

**APPENDIX D**

**EIGHT-STEP NARRATIVE FOR FLOODPLAINS  
(EXECUTIVE ORDER 11988 AND 44 CFR, PART 9)**

**CITY OF PASADENA STREET DRAINAGE & FLOOD MITIGATION PROJECT**  
**Executive Order 11988 – Floodplain Management**  
**Eight-Step Decision-Making Process**

Executive Order 11988 (Floodplain Management) requires federal agencies “to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of the floodplain and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.” FEMA’s implementing regulations are at 44 CFR Part 9, which includes an eight-step decision-making process for compliance with this part. This eight-step process is applied to the proposed City of Pasadena Street Drainage and Flood Mitigation Project since the project is located partially within the 100-year floodplain of Vince Bayou and Little Vince Bayou. The steps in the decision-making process are as follows:

***Step 1 Determine if the proposed action is located in the Base Floodplain.***

The proposed project involves lowering the elevations within existing right-of-way (ROW) of approximately 27 miles of city street segments and replacing the existing storm drainage systems along these streets with new storm sewers to contain and direct storm and floodwaters in Pasadena. The project also includes construction of eight new detention ponds. The project area drains to the Houston Ship Channel downstream of the Channel’s confluence with White Oak, Buffalo, Brays, and Sims Bayous. Under severe rain events, including hurricanes such as Hurricane Harvey, heavy rainfall overwhelms the existing streets and storm drainage systems, causing flooding into the adjacent properties. The selected roadways were chosen from flood-damaged areas located near or outside of the floodplains in low to moderate income neighborhoods with the greatest potential National Flood Insurance Program (NFIP) obligations after extreme weather events. Proposed detention sites were chosen from available City of Pasadena properties also located within these impacted neighborhoods.

A total of approximately 0.74 mile (3,900 linear feet; 4.6 acres) of the proposed street improvements will be located inside of the 100-year floodplain (“base floodplain”) of Vince Bayou and Little Vince Bayou, according to Flood Insurance Rate Maps (FIRM) 48201C0905N and 48201C0915N (published May 2, 2019). No improvements are proposed within the channels of Vince Bayou and Little Vince Bayou. Approximately 3.5 acres of the proposed detention ponds will be located within the 100-year floodplain of Vince Bayou. None of the existing bridges and drainage culvert structures at site crossings in the project area will be altered or replaced under the proposed flood control project.

The floodplain in relation to the community and proposed project sites are depicted in Appendix C of the Environmental Assessment.

***Step 2 Early Public Notice (Preliminary Notice).***

The City of Pasadena conducted two Public Information Meetings at City Hall to present the proposed project and solicit input from local residents, business owners, public officials, and other interested stakeholders. The first meeting occurred on August 15, 2019 in which a total of 12 members of the public signed in. The second meeting was held on September 19, 2019 with nine members of the public attending. An Environmental Assessment for the City of Pasadena Street Drainage and Flood Mitigation Project was prepared and is undergoing review for compliance with the National Environmental Policy Act.

***Step 3 Identify and evaluate alternatives to locating in the Base Floodplain.***

A portion of the existing community to be served by the City of Pasadena Street Drainage and Flood Mitigation Project is within 100- and 500-year floodplains. Vince Bayou, Little Vince Bayou, and

Glenmore Ditch must serve the drainage needs of existing area development, including residences, businesses, community facilities, and public institutions within the 100- and 500-year floodplains. Additionally, the area served by the proposed project is predominantly low to moderate income and minority populations. Therefore, flooding during a storm event has the potential to disproportionately impact environmental justice populations of the public both within and beyond the 100-year floodplain. In order to serve existing development located within and beyond floodplains, the project is proposed to significantly minimize flooding in Pasadena neighborhoods during heavy rainfall events.

The proposed drainage structures will be buried under the project roadway segments and will therefore have no adverse impacts to the 100-year and 500-year floodplains. Lowering the streets and installing properly-sized storm drainage systems are designed to provide the roadway corridors the capacity to store floodwaters and will also have no adverse impacts.

Alternative drainage improvements with greater storm drainage capacity or major channel modifications were considered and determined to be unfeasible. While providing greater storm drainage capacity would meet the need of the project, the higher construction costs compared to the proposed project would prove prohibitive to the Benefit-Cost Analysis/Ratio. Additionally, providing greater storm drainage capacity but reducing the number of impacted areas to meet budgetary limitations would not achieve the purpose of proactively providing equitable flood protection for all citizens in the extensive low to moderate income Census Tracts located within the project area. Improvements to Vince Bayou and Little Vince Bayou would not meet the purpose of providing improved flood control. Major channel projects for Vince Bayou and Little Vince Bayou would be ineffective because flood elevations from White Oak, Buffalo, Brays, and Sims Bayous feed into the Houston Ship Channel and control Base Flood Elevations in Pasadena. Major channel improvements to all six water bodies could not be provided in a timely manner due to lengthy approval timelines needed when coordinating with the Harris County Flood Control District (HCFCD) and the U.S. Army Corps of Engineers (USACE), which have respective jurisdiction over these water bodies.

#### ***Step 4 Identify impacts of proposed action associated with occupancy or modification of the floodplain.***

##### *Impact on natural function of the floodplain*

The City of Pasadena Street Drainage and Flood Mitigation Project will not negatively affect the functions and values of the 100-year floodplain. The purpose of the proposed project will be to create additional flood mitigation to minimize flooding in the area neighborhoods. The project will not place structures within 100- or 500-year floodplains which would impede or redirect flood flows. By not conducting any work within the channels of Vince Bayou and Little Vince Bayou, floodplain impacts will be further reduced. In addition, the project will produce minimal impacts to the floodplain because the project involves reconstructing existing roadway segments within their existing ROW. Approximately 3.5 acres of proposed detention ponds will be located within the 100-year floodplain of Vince Bayou. These ponds will create additional flood mitigation and will not negatively affect the 100-year floodplain. Internal drainage structures to be installed below proposed project roadway segments will not result in fill added to floodplains.

Best management practices (BMPs) will be in place during construction to limit sedimentation into water bodies in the area. The project will not facilitate development in the 100-year floodplain and will not facilitate development (including critical facilities such as hospitals, emergency services, fire stations, etc.) in the 500-year floodplain to any greater degree than in non-floodplain areas of the community. Compliance with applicable ordinances and building codes will be required of any new development within floodplains. Completing this project as described will reduce and minimize impacts to the floodplain to the most practicable extent possible.

*Impact on natural (water, biological, and societal) resources of the floodplain*

There will be no impacts to Waters of the U.S., including wetlands. The project boundaries have been specifically designed to minimize or avoid impacts to the 100-year floodplains and wetlands, and outfalls from the proposed detention ponds will be located above the ordinary high water marks of Vince Bayou and Little Vince Bayou. Thus, no Clean Water Act Section 404 permits are required.

Hydrologists and engineers have been consulted in order to design the site plan in such a way that natural flood and erosion control, water quality, and groundwater recharge are preserved. Surface water runoff will flow into area inlets then drain into one of the proposed detention ponds or existing drainage channels in the project area, allowing sediments and other particulates to settle out and minimize water quality impacts. BMPs will also be utilized and maintained as necessary to prevent erosion and limit sedimentation into water bodies in the area. The rate at which overland flow reaches Vince Bayou and Little Vince Bayou will not be adversely impacted, and groundwater recharge is not anticipated to be affected.

Completing this project as described will reduce and minimize impacts to the floodplain to the most practicable extent possible. Aboveground modifications will be limited to required areas, and disturbed surfaces not occupied by key features will be restored to their previous elevations after construction.

Vegetation found within the proposed project site included live oak (*Quercus virginiana*), water oak (*Quercus nigra*), crepe myrtle (*Lagerstroemia indica*), Chinese tallow (*Triadica sebifera*), St. Augustine grass (*Stenotaphrum secundatum*), Bermuda grass (*Cynodon dactylon*), ragweed (*Ambrosia artemisiifolia*), white clover (*Trifolium repens*), Johnson grass (*Sorghum halepense*), and alligatorweed (*Alternanthera philoxeroides*). Any potential vegetation impacts will be temporary and minimized to the maximum extent practicable. Disturbed areas within improved or developed areas will be replaced with sod. All other areas including regrading of ditches and detention ponds will be hydro-mulched and/or sodded. Efforts will be made to preserve existing trees on the sites where practicable.

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where practicable and when seed is reasonably available, a mixture of native grasses and forbs appropriate to address potential erosion problems and long-term cover will be planted. The City's goal is to utilize native trees, shrubs, and herbaceous species that are low-maintenance and drought tolerant.

The proposed project area is located in an area containing commercial, residential, institutional (including governmental), and light industrial areas with some city parks. Mammals likely to be found in the area include domestic dogs and cats, raccoons, opossums, and squirrels although none were observed during site reconnaissance activities. Common reptiles in the county include snakes and turtles. Frogs, toads, and other amphibians are also well distributed throughout the county. General wildlife species observed in the field during site reconnaissance activities in June of 2019 were various birds and turtles and numerous insect species. Evidence of hog wallows were also identified on the proposed project site. Federal and state threatened and endangered (T&E) species on the U.S. Fish and Wildlife Service's Information, Planning, and Consultation (IPaC) list and Texas Parks and Wildlife Department's county list were evaluated to determine if the proposed project will adversely affect them. Based on the nature of the project, lack of habitat, and on-site observations, the project will have no effect on listed T&E species.

Societal resources were also considered during the design process. Designs were developed with the intent of constructing aesthetically pleasing roadways that will be consistent with similar features in the City. The project is in a well-developed area, and therefore, the proposed sites will not have a notable effect on agricultural lands.

### *Impact of the floodwater on the proposed facilities*

The project, by nature of its scope, is intended to be affected by floodwater since street segments in the project area will be reconstructed to serve as additional detention during storm events. These streets, including sidewalks, driveway connections, and retaining walls, have been designed to handle periodic flooding and are anticipated to have a life-span of approximately 40 years. Proposed detention ponds are partially located within the Vince Bayou floodplain.

### **Step 5 Design or modify the proposed action to minimize threats to life and property and preserve its natural and beneficial floodplain values.**

The City of Pasadena Street Drainage and Flood Mitigation Project is designed to minimize floodplain impacts. No street lowering and reconstruction will occur within the bayou channels at any street crossing, thereby minimizing floodplain impacts. The construction limits of proposed detention ponds are designed to minimize overlap within the 100-year floodplains of Vince Bayou. If constructed as designed, the project (roadway corridors and detention ponds) will address existing threats to life and property as well as improve the natural and beneficial floodplain values of Vince Bayou and Little Vince Bayou.

The most environmentally sound option that still meets the purpose and need of the project was selected to minimize impacts to the natural value of the floodplain. Impacts (excavation and fill) within the floodplain will consist of reconstruction of the existing roadways and associated drainage facilities.

### *Preserving lives*

Local law enforcement and the emergency broadcast system are the sources of notification in the event that flooding conditions arise but not the primary mechanism that drives the response process. Harris County and the City of Pasadena Office of Emergency Management, which is activated with any impending disaster, will coordinate local efforts. The proposed roadway reconstruction will result in more roadways being inundated during flooding events in order to control the overall severity of flooding events and preserve lives at nearby buildings. Emergency alert signs, roadway closures, and public information campaigns will be utilized to discourage motorists from driving through inundated roadways during flooding events. Additionally, a new flood notification system, with its infrastructure installed within the reconstructed roadways, will be established.

### *Preserving property*

In order to preserve property, the City is following current design standards of new subdivisions in the region where streets have flooded without impacting the adjacent properties. The proposed project is designed to allow inundation of the reconstructed roadways. The proposed lower roadway segments and detention ponds will provide mitigation to minimize the hydrological impacts of any future flood event on project area homes and businesses.

### *Preserving natural values and minimizing impacts*

The proposed fill and disturbance are the minimum that this project can have. No wetlands will be impacted as a result of the project; therefore, no mitigation is needed. BMPs will be utilized and maintained as necessary to prevent erosion and limit sedimentation into the on-site water bodies. To provide additional capacity for floodwater, which will help mitigate impact to the floodplains, the City proposes to construct eight detention ponds totaling approximately 7.7 acres. Rainfall will flow to area inlets on the streets and then flow directly by storm sewers into one of the eight proposed detention ponds or existing drainage channels in the area, preserving water quality. No modifications or improvements to the bayous are proposed, thereby preserving these natural stream systems.

Various recommendations by TPWD will be incorporated into the project: BMPs will be employed to minimize potential impacts to aquatic organisms and overall water quality. Contractors will be made aware of the Southern crawfish frog and giant sharp-stem umbrella-sedge appearance to avoid impacts. Other wildlife and rare native plant impacts will also be avoided during construction. Any encounters with listed species will be reported to TPWD per current instructions. Vegetation impacts are unavoidable; however, efforts will be made by the contractors to preserve existing trees on the site where practicable. The City will also attempt to plant a mixture of native grasses and forbs appropriate to address potential erosion problems, and long-term cover will be planted.

**Step 6 Re-evaluate the proposed action.**

The project will not expose any segment of the population to additional flood hazards because it does not include a housing component and will not facilitate development in the floodplains to any greater degree than non-floodplain areas of the community. The project will not aggravate the current flood hazard because the proposed facilities and structures are designed to enable flood flows within the existing floodway. The project will not disrupt floodplain values because it will not alter water levels in the floodplain and will not reduce habitat in the floodplain. Therefore, it is still practicable to construct the proposed project within the floodplain. Alternatives consisting of locating additional detention outside the floodplain or taking “no action” are not practicable nor do they address the project need.

**Step 7 Findings and Public Explanation (Final Notification).**

After evaluating alternatives, including impacts and mitigation opportunities, the City determined that the proposed project is the most practical alternative. The City of Pasadena must prepare and provide a Public Notice when a proposed floodplain or wetland project is the only practicable alternative. The Public Notice concerning the City of Pasadena Street Drainage and Flood Mitigation Project will be published twice in the *Pasadena Citizen* newspaper together with the Notice of Availability of the draft EA for public review. The *Pasadena Citizen* is the local newspaper for the Pasadena area, including the floodplain areas of Vince Bayou and Little Vince Bayou. A minimum of 30 calendar days is required for the public comment period. The first notice will be published at the initiation of the comment period while the second notice will be published approximately two weeks later (i.e., halfway into the comment period).

It is our determination that there is no practicable alternative to locating portions of the project in the 100- and 500-year floodplains of Vince Bayou and Little Vince Bayou because:

1. By definition, the City of Pasadena Street Drainage and Flood Mitigation Project must be performed partially within the 100-year floodplains of Vince Bayou and Little Vince Bayou and 500-year floodplain of Glenmore Ditch. A portion of the community exists within the floodplains, and drainage improvements must be implemented to address existing flooding hazards.
2. A “no action” plan would not resolve or improve the existing flooding problems in the City of Pasadena.

**Step 8 Implement the action.**

The proposed City of Pasadena Street Drainage and Flood Mitigation Project will be constructed in accordance with applicable floodplain development requirements.