

Task 5: Recommendation of Flood Management Evaluations, Flood Management Strategies and Associated Flood Mitigation Projects

The objective of Task 5 is for RFPGs to use the information developed under Task 4 to recommend flood mitigation actions for inclusion in the Regional Flood Plan. While there was a lot of overlap in the performance of Tasks 4B and 5 (task 5 is a continuation of 4B), Chapter 4B focused on the technical evaluations and screening of the potential FMEs and potentially feasible FMSs and FMPs and Chapter 5 focuses on how the RFPG used this data to determine whether to recommend flood mitigation actions. This chapter summarizes and documents:

1. The process undertaken to make final recommendations on flood mitigation actions
2. The potential FMEs and potentially feasible FMSs and FMPs identified and evaluated under Task 4B and whether these actions are recommended by the RFPG
3. The entities that will benefit from the recommended flood mitigation actions

While there is a significant need across the region to improve flood risk awareness and to develop and implement actions to reduce existing and future flood risk, not every flood mitigation action can be recommended in the Regional Flood Plan or included in the State Flood Plan.

The Guadalupe RFPG opted to take an inclusive approach to the evaluation and recommendation process. If an evaluation, strategy, or project met the TWDB requirements, was aligned with the Regions' flood mitigation and floodplain management goals, and seemed reasonable, the planning group choose to show deference to the local communities/sponsors and leaned towards including in the regional plan.

5.1 RFPG Evaluation and Recommendation Process

The RFPG considered recommendations of flood mitigation actions through a multi-step process. The methodology included a screening of all potential flood mitigation actions considering TWDB requirements for inclusion in the Regional Flood Plan. The reasons for not recommending a particular flood mitigation action were clearly documented as part of the screening, evaluation, and recommendation process.

The screening process for evaluating and recommending flood mitigation actions is summarized in **Figure 5.1** for FMPs and FMSs, and **Figure 5.2** for FMEs. These processes were developed following the TWDB rules and requirements that left some evaluation criteria at the discretion of the RFPG.

Because many projects are constrained physically and financially the RFPG decided that they did not want to exclude good flood reduction projects based on the level of service or benefit-cost-ratio. Similarly,

1 because many of the known flood mitigation projects were identified by local jurisdictions the drainage
2 areas are often under one-square mile and the RFPG did not want to exclude those from the plan. The
3 RFPG did express a desire to identify and group small individual projects to create larger FMPs within
4 single jurisdictions as well as to encourage communities to work together on regional projects. Those
5 efforts are somewhat limited in this first cycle but will be an important aspect of the amended plan due
6 to be submitted in July 2023.

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8 *Due to the overlap of Tasks 4B and 5, the recommendation process was in many ways an extension of the*
9 *initial screening process with a more detailed evaluation of each action, geospatial location, determination*
10 *of flood risk indicators and risk reduction potential, and reassignment of actions as needed (ex: FMP to*
11 *FME).*

13 5.2 Sponsor Support

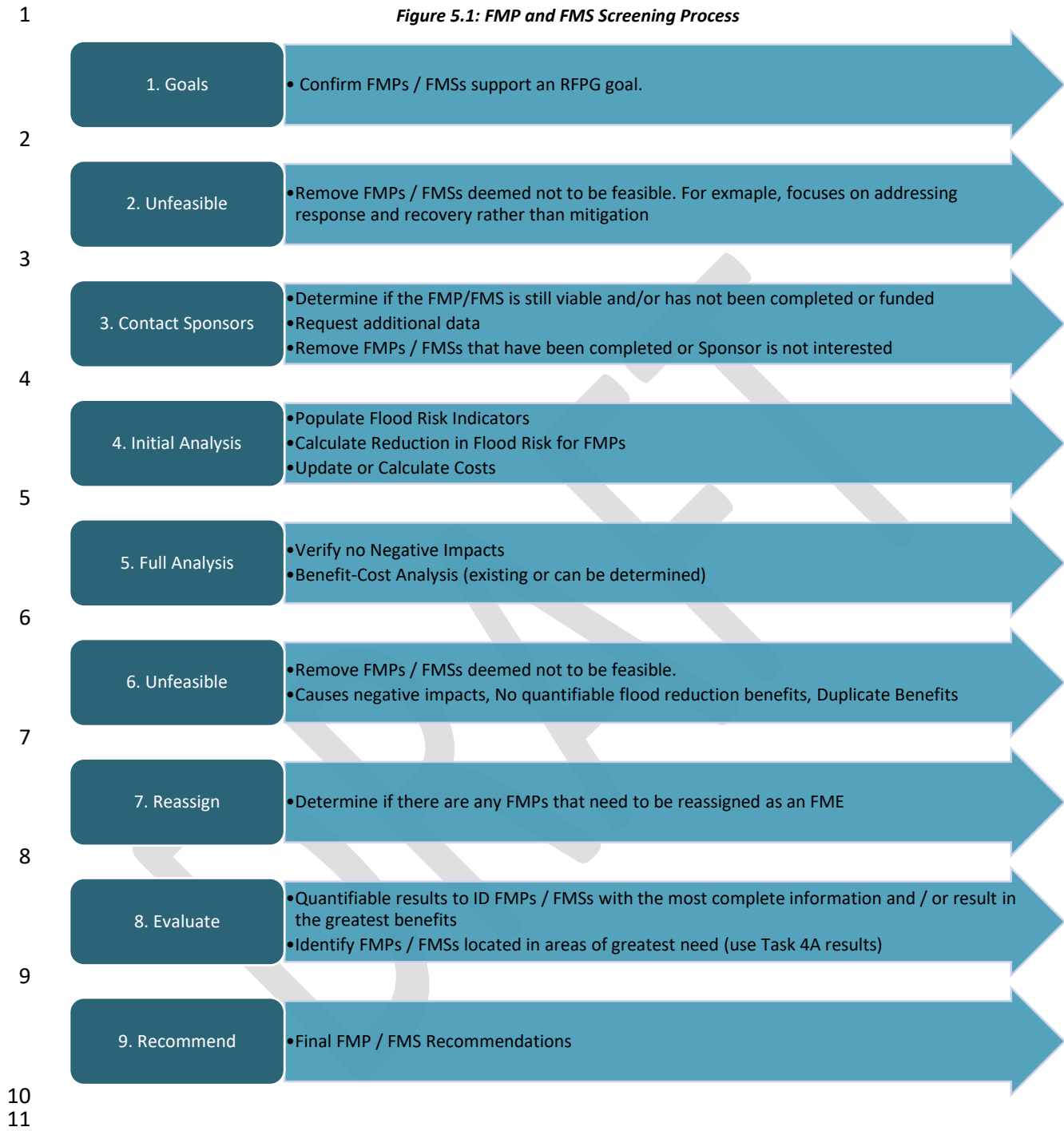
14 Initial efforts to contact potential sponsors consisted of sending surveys to communities. These surveys
15 included actions identified for each community, giving the community an opportunity to identify any that
16 are no longer relevant or that they are actively pursuing. These surveys were followed up with calls to
17 inform communities of the survey and its purpose. To supplement this outreach effort the planning group
18 leveraged existing relationships to contact communities in an effort to increase community participation
19 and to gather additional input.

20
21 While these efforts furthered the goal of receiving community feedback on what actions they wanted to
22 pursue, not all communities were able to be reached, and accordingly, the RFPG decided that an
23 affirmative willingness to sponsor a given action would not be a prerequisite for inclusion in the plan.
24 Therefore, all potential actions were considered for inclusion in the plan unless an entity had specifically
25 declined to be listed as a sponsor and no other appropriate potential sponsor was identified. This
26 approach was adopted because:

- 27 1. It provides a conservative estimate of the flood mitigation need in the region.
- 28 2. Inclusion in the plan does not obligate an entity to sponsorship an action, it simply allows an entity
29 to be eligible for funding if they have the interest and capacity to pursue an action.

30
31 It is important to note that all sponsors associated with recommended actions were subsequently sent a
32 survey to identify potential funding sources for the actions listed in the plan. This effort is detailed in
33 Chapter 9.

Figure 5.1: FMP and FMS Screening Process



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Figure 5.2: FME Screening Process



5.3 Flood Management Evaluations

Description and Summary of Recommended FMEs

A total of 136 potential FMEs were identified and evaluated by the RFPG. Of these, all 136 were recommended, representing a combined total of \$68,414,000 of flood management evaluation need covering more than 25,000 square miles across the region. Some of the FMEs also included an estimated construction cost totaling an additional \$ [REDACTED]. The number and types of studies recommended by the RFPG are summarized in **Table 5.1**.

Table 5.1: Summary of Recommended FMEs

FME ID	Name	Type	Cost
111000012	City of Buda Dam Study	Preparedness	\$ 500,000
111000063	City of Seguin Ingress Egress Improvements Project Planning	Preparedness	\$ 250,000
111000096	Comal County Evacuation and Dam Safety Plan	Preparedness	\$ 50,000
111000112	Hays County Dam Inundation Maps	Preparedness	\$ 500,000
111000123	Kerr County Dam Integrity Study	Preparedness	\$ 500,000
111000010	City of Cibolo and Seguin Road Access and Conditions Study	Preparedness	\$ 500,000
111000006	Caldwell County Emergency Service District #3 Repetitive Loss Property Mitigation Study	Project Planning	\$ 1,000,000
111000007	Caldwell County Emergency Service District #4 Fire Station 2 Project Planning	Project Planning	\$ 100,000
111000008	Canyon Regional WA Hays Caldwell Water Treatment Plant Floodwall Project Planning	Project Planning	\$ 159,355
111000100	Comal County Master WID River Road Low Water Crossing Improvement Project Planning	Project Planning	\$ 700,000
111000119	Hunts ISD Storm Drainage Infrastructure Project Planning	Project Planning	\$ 100,000
111000120	Ingram ISD Construct New Storm Drainage Infrastructure	Project Planning	\$ 100,000
111000121	Ingram ISD Improve Existing Storm Drainage Infrastructure	Project Planning	\$ 100,000
111000124	Kerr ISD Storm Drainage Infrastructure Project Planning	Project Planning	\$ 100,000
111000003	Caldwell County Bridge Improvements Project Planning	Project Planning	\$ 256,000
111000015	City of Flatonia Drainage Project Planning	Project Planning	\$ 2,739,000
111000016	City of Flatonia WWTP Floodproofing Project Planning	Project Planning	\$ 100,000
111000017	City of Garden Ridge Drainage Improvements Project Planning	Project Planning	\$ 100,000
111000018	City of Gonzales Tinsley Creek Improvement Project Planning	Project Planning	\$ 600,000
111000019	City of Gonzales Tinsley Creek Flood Mitigation Project Planning	Project Planning	\$ 430,000
111000022	City of Kerrville Pinto Trail Project Planning	Project Planning	\$ 100,000
111000023	City of Kerrville Park Street Low Water Crossing Project Planning	Project Planning	\$ 340,000
111000024	City of Kerrville First Street Low Water Crossing Project Planning	Project Planning	\$ 510,000
111000025	City of Kerrville Fourth Street Low Water Crossing Project Planning	Project Planning	\$ 180,000
111000026	City of Kerrville Hill Country Drive at SH 16 Project Planning	Project Planning	\$ 245,000
111000027	City of Kerrville Upper Lois Street Drainage Improvements (between Woodlawn and Ox) Project Planning	Project Planning	\$ 100,000
111000028	City of Kerrville Harper Street between Culberson Avenue and Lewis Avenue Project Planning	Project Planning	\$ 180,000
111000029	City of Kerrville Circle Avenue Drainage Channel Project Planning	Project Planning	\$ 100,000
111000030	City of Kerrville Jack Drive - Undersized Inlet Project Planning	Project Planning	\$ 240,000

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111000031	City of Kerrville Harper Road to Town Creek (Fay Drive) Drainage Improvements Study	Project Planning	\$ 150,000
111000034	City of Kyle - N. Burseson Street Drainage Improvements Project Planning	Project Planning	\$ 983,000
111000039	City of Mountain City Repetitive Loss Structure Mitigation Study	Project Planning	\$ 150,000
111000040	City of New Braunfels Goodwin Lane Improvements Project Planning	Project Planning	\$ 200,000
111000041	City of New Braunfels Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000042	City of New Braunfels - Landa Park Aquatics Complex - Green Stormwater Infrastructure Retrofit Project Planning	Project Planning	\$ 675,086
111000043	City of New Braunfels - Box Culvert Installation to Reduce Flood Risk on Blieders Creek, Comal River and Landa Park Project Planning	Project Planning	\$ 878,000
111000051	City of Niederwald Engineering Review of City Hall	Project Planning	\$ 10,000
111000052	City of Nixon Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000056	City of San Marcos Low Water Crossing at Jackman Project Planning	Project Planning	\$ 150,000
111000057	City of San Marcos Low Water Crossing at Mitchell and Purgatory Creek Project Planning	Project Planning	\$ 200,000
111000058	City of San Marcos LWC at River Road and Railroad Trestle/Blanco River Project Planning	Project Planning	\$ 150,000
111000059	City of San Marcos LWC at S LBJ and Purgatory Creek Project Planning	Project Planning	\$ 150,000
111000060	City of San Marcos - Extension of River Ridge Parkway West Project Planning	Project Planning	\$ 298,000
111000064	City of Seguin City-wide Drainage Improvements Project Planning	Project Planning	\$ 200,000
111000065	City of Seguin Voluntary Buyout Program Project Planning	Project Planning	\$ 300,000
111000066	City of Seguin Citywide Drainage Project Planning	Project Planning	\$ 4,304,000
111000067	City of Seguin Sewage Treatment Plant Floodproofing Project Planning	Project Planning	\$ 100,000
111000068	City of Uhland Drainage Improvement Project Planning	Project Planning	\$ 1,334,000
111000070	City of Victoria Harden Critical Infrastructure Project Planning	Project Planning	\$ 100,000
111000071	City of Victoria Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000072	City of Victoria Flood Gate Project Planning	Project Planning	\$ 45,000
111000073	City of Victoria Regional Drainage Solutions Project Planning	Project Planning	\$ 1,327,962
111000074	City of Victoria - Storm Sewer Improvements Project Planning	Project Planning	\$ 3,946,100
111000075	City of Victoria Clean and Televis Storm Sewers Project Planning	Project Planning	\$ 1,662,106
111000076	City of Victoria Regrade Priority Ditches and Driveway Culverts Project Planning	Project Planning	\$ 1,165,853
111000077	City of Victoria Repair Channel Failures & Sediment Removal Project Planning	Project Planning	\$ 276,201
111000079	City of Waelder Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000081	City of Wimberley FM 1492 at Blanco River Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000082	City of Wimberley Hidden Valley at Blanco River Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000083	City of Wimberley Little Arkansas at Blanco River Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000084	City of Wimberley Valley Drive at Pierce Creek Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000085	City of Wimberley Flite Acres Road Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000086	City of Wimberley FM 1492 at Pierce Creek Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000087	City of Wimberley Wilson Creek at River Road Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000088	City of Wimberley Green Acres Dr. at Fire Station Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000089	City of Wimberley Leveritt's Loop Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000090	City of Wimberley Spoke Hollow Dr. at Spoke Pile Creek Low Water Crossing Project Planning	Project Planning	\$ 100,000

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111000091	City of Wimberley River Road at Western City Limit Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000092	City of Wimberley Paradise Hills Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000093	City of Wimberley River Road Reconstruction Project Planning	Project Planning	\$ 100,000
111000094	City of Wimberley Little Ranches at Panther Creek Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000095	City of Wimberley Hoots Holler Low Water Crossing Project Planning	Project Planning	\$ 100,000
111000097	Comal County Low Water Crossing Improvements Project Planning	Project Planning	\$ 150,000
111000098	Comal County Voluntary Buyout Program Project Planning	Project Planning	\$ 357,000
111000099	Comal County Retention Dam Project Planning	Project Planning	\$ 8,000,000
111000102	City of Cuero City Public Service Station Project Planning	Project Planning	\$ 100,000
111000104	Dewitt County Drainage District Channel Improvements Project Planning	Project Planning	\$ 250,000
111000103	City of Cuero WWTP Floodproofing Project Planning	Project Planning	\$ 100,000
111000105	DeWitt County (City of Nordheim) Flash Flood Mitigation Project Planning	Project Planning	\$ 150,000
111000106	Gillespie County Low Water Crossing Improvements Project Planning	Project Planning	\$ 50,000
111000107	Gonzales County Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000110	Guadalupe County Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000111	Guadalupe County LWC Project Planning	Project Planning	\$ 2,000,000
111000113	Hays County Harden Critical Infrastructure Project Planning	Project Planning	\$ 100,000
111000114	Hays County Drainage Project Planning (Willow Springs Creek between McCarty Lane and Hunter Road)	Project Planning	\$ 800,000
111000115	Hays County Drainage Project Planning (Willow Springs Creek between Hunter Rd and the Railroad)	Project Planning	\$ 1,200,000
111000117	Hays County The Willow Springs Drainage Improvement Project Planning	Project Planning	\$ 1,124,000
111000116	Hays County Southeastern Property Acquisition Project Planning	Project Planning	\$ 800,000
111000118	Hays County Community Flood Mitigation Project Planning	Project Planning	\$ 238,035
111000122	Kerr County Storm Drainage Infrastructure Project Planning	Project Planning	\$ 120,000
111000126	Travis County Voluntary Buyout Program Project Planning	Project Planning	\$ 300,000
111000131	Victoria County Drainage Improvements around County EOC Project Planning	Project Planning	\$ 100,000
111000132	Victoria County Bridge Improvements Project Planning	Project Planning	\$ 500,000
111000133	Victoria County Voluntary Buyout Program Project Planning	Project Planning	\$ 300,000
111000135	Wilson County Low Water Crossing Improvements Project Planning	Project Planning	\$ 150,000
111000136	Wilson County Voluntary Buyout Program Project Planning	Project Planning	\$ 150,000
111000137	Emergency power generators at critical infrastructure/key resource locations project planning	Project Planning	\$ 100,000
111000138	Cypress Creek Regional detention	Project Planning	\$ 113,855
111000009	Center Point ISD Drainage Improvements Study	Watershed Planning	\$ 100,000
111000004	Caldwell County Emergency Service District #1 Drainage and Utility Plan	Watershed Planning	\$ 100,000
111000005	Caldwell County Emergency Service District #3 River Crossing Improvements Study	Watershed Planning	\$ 1,000,000
111000001	Blanco County Low Water Crossing Improvements Study	Watershed Planning	\$ 250,000
111000002	Blanco County Soil Conservation Plan	Watershed Planning	\$ 100,000
111000013	City of Bulverde Drainage Improvements Study	Watershed Planning	\$ 150,000

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111000014	City of Bulverde Local Flooding Study	Watershed Planning	\$ 100,000
111000020	City of Ingram Drainage Improvements Study	Watershed Planning	\$ 100,000
111000021	City of Kerrville Stormwater Master Plan	Watershed Planning	\$ 250,000
111000032	City of Kyle Structural Engineering Design Manual	Watershed Planning	\$ 100,000
111000033	City of Kyle Prairie and Woodland Restoration Plan	Watershed Planning	\$ 250,000
111000035	City of Lockhart Drainage Improvements Study	Watershed Planning	\$ 2,400,000
111000036	City of Lockhart USACE Study	Watershed Planning	\$ 360,000
111000037	City of Luling Drainage Improvements Study	Watershed Planning	\$ 150,000
111000038	City of Martindale Drainage Improvements Study	Watershed Planning	\$ 100,000
111000044	City of New Braunfels Faust St / Nacogdoches Ave Improvements Project Planning	Watershed Planning	\$ 1,102,000
111000045	City of New Braunfels Dry Comal Creek Tributary East Watershed Project Planning	Watershed Planning	\$ 344,000
111000046	City of New Braunfels Comal Springs Watershed Project Planning	Watershed Planning	\$ 869,000
111000047	City of New Braunfels Hunters Creek Regional Project Planning	Watershed Planning	\$ 211,000
111000048	City of New Braunfels South Guadalupe Tributary Watershed Project Planning	Watershed Planning	\$ 168,000
111000049	City of New Braunfels Dry Comal Creek West Watershed Project Planning	Watershed Planning	\$ 126,000
111000050	City of New Braunfels Stream and Rain Guage Study	Watershed Planning	\$ 175,000
111000054	City of San Marcos Regional Detention Study	Watershed Planning	\$ 200,000
111000055	City of San Marcos Modeling of Purgatory Creek and Willow Springs Creek Overflow Area	Watershed Planning	\$ 271,000
111000061	City of Seguin Drainage Improvements Study	Watershed Planning	\$ 1,100,000
111000062	City of Seguin Low Water Crossing Improvements Study	Watershed Planning	\$ 1,500,000
111000069	City of Victoria Drainage Improvement Study	Watershed Planning	\$ 1,000,000
111000078	City of Victoria Stream Restoration Study	Watershed Planning	\$ 500,000
111000080	City of Wimberley Drainage Master Plan	Watershed Planning	\$ 150,000
111000101	City of Cuero Drainage Improvements Study	Watershed Planning	\$ 150,000
111000108	GBRA FEMA Cooperating Technical Partners (CTP) Modeling and Mapping	Watershed Planning	\$ 250,000
111000109	Guadalupe County Drainage Improvements Study	Watershed Planning	\$ 3,000,000
111000127	Upper Guadalupe River Authority Evaluation of Water and Sediment Control Facilities	Watershed Planning	\$ 250,000
111000128	Victoria County Planning and Development Standards Study	Watershed Planning	\$ 100,000
111000129	Victoria County Drainage Improvements Study	Watershed Planning	\$ 150,000
111000130	Victoria County FIRMs	Watershed Planning	\$ 500,000
111000134	Wilson County Stormwater Management Plan	Watershed Planning	\$ 500,000

111000011	City of Cibolo and Seguin USACE Study	Watershed Planning	\$ 1,000,000
			\$68,414,000

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2 A map and table of recommended FMEs is presented in **Appendix** and , respectively.
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5 5.4 Flood Mitigation Projects

6 Summary of Approach in Recommending FMPs

7 For consideration as an FMP, a project must be defined in a sufficient level of detail to meet the technical
8 requirements of the flood planning project *Scope of Work* and the associated *Technical Guidelines*
9 developed by the TWDB. In summary, the RFGP must be able to demonstrate that each recommended
10 FMP meets the following TWDB requirements:

- 11 1. The primary purpose is mitigation (response and recovery projects are not eligible for inclusion in
12 the Regional Flood Plan).
- 13 2. Supports at least one regional floodplain management and flood mitigation goal.
- 14 3. The FMP is a discrete project (not an entire capital program or drainage master plan).
- 15 4. Implementation of the FMP results in:
 - 16 a. Quantifiable flood risk reduction benefits
 - 17 b. No negative impacts to adjacent or downstream properties
 - 18 c. No negative impacts to an entity’s water supply
 - 19 d. No overallocation of a water source based on the water availability allocations in the most
20 recently adopted State Water Plan.

21
22 In addition, the TWDB recommends that, minimally, FMPs should mitigate flood events associated with
23 the 1% annual chance flood (100-yr LOS). However, if a 100-yr LOS is not feasible, the RFGP can document
24 the reasons for its infeasibility and still recommend an FMP with a lower LOS.
25

26 Updated construction cost estimates and estimates of project benefits must also be available to define a
27 benefit-cost ratio (BCR) for each recommended FMP. The TWDB recommends that proposed projects
28 have a BCR greater than one, but the RFGP may recommend FMPs with a BCR lower than one with proper
29 justification.
30

31 All potentially feasible FMPs that had the necessary data and detailed modeling results available to
32 populate these technical requirements were considered for recommendation by the RFGP. Pertinent
33 details about the FMP evaluation are provided in the following section.
34

35 FMP Evaluation

36 *Initial Evaluation*

37 The scope of work for each FMP was evaluated to ensure that it would support at least one of the regional
38 floodplain management and flood mitigation goals established in Chapter 3. The goals associated with
39 each FMP are included in **Appendix 3**. Based on a review of supporting information, it was determined
40 that the primary purpose for each FMP is mitigation (rather than a response or recovery project), they are

1 discrete projects, and they do not have any anticipated impacts to water supply or water availability
 2 allocations as established in the most recent adopted State Water Plan.

3
 4 *Level of Service (LOS) Evaluation and BCR*

5 All the recommended FMPs provide some level of flood reduction benefits which are included based on
 6 the available information. When a BCR had been previously calculated in an engineering report or study
 7 that was used to create an FMP, the previously calculated BCR value was utilized for the FMP analysis. For
 8 any FMP that did not already have a calculated BCR value, the TWDB BCA Input Spreadsheet was utilized
 9 in conjunction with the FEMA BCA Toolkit 6.0 to generate BCR values.

10
 11
 12 **Description and Summary of Recommended FMPs**

13 Due to the high level of detail required for consideration as an FMP, 37 projects were determined to have
 14 enough details available for evaluation and potential recommendation as FMPs. All FMPs were
 15 recommended by the RFPG, representing a combined total project cost of \$268,187,000. A summary of
 16 the recommended FMPs for inclusion in the Regional Flood Plan is presented in **Table 5.2**. A map of project
 17 areas for the recommended FMPs is provided as **Appendix 4**. Additionally, the required *Project Details*
 18 *Spreadsheet*, which will be used for evaluation and project ranking by the State, is included as **Appendix**
 19 **3**.

20
 21 **Table 5.2: Summary of Recommended FMPs**

FMP ID	Name	Type	Description	Cost
113000001	Detention on the Blanco River	Dam	The proposed dam height of 102 ft. and dam length of 1,840 ft. will provide a maximum storage capacity of approximately 1128 ac-ft.	\$7,467,000
113000006	Plum Creek Tributary 3 Arbor Knot Dr. Improvement	Infrastructure	A proposed culvert improvement has been developed to convey a 1% ACE event. The proposed culvert improvement is to add one additional 8ft x 4ft culvert totaling three culverts at this location, and raising the finished deck elevation by 0.5ft.	\$484,000
113000007	Plum Creek Tributary 4 Sledge Rd. Improvement	Infrastructure	The proposed culvert improvement resulted in eight (7ft x 4ft) box culverts, needed to clear the roadway and to alleviate additional backwater flooding.	\$998,000
113000008	Plum Creek Tributary 4 FM 150 Improvement	Infrastructure	Bridge improvement which will increase the mouth opening and raise the deck level.	\$1,757,400
113000009	80ft Channel Modification and Additional Culvert	Comprehensive	This project consists of channel modifications and an additional culvert. The channel will have 4:1 side slopes and an additional 12 ft x 6 ft culvert is added.	\$1,502,400
113000010	65ft Channel Modification and Additional Culvert	Comprehensive	The channel modifications consists of 65-ft bottom width channel modifications with 4:1 side slopes spanning from the North I-35 frontage road down past Goforth Road to Kym Way.	\$512,000
113000011	Plum Creek Detention Pond Upstream of IH35	Detention Pond	This project consists of a detention pond between the railroad track and the South bound I-35 frontage road. Under this proposed alternative a 13-ft high dam wall would be placed on Plum Creek near Kyle Center Drive.	\$750,000
113000013	Wood Road/Landa Street Drainage Improvement	Other	Authorized services include developing a 2D hydrologic and hydraulic model to evaluate existing conditions flood risk for the project area, conceptually evaluating the feasibility of constructing a new detention pond upstream of Wood Road, and preparing a	\$33,089,000
113000015	Improve Flood Warning Systems	Preparedness	Enhancing stream flow gage network by increasing number of gages throughout community by at least six	\$300,000
113000026	Purgatory Creek Channel Improvement	Channel	Purgatory Creek Channel Improvement Project Preliminary Engineering Report	\$20,720,000
113000027	Sherwood/Kingwood Drainage Improvements	Infrastructure	Sherwood Drive and Kingwood Street Improvements Preliminary Engineering Report	\$5,223,000
113000035	Guadalupe Street Automatic Flood Gates	Preparedness	Place automatic flood gates with vehicle detection on inside of flooded area to allow for egress.	\$100,000

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113000036	Baldrige Creek Regional Detention Pond	Comprehensive	The scope of work includes constructing a regional detention pond on Baldrige Creek upstream of the City. The proposed pond would be located northwest of the City and would release runoff at a substantially lower flowrate, resulting in lower flood eleva	\$9,772,000
113000037	Baldrige Creek Channel and Culvert Improvement	Comprehensive	A combination of a 50 ft. bottom width channel modification with 3:1 side slopes downstream of SH 97 and the addition of two 10 foot by 10 foot concrete box culverts was determined to be the most effective flood mitigation solution for the area.	\$3,412,000
113000039	Wilson Creek - Green Acres Dr. Improvement	Infrastructure	A proposed updated culvert geometry consists of 11 box culverts (10ft-12ft) and a raised finished deck elevation (3ft rise).	\$1,083,000
113000040	Regional Detention South of Mountain Crest Drive	Detention Pond	The alternative consists of a 20 ft. tall detention structure with a 175 ac-ft detention capacity. The outflow control would consist of culverts for low flow and an overflow weir for high flow.	\$756,000
113000041	Improvements to Brookside Drive Culvert Crossing	LWC upgrade	The culvert opening will be increased to three 36" concrete pipes to match the culvert capacity just downstream at Brook Meadow Dr. and also involve some minimal re-grading of the stream flowline.	\$31,000
113000042	Brookmeadow Drive Drainage Improvements	Channel	The proposed alternative consists of a rip rap ditch along the south side of Brookmeadow Drive, under Overbrook Court and down to Hog Creek. The capacity of the ditch would be enough to hold the most frequent flows	\$52,000
113000044	Regional Detention on Bear Creek	Detention Pond	The proposed dam height of 85 ft. and dam length of 620 ft. will provide a maximum storage capacity of approximately 3,375 ac-ft.	\$5,576,000
113000046	Flood Warning System & Stream Gage Network	Preparedness	The plan will establish a flood early warning system that utilizes 12 stream gages to provide streamflow data and flood stage information	\$211,000
113000047	Regional Detention on Peach Creek	Detention Pond	A 29 ft. high dam with a length of 5780 ft. would provide approximately 41,774 ac-ft of storage. This site would be able to store a large volume of water and greatly reduce the peak from the Peach Creek watershed.	\$6,254,000
113000049	Lake McQueeney Spillgate Replacement and Dam Armoring	Dam	GBRA proposes to replace existing obermeyer and bear-trap style crest gates with new hydraulically actuated steel crest gates at Lake McQueeney Dam. Replacement of the gates will include structural modifications to the existing spillway structure, upgrade	\$40,000,000
113000050	Lake Placid Spillgate Replacement and Dam Armoring	Dam	GBRA proposed to replace the two antiquated bear-trap style spillgates on the Lake Placid dam with new hydraulically-actuated steel crest gates. Replacement of the gates will include structural modifications to the existing spillway structure, upgrades to	\$40,000,000
113000052	Kerr County Back-up Power Generators	Preparedness	Installing generators at critical facilities will help ensure physical safety for facility occupants and maintain electronic systems functionality during power outages. Portable generators will maintain additional systems functionality including but not	\$735,000
113000057	Spring Street Erosion at Outfall Project	Storm Drain	Proposed project to extend the existing 54" storm drain, regrading and compacting the earthen channel to stabilize the erosion that has taken place, and constructing a concrete baffled chute to convey flow down the steep channel embankment with a stilling	\$750,000
113000058	Clay Street Drainage and Kroc Center Detention Pond Spillway	Comprehensive	Proposed project to reconfigue and reconstruct the existing Kroc Center outlet structure and Clay Street drainage improvements. No adverse impacts have been identified downstream.	\$9,000,000
113000059	Coronado Drive and Junction Highway Drainage Improvements	Comprehensive	Proposed proposed street and drainage improvements project to alleviate street ponding and nuisance flooding at Coronado Drive north of Junction Highway.	\$495,000
113000060	City of Victoria Back-up Power Generators	<Null>	Install emergency generators and quick connects on all buildings, critical infrastructure, and government buildings.	<Null>
113000061	City of Buda-Lifschutz Headwaters Voluntary Buyout	Property Acquisition	Voluntary, targeted buyouts for 1 or more affected properties. (November 11, 2016 Preliminary Engineering Report)	\$500,000
113000062	City of Nixon-Wastewater System Flood Improvments	Comprehensive	The WWTP lift station and 8th Avenue lift station have experienced inundation and caused overflows as a result of stormwater inflow into the wastewater system. Also need a new generator & SCADA System Improvements at the City's WWTP, Water Well 6/Water PI	\$3,600,000
113000063	City of San Marcos-Emergency Generators	Preparedness	Purchase and installation of generators for temporary sheltering efforts in all public facilities capable of housing citizens.	<Null>
113000064	Victoria County-Emergency Generators	Preparedness	Install emergency generators at critical facilities.	\$500,000

TASK 5: RECOMMENDATION OF FMEs, FMPs, AND FMPs

113000065	City of Seguin Regional Detention Southwest of Seguin City Limits	Detention Pond	Proposed regional detention detention project on Mays Creek.	\$1,750,000
113000066	City of Seguin - Culvert Improvements at Guadalupe River Drive	LWC upgrade	Proposed project to add two additional 10 ft. by 10 ft. reinforced concrete box culverts on either side of the existing two- 10ft. by 10ft. box culverts at Guadalupe River Dr.	\$516,000
113000067	City of Victoria Channel and Bridge Modifications on Highway 87	Comprehensive	Proposed channel and bridge modification project. The design modification consists of adding two additional piers to the right and left overbanks of the bridge.	\$7,255,000
113000068	City of Victoria Detention Upstream of State Highway 87	Comprehensive	Proposed detention structure located upstream of State Highway 87. The detention basin has a proposed height of 11ft from crest to inlet structure. The dam has a proposed capacity of 3700 ac-ft. Three culvert outlet structures are proposed to be used for	\$50,736,000
113000069	Guadalupe County Detention on York Creek Project	Comprehensive	Project for detention on York Creek. The currently proposed dam height of 48 ft. and dam length of 4800 ft. will provide a maximum storage capacity of approximately 48,130 ac-ft.	\$12,100,300
				\$268,187,000

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5.5 Flood Management Strategies

Summary of Approach in Recommending FMSs

The approach for recommending FMSs adheres to similar requirements as the FMP process except, due to the flexibility and varying nature of RFPG's potential utilization of FMSs, some of these requirements may not be applicable to certain types of FMSs. In general, the RFPG must be able to demonstrate that each recommended FMS meets the following TWDB requirements as applicable:

1. The primary purpose is mitigation (response and recovery projects are not eligible for inclusion in the Regional Flood Plan).
2. Supports at least one regional floodplain management and flood mitigation goal.
3. Implementation of the FMS results in:
 - a. Quantifiable flood risk reduction benefits
 - b. No negative impacts to adjacent or downstream properties (a No Negative Impact certification is required)
 - c. No negative impacts to an entities water supply
 - d. No overallocation of a water source based on the water availability allocations in the most recently adopted State Water Plan.

In addition, the TWDB recommends that, at a minimum, FMSs should mitigate flood events associated with the 1% annual chance flood (100-yr LOS). However, if a 100-yr LOS is not feasible, the RFPG can document the reasons for its infeasibility and still recommend an FMS with a lower LOS.

Although each potentially feasible FMS must demonstrate that there would be no negative flood impacts on a neighboring area due to its implementation, there were no structural FMSs identified for this region, and therefore no adverse impacts from flooding or to the water supply are anticipated.

Description and Summary of Recommended FMSs

The RFPG identified and reviewed more than 150 individual strategies from stakeholders within the region. Many of the identified strategies were found in existing Hazard Mitigation Action Plans and, it was noted, that there is a lot of similarity in the strategies, and all the strategies can be categorized as one of the five strategy types identified in the TWDB Guidance Documents. For these reasons the planning group decided to bundle the individual strategies under five regional strategies. The main reasons for this decision were to make each strategy inclusive of all communities within the region that choose to pursue them, and to encourage collaboration between sponsors, particularly neighboring communities.

For example, many communities identified media campaigns for public education and outreach. Rather than developing individual programs or material the RFPG encourages communities within media markets to develop joint programs to provide consistency and efficient use of resources. A one-page summary for each strategy is included in Appendix [redacted] along with a table of individual actions identified to date under each strategy.

1 *Education and Outreach*

2 This strategy covers all potential sponsors within the region to undertake activities not limited to
3 implementing/improving flood education and awareness programs for residents, elected officials, and
4 real estate agents/developers; and flood insurance campaigns. Communications tools and programs may
5 include brochures, websites, social media, workshops, mail inserts, and newspaper/radio. The desired
6 outcomes include reducing flood risk through education and avoidance of flood risk as well as increasing
7 NFIP participation.

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9 *Property Acquisitions and Structural Elevation*

10 This strategy covers all potential sponsors within the region that choose to develop and implement a
11 voluntary buyout or structural elevation assistance programs. Desired outcomes include eliminating
12 repetitive loss structures and implementing programs to purchase and preserve open space to protect
13 existing riparian corridors and protect or restore floodplain functionality and conveyance.

14

15 *Regulatory and Guidance*

16 This strategy covers all potential sponsors within the region to regularly review and update floodplain
17 ordinances, land use/zoning, development criteria, and enforcement. Actions are not limited to developing
18 and implementing higher standards such as increased freeboard and detention requirements; developing
19 and implementing green infrastructure programs or riparian preservation; or updating codes and
20 ordinances to allow a community to use of “best available data” if needed. The ability to use best available
21 data is a particularly important point for communities that have outdated, or no effective floodplains
22 defined because it allows for the use of Base Level Engineering products to manage floodplains.

23

24 *Flood Measurement and Warning*

25 This strategy covers all potential sponsors within the region to develop or implement programs to increase
26 flood warning. Actions are not limited to installing reverse 911 systems; preparing, maintaining, and
27 exercising evacuation/emergency management plans (including personnel training); purchasing NOAA all-
28 hazards radios for critical facilities and for discounted distribution to residents; installing stream gauges
29 to provide advanced flood warning; and developing a program to increase flood safety systems at low
30 water crossings such as barricades, signs, flashers.

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32 *Infrastructure Projects*

33 This strategy covers all potential sponsors within the region to develop or implement maintenance
34 programs to preserve system functionality of existing infrastructure (i.e. storm drains, culverts, and
35 bridges); stream restoration/channelization programs to enhance riparian corridors and preserve
36 floodplain capacity; and infrastructure improvements programs that identify and prioritize flood risk
37 reduction projects.

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1 The total estimated cost for the recommended FMSs is approximately \$33,473,000. While the
 2 recommended strategies are combined for the region, the number and types of individual strategies
 3 identified are summarized in **Table 5.3**. The full list of FMSs is included as **Appendix 5** and a map of
 4 recommended FMSs is presented as **Appendix 6**.

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Table 5.3 Summary of Recommended FMSs

FMS Type	# of FMSs Identified	# of FMSs Recommended	Total Cost of Recommended FMSs
Education and Outreach	61	1	\$978,000
Flood Measurement and Warning	46	1	\$9,541,000
Property Acquisition and Structural Elevation	31	1	\$1,250,000
Regulatory and Guidance	31	1	\$93,000
Infrastructure Projects	16	1	\$21,611,000
Other	0	0	\$0
Total	185	5	\$33,473,000

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