Element F & G- Interim Milestones and Implementation Schedule

This watershed protection plan identifies strategies for achieving both the implementation schedule and measurable milestones of the Highland Bayou Watershed. Milestones are used to benchmark progress in implementing specific management measures from the 10 priority action areas. Implementation of the Highland Bayou Watershed Protection Plan is divided into 3 parts: Near (1-2 years), Medium (3-5 years), and Long (6-15 years). Multi-year increments also take into account the fact that many of the priority action areas will be contingent on funding, staffing, and the implementation of new programs, all of which will have initial time demands. Additionally, changes in water quality are often delayed following initial implementation of management measures, and substantial changes generally require several years to be noticeable.

Implementation for the Highland Bayou actions areas is anticipated to take place over a 15 year timeframe. Table F-1 provides targeted implementation timelines and milestones for specific objectives from each priority action areas. Some of these priority action areas could take longer or less than the estimated timeframes provided. These implementation milestones may need to be adjusted through the adaptive management process if they are found to be unrealistic or ineffective.

Figure F/G- 1. Review of priority action area voting exercise results

Table F & G- 1. Action Area Implementation Schedule

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
9	Infrastructure Upgrades to the Sanitary Sewer Collection System	To reduce the volume of raw sewage discharging from failing sanitary sewer system infrastructure.				
9.1	Infrastructure Upgrades to the Sanitary Sewer Collection System	Adopt or update asset management programs to encourage proactive/preventative maintenance activities	√	√	√	5% of asset management programs adopting preventative maintenance techniques

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
9.2	Infrastructure Upgrades to the Sanitary Sewer Collection System	Identify areas in the collection system where I/I or aging infrastructure is a problem.		√	√	See Table B-2. 6.5 % SSO volume discharge reduction per year. 2-3 points with major repairs per year, approx. 900 linear feet of line replaced a year, and 1-3 lift stations repaired per year, for a 10 year implementation horizon
9.3	Infrastructure Upgrades to the Sanitary Sewer Collection System	Rehabilitate collection system infrastructure			√	10% of identified private line connections needing repair replaced for a 10 year implementation horizon
9.4	Infrastructure Upgrades to the Sanitary Sewer Collection System	Upgrade or repair private line connections to the wastewater collection system. Performed as necessary		√	√	10% of identified private line connections needing repair replaced for a 10 year implementation horizon
6	Fats, Oils, and Grease and Wipes in the Sanitary Sewer Collection System	To minimize the introduction of SSO raw sewage into local waterways. Reduce the deposition FOG and wipes from entering sewer lines. Encourage proper disposal practices through education and outreach to residents and commercial entities on items that should not enter their drains.				
6.1	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Draft and adopt ordinance and local policy for FOG in commercial settings	√	√		Draft and adopt updated ordinance and policies for grease maintenance at commercial entities
6.1.1	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Compile existing regulations within the watershed and share.	√			Final report of existing local regulations, and assessment for how to improve and update compliance and enforcement
6.1.2	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Examine, establish, and/or update regulations as necessary to address gaps.	√	√		Draft and adopt updated ordinance and policies for grease maintenance at commercial entities
6.1.3	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Include enforcement measures		√	√	Municipalities and municipal agencies have updated
6.1.4	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Perform outreach to promote participation and aid in compliance.	√	√	√	Educational materials handed out to 10 commercial entities per month
6.2	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Utilize existing educational materials related to cooking grease –Cease the Grease campaign	√	√		Provide existing handouts and educational materials to 100 contacts per year at events, workshops, meetings, etc.

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
6.2.1	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Join the Cease the Grease workgroup.	√			Join the Cease the Grease workgroup
6.2.2	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Utilize available online social media materials and website content.	√	√		1-3 social media posts per month utilizing materials from Cease the Grease
6.3	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Pilot project - establish one Cease the Grease kitchen grease collection station at an apartment complex		√	√	Establish 1 Cease the Grease kitchen grease collection location within the watershed with 50 contacts per month utilize the kitchen grease collection station
6.4	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Utilize existing educational messaging related to wipes - Patty Potty campaign materials	√	√	√	Provide existing handouts and educational materials to 100 contacts per year at events, workshops, meetings, etc.
6.4.1	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Bolster online presence using free Patty Potty materials on social media sites and webpages	√	√		1-3 social media posts per month utilizing materials from Patty Potty Patrol
6.4.2	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Join the Patty Potty Patrol for access to videos, inserts, and public service announcements. Save Water Texas Coalition members receive a discount. Project ideas include: showing a Patty Potty video clip on the topic of flushable wipes in movie theatres (as the San Jacinto River Authority currently does); and setting up a standup cardboard cut-out of Patty Potty with a "don't flush wipes" message in City Hall lobby	√			Join the Patty Potty Patrol
6.5	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Publicize costs for damages to sewer infrastructure to city taxpayers. "Cleaning out wipes that go down the drain is costing tax dollars". Include a list of annual repairs for pump stations with costs, photos, the dos and don'ts of flushing and drains.	√	√		Development of 1 municipal specific, public education handout or brochure per city
6.6	Wipes, Fats, Oils, Grease and Roots in the Sanitary Sewer Collection System	Host education and outreach workshops for residents and commercial entities	√	√	√	Host 1-2 workshops per year

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
11	Stream flow within the Highland Bayou Channel	Improve flow conditions within the Highland Bayou channel by improving channel flow and by removing impediments to flow, such as fallen trees and sediment accumulation.				
11.1	Stream flow within the Highland Bayou Channel	Determine causes of flow reduction by requesting a study to identify contributing factors	√			Request 1 study to identify contributing factors to flow issues faced in the Highland Bayou Watershed; study agency USACE
11.2	Stream flow within the Highland Bayou Channel	Conduct a sediment source study to find the cause of sediment entering the bayou	√			Conduct 1 sediment source study; study agency USACE
11.3	Stream flow within the Highland Bayou Channel	Selectively remove sediment and clear vegetation from the channel as recommended during assessments performed by the USACE		√	√	Remove sediment and vegetation selectively 1 time per year; Reuse sediment as feasible for ecological wetland restoration activities near Jones Bay.
11.4	Stream flow within the Highland Bayou Channel	Selectively remove accumulations of woody debris impeding flow within the channel in residential areas as recommended during assessments performed by the USACE		√	√	Removal of 5 trees per year in residential areas to improve flow and remove obstacles.
13	Culvert Dam Maintenance in the Highland Bayou Channel	To improve flow within the Highland Bayou channel, via the culvert and investigate maintenance needs for culverts within Jack Brooks Park.				
13.1	Culvert Maintenance in the Highland Bayou Channel	Request information from the USACE about culverts to determine maintenance needs (potential removal of sediment and debris) to improve flow	√			Submit 1 request for USACE to provide information about culverts so maintenance needs can be determined
13.2	Culvert Maintenance in the Highland Bayou Channel	Remove sediment and clear vegetation from culverts		√	√	Responsible entities manage sediment and vegetation removal from culverts
13.3	Culvert Maintenance in the Highland Bayou Channel	Establish a management/maintenance agreement	√			1 MOU established for culvert maintenance
19	Pet Waste Education	To reduce bacteria loads from pet waste, encourage pet owners to pick up pet waste by providing pet waste stations in public areas, and provide education and outreach to pet owners on proper pet waste management and impact of pet waste on water quality.				
19.1	Pet Waste Education	Distribute pet waste educational material to residents during public events	√	√	√	Provide existing handouts and educational materials to 200 at events, workshops, meetings, etc. per year
19.2	Pet Waste Education	Install pet waste stations with bag dispensers in parks and other public spaces		√	√	Installation of 10 pet waste stations at high visibility, pet friendly public locations or apartment complexes
19.3	Pet Waste Education	Distribute pet waste bag dispensers to residents during public events	√	√	√	100 pet waste bag dispensers given to residents per year

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
24	Green Infrastructure and Stormwater Treatment Wetlands	To reduce the amount of stormwater runoff entering local waterways by retaining rainfall on site or in neighborhood and regional detention features and to treat stormwater runoff using GI and SWW.				
24.1	Green Infrastructure and Stormwater Treatment Wetlands	Update development codes to allow for GI projects during new development and stormwater retrofits; example ordinances are available for reference		√		Final report on existing local ordinances and recommended strategies for updating specific codes or site review procedures.
24.2	Green Infrastructure and Stormwater Treatment Wetlands	GI for public buildings and in public spaces		√	√	Design and construction of demonstration project at municipal or public facility with high public visibility.
24.2.1	Green Infrastructure and Stormwater Treatment Wetlands	Identify public entities interested in utilizing GI	√	√		Stormwater coordinator identifies and contacts 1 business interested in GI per month, or 12 per year
24.2.2	Green Infrastructure and Stormwater Treatment Wetlands	Design and implement GI projects including rain gardens, permeable pavement, bio-swales, vegetated curb extensions, rain water harvesting cisterns and WaterSmart landscaping		√	√	1 GI demonstration project designed and built every two years
24.3	Green Infrastructure and Stormwater Treatment Wetlands	Educate residents as well as public entities about GI	√	√	√	Host 1 GI workshop in watershed for homeowners per year
24.3.1	Green Infrastructure and Stormwater Treatment Wetlands	Distribute educational materials about GI practices, how they can be used locally, and their impact on water quality	√	√	√	Development of 6 handout/brochures about 6 GI practices
24.3.2	Green Infrastructure and Stormwater Treatment Wetlands	Partner with AgriLife to host GI workshops, lectures and field trips to educate homeowners, businesses and municipal officials		√	√	1 GI workshop held per year for businesses, municipal officials, and homeowners
24.3.3	Green Infrastructure and Stormwater Treatment Wetlands	Partner with GBF to host rain barrel workshops for residents to promote water conservation		√	√	20 rain barrels created or given away per workshop hosted per year in watershed
24.4	Green Infrastructure and Stormwater Treatment Wetlands	Encourage the use of constructed stormwater treatment wetlands	√	√	√	10 acre stormwater treatment wetlands created within the Highland Bayou Watershed
24.4.1	Green Infrastructure and Stormwater Treatment Wetlands	Host constructed SWW workshops for public entities and developers		√	√	1 constructed SWW workshop held per year

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
24.4.2	Green Infrastructure and Stormwater Treatment Wetlands	Identify public entities interested in utilizing stormwater treatment wetlands and establish ordinances to consider these practices	√	√	√	Identify and contact 1 business interested in GI per month
24.4.3	Green Infrastructure and Stormwater Treatment Wetlands	Retrofit existing stormwater detention facilities into stormwater treatment wetlands where feasible		√	√	Design and implement green infrastructure systems to intercept and treat existing load runoff, approx. 3% per year, for 6 years.
24.4.4	Green Infrastructure and Stormwater Treatment Wetlands	Incorporate stormwater treatment wetlands during new development projects		√	√	Review and update local development codes to require or not prohibit the use of stormwater treatment wetlands in new development
30	Stormwater Infrastructure Assessment Surveys	To assess stormwater drainage system infrastructure to improve system management and identify maintenance needs and opportunities for where water quality practices could be implemented.				
30.1	Stormwater Infrastructure Assessment Surveys	Compile and review previous storm drainage system studies to determine the scope needed for an updated assessment	√	√		Previous storm drainage system study scopes compiled and reviewed
30.2	Stormwater Infrastructure Assessment Surveys	Inventory stormwater infrastructure components		√		Development of inventory for stormwater infrastructure within the Highland Bayou Watershed
30.2.1	Stormwater Infrastructure Assessment Surveys	Establish data objectives, requirements, and the data collection schedule		√		Development of data collection schedule, data objectives, and data requirements
30.2.2	Stormwater Infrastructure Assessment Surveys	Inventory and map public stormwater system		√		Develop 1 map showing public stormwater systems
30.2.3	Stormwater Infrastructure Assessment Surveys	Include a plant to maintain data and update inventory as required		√	√	Development of stormwater infrastructure inventory plan
30.3	Stormwater Infrastructure Assessment Surveys	Characterize stormwater system components in the inventory to prioritize improvement needs and pollution prevention measures		√	√	Development of characterized stormwater system components in the inventory
23	Landscaping and Landscaping Debris Ordinances	To decrease and minimize the introduction of lawn debris and nutrients into stormwater.				
23.1	Landscaping and Landscaping Debris Ordinances	Develop new or strengthen existing ordinances addressing lawn clipping and landscaping debris management. Example ordinances are widely available for reference		√		Work with all 5 municipalities in the basin to identify potential updates to local ordinances
23.2	Landscaping and Landscaping Debris Ordinances	Ordinance requirements will be communicated to residents and landscaping crews		√	√	Number of violations reported by year

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
23.3	Landscaping and Landscaping Debris Ordinances	Develop enforcement measures for the ordinance including penalties due following multiple offenses.		√	√	Work with all 5 municipalities in the basin to identify potential updates to enforcement measures and penalties
23.4	Landscaping and Landscaping Debris Ordinances	Publicize contact information for reporting violations or poor disposal practices.	√			Distribute contact information to stakeholders at public events
37	Landowner Conservation Plans	To increase landowner participation in existing conservation and habitat management plans to decrease bacteria and nutrient loading and enhance water quality within the watershed.				
37.1	Landowner Conservation Plans	Identify existing conservation and habitat management plans within the watershed	√			Review all existing conservation and habitat management plans found
37.2	Landowner Conservation Plans	Identify interested landowners to participate in conservation and habitat management plans. Facilitate communication between organizations with existing voluntary programs with potential participants when appropriate	√	√	√	Identification of 2 interested landowners in medium and long term periods
37.2.1	Landowner Conservation Plans	Host landowner workshops addressing land management practices	√	√		2 Workshops held per year, target attendance 10-20 land owners
37.2.2	Landowner Conservation Plans	Distribute educational materials to landowners regarding land stewardship practices.	√	√	√	50 contacts reached with educational materials per year
37.2.3	Landowner Conservation Plans	Develop and implement individual NRCS conservation plans, WQMPs, and LIP participation		√	√	Development of 1 conservation plan, WQMP, or LIP participation
34	Preserve Existing Natural Areas	To preserve priority undeveloped lands in their natural state and protect the water quality benefits of undeveloped land and improve land management practices of undeveloped areas by providing education on habitat value for wildlife and water quality.				
34.1	Preserve Existing Natural Areas	Support acquisition of undeveloped natural lands for conservation	√	√	√	10-40 acres at critical locations with high potential for realizing water quality improvement, per five year period
34.1.1	Preserve Existing Natural Areas	Review area conservation plans and consult with resource and conservation organizations to identify protected lands within the watershed	√			Review complete, with recommendations for improvement of existing plans and to encourage adoption of new plans by currently non-participating land owners.
34.1.2	Preserve Existing Natural Areas	Identify properties with the potential for conservation management	√	√	√	Identification of 5 properties with potential for conservation management within the watershed
34.1.3	Preserve Existing Natural Areas	Acquire undeveloped natural lands and encourage conservation easements		√	√	10-40 acres at critical locations with high potential for water quality improvement, per five year period

Action Area		Objective	Schedule of Implementation (years)			Milestones
			Near 1-2	Medium 3-5	Long 6-15	
34.2	Preserve Existing Natural Areas	Provide education for public entities and residents on loss of habitat for wildlife utilizing Back the Bay materials and other existing programs		√		Work with 3 city councils to identify appropriate ordinances for consideration and adoption.
34.3	Preserve Existing Natural Areas	Use regulatory techniques to preserve natural lands		√	√	Preserve natural land using regulatory techniques
34.3.1	Preserve Existing Natural Areas	Require inquiry through the USACE for Section 404 mitigation needs during the building permit process			√	Inquiry through the USACE for Section 404 mitigation needs during the building permit process required
34.3.2	Preserve Existing Natural Areas	Enact ordinances to protect certain trees from removal or discourage developers from cutting down all trees prior to construction		√		Sparse tree removal ordinance for new construction established