



San Jacinto River Authority

ADMINISTRATIVE OFFICE
P.O. Box 329 • Conroe, Texas 77305
(T) 936.588.3111 • (F) 936.588.3043

June 15, 2020

Texas Water Development Board
ATTN: FIF Abridged Application
P.O. Box 13231
Austin, Texas 78711

Re: FIF Abridged Application: Spring Creek Watershed Flood Control Dams Conceptual Engineering Feasibility Study

Dear Mr. Entsminger:

The San Jacinto River Authority thanks the Texas Water Development Board (TWDB) for the opportunity to submit an abridged application for funding via recently created Flood Infrastructure Fund. Attached please find the abridged application for a Spring Creek Watershed Flood Control Dams Conceptual Engineering Feasibility Study with the following attachments:

1. Attachment A: Project Benefit Area
2. Attachment B: Census/ SVI Data and Calculations
3. Attachment C: Grant Percentage Calculator Spreadsheet
4. Attachment D: Disaster Declaration for Hurricane Harvey and Tropical Storm Imelda
5. Attachment E: NFIP Certifications from Waller County, Montgomery County, Harris County, City of Conroe, City of Houston, City of Tomball, and City of Stagecoach
6. Attachment F: San Jacinto Regional Watershed Master Drainage Plan Project Fact Sheet
7. Attachment G: San Jacinto Regional watershed Master Drainage Plan Alternative Fact Sheets
8. Attachment H: Spring Creek Watershed

We appreciate your review and consideration of this application, and look forward to working with TWDB as a regional partner on efforts to reduce flood risks within the San Jacinto River Basin.

If you have any questions or require further documentation or data, please contact me at (936)-588-7177 or mbarrett@sjra.net.

Sincerely,

Matt Barrett, P.E.
Division Engineer

LAKE CONROE DIVISION
P.O. Box 329
Conroe, Texas 77305
(T) 936.588.1111
(F) 936.588.1114

GRP DIVISION
P.O. Box 329
Conroe, Texas 77305
(T) 936.588.1662
(F) 936.588.7182

WOODLANDS DIVISION
P.O. Box 7537
The Woodlands, Texas 77387
(T) 281.367.9511
(F) 281.362.4385

HIGHLANDS DIVISION
P.O. Box 861
Highlands, Texas 77562
(T) 281.843.3300
(F) 281.426.2877

FLOOD MANAGEMENT DIVISION
P.O. Box 329
Conroe, Texas 77305
(T) 936.588.3111
(F) 936.588.1114

SFY 2020 Flood Project Abridged Application

Due June 15, 2020 at 5:00 p.m.

Email to FIF@twdb.texas.gov

By submitting this Abridged Application, you understand and confirm that the information provided is true and correct to the best of your knowledge and further understand that the failure to submit a complete Abridged Application by the stated deadlines, or to respond in a timely manner to additional requests for information, may result in the withdrawal of the Abridged Application without review.

GENERAL INFORMATION

Entity Name		
San Jacinto River Authority		
Entity Type		
River Authority		
Contact Who should TWDB contact with questions during the review of this submission?	Name	Matt Barrett, PE
	Title	Division Engineer
	Phone	936-588-7177
	Email	mbarrett@sjra.net

PROJECT INFORMATION

Project Name	Spring Creek Watershed Flood Control Dams Conceptual Engineering Feasibility Study		
Amount Requested from TWDB	\$500,000 (50% grant based on attached calculations (Attachment C))		
Financing from Federal Sources	\$0		
(if receiving federal funds, include the federal agency and program)	N/A		
Financing from Other Sources	\$500,000 (local match for remaining 50% not covered by grant)		
Total Project Cost (Check here if requesting loan funds only <input type="checkbox"/>)	\$1,000,000		
Category Applied For			
<input checked="" type="checkbox"/> Category 1 Flood Protection Planning for Watersheds See item (G) in Description of Proposed Project for explanation.	<input type="checkbox"/> Category 2 Planning, Acquisition, and Design, Construction / Rehabilitation (All combinations)	<input type="checkbox"/> Category 3 Federal Award Matching Funds	<input type="checkbox"/> Category 4 Measures immediately effective in protecting life and property

MINIMUM STANDARDS

Only projects that satisfy all minimum standards will be included in the prioritization.	<input checked="" type="checkbox"/>	1. For applicable projects, the benefit-cost ratio of the proposed project is >1.0 or an explanation is provided. N/A for study/non-construction projects per Intended Use Plan. However, see item (E) in Description of Proposed Project for description of preliminary BCR findings.
	<input checked="" type="checkbox"/>	2. For applicable projects, a proposed MOU and a project description was provided to all eligible political subdivisions and the list of political subdivisions that received this information is attached to the abridged application. N/A for Category 1 projects per Intended Use Plan.
	<input checked="" type="checkbox"/>	3. The applicant has acted cooperatively with other political subdivisions to address flood control needs in the area in which the eligible political subdivisions are located; and all eligible political subdivisions substantially affected by the proposed flood project have participated in the process of developing the proposed flood project. Requested input from multiple entities during the development of this project. See item (F) in Description of Proposed Project for further explanation.
	<input checked="" type="checkbox"/>	4. The funding request does not include redundant funding for activities already performed and/or funded through another source.
	<input checked="" type="checkbox"/>	5. a. The area to be served by the proposed project has floodplain ordinances in place and is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards. See Attachment E. OR
	<input type="checkbox"/>	5. b. Requesting funds to fulfill additional requirements for participation in the National Flood Insurance Program. N/A
	<input checked="" type="checkbox"/>	6. The proposed project was developed using the best and most recent available data. See item (A) in Description of Proposed Project for explanation.
	<input checked="" type="checkbox"/>	7. a. (Construction applicants only) Operations and maintenance costs associated with proposed facilities have been considered. N/A, but see item (E) in Description of Proposed Project.
	<input checked="" type="checkbox"/>	7. b. (Construction applicants only) Floodwater capture techniques have been considered. N/A, but see item (D) in Description of Proposed Project.

DESCRIPTION OF PROPOSED PROJECT

The purpose of this project is to perform a conceptual engineering feasibility study of two potential dams/reservoirs within the Spring Creek watershed. The Spring Creek watershed begins on the western edge of the Upper San Jacinto River Basin (Lake Houston watershed) and ultimately flows to the West Fork of the San Jacinto River and Lake Houston. The watershed covers portions of Montgomery, Harris, Grimes, and Waller Counties, with Spring Creek itself acting as the county line between Harris and Montgomery Counties. This project is proposed as a continuation or next phase of the Spring Creek Siting Study, which is currently being completed as a sub-task to the San Jacinto Regional Watershed Master Drainage Plan project (SJRWMDP), being performed by the Harris County Flood Control District (HCFCD; see item (A) below). The Spring Creek Siting Study, still in draft form, has identified two dam/reservoir construction locations within the Spring Creek watershed, along Walnut Creek and Birch Creek (see item (E) below), which have potential to provide flood mitigation benefits to the watershed, and which are anticipated to be recommended projects for implementation in the results of the SJRWMDP.

The next phase of efforts related to the reservoirs, as proposed by the consultant team performing the work for HCFCD, includes, but is not necessarily limited to, the following:

1. Environmental due diligence – site investigations, literature and mapping review, permitting requirement investigations, desktop surveys/assessments, permitting agency preliminary coordination, etc.
2. Conceptual design of dams to determine feasibility – geotechnical borings, alternative configurations development, H&H modeling analysis, etc.
3. Cost estimate development – dam construction costs, as well as costs related to land acquisition, utility conflicts and relocations, environmental mitigation, O&M, etc.
4. Update benefit/cost ratios (BCR) from SJRWMDP using data developed as part of this effort.

The completion of these tasks will allow for further verification of the feasibility and cost-effectiveness of the potential projects identified in the SJRWMDP, as well as the determination of what infrastructure, if any, should proceed to a preliminary engineering report (PER) phase and, ultimately, final design and construction.

- (A) The project will be performed utilizing the most recent/best available data, technology, and techniques available to SJRA. Data and results from the SJRWMDP, which is nearing completion and utilizes Atlas 14 rainfall data in its modeling, will be used as the basis for the proposed project and inform this and all future phases. The SJRWMDP is a \$2.7 million comprehensive regional study funded 25% by local partners HCFCD, SJRA, Montgomery County, and the City of Houston, and 75% by FEMA, conveyed through the Texas Division of Emergency Management. By continuing and building on the efforts performed in the SJRWMDP, the proposed project will increase the benefits gained from the large investments made for the SJRWMDP. See Attachment F for more information on the SJRWMDP.
- (B) For the purposes of SVI and AMHI and other census bureau data calculations, the benefit area for the project was considered as any census block group "more than minimally" overlapping (i.e. approximately more than 10% overlapping) the 100-year (1% annual chance) storm event inundation extent along the entirety of Spring Creek, along the West Fork of the San Jacinto River between its confluence with Spring Creek and Lake Houston, around Lake Houston, and downstream of Lake Houston to Interstate 10, acquired from the draft model developed for the SJRWMDP (see item (A) above). While project benefits extend beyond the Spring Creek watershed, the project is directly planning for the control/conveyance of floodwaters originating within the watershed, where the most substantial benefits would be experienced (see item (G) below). See Attachment A for project benefit area map.

- (C) It is anticipated that this study can be completed within 18 months, as indicated in the Prioritization Criteria section below. Completion of the entire project, including future design (likely preliminary and final) and construction phases, will take longer than 18 months to complete.
- (D) The proposed dams are anticipated to be evaluated as earthen embankments with minimal permanent storage (i.e. "dry bottom" reservoirs) and uncontrolled discharge structures and spillways. Therefore, they will provide minimal to no water supply benefit as water supply reservoirs. However, it is anticipated that one of the benefits of the reservoirs may be collection and trapping of sediment which would otherwise flow downstream into Spring Creek, the West Fork of the San Jacinto, and ultimately to Lake Houston. SJRA is developing a separate project and submitting a separate FIF abridged application for an Upper San Jacinto River Basin Regional Sedimentation Study which, if funded, could help determine the benefits and feasibility of the proposed dams/reservoirs within the Spring Creek watershed also acting as sediment removal facilities. Any relevant data from that effort can be shared with and utilized for this project, and vice versa. Any sediment removed from the Spring Creek watershed before water flows to Lake Houston may have an impact in reducing sedimentation, and therefore reducing water supply storage loss, in the lake, which acts as the major water supply reservoir for the City of Houston and surrounding communities.
- (E) Though the project is currently only in the conceptual/feasibility stage, results from the SJRWMDP include preliminary structural benefit/cost ratio (BCR) calculations (0.55-0.83 for Birch Creek and 0.78-1.06 for Walnut), as well flood mitigation estimates [50-year (timeframe, not frequency storm event) reductions in instances of flooding (could include some structures flooding multiple times) of 918 and 1,412 for the Birch and Walnut Creek reservoirs, respectively]. Though the preliminary structural BCR calculations for the proposed reservoirs range from below to just above 1.0, the project consultant has identified the potential, depending on the ultimate scope and extent of the project, for increasing the combined BCR of the two reservoirs to 2.7 if social benefits are included as well as structural, as is typically allowed in FEMA grants. Additional benefits could potentially be identified in future project phases. Spring Creek watershed flood mitigation is anticipated to benefit areas impacted by Hurricane Harvey (see Attachment D), as well as storms in 2016 (Tax Day and Memorial Day), 1994. Benefits extending beyond the Spring Creek watershed (see item (B) above) could extend to areas impacted by Tropical Storm Imelda (see Attachment D) and other recent and historical events. Though the source of O&M funding for the proposed reservoirs has not been identified at this point, some consideration was given in SJRWMDP efforts as to who potential project partners might be. As noted above, one of the tasks in the proposed scope of work is to determine estimated O&M costs for the proposed infrastructure. Land acquisition will not be required for the efforts covered by this application, but will ultimately be required to implement construction of any reservoirs, and preliminary estimates of land acquisition quantities have been developed as part of the SJRWMDP efforts. Draft results of the SJRWMDP related to the two reservoirs proposed along Spring Creek can be found in the attached fact sheets for the reservoirs (see Attachment G).

- (F) The San Jacinto River Authority (SJRA) Flood Management Division is focused on creating and sustaining regional flood management partnerships and coordinating with stakeholders to provide regional flood mitigation solutions within the San Jacinto River Basin. Created in 2018 in response to Governor Abbott calling on SJRA to become more involved with regional flood management, the Division has acted cooperatively with various political subdivisions throughout the region to address flood control/mitigation needs within the jurisdictional area of SJRA, and is now leading efforts with other entities to submit multiple abridged FIF funding applications for projects which span the Upper San Jacinto River Basin (Lake Houston watershed). For this specific application, SJRA requested input from HCFCD, Harris County Precinct 4, Harris-Montgomery Counties MUD 386, Montgomery County, and Woodlands Water Agency. HCFCD is leading the Spring Creek Siting Study project (referenced above in the project description), which this proposed project is continuing, in coordination with other regional entities. Finally, it is SJRA's understanding that Waller County is submitting an FIF abridged application for efforts within the Spring Creek watershed, which are separate from, but could complement, the efforts included in this application. If both projects are approved for funding, any relevant data from each project can be shared and utilized with the other.
- (G) This project is being submitted as a Category 1 project as it is a continuation of planning efforts to determine feasible flood mitigation solutions for the Spring Creek watershed, which is a HUC-10 watershed. See Attachment H for a depiction of the Spring Creek watershed.

INFORMATION FOR GRANT FUNDING

Provide information for the applicable level of grant funding:

Category 1:

Study area AMHI (weighted average based on population)-\$98,652.75

(Optional – attached a copy of federal disaster declaration – flood related within the last 60 months) **See Attachment D**

Categories 2, 3, and 4 **N/A**

- For consideration of being outside MSA: Project is entirely located outside of an MSA - Yes or No
- Project area AMHI (weighted average based on population)-\$_____
- Project area Unemployment Rate (weighted average based on population)-_____%
- Project area Population Decline (if any) (based on sum of the population in the project areas)-_____%
- For consideration of being a Rural Applicant: All entities within the project benefit area are outside MSAs and have populations <10,000; or the applicant is a district or municipality with a service area of 10,000 or less in population; or located in a county in which no urban area exceeds 50,000 in population - Yes or No
- For consideration of being a Green or Nature-Based project: Percentage of total project costs that are considered green or nature-based- _____% (attach the calculation)

Note: If requesting grant funds that rely on a calculation of the AMHI, Unemployment Rate, or Population Decline then attach the calculation of the weighted average amounts for the project area based on the applicable U.S. Census Bureau geographic areas such as County, Place (City), Census Tract, or Block Group using the ACS data sources described in the IUP. **See Attachment B for US Census Bureau data calculations. See item (B) in Description of Proposed Project for explanation of project benefit area.**

During census data compilation efforts for abridged grant applications, it was noted by SJRA staff that the number of block groups included in each project benefit area did not always necessarily correlate to the same number of rows of census data in the census data spreadsheet provided by TWDB when queries were run to extract only the spreadsheet data related to the block groups for specific project benefit areas. This is not necessarily the case on all projects/grant applications submitted by SJRA, but SJRA wanted to make TWDB aware of this inconsistency.

PRIORITIZATION CRITERIA

<p>Rural Applicant</p> <p>All entities within the project benefit area are (a) outside MSAs and have populations <10,000; or (b) a district or municipality with a service area of 10,000 or less in population; or (c) a county in which no urban area exceeds 50,000 in population.</p>	<p style="text-align: center;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p style="text-align: center;"><i>(Please attach a list of all entities in the project benefit area and U.S. Census Bureau 2014-2018 American Community Survey (ACS) 5-year estimates data indicating the population of each area.)</i></p>
<p>Emergency Need Due to Recent or Imminent Failure or recent Flood-related Disaster Declarations.</p> <p>A need exists for flood hazard mitigation actions to address a clear and imminent threat to public health, safety, and welfare or property due to recent or imminent failure of existing flood infrastructure or flood-related federal or state disaster declarations within the most recent 36 months that would be significantly mitigated by the proposed project.</p>	<p style="text-align: center;"><input type="checkbox"/> Yes, due to a recent failure. <input type="checkbox"/> Yes, due to imminent failure. <input checked="" type="checkbox"/> Yes, recent flood-related disaster declaration for the proposed project area <input type="checkbox"/> No</p> <p style="text-align: center; color: red;">Hurricane Harvey (FEMA-4332-DR) and Tropical Storm Imelda (FEMA-4466-DR). See Attachment D and item (E) in Description of Proposed Project.</p>
<p>Distributed Benefits</p> <p>Is the project expected to directly benefit or include the active participation of jurisdictions other than the applicant?</p>	<p style="text-align: center;"><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p style="text-align: center; color: red;">Potential benefits to multiple entities. Requested input from multiple entities as part of application development process, and SJRA anticipates partnering with other entities on project execution. See items (B) and (F) in Description of Proposed Project and Attachments A and G.</p>

<p>Estimated Completion Date</p> <p>When would all project phases expected to be complete, assuming funds for the project are closed on in Fall of the current year?</p>	<p style="text-align: center;"> <input checked="" type="checkbox"/> Within 18 months of closing <input type="checkbox"/> Within 36 months of closing <input type="checkbox"/> Other </p> <p>See item (C) in Description of Proposed Project for more information.</p>
<p>Construction Projects Only (Including PAD plus Construction combined)</p> <p>Project is anticipated to result in an integral, reliable, and quantifiable water supply benefit to a specific water user group with an identified need. May include groundwater recharge benefits.</p>	<p style="text-align: center;"><input checked="" type="checkbox"/> Yes</p> <p>Not a construction project at this time. However, some water supply benefits can potentially be realized with ultimate construction of project. See item (D) in Description of Proposed Project for explanation.</p> <p style="text-align: right;"><input type="checkbox"/> No</p>
<p>Construction Projects Only (Including PAD plus Construction combined)</p> <p>How many structures are anticipated to be removed from floodplains as a result of the proposed project?</p>	<p>Not a construction project at this time. However, ultimate goal of the project is to mitigate flooding in the Spring Creek watershed, and preliminary efforts show 50-year (timeframe, not frequency storm event) reductions in instances of flooding (could include some structures flooding multiple times) of 918 and 1,412 for the Birch Creek and Walnut Creek reservoirs, respectively. See item (E) in Description of Proposed Project.</p>
<p>Non-structural flood mitigation elements</p> <p>Non-structural flood mitigation elements constitute at least 20 percent of the total project costs.</p>	<p>Percentage of total project costs that are considered nature-based- 0%</p>

ADDITIONAL INFORMATION FOR THE FLOOD INFORMATION CLEARINGHOUSE COMMITTEE

Responses to questions 1 through 7, along with other information included in this abridged application, will be shared with the Flood Information Clearinghouse Committee (FLICC), a new cooperative effort between the TWDB, General Land Office, Texas Division of Emergency Management, and other state and federal agencies that administer flood mitigation financial assistance programs. After review by the FLICC, the applicant may be advised of other available source(s) of funding.

1. Type of Assistance Requested (Check all that apply):	<input type="checkbox"/> Low Interest Loan <input checked="" type="checkbox"/> Grant <input type="checkbox"/> Loan/Grant Combination <input type="checkbox"/> Local Match for Federal Funding
If requesting funds for the local cost share of a federally funded project, the name of the program:	N/A
2. County(ies) in which the project is located:	Reservoir locations proposed in Waller County. See Attachment G.
3. (If applicable) Associated FEMA disaster name and number:	Hurricane Harvey (FEMA-4332-DR) and Tropical Storm Imelda (FEMA-4466-DR), see Attachment D
4. Does the applicant have an approved Mitigation Action Plan?	No
5. Is the community to be served by the project in good standing with the National Flood Insurance Program?	Yes, see Attachment E.
6. Will this project involve enlargement of a dam or levee beyond the original footprint of the structure that existed prior to a disaster event?	No, but ultimate goal of project is to construct new dams.
7. Will this project mitigate a repetitive or severe repetitive loss property?	See Attachment D and item (E) in Description of Proposed Project .

CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, _____(Name), serving as _____(Title) hereby certify that _____(Appropriate entity for area to be served by the project) is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p>_____ Signature</p> <p>_____ Date</p>
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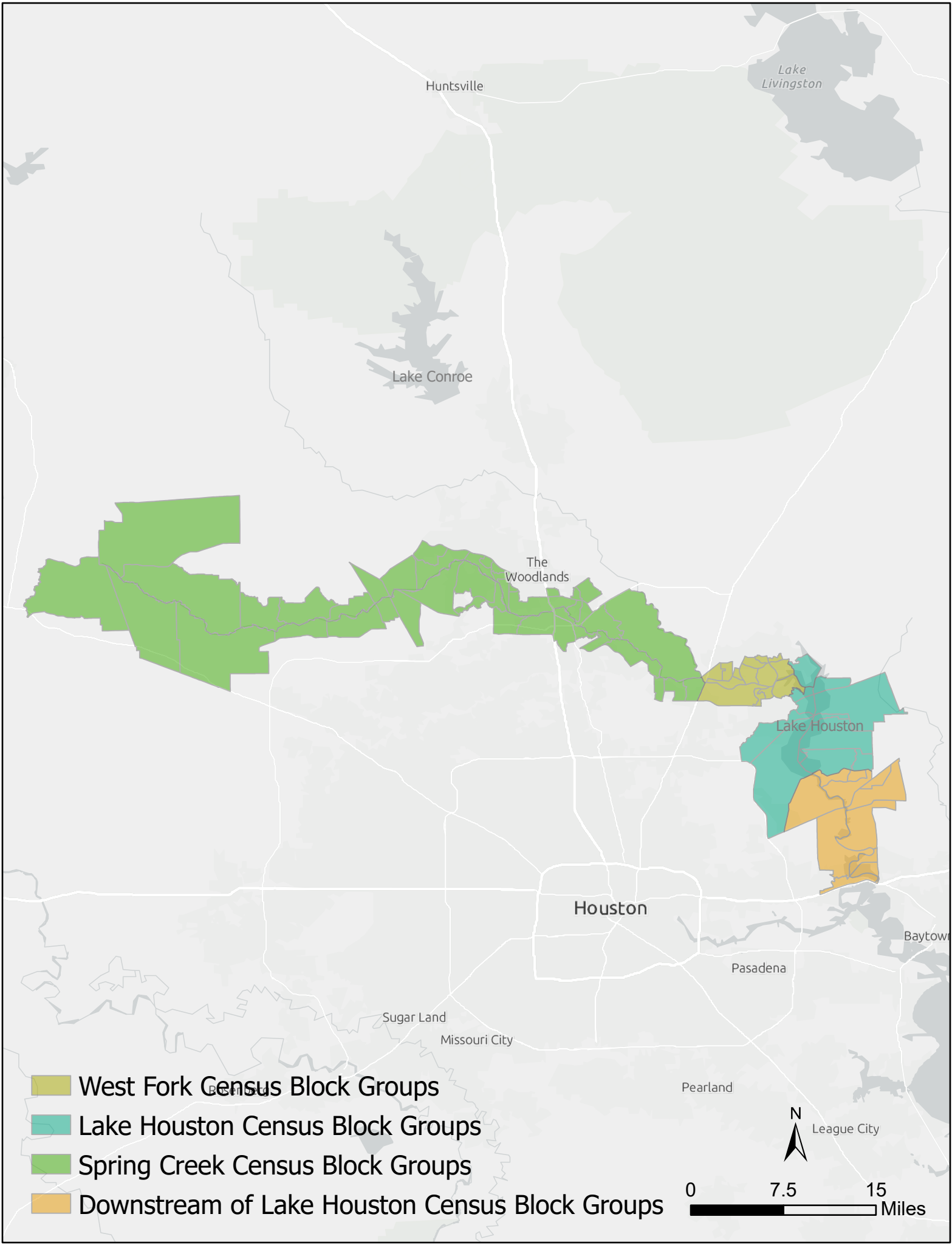
SEE ATTACHMENT E

ATTACHMENT CHECKLIST

- | <input checked="" type="checkbox"/> | <u>N/A</u> | <u>Attachment Description</u> |
|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | List of entities receiving the proposed MOU and project description N/A for Category 1 projects per Intended Use Plan. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Benefit-Cost Ratio required information. N/A for study/non-construction projects per Intended Use Plan. However, preliminary study efforts indicate promising BCR is anticipated. However, see item (E) in Description of Proposed Project and Attachment G for preliminary BCR findings. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Documentation indicating the best/most recent data was used in the development of the proposed project. See item (A) in Description of Proposed Project. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Documentation demonstrating the area to be served by the proposed project has floodplain ordinances in place and the appropriate entity has certified that it is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards. (The only exception is an entity that is requesting FIF funding to fulfill the requirements for participation in the National Flood Insurance Program.) See Attachment E. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | If requesting grant funds that rely on a calculation of the AMHI, Unemployment Rate, or Population Decline then attach the calculation of the weighted average amounts for the project area based on the applicable U.S. Census Bureau geographic areas such as County, Place (City), Census Tract, or Block Group and the ACS data sources described in the IUP. See Attachments A and B. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | If requesting prioritization points for "Rural Applicant", a list of all entities in the project benefit area and U.S. Census Bureau 2014-2018 American Community Survey (ACS) 5-year estimates data indicating the population of each area. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | (If applying for matching funds) Documentation of an existing federal award pending availability of local match. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | (If the project involves property acquisitions) Documentation supporting the determination that acquisitions are the best solution and the properties are a high risk. Property acquisition will be required for ultimate construction of project, but not at this time as part of this project phase. See item (E) in Description of Proposed Project for explanation. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | (Construction projects) Description of the anticipated funding source for operations and maintenance costs. Only applying for study at this time, but see item (E) in Description of Proposed Project. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | (Construction projects) Map and description of area benefitting from the proposed project, including a list of all benefitting political subdivisions. Only applying for study at this time. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | (If applicable) Documentation of recent or imminent infrastructure failure causing an emergency need or a flood-related federal or state disaster declaration within the most recent 36 months that would be significantly mitigated by the proposed project. Hurricane Harvey (FEMA-4332-DR) and Tropical Storm Imelda (FEMA-4466-DR), see Attachment D and item (E) in Description of Proposed Project. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | List and explanation of geographies used to determine average SVI. See SVI section of Prioritization Criteria, item (B) in Description of Proposed Project, and Attachments A and B. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Certification on enforcing floodplain management standards for all applicable areas See Attachment E. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Additional Information for the Flood Information Clearinghouse Committee |

Attachment A:

Project Benefit Area



Huntsville

Lake Livingston

Lake Conroe

The Woodlands

Lake Houston

Houston

Baytown

Pasadena

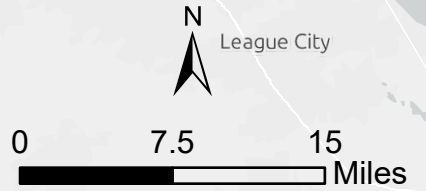
Sugar Land

Missouri City

Pearland

League City

- West Fork Census Block Groups
- Lake Houston Census Block Groups
- Spring Creek Census Block Groups
- Downstream of Lake Houston Census Block Groups



Attachment B:

Census/SVI Data and Calculations

Overall SVI	Location	Geography	County	2018 ACS 5 YR - Annual Median Household Income (B19013_001E)	2018 ACS 5 YR - Average Household Size (B25010_001E)	2014 ACS 5 YR - Total Population (B01003_001E) - Prior	2018 ACS 5 YR - Total Population (B01003_001E) - Current	2018 Unemployment Rate (derived from Civilian Labor Force-Unemployed/Total- B23025)	2018 ACS 5 YR - Civilian Labor Force: Total (B23025_003E)	2018 ACS 5 YR - Civilian Labor Force: Unemployed (B23025_005E)	AMHI x 2018 Population	Unemployment x 2018 Population	SVI x 2018 Population
0.1189	Spring Creek	Block Group 6, Census Tract 6920.01, Montgomery County, Texas	Montgomery	75321	2.18	1049	1062	0	695	0	79990902	0	126
0.317	Spring Creek	Block Group 2, Census Tract 6901, Montgomery County, Texas	Montgomery	39142	2.91	3266	3376	6.89	1451	100	132143392	23260.64	1070
0.0031	Spring Creek	Block Group 2, Census Tract 6913.01, Montgomery County, Texas	Montgomery	164500	2.89	1940	1771	3.34	867	29	291329500	5915.14	5
0.1177	Spring Creek	Block Group 4, Census Tract 6906.02, Montgomery County, Texas	Montgomery	199912	3.28	3513	3069	8.36	1388	116	613529928	25656.84	361
0.1177	Spring Creek	Block Group 2, Census Tract 6906.02, Montgomery County, Texas	Montgomery	123872	3.35	7572	9978	2.53	4472	113	1235994816	25244.34	1174
0.437	Spring Creek	Block Group 2, Census Tract 6913.02, Montgomery County, Texas	Montgomery	30184	2.01	2531	2651	0	1380	0	80017784	0	1158
0.1189	Spring Creek	Block Group 1, Census Tract 6920.01, Montgomery County, Texas	Montgomery	126220	3.4	8070	10686	5.52	5547	306	1348786920	58986.72	1271
0.1189	Spring Creek	Block Group 3, Census Tract 6920.01, Montgomery County, Texas	Montgomery	71952	3.05	5719	3475	2.07	1980	41	250033200	7193.25	413
0.1346	Spring Creek	Block Group 2, Census Tract 5553.02, Harris County, Texas	Harris	145167	3.23	10627	15214	3.33	7050	235	2208570738	50662.62	2048
0.313	Spring Creek	Block Group 1, Census Tract 6919, Montgomery County, Texas	Montgomery	94567	3.13	2924	2851	1.36	1765	24	269610517	3877.36	892
0.4497	Spring Creek	Block Group 1, Census Tract 2409.02, Harris County, Texas	Harris	26566	2.31	998	875	0	414	0	23245250	0	393
0.2166	Spring Creek	Block Group 3, Census Tract 2413, Harris County, Texas	Harris	103523	3.03	4969	6177	4.36	3346	146	639461571	26931.72	1338
0.727	Spring Creek	Block Group 3, Census Tract 5554.02, Harris County, Texas	Harris	78333	2.84	2154	2574	10.08	1280	129	201629142	25949.92	1871
0.5182	Spring Creek	Block Group 5, Census Tract 6918, Montgomery County, Texas	Montgomery	61063	2.86	2739	4566	2.04	2599	53	278813658	9314.64	2366
0.313	Spring Creek	Block Group 2, Census Tract 6919, Montgomery County, Texas	Montgomery	38632	2.36	1064	1192	2.38	672	16	46409344	2836.96	373
0.3788	Spring Creek	Block Group 2, Census Tract 2414, Harris County, Texas	Harris	80440	2.85	2974	3650	3.99	2205	88	293606000	14563.5	1383
0.3159	Spring Creek	Block Group 1, Census Tract 5554.01, Harris County, Texas	Harris	67375	2.54	2756	2544	4.72	1249	59	171402000	12007.68	804
0.2118	Spring Creek	Block Group 1, Census Tract 5553.03, Harris County, Texas	Harris	97000	3.02	5084	9612	5.24	5034	264	932364000	50366.88	2036
0.312	Spring Creek	Block Group 2, Census Tract 5556, Harris County, Texas	Harris	89688	2.25	1858	1703	1.76	967	17	152738664	2997.28	531
0.317	Spring Creek	Block Group 3, Census Tract 6901, Montgomery County, Texas	Montgomery	46442	3.03	875	1175	10.56	445	47	54659690	12408	372
0.0031	Spring Creek	Block Group 1, Census Tract 6913.01, Montgomery County, Texas	Montgomery	120273	2.64	2568	2792	1.8	1280	23	335802216	5025.6	9
0.0538	Spring Creek	Block Group 1, Census Tract 6920.02, Montgomery County, Texas	Montgomery	191486	3.37	2294	5885	0.98	3057	30	1126895110	5767.3	317
0.437	Spring Creek	Block Group 1, Census Tract 6913.02, Montgomery County, Texas	Montgomery	40649	2.27	3217	3049	4.05	1433	58	123938801	12348.45	1332
0.1561	Spring Creek	Block Group 1, Census Tract 6914, Montgomery County, Texas	Montgomery	68193	2.83	3251	2692	0.88	1358	12	183575556	2368.96	420
0.0701	Spring Creek	Block Group 1, Census Tract 5553.01, Harris County, Texas	Harris	112500	1.93	768	1147	1.95	665	13	129037500	2236.65	80
0.3848	Spring Creek	Block Group 3, Census Tract 6904.02, Montgomery County, Texas	Montgomery	135409	3.75	1319	1345	3.64	715	26	182125105	4895.8	518
0.6638	Spring Creek	Block Group 1, Census Tract 6803, Waller County, Texas	Waller	49514	2.66	2356	919	0	352	0	45503366	0	610
0.332	Spring Creek	Block Group 2, Census Tract 6806, Waller County, Texas	Waller	84375	3.08	2443	2566	2.59	1158	30	216506250	6645.94	852
0.0538	Spring Creek	Block Group 2, Census Tract 6920.02, Montgomery County, Texas	Montgomery	132500	3.53	5932	8064	1.24	3643	45	1068480000	9999.36	434
0.332	Spring Creek	Block Group 1, Census Tract 6806, Waller County, Texas	Waller	80231	3.39	2472	3034	0	1609	0	243420854	0	1007
0.3078	Spring Creek	Block Group 1, Census Tract 5552, Harris County, Texas	Harris	87326	3.8	3168	5437	5.62	2579	145	474791462	30555.94	1674
0.5109	Spring Creek	Block Group 2, Census Tract 5555.01, Harris County, Texas	Harris	73106	3.14	3166	3436	3.33	1410	47	251192216	11441.88	1755
0.7103	Spring Creek	Block Group 1, Census Tract 5560, Harris County, Texas	Harris	35949	2.25	1284	1130	10.09	413	45	40622370	12317	803
0.3078	Spring Creek	Block Group 2, Census Tract 5552, Harris County, Texas	Harris	120450	3.12	3757	5465	0.48	2937	14	658259250	2623.2	1682
0.3788	Spring Creek	Block Group 3, Census Tract 2414, Harris County, Texas	Harris	40506	4.76	2604	3082	0	636	0	124839492	0	1167
0.1561	Spring Creek	Block Group 2, Census Tract 6914, Montgomery County, Texas	Montgomery	87946	2.35	5568	4719	3.46	3010	104	415017174	16327.74	737
0.4495	Spring Creek	Block Group 2, Census Tract 6902.02, Montgomery County, Texas	Montgomery	88790	2.98	1543	1343	8.47	708	60	119244970	11375.21	604
0.4328	Spring Creek	Block Group 2, Census Tract 2409.01, Harris County, Texas	Harris	64679	3.44	6419	8629	4.34	4727	205	558115091	37449.86	3735
0.3848	Spring Creek	Block Group 1, Census Tract 6904.02, Montgomery County, Texas	Montgomery	91250	2.81	2685	3008	0	1744	0	274480000	0	1157
0.4497	Spring Creek	Block Group 2, Census Tract 2409.02, Harris County, Texas	Harris	63632	2.92	7473	8316	4.89	4334	212	529163712	40665.24	3740
0.7103	Spring Creek	Block Group 2, Census Tract 5560, Harris County, Texas	Harris	65823	3.35	2583	2522	8.04	1194	96	166005606	20276.88	1791
0.4464	Spring Creek	Block Group 3, Census Tract 2410, Harris County, Texas	Harris	57333	3.1	1127	2283	1.8	1111	20	130891239	4109.4	1019
0.2041	West Fork	Block Group 1, Census Tract 2507.01, Harris County, Texas	Harris	94318	3.49	1662	1935	4.56	965	44	182505330	8823.6	395
0.3105	West Fork	Block Group 1, Census Tract 2510, Harris County, Texas	Harris	65966	2.53	2302	1877	8.64	995	86	123818182	16217.28	583
0.2041	West Fork	Block Group 2, Census Tract 2507.01, Harris County, Texas	Harris	59444	1.92	1276	622	7.74	336	26	36974168	4814.28	127
0.0772	West Fork	Block Group 3, Census Tract 2508, Harris County, Texas	Harris	134007	3.05	4011	4453	2.51	2229	56	596733171	11177.03	344
0.2041	West Fork	Block Group 3, Census Tract 2507.01, Harris County, Texas	Harris	76440	3.23	3302	3090	7.76	1662	129	236199600	23978.4	631
0.3105	West Fork	Block Group 2, Census Tract 2510, Harris County, Texas	Harris	142350	2.7	661	1217	5.61	517	29	173239950	6827.37	378
0.2373	West Fork	Block Group 2, Census Tract 2511, Harris County, Texas	Harris	81477	2.37	1285	1116	5.71	700	40	90928332	6372.36	265
0.2373	West Fork	Block Group 3, Census Tract 2511, Harris County, Texas	Harris	111172	2.48	2118	1584	4.44	879	39	176096448	7032.96	376
0.2373	West Fork	Block Group 5, Census Tract 2511, Harris County, Texas	Harris	57014	2.9	1766	2745	11.6	1250	145	156503430	31842	651
0.0889	West Fork	Block Group 4, Census Tract 2513, Harris County, Texas	Harris	93008	2.65	1912	1687	4.28	724	31	156904496	7220.36	150
0.0889	West Fork	Block Group 5, Census Tract 2513, Harris County, Texas	Harris	57891	2.13	1190	745	0	289	0	43128795	0	66
0.1254	West Fork	Block Group 2, Census Tract 2509, Harris County, Texas	Harris	81964	2.12	3238	3243	7.11	1632	116	265809252	23057.73	407
0.2373	West Fork	Block Group 4, Census Tract 2511, Harris County, Texas	Harris	86528	2.49	568	458	13.98	279	39	39629824	6402.84	109
0.0353	West Fork	Block Group 6, Census Tract 2515.02, Harris County, Texas	Harris	126458	2.39	1570	1015	5.55	559	31	128354870	5633.25	36
0.1521	Lake Houston	Block Group 3, Census Tract 2519.01, Harris County, Texas	Harris	86066	2.5	2179	2253	2.49	1045	26	193906698	5609.97	343
0.1521	Lake Houston	Block Group 2, Census Tract 2519.01, Harris County, Texas	Harris	102969	2.95	589	784	0	384	0	80727696	0	119
0.3715	Lake Houston	Block Group 4, Census Tract 2517, Harris County, Texas	Harris	44087	2.81	2281	2452	0	908	0	108101324	0	911
0.3715	Lake Houston	Block Group 2, Census Tract 2517, Harris County, Texas	Harris	56754	2.73	3528	2497	1.47	1160	17	141714738	3670.59	928
0.1123	Lake Houston	Block Group 3, Census Tract 2504.02, Harris County, Texas	Harris	66944	2.58	5165	5100	0.87	2188	19	341414400	4437	573
0.1521	Lake Houston	Block Group 1, Census Tract 2519.01, Harris County, Texas	Harris	88906	2.98	3923	3404	6.44	1739	112	302636024	21921.76	518
0.2133	Lake Houston	Block Group 1, Census Tract 2520, Harris County, Texas	Harris	127921	3.16	13818	19799	4.41	10952	483	253270789	87313.59	4223
0.1521	Lake Houston	Block Group 4, Census Tract 2519.01, Harris County, Texas	Harris	60215	2.77	3105	3818	9.98	1883	188	229900870	38103.64	581
0.0772	Lake Houston	Block Group 2, Census Tract 2508, Harris County, Texas	Harris	81813	2.54	2583	2417	2.61	1035	27	197742021	6308.37	187
0.1123	Lake Houston	Block Group 1, Census Tract 2504.02, Harris County, Texas	Harris	123659	3.24	10305	15970	3.15	8393	264	1974834230	50305.5	1793

0.1254	Lake Houston	Block Group 4, Census Tract 2509, Harris County, Texas	Harris	221042	3.66	4331	4225	0	1553	0	933902450	0	530
0.7571	DS of LH	Block Group 1, Census Tract 2528, Harris County, Texas	Harris	60012	2.63	2533	2335	7.55	1139	86	140128020	17629.25	1768
0.153	DS of LH	Block Group 1, Census Tract 2519.02, Harris County, Texas	Harris	69896	2.45	1880	1076	3.96	505	20	75208096	4260.96	165
0.153	DS of LH	Block Group 2, Census Tract 2519.02, Harris County, Texas	Harris	77314	2.89	1269	2006	2.84	1021	29	155091884	5697.04	307
0.3685	DS of LH	Block Group 1, Census Tract 2521, Harris County, Texas	Harris	62375	3.26	2058	2274	4.53	1170	53	141840750	10301.22	838
0.6955	DS of LH	Block Group 2, Census Tract 2527, Harris County, Texas	Harris	36458	2.73	1746	1722	7.88	774	61	62780676	13569.36	1198
0.631	DS of LH	Block Group 2, Census Tract 2529, Harris County, Texas	Harris	31812	2.15	537	605	16.93	319	54	19246260	10242.65	382
0.153	DS of LH	Block Group 3, Census Tract 2519.02, Harris County, Texas	Harris	101064	2.96	2115	2938	9.14	1466	134	296926032	26853.32	450
0.8466	DS of LH	Block Group 4, Census Tract 2526, Harris County, Texas	Harris	46696	2.86	1675	2029	22.68	1045	237	94746184	46017.72	1718
0.8466	DS of LH	Block Group 3, Census Tract 2526, Harris County, Texas	Harris	61667	3.78	1755	1891	9.59	876	84	116612297	18134.69	1601
0.631	DS of LH	Block Group 1, Census Tract 2529, Harris County, Texas	Harris	45147	2.89	1608	1707	30.81	581	179	77065929	52592.67	1077
0.6955	DS of LH	Block Group 1, Census Tract 2527, Harris County, Texas	Harris	42115	2.84	1101	1461	2.86	664	19	61530015	4178.46	1016

Population Totals: 237,629 277,614

Total AMHI x 2018 Population (A) =	27,387,384,337
Total 2018 Population (B) =	277,614
Total Weighted Average AMHI (A/B) =	\$ 98,652.75
Total Unemployment x 2018 Population (C) =	1,181,147.12
Total 2018 Population (D) =	277,614
Total Weighted Average Unemployment (C/D) =	4.25
SVI x 2018 Population (E) =	71,169.89
Total 2018 Population (F) =	277,614
Total Weighted Average SVI (E/F) =	0.2564

Attachment C:

Grant Percentage Calculator Spreadsheet

CATEGORY 1 - Spring Creek Watershed Flood Control Dams Conceptual Engineering Feasibility Study

Project AMHI =	\$ 98,652.75	
State AMHI =	\$ 59,570.00	
Project/State =	166%	
Project/State ≤ 50% and Fed. Disaster Declaration Last 5 Years =	100% Grant	<input type="checkbox"/>
Project/State ≤ 75% =	90% Grant	<input type="checkbox"/>
Project/State > 75% and ≤ 125% =	75% Grant	<input type="checkbox"/>
Project/State > 125% =	50% Grant	<input checked="" type="checkbox"/>
AMHI Grant % =	50%	

TOTAL GRANT % =	50%
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Notes:

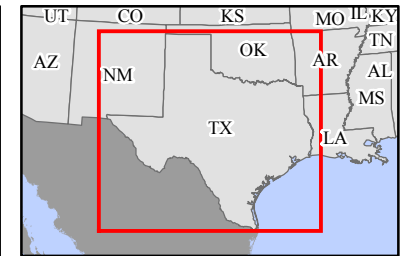
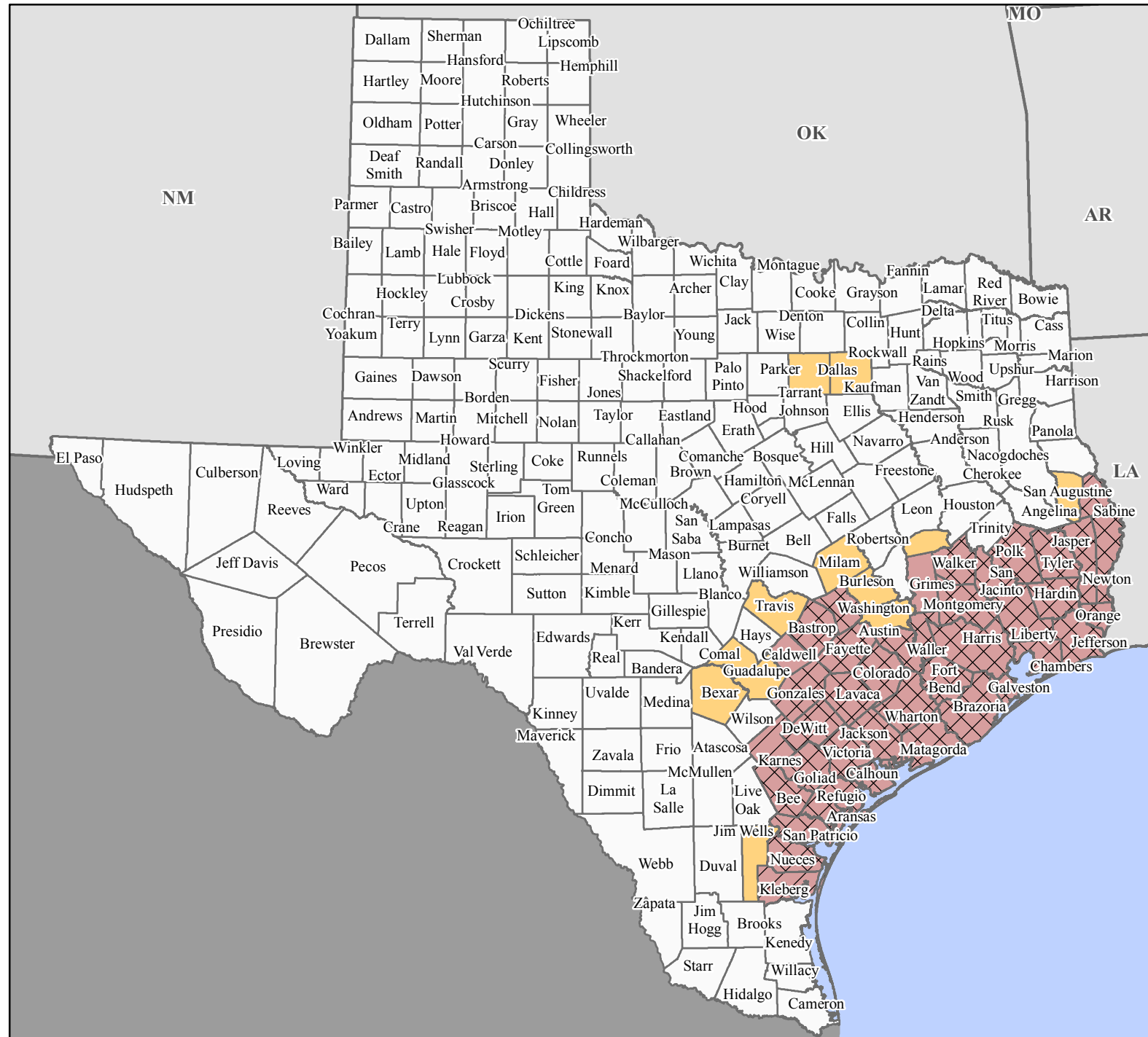
Attachment D:

Disaster Declarations for Hurricane Harvey
and Tropical Storm Imelda

FEMA-4332-DR, Texas Disaster Declaration as of 10/11/2017



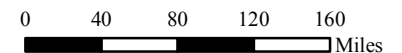
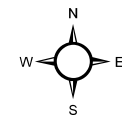
FEMA



Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Texas.

All designated areas in the State of Texas are eligible to apply for assistance under the Hazard Mitigation Grant Program.

- Designated Counties**
- No Designation
 - Public Assistance
 - Individual Assistance and Public Assistance
 - Public Assistance (Category B)
 - Individual Assistance and Public Assistance (Categories A and B)
 - Individual Assistance and Public Assistance (Categories A - G)

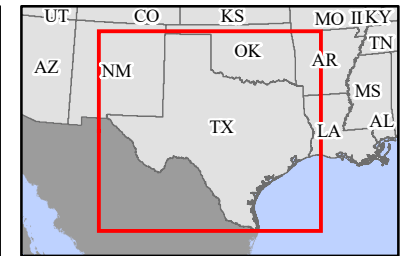
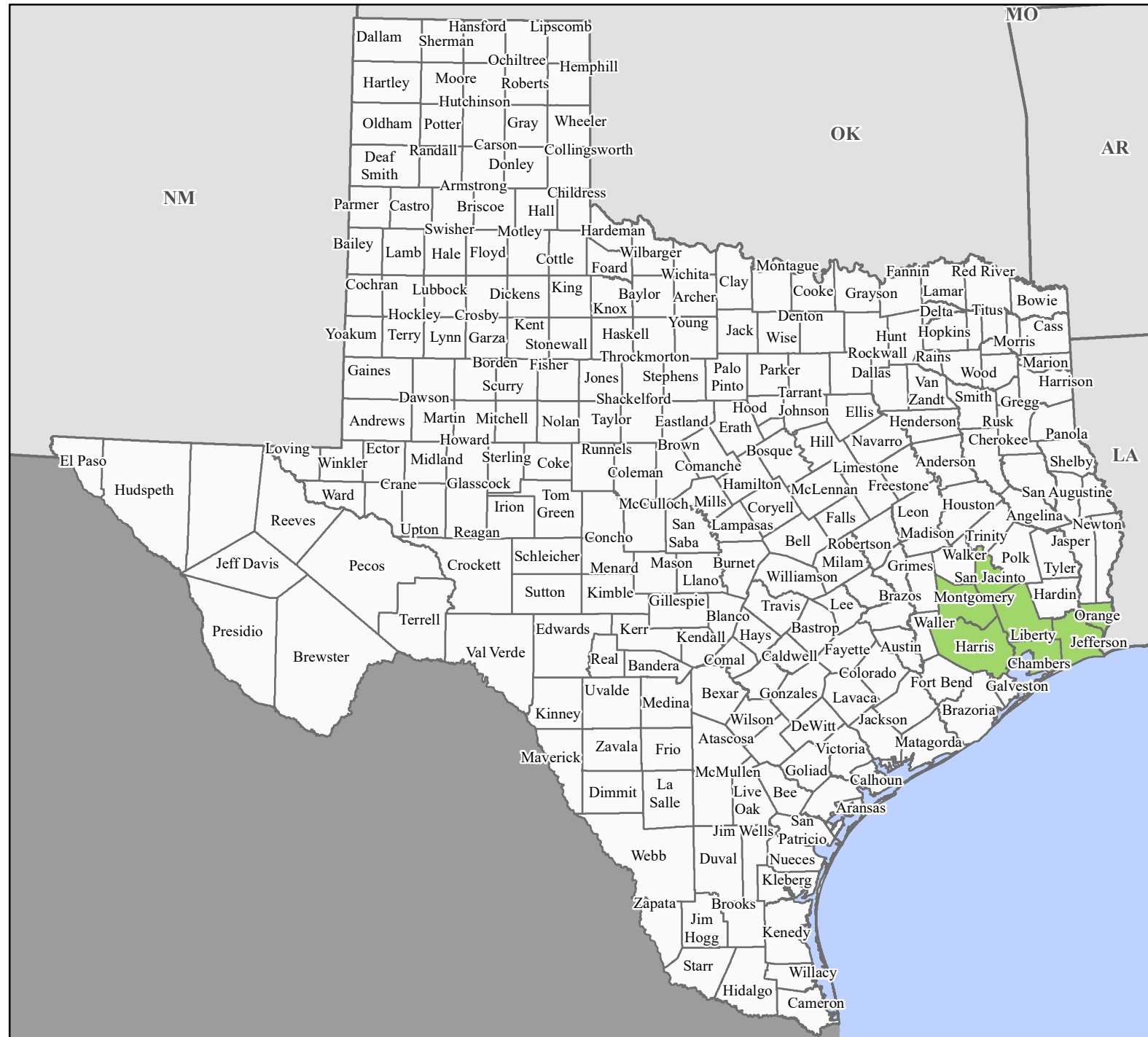


Data Sources:
FEMA, ESRI;
Initial Declaration: 08/25/2017
Disaster Federal Registry Notice:
Amendment #10 - 10/11/2017
Datum: North American 1983
Projection: Lambert Conformal Conic

FEMA-4466-DR, Texas Disaster Declaration as of 10/24/2019



FEMA



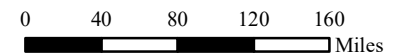
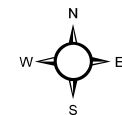
Data Layer/Map Description:

The types of assistance that have been designated for selected areas in the State of Texas.

All areas within the State of Texas are eligible for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Individual Assistance



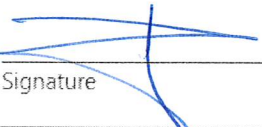
Data Sources:

FEMA, ESRI;
 Initial Declaration: 10/04/2019
 Disaster Federal Registry Notice:
 Amendment #1: 10/24/2019
 Datum: North American 1983
 Projection: Lambert Conformal Conic

Attachment E:

NFIP Certifications


CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, <u>Jay Muschenheim</u> (Name), serving as <u>Flood Plain Administrator</u> (Title)</p> <p>hereby certify that <u>unincorporated Montgomery Co., TX</u> (Appropriate entity for area to be served by the project)</p> <p>is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p> _____ Signature</p> <p><u>April 29, 2020</u> Date</p>
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CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, <u>Choyce Morrow</u> (Name), serving as <u>Flood Administrator</u> (Title)</p> <p>hereby certify that <u>City of Houston</u> (Appropriate entity for area to be served by the project)</p> <p>is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p><u>Choyce Morrow</u> Signature</p> <p><u>6/2/2020</u> Date</p>
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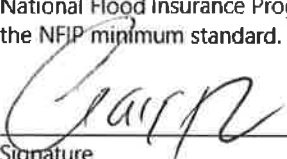
CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, <u>Ann Colina</u> (Name), serving as <u>Floodplain Administrator</u> (Title) hereby certify that <u>the City of Caroe</u> (Appropriate entity for area to be served by the project) is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p><u></u> Signature <u>5-15-20</u> Date</p>
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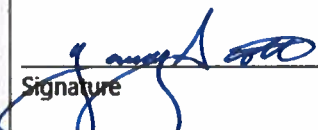
CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, <u>Jonathan Steiber</u> (Name), serving as <u>Harris County Floodplain Administrator</u> (Title)</p> <p>hereby certify that <u>San Jacinto River Authority Harris County</u> (Appropriate entity for area to be served by the project)</p> <p>is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p> Signature</p> <p><u>4-29-2020</u> Date</p>
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CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, <u>Craig T. Meyers, PE, CFM</u> (Name), serving as <u>Community Development Director</u> (Title)</p> <p>hereby certify that <u>the City of Tomball, Texas</u> (Appropriate entity for area to be served by the project)</p> <p>is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p> _____ Signature</p> <p><u>05/13/2020</u> _____ Date</p>
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CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p> <p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>I, <u>YANCY SCOTT</u> (Name), serving as <u>COUNTY ENGINEER / FLOODPLAIN ADMIN.</u> (Title) hereby certify that <u>WALLER COUNTY</u> (Appropriate entity for area to be served by the project) is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p> <p><u></u> Signature <u>5/18/2020</u> Date</p>
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CERTIFICATION ON ENFORCING FLOODPLAIN MANAGEMENT STANDARDS

<p>Certification on enforcing floodplain management standards</p>	<p>I, <u>Fred Hagans</u> (Name), serving as <u>Floodplain Administrator</u> (Title)</p>
<p>Exception: The only exception is an entity that is requesting FIF funding to fulfill additional requirements for participation in the National Flood Insurance Program. If this is the situation, check here: <input type="checkbox"/></p>	<p>hereby certify that <u>City of Stagecoach</u> (Appropriate entity for area to be served by the project) is currently enforcing floodplain management standards at least equivalent to National Flood Insurance Program (NFIP) minimum standards, but it may exceed the NFIP minimum standard.</p>
	<p><u>Fred S Hagans</u> 5-14-2020 Signature Date</p>

Attachment F:

San Jacinto Regional Watershed Master
Drainage Plan Project Fact Sheet

SAN JACINTO REGIONAL WATERSHED MASTER DRAINAGE PLAN FACT SHEET



The San Jacinto Regional Watershed Master Drainage Plan is a comprehensive regional study led by local partners including the Harris County Flood Control District, the San Jacinto River Authority, Montgomery County, and the City of Houston.

This integrated effort, kick started in April 2019, will identify future flood mitigation projects that can be implemented in the near- and long-term to reduce flood risks to people and property throughout the San Jacinto River regional **watershed**.

The goals of the San Jacinto Regional Watershed Master Drainage Plan are to:

- Identify the region’s vulnerabilities to flood hazards using Atlas 14 rainfall
- Develop approaches to enhance public information and flood level assessment capabilities during a flood disaster event
- Evaluate flood mitigation strategies to improve community resilience
- Provide a comprehensive Flood Mitigation Plan that supports the needs and objectives of each regional partner

The goals of the project will be achieved by developing a set of hydrologic and hydraulic models for the major tributaries of the Upper San Jacinto River regional watershed (from the **headwaters** in Walker County to the Interstate 10 crossing at the San Jacinto River in Harris County). The models will use consistent, cohesive methodology and rainfall rates, regardless of the county in which those channels are located.

Information to be developed includes *non-regulatory inundation maps* (not intended to replace current effective maps) for the studied streams that show the extent and depth of **riverine flooding** of the larger rivers within the watershed for an array of simulated storm events. Additionally, information will be gathered about the number of structures, acres of land, properties, and miles of roadway that are located within the modeled floodplains. Study results will be used to inform and update **Hazard Mitigation Plans** for each of the participating partners and to provide guidance on regulations for future growth within the study area.

The project area covers nearly 3,000 square miles. The expected completion time frame is Fall 2020. The project is budgeted at \$2.7 million.

Contact Us

The participating project partners are interested in hearing from you. Please contact your local representative with comments and questions:

- **Harris County Flood Control District** – Jing Chen, jing.chen@hcfcd.hctx.net
- **San Jacinto River Authority** – Matt Barrett; mbarrett@sjra.net
- **Montgomery County** – Darren Hess, darren.hess@mctx.org
- **City of Houston** – Adam Eaton, adam.eaton@houston.tx.gov

GLOSSARY

Watershed: A geographical region of land or “drainage area” that drains to a common channel or outlet, mostly creeks and bayous. Drainage of the land can occur directly into a bayou or creek, or through a series of systems that may include storm sewers, roadside ditches, and/or tributary channels.

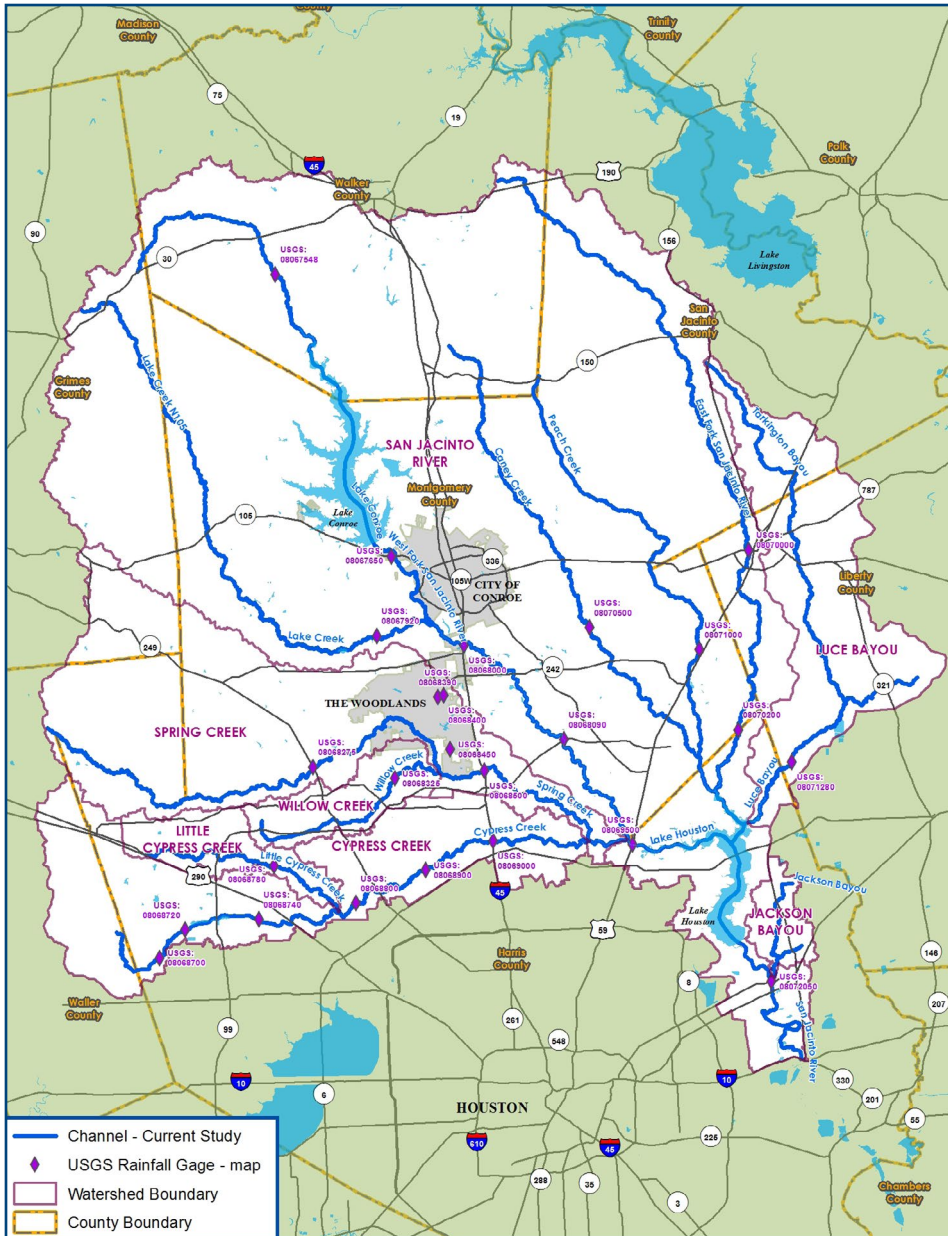
Headwaters: Headwaters are simply the initial source of the water in a river.

Inundation maps: Maps that show where flooding may occur over a range of water levels in a community’s local stream or river.

Riverine flooding: Flooding that is the result of creeks and bayous leaving their banks due to heavy rainfall.

Hazard Mitigation Plans: Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters, such as flooding. Governmental organizations engage in hazard mitigation planning to identify risks and vulnerabilities associated with natural disasters, and develop long-term strategies for protecting people and property. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage.

SAN JACINTO REGIONAL WATERSHED MASTER DRAINAGE PLAN STUDY AREA



3,000 SQUARE MILES OF STUDY AREA

The watershed for the streams to be studied covers an expanse of nearly 3,000 square miles, located in seven different counties:

- Grimes County
- Harris County
- Liberty County
- Montgomery County
- San Jacinto County
- Walker County
- Waller County

The study includes approximately 535 miles of stream, including West Fork San Jacinto River, East Fork San Jacinto River, San Jacinto River, Lake Creek, Cypress Creek, Little Cypress Creek, Spring Creek, Willow Creek, Caney Creek, Peach Creek, Luce Bayou, Tarkington Bayou, and Jackson Bayou.

Stream Name	Stream Length (Miles)
West Fork San Jacinto River	61.4
East Fork San Jacinto River	73.2
San Jacinto River	16.3
Lake Creek	58.9
Cypress Creek	60.5
Little Cypress Creek	20.8
Spring Creek	69.6
Willow Creek	19.8
Caney Creek	49.3
Peach Creek	53.5
Luce Bayou	10.8
Tarkington Bayou	36.9
Jackson Bayou	4.6
Total	535.6



West Fork of San Jacinto River

Attachment G:

San Jacinto Regional Watershed Master
Drainage Plan Alternative Fact Sheets

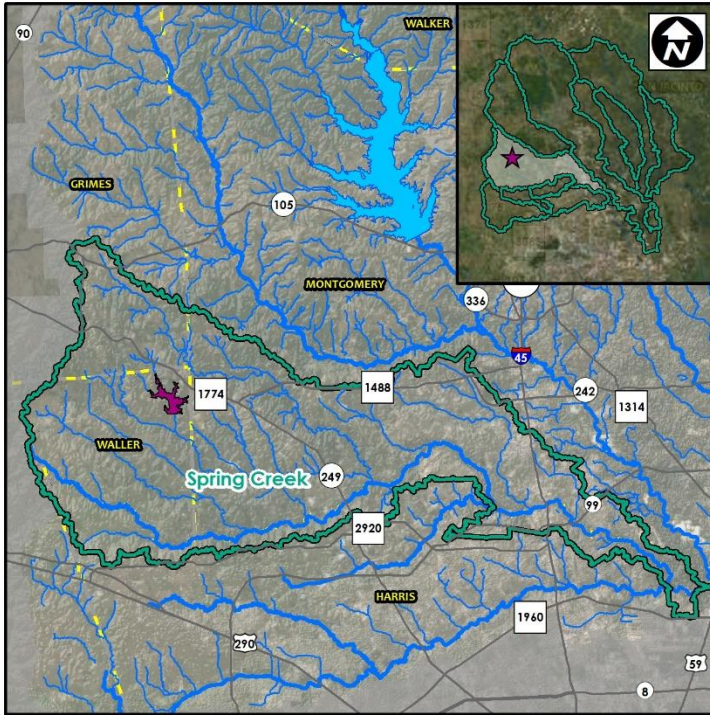
SPRING CREEK DETENTION – Birch Creek **(DRAFT)**

LOCATION: Approximately 10 miles U/S of Spring Creek on Birch Creek

OBJECTIVE: Reduce flooding in Spring Creek

HOW IT WORKS: Captures runoff inline

IMMEDIATE DOWNSTREAM FREQUENCY BENEFIT: Incremental reduction of 100-year (Atlas 14) WSEL



IMPROVEMENT SPECIFICATIONS

PROPOSED RESERVOIR

- 873 acres (1% AEP)
- 917 acres (PMF)
- 7,731 acre-feet (1% AEP)
- 460k cubic yards of excavation
- 41 ft of dam height
- 0.7 miles in length

BENEFITS

- Reduction in structural flooding: 763
- Reduction in instances of flooding: 918
- Benefited areas:
 - The Woodlands, Tomball, Stagecoach
- Reduces 100-year WSEL up to 0.5 feet for 25.9 miles downstream
- Improves LOS:
 - 2 Railroad Crossings
- Net Present Value Benefit: \$67M

OPPORTUNITIES AND CHALLENGES

POTENTIAL PARTNERS

Waller County, Montgomery County, SJRA, HCFC, TxDOT, USACE, City of Tomball, The Woodlands Township, Woodlands Water Agency, TWDB, GLO, FEMA

REQUIRED REAL ESTATE

- 71 parcels within PMF
- 15 parcels within 1% AEP WSEL

DESKTOP ENVIRONMENTAL MITIGATION

- 1,370 linear feet of NHD streams

RELOCATIONS/RECONSTRUCTION

- 1 Utility to be relocated
- 0.3 miles of Roads (1% AEP)

COSTS

- Design/Construction Cost - \$25M
- Environmental Cost - \$8M
- ROW Cost - \$48M - \$88M
- TOTAL COSTS - \$82M - \$122M
- 20-Year Escalation Cost - \$124M-\$184M

BCR: 0.55-0.83

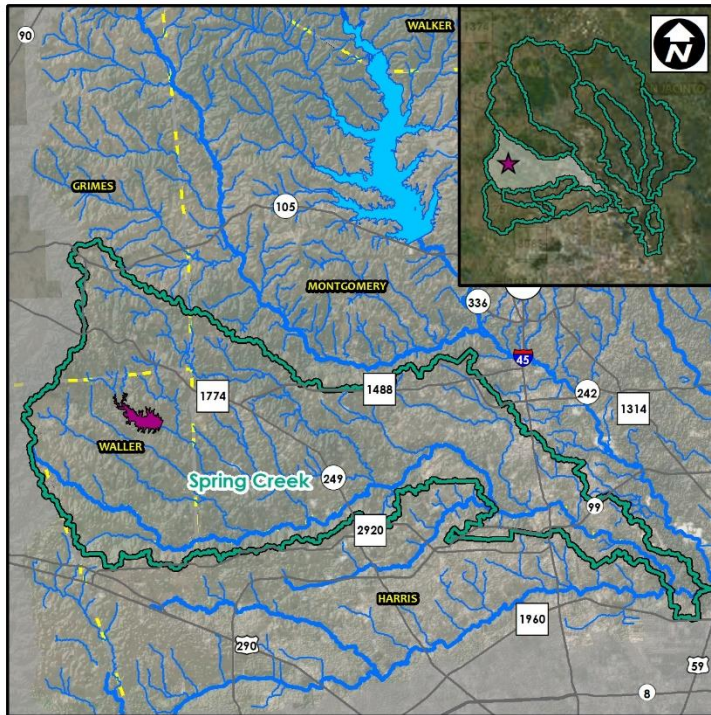
SPRING CREEK DETENTION – Walnut Creek **(DRAFT)**

LOCATION: Approximately 10 miles U/S of Spring Creek on Walnut Creek

OBJECTIVE: Dry bottom detention pond to reduce flooding in Spring Creek

HOW IT WORKS: Captures runoff inline

IMMEDIATE DOWNSTREAM FREQUENCY BENEFIT: Incremental reduction in 100-year (Atlas 14) WSEL



IMPROVEMENT SPECIFICATIONS

PROPOSED RESERVOIR

- 1,218 acres (1% AEP)
- 1,279 acres (PMF)
- 12,159 acre-feet (1% AEP)
- 670k cubic yards of excavation
- 46 ft of dam height
- 1.2 miles in length

BENEFITS

- Reduction in instances of flooding: 1,412
- Benefited areas:
 - Tomball, The Woodlands
- Reduces 100-year WSEL up to 0.5 feet for 40.9 miles downstream
- Improves LOS:
 - 2 Railroad Crossings
- Net Present Value Benefit: \$102.7M

OPPORTUNITIES AND CHALLENGES

POTENTIAL PARTNERS

Waller County, Montgomery County, SJRA, HCFC, TxDOT, USACE, The Woodlands Township, Woodlands Water Agency, TWDB, GLO, FEMA

REQUIRED REAL ESTATE

- 37 parcels within PMF
- 30 parcels within 1% AEP WSEL

DESKTOP ENVIRONMENTAL MITIGATION

- 6 acres of potential wetlands
- 832 linear feet of NHD streams

RELOCATIONS/RECONSTRUCTION

- 1 Utility to be relocated
- 1.3 miles of Roads (PMF)

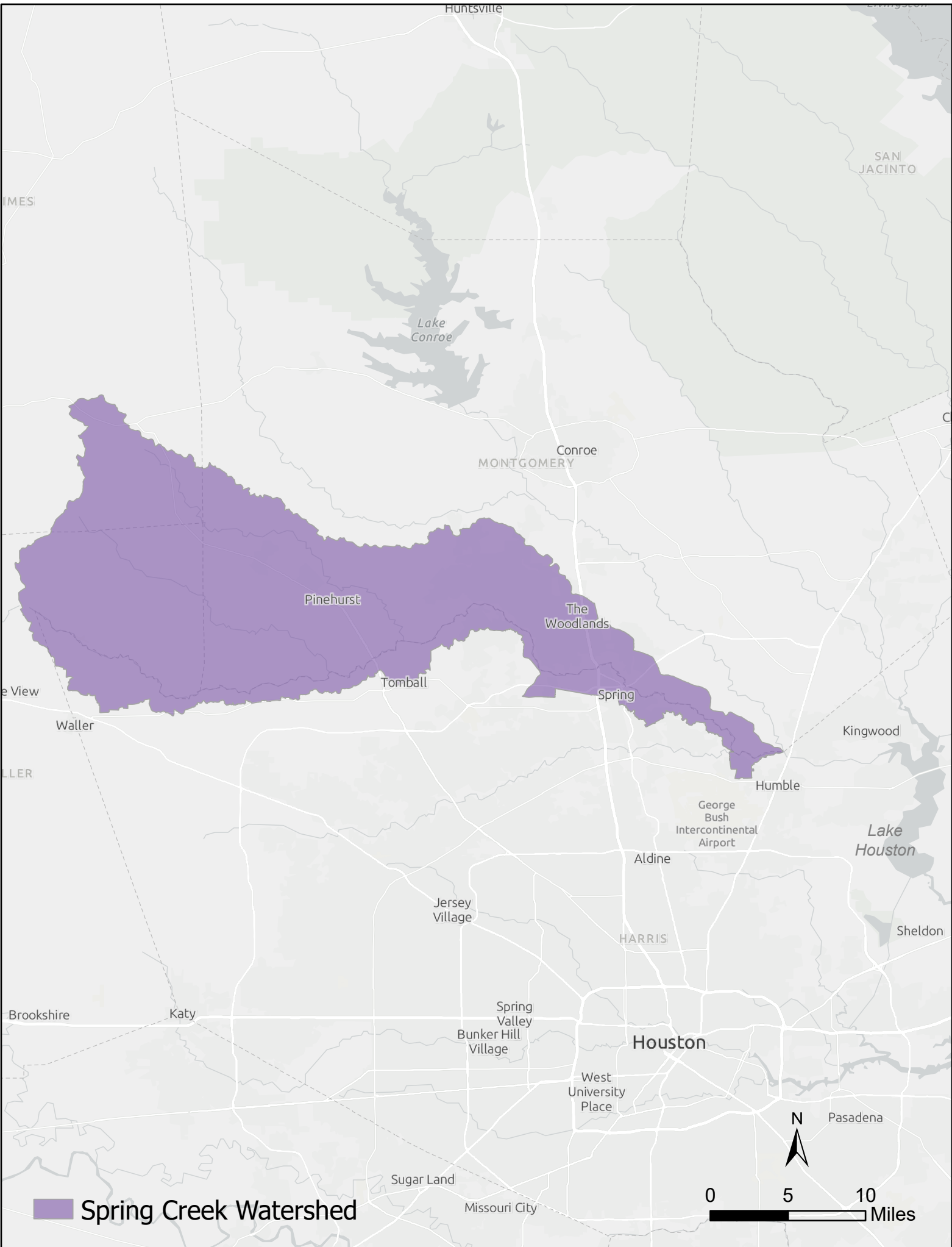
COSTS

- Design/Construction Cost - \$41M
- Environmental Cost - \$7M
- ROW Cost - \$49M - \$84M
- TOTAL COSTS - \$97M - \$132M
- 20-Year Escalation Cost - \$147M - \$200M

BCR: 0.78 – 1.06

Attachment H:

Spring Creek Watershed



Huntsville

SAN JACINTO

Lake Conroe

Conroe
MONTGOMERY

Pinehurst

The Woodlands

Tomball

Spring

Kingwood

Humble

George Bush Intercontinental Airport

Lake Houston

Sheldon

Jersey Village

HARRIS

Brookshire

Katy

Spring Valley

Bunker Hill Village

Houston

West University Place

Pasadena

Sugar Land

Missouri City



0 5 10 Miles

Spring Creek Watershed