

January 7, 2025

Gabriel Lopez
City of Bay City
Department of Public Works
1217 Ave J
Bay City, TX 77414

Re: Task Authorization No. 1 City of Bay City Stormwater Management Plan

Dear Mr. Lopez,

We are pleased to submit this proposal for providing Stormwater Management Planning services to the City of Bay City, Texas. Freese and Nichols, Inc. (FNI) is uniquely positioned to assist the city in completing this project.

Our team comprises experienced stormwater professionals from FNI who are familiar with the flooding issues experienced across the City. We are committed to delivering high-quality services and achieving the best possible outcomes for Bay City.

The proposed scope of services to be provided are attached as Exhibit A. Basic services include data collection, a drainage system inventory, an initial flood hazard assessment, flood mitigation planning and future flood mitigation planning. A task order attached as Exhibit B, includes the proposed budgets for the scope of services to be provided. The proposed project is anticipated to be completed within 18 months of notice to proceed. A preliminary schedule is attached as Exhibit C.

We look forward to the opportunity to work with you and contribute to the safety and resilience of your community.

Please feel free to contact me at 832-651-5817 or dane.schneider@freese.com if you have any questions or require further information.

Thank you for considering our proposal.

Sincerely,



Dane P. Schneider, PE, ENV SP
Project Director

EXHIBIT A



SCOPE OF SERVICES

FOR

City of Bay City, Texas

Stormwater Management Plan

TASK AUTHORIZATION NO. 1: Professional Engineering Services for Hazard Mitigation Assistance (HMA) Management Funding

City of Bay City Stormwater Management Plan

Project Background:

The City of Bay City (the City) submitted an application for funding assistance to the FEMA Hazard Mitigation Grant Program (HMGP) under the DR-4485-TX (Texas Covid-19 Pandemic) Notice of Funding Opportunity administered by the Texas Division of Emergency Management (TDEM). On December 18, 2023 the City received notice from TDEM that FEMA had approved the application. The City has experienced multiple extreme storm events in recent years, including Memorial Day 2015, Hurricane Imelda, Hurricane Harvey, and June 2019. In addition to street and structural flooding from noted historical storm events, the City experiences fluvial flooding from its geographic position with respect to the Colorado River and Cottonwood Creek floodplains, and pluvial flooding from more frequent rainfall events that overwhelms the capacity of existing local roadside ditch and storm sewer drainage systems.

Project Description:

The City of Bay City is located in Matagorda County, Texas. The project limits include 8.5-square miles of incorporated area and extra-territorial jurisdiction (ETJ) generally defined by Walker Rd on the north, Bordeaux Dr on the south, and the Colorado River floodplain and levee system on the west. The eastern project limits follow SH35 to Van Vleck and include the floodplains of Dry Creek, Bucks Bayou, and Hardeman Slough. The floodplain of Cottonwood Creek, and Old Cottonwood Creek, overlay a large area of the central project area from north to south. The current land use within the City is a mix of residential, commercial, industrial, and agricultural.

Project Understanding:

Freese and Nichols, Inc. (FNI) was engaged by the City of Bay City to provide professional services related to development of a city-wide stormwater management plan (the project). The overall objective of the project is to conduct a hydrologic and hydraulic (H&H) analysis of the watersheds and drainage systems within the project area to identify existing flood hazards and perform flood mitigation planning that leads to the conceptual development of projects that reduce flood risk and damage costs.

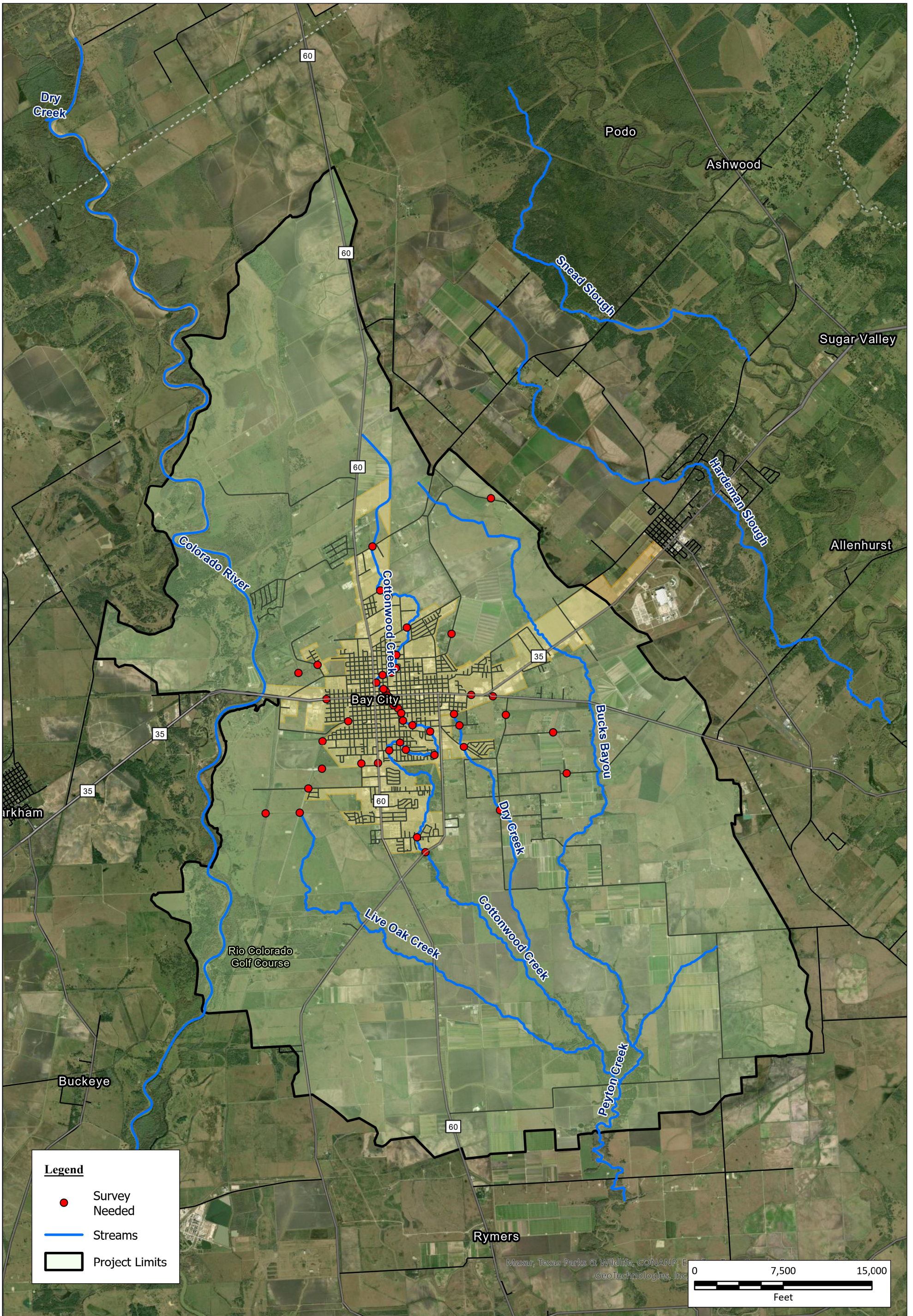
The project will achieve the following objectives:

- Provide current information to the City regarding existing H&H conditions for an array of storm events within the project area.
- Identify locations at risk for flooding from and prioritize problem locations based on ponded stormwater depth and historical flood frequency information. Identify the cause(s) of the flooding problem.
- Gain a better understanding of existing local drainage infrastructure (layout, size, condition) serving project areas which flood during more frequent, less severe rainfall events. Identify existing level of service and system inadequacies.

- Develop drainage improvement concepts to address a minimum design level of service and reduce flood risk and damage costs.
- Develop proposed project implementation phasing, capital costs, and identify potential sources of funding assistance.

FNI understands the importance of compliance with the terms and conditions of the HMGP funding assistance, as noted in the award letter from TDEM, and will coordinate with the City's grant management consultant accordingly:

- The plan will meet or exceed the requirements for Local Mitigation Plans as outlined in 44 CFR § 201.6 and as determined by the State Hazard Mitigation Officer (SHMO).
- The natural hazards assessed by the plan will be coordinated with the current FEMA-approved version of the 2022 Matagorda County Hazard Mitigation Plan adopted by the City.
- The plan will be developed using FEMA guidance documents - Local Mitigation Planning Handbook and Local Mitigation Plan Review Guide, including the Local Mitigation Plan Review Tool.
- The plan will be submitted to FEMA no later than 6-months prior to the end of the performance period and following SHMO review and concurrence.



FN PROJECT NO.	Project #
DATE CREATED	Date: 10/31/2022
DATUM & COORDINATE SYSTEM	NAD 1983 StatePlane Texas South Central FIPS 4204 Feet
FILE NAME	City of Bay City Stormwater Management Plan
PREPARED BY	FX

FREASE AND NICHOLS, INC.
 10497 TOWN AND COUNTRY WAY, SUITE 600
 HOUSTON, TEXAS 77024
 OFFICE: 713-600-6800
 FAX: 713-600-6801

City of Bay City
Stormwater Management Plan
Project Limits

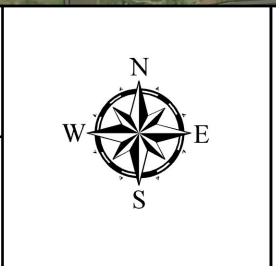


FIGURE 1

BASIC SERVICES

1.0 PROJECT MANAGEMENT AND COORDINATION

Project management and coordination services are based on an estimated maximum eighteen (18) month project duration.

- 1.1 Kickoff Meeting - Attend initial kickoff meeting with the City to discuss project objectives, scope, schedule, deliverables, criteria, and other critical items. FNI to receive notice to proceed from the City, if not previously issued.
- 1.2 CHARM Meeting – Attend in-person the Texas Community Watershed Partners (TCWP) Workshop using the Community Health and Resource Management (CHARM) platform on October 17, 2024.
- 1.3 Progress Meetings - Attend up to twelve (18) monthly project progress meetings with the City and grant management consultant to provide updates and discuss future work items.
- 1.4 Routine Project Controls – Administration of the contract, preparation of monthly invoices and progress reports, and coordination with the grant administrator. The FNI project management team will provide monthly progress reports that may be used by the grant management consultant to generate the required quarterly progress report to TDEM. Project management and coordination of FNI task leads, engineering disciplines, and subconsultants.
- 1.5 Quality Assurance/Quality Control (QA/QC) – Implement quality management plan and document QA/QC activities performed. Engage senior staff and subject matter experts to perform detailed reviews of the contract deliverables at each milestone.

2.0 DATA COLLECTION AND REVIEW

- 2.1 Project Information - Collect and review information provided by the City to be used for the project, including history of flooding problems, record plans, on-going or planned projects, GIS data, and previous drainage studies. Record plans will be utilized when available to minimize the need for topographic survey and channel cross-sections.
 - Review applicable current design criteria and confirm all entities having jurisdictional authority over the project, including review, approval, and permits.
 - Review topography (2018 and 2019 LiDAR), current land use/land cover (H-GAC Regional Land Use Information System), effective Flood Insurance Study and floodplain maps (FEMA), and stream and precipitation gage data (USGS) as applicable.
 - Collect GIS building structures inventory from county appraisal district, Microsoft building footprint, and Texas Natural Resources Information System (TNRIS).
- 2.2 Previous Studies (to be provided by the City):
 - Deliverable C Preliminary Models for Matagorda County Regional Master Drainage Plan, City of Bay City, Matagorda County, Texas, August 2021 by Jones & Carter [report and model files,

received]. This study represents the most current H&H modeling available, and utilized previous studies as noted below.

- Colorado River HEC-HMS and 1D2D HEC-RAS 2021 update to 2001 Lower Colorado River Authority Flood Damage Evaluation Project by Scheibe Consulting LLC [report and model files]. According to Jones & Carter study, “only the hydrology for the Colorado River drainage areas will be updated...the Colorado River will not be included in the hydraulic modeling.”
- Final Results of Hydrology Study Cottonwood Creek Watershed Bay City, Texas, September 2017 by Halff & Associates [FIRMs effective 01-15-2021]. The Halff work product updated the 1983 FEMA FIS for Bucks Bayou, Hardeman Slough, and Cottonwood Creek. According to Jones & Carter study, “to be consistent with this study and to capture the overflow in this area, JC incorporated these models into the final models detailed in this report.”
- Matagorda County Flood Mitigation Plan, January 2010 by Halff Associates, Inc [report received].
- Current FEMA-approved version of the Matagorda County Hazard Mitigation Plan [report].
- Cottonwood Creek Flood Protection Plan, October 1990 by Pledger Kennedy Rogers Kalkomey Consulting Engineers [report, received].

2.3 Field Visits - Perform up to two (2) field visits at designated locations to familiarize the project team with existing watershed conditions and inform development of the hydrologic and hydraulic (H&H) models. Site visit locations may include areas with a history of structural or roadway flooding, areas indicated within FEMA flood loss database, field verification of survey deliverable, condition assessment of drainage and roadway infrastructure, major hydraulic structures, and channel conditions at major roadway crossings. Site visits will be documented and include geo-referenced photographs of existing features.

2.4 Historic Storm Events – Coordinate with the City to identify historic storm events with documented flood damage within the project limits. Research previous news reports and available precipitation and stream gage data. Data collected will be used for validation of H&H models.

3.0 DRAINAGE INFRASTRUCTURE INVENTORY

3.1 Database Development – Meet with the City and on-call GIS consultant to identify attributes and schema to use in the drainage infrastructure inventory database. Create geodatabase and feature classes with applicable attribute fields.

3.2 Digitizing Drainage Infrastructure – Populate the geodatabase with points and lines representing the following public drainage infrastructure: underground storm sewers, roadway crossing culverts. Data such as pipe size, material, inlet type, and flowline elevations will be input to populate attributes of the features based on the information provided in the 1981 Grid Map PDFs and record drawings provided by the City. Drainage infrastructure located on private property and driveway crossing culverts at roadside ditches are excluded from this task. Only drainage infrastructure located in the public right of way, owned and operated by the City, will be captured.

- 3.3 Major Hydraulic Structures – Identify major crossing structures or storm sewer outfalls [culverts and bridges] through evaluation of the local topography, stream centerlines, roadway lines, and review of the August 2021 Jones & Carter study. Topographic survey and channel sections upstream and downstream at major crossing structures or outfall flowline and pipe characteristics will be collected at up to twenty (20) additional locations where more detail is warranted. Coordinate with the City's current on-call GIS consultant to identify opportunities to update the existing geodatabase with regard to major hydraulic structures.

Task 3.0 Deliverables:

- Geodatabase of digitized drainage infrastructure with populated attribute fields.

4.0 FLOODING HAZARD ASSESSMENT

4.1 Localized Flooding Methodology and Calculations – Perform preliminary study of local flooding problem areas using a HEC-RAS Rain-on-Mesh model. Storm sewers digitized as part of Task 3 will be included within the model. This analysis will focus on localized drainage issues and will assume major channels are within banks and do not have a tailwater condition. Ponding areas and structural flooding will be highlighted for further investigation. The 2-year, 10-year, and 100-year 24-hour storm events will be simulated.

4.2 Riverine Flooding Methodology and Calculations - Riverine flooding will be investigated by updating the J&C model of Cotton Wood Creek and Bucks Bayou using relevant data collected in Task 3 and rerun for establish existing conditions in the 2-year, 10-year and 100-year storms. No additional analysis beyond the conclusions reached in previous studies will be completed for the Colorado River. Key assumptions are listed below:

- Drainage areas from the 2021 Jones & Carter study will be utilized and refined as needed for the Cottonwood Creek and Bucks Bayou systems. The delineations will be reviewed, and refinements will be made as necessary based on topography and hydraulic connections (storm sewers, culvert crossings, and bridge crossings) which currently exist.
- To better assess the inflows to the City from Cottonwood Creek, the 1D/2D model will be updated to capture additional detail and to correct model deficiencies from the previous studies. Where drainage areas extend beyond the City limits, the H&H model will be extended to include the limits of the contributing drainage area if needed.
- Update the 2021 Jones & Carter hydraulic models as needed (breaklines, structure info, land use layer for Manning's n-values) The extents of this model will include all drainage from Cottonwood Creek and will end near County Road 218 for Cottonwood Creek, Dry Creek, and Bucks Bayou. The end of Live Oak Creek will be at State Highway 60 to account for potential restrictions in roadway crossings which may affect areas within the City limits.

4.3 Target Problem Locations – Areas of riverine vs localized risk vs combined risk will be highlighted in graphical results. Particular focus will be placed upon target areas of concerns based on input from the City. Locations to be identified for further analysis in Task 5 can include but are not limited to:

- Intersection of Encino Ave & Nichols Ave

- Tenie Holmes south of 3rd St to Helen Ave
- HWY 60 & Thompson Rd
- HWY 60 & Morningside Dr
- Glen Meadows at 4121 Heatherglen Dr
- 12th St & 7th ST
- HWY 60 & Judy St

Based on results from the flood hazard assessment, and input from the City and the public, the top five (5) problem locations will be targeted for flood mitigation solutions. Locations at high risk of structural flooding will be a priority, but in some cases the City may select major roadways and highways at high risk for flooding as a targeted problem location as these may be important transportation routes and/or evacuation corridors.

Task 4.0 Deliverables:

- Preliminary existing condition H&H model of the City using Rain-on-Mesh model with graphic and tabular results. Updated J&C riverine H&H model with graphic and tabular results.

5.0 FLOOD MITIGATION PLANNING

5.1 Identify Flood Mitigation Alternatives – Using the results of the existing conditions flood hazard assessment, flood mitigation alternatives will be developed and evaluated for their potential to reduce flood risk at the priority problem locations.

- Evaluate the recommendations from previous flood mitigation studies. Unimplemented recommendations that remain valid and align with the objectives of the current study may be leveraged.
- Consider how on-going or planned projects may affect the watershed's condition and the targeted flood hazard location.
- Review stakeholder and public feedback and incorporate requests or suggestions that are aligned with the objectives of the current study and provide benefit to solving the flooding problem in the targeted flood hazard location.

5.2 Develop Conceptual Alternatives – Develop conceptual flood mitigation alternatives that reduce the severity or eliminate the cause of the current problem. Alternatives will be developed and evaluated individually or in combination to achieve the greatest benefit. Alternatives considered may include:

- Channel capacity/conveyance improvements along main stem or tributaries.
- New or improved detention storage such as regional detention basins.
- Overland flow conveyance or diversion/bypass channel improvements.
- Storm sewer or roadside ditch capacity/conveyance improvements.

- Protective levee systems.
- Property buy-out programs.

5.3 Detailed H&H Modeling – Building upon the methodology and assumptions from the existing conditions H&H task, develop and execute a stormwater drainage model of the conceptual flood mitigation alternative to determine proposed hydraulic conditions for an array of storm events, including the 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr, and 500-yr frequency events.

Up to three (3) feasible flood mitigation alternatives per targeted problem location will be evaluated to simulate water surface elevations to evaluate the magnitude of water surface reductions for each event, develop peak flows, and flood inundation extents for each storm event.

- Adjust hydrologic parameters, as necessary, to support the inclusion of a proposed project into the models

Changes in peak flows and WSE will be evaluated throughout the model to identify adverse impacts. Mitigation concepts will be recommended for further detailed analysis in design, including:

- Detention storage volume required to mitigate adverse impacts to flows, max water surface elevations, and lost floodplain storage.
- Number of homes and acreage of land required to be purchased for additional right of way.
- Hydraulic structures that will need to be modified.

5.4 Evaluate Conceptual Alternatives – Evaluate the effectiveness of the proposed condition by comparing pre-project and post-project peak flows, maximum water surface elevations, and flood inundation extents. Flood hazard assessment metrics will be used to evaluate alternatives and recommend one (1) project that achieves the maximum feasible benefit at each targeted problem location. Consideration will be given to:

- Reduction in number of parcels and building structures at risk of flooding in the 10-year and 100-year events
- Reduction in land area of 100-year floodplain
- Project life cycle costs
- Ability to incorporate Green Infrastructure or Nature Based Solutions
- Feasibility and Constructability

5.5 Conceptual Project Layout – Develop conceptual layout in one-line detail for the recommended flood mitigation project at each targeted problem location.

- Based on readily available aerial imagery and field visits, identify and describe significant physical conditions such as overhead infrastructure, utilities, pipelines, railroads, or encroachments that may represent a fixed constraint, require relocation, or require some other action for conflict resolution.

- Identify any condition within the project area that may present a risk to implementation of the flood mitigation, including stakeholder buy-in, environmental permitting, coordination with jurisdictional entities, etc.
- Identify right of way needs, potential environmental constraints, potential utility conflicts, and other issues that may hinder implementation.
- Develop a planning-level cost estimate for the recommended flood mitigation project.
- Determine estimated costs associated with buy-out areas using available county appraisal district values and agreed upon multiplier.
- Complete a preliminary benefit-cost analysis for recommended flood mitigation projects in a level of detail sufficient to support submission and inclusion to the Texas State Flood Plan.

5.6 Project Implementation and Phasing – Based on input from the City, assist with the development of a fiscal year based project delivery plan that aligns with the current limitations of the 5-year Capital Improvement Program (CIP), including right of way acquisition, design procurement, and construction costs.

- Identify critical constraints that influence implementation schedule of construction costs.
- Phase construction costs over multiple fiscal years.
- Identify possible sources of funding assistance, including TWDB FIF, FEMA FMA or BRIC, HMGP, and GLO CDBG-MIT.

Task 5.0 Deliverables:

- Proposed conditions H&H models with graphic and tabular results.
- Stormwater Management Plan report, including executive summary, flood mitigation planning report content, supporting tables, maps, and exhibits.
- Submit the draft report to the City for review and comment. Task includes effort associated with one (1) round of review comments and revisions to achieve the submittal to the SHMO.
- Submit the final report to the SHMO for review and comment. Task includes effort associated with one (1) round of review comments and revisions to achieve final acceptance by TDEM/FEMA.

6.0 FUTURE FLOOD MITIGATION PLANNING

6.1 Future Studies

- Identify additional studies needed to fully understand and propose solutions to areas within Bay City not able to be covered as part of this study.

6.2 Regional Flood Planning Group Coordination

- Submit any future studies identified as FMEs to the Lower Colorado RFPG.
- Submit projects proposed as part of study as FMPs to the Lower Colorado RFPG.

6.3 FEMA Grant Planning

- Provide a letter recommending a strategy for recommended project funding utilizing FEMA grant opportunities focused on HMA opportunities (HMPG, FMA, BRIC).

Task 6.0 Deliverables:

- Memorandum identifying future studies needed to capture additional existing and future flood risk to Bay City.
- Submit list of FMXs to Lower Colorado RFPG (Future studies as FMEs, Projects proposed as part of study as FMPs).
- Letter documenting FEMA funding strategy for HMA programs. Applications to funding opportunities can be completed as part of future task orders.

ADDITIONAL SERVICES

7.0 SURVEY SERVICES [Tejas Surveying]

- Generally includes collecting topographic data at cross sections at channel crossings and collecting storm sewer flowlines at locations indicated.
- Horizontal data collected will be provided in grid coordinates, based on North American Datum of 1983 (NAD83) Texas Coordinate System South Central Zone.
- Vertical data collected will be referenced to North American Vertical Datum of 1988 (NAVD88) using GEOID12B for integrating with existing project LiDAR.
- Cross sections at channel crossings – data collected as indicated in Survey proposal.
- Storm sewer outfall pipes and manholes or junction structures – data collected includes horizontal and vertical location of structures including pipe size, material, inlet type, and flowline elevations.
- Topographic data at up to twenty (20) additional channel crossings or storm sewer flowlines to be selected on a case-by-case basis. Survey data to be collected at each location will be according to schematic provided by FNI.
- Deliverables will include point file in standard ASCII (PNEZD) format,.XML surface, and Civil 3D .DWG files.
- Pictures of identified storm sewer outfalls to channels for use in condition assessment.

8.0 COMMUNICATIONS SERVICES [FNI and Hollaway Environmental]

- Provide support services to the City's grant management consultant in the development of communications materials and provide PowerPoint presentation suitable to convey information to the public.
- Assist with providing technical responses to comments received during community engagement meetings. The grant administrator will manage comment tracking and response delivery process.
- Prepare for and attend one (1) townhall meeting, provide printing, reproduction, exhibit boards, and collect feedback from this public engagement effort.
- Prepare for and attend one (1) City Council meeting or similar civic meeting to present findings of the project and the recommended projects.
- City will be responsible for selection of dates and venues for the meetings.

TIME OF COMPLETION

FNI is authorized to commence work on the Project and agrees to provide deliverables based on the attached schedule of Task completion. The overall project is expected to span 18 months with several interim deliverables.

If FNI's services are delayed through no fault of FNI, FNI shall be entitled to adjust the contract schedule consistent with the number of days of delay. These delays may include but are not limited to delays in Client or regulatory reviews, delays on the flow of information to be provided to FNI, governmental approvals, etc.



City of Bay City, TX
Gabriel Lopez
Engineering Tech
1217 Avenue J
Bay City, TX 77414

FNI Project: CBC

Client Contract:  PO/Contract No.)

Date: 1/7/2025

Project Name: City of Bay City Stormwater Management Plan
Description of Services: Refer to attached Scope of Services – Basic Services.
Deliverables: Refer to attached Scope of Services – Basic Services.
Schedule: Refer to attached Scope of Services – Time of Completion.
Compensation Type: Hourly (Not To Exceed Budget)
Amount Authorized: Total Compensation = \$650,000.00

The services described above shall proceed upon execution of this Task Authorization. All other provisions, terms, and conditions of the Master Professional Services Agreement which are not expressly amended shall remain in full force and effect.

CITY OF BAY CITY, TX

FREESE AND NICHOLS, INC.

By:

By: 

Name:

Name: Cory J. Stull

Title:

Title: Principal and Vice President

Date:

Date: January 7th, 2025

Exhibit C

City of Bay City Stormwater Management Plan	2025												2026					
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	May	June
Task 1 - Project Management																		
Task 2 - Data Collection and Review																		
<i>Survey</i>																		
<i>Field Visits and Data Review</i>																		
Task 3 - Drainage Infrastructure Inventory																		
<i>Storm Digitization Geodatabase Deliverable</i>																		
Task 4 - Flood Hazard Assessment																		
<i>Localized Analysis</i>																		
<i>Riverine Analysis</i>																		
<i>Existing Condition H&H Modeling Task 4 Deliverable</i>																		
Task 5 - Flood Mitigation Planning																		
<i>Conceptual Alternatives</i>																		
<i>Detailed H&H Modeling</i>																		
<i>Evaluate and Project Layout</i>																		
<i>Project Implementation and Phasing</i>																		
<i>Flood Mitigation Projects - Task 5 Deliverable</i>																		
Task 6 - Future Flood Planning																		