111403010406, 111401010601, 111403010306, 111401010703, 111403010407, 111401010605, 111403010308, 111403010307, 111401010702, 111401010704, 111401010604, 111403010405, 111403020101	Bois D'arc-Island,Sulphur Headwaters,Lower Sulphur	<Null>	199.3267	Urban	City of Paris			\$ 489,733.00	
FMP0016	2	Lower Red-Sulphur-Cypress	Ferguson Park Feasibility Study	Improvements to existing culverts and channelization	5001. 5002	Bowie	111402010201, 111403020705, 111401060606, 111401060605, 111403020704, 111401060607, 111403020701, 111402010202, 111401060604	McKinney-Posten Bayous,Pecan-Waterhole,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	<Null>	Urban	City of Texarkana			\$ 10,685,000.00	
FMP0017	2	Lower Red-Sulphur-Cypress	Wagner Creek	Channel/Overbank Clearing	6001. 6002. 6003. 6004	Bowie	111402010201, 111403020705, 111401060606, 111401060605, 111403020704, 111401060607, 111403020701, 111402010202, 111401060604	McKinney-Posten Bayous,Pecan-Waterhole,Lower Sulphur	Regional Channel Improvements	88.04081	Urban	City of Texarkana			\$ 658,945.13	
FMP0018	2	Lower Red-Sulphur-Cypress	Stream WC-2	Independence Circle & Lexington Place Bridge Improvements	6001. 6002	Bowie	111402010201, 111403020705, 111401060606, 111401060605, 111403020704, 111401060607, 111403020701, 111402010202, 111401060604	McKinney-Posten Bayous,Pecan-Waterhole,Lower Sulphur	Infrastructure (channels, ditches, ponds, pipes, etc.)	<Null>	Urban	City of Texarkana			\$ 1,325,277.53	

FMP ID	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	Benefit-Cost Ratio	RFPG Recommendation (Y/N)	Reason for Recommendation						
	Area in 100yr (1% annual chance) Floodplain	Area in 500yr (0.2% annual chance) Floodplain	Estimated number of structures at 100yr flood risk	Residential structures at 100-year flood risk	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)	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)													Estimated reduction in fatalities (if available)	Estimated reduction in injuries (if available)				
FMP0001																																						
FMP0002																																						
FMP0003																																						
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FMP0015																																						
FMP0016																																						
FMP0017																																					0.58	
FMP0018																																					1.15	

Attachment 6

Task 4C.1j – List of FMSs and FMPs
that were determined infeasible

ID	Community	County	Source Name	Source Type	Source Date	Project Title	Project Location	Project Type	Project Description	Project Cost	Maintenance Cost	Current Level of Service	Proposed Level of Service	Benefit-Cost Ratio	Drainage Area Greater than 1sm	Rainfall Data

ID	Step 0 Screening: Already completed?	Step 1 Screening: FMP	Step 1 Screening: FME	Step 1 Screening: FMS	Step 1 Screening: Disqualified due to: Not a flood problem with DA > 1 sm	Step 1 Screening: Disqualified due to: Does not reduce 100-year flood risk	Step 1 Screening: Disqualified due to: Does not meet flood mitigation or floodplain management goal	Step 2 Screening: Structural FMP	Step 2 Screening: Non-Structural FMP	Step 2 Screening: FME	Step 2 Screening: FMS	Step 2 Screening: H&H model available?	Step 2 Screening: Is there sufficient data?	Step 2 Screening: Has impact analysis?	Step 2 Screening: Has negative impact?

Attachment 7

Task 4C – Geodatabase
(provided in digital format only)