

## Alternatives Analysis

### INTRODUCTION

The Texas Department of Transportation is proposing improvements to State Highway (SH) 146 from Fairmont Parkway to Red Bluff Road in Harris County, Texas. The proposed project consists of improvements to the existing four-lane arterial, including adding lanes to the existing main lanes, sidewalks/side paths, adding additional frontage road lanes, adding pedestrian bridges, replacing the bridge over Water 1 (Taylor Bayou), and adding detention ponds.

Within the project limits, the existing SH-146 has two, 12-foot-wide main lanes and 10-foot-wide shoulders in each direction with a one-foot-wide concrete barrier separating them. Two 12-foot-wide frontage road lanes and two-foot shoulders in each direction and bicycle or pedestrian accommodations are intermittent throughout the corridor.

Pursuant to the Texas Administrative Code Title 43, Part 1, §15.120-122 in the Roadway Design Manual in regards to non-maintenance transportation projects, the inclusion of pedestrian facilities was required to be incorporated into the SH 146 project. In accordance with these guidelines, sidewalks are proposed on both sides of the road between Fairmont Parkway and Shoreacres Boulevard as there is residential and commercial development on either side of this section of SH 146. No sidewalks are proposed between Shoreacres Blvd and Port Roads, as this portion of the project area is adjacent to railroad tracks which could pose a safety hazard to pedestrians. In the southern portion of the project area, sidewalks are only proposed to the east of SH 149 as there is little development to the west of the roadway.

A concrete batch plant located adjacent to SH 146 within the existing ROW is being utilized for the production of the necessary base material for this project. This location was selected as the batch plant for this current project as the original batch plant at this location was installed over five years ago. The contractor intends to use the same layout for this project as the previous setup and will also re-utilize an existing concrete slab for the pug mill. At this time, the pug mill has not been constructed. The proposed location for this pug mill and all associated storage for the entire batch plant location can be seen on the cross sections included in this permit application.

The proposed facility would consist of three 12-foot lanes with 12-foot-wide shoulders in both the eastbound and westbound directions, 12-foot-wide westbound and eastbound auxiliary lanes, sidewalks/side paths for bicycle or pedestrian accommodations, and four detention ponds at the intersection of SH 146 and Shoreacres Boulevard. Construction of overpasses, underpasses, or elevated ramps would be proposed. The project would be completed within existing right-of-way (ROW) and is approximately 4.5 miles in length. The project will not require the acquisition of any ROW or easements.

The project area is located within the Clear Creek-Frontal Galveston Bay (HUC#1204020401) watershed. This watershed has an area of about 298 square miles including both tidal and non-tidal streams. Taylor Bayou is a coastal stream that drains into

Taylor Lake before flowing into Clear Lake and Galveston Bay system. The bayou is tidally influenced for most of its length, including the vicinity of the SH 146 project area.

### **Project Area History**

According to historical topographic maps, SH 146 was constructed and has been located on its current alignment from between 1956 and 1967. Google Earth historical imagery is available in 1944 and 1953 but does not depict the roadway constructed on its current alignment; however, the Southern Pacific Railroad is visible on the western edge of the ROW in both historic images. Historical imagery has the current alignment first visible in 1978. Construction of the overpasses at McCabe Road and Shoreacres Boulevard began in 2011, suggesting that the roadside drainage ditches along the project area have been in use for at least that long, but the ditches are visible prior to the 2011 construction activities. The land surrounding the project corridor has been used for a mix of residential, commercial, and industrial use.

On April 13, 2022, a NWP 14 (SWG-2006-00484) was issued by the U.S. Army Corps of Engineers (USACE) Galveston District authorizing TxDOT to construct the proposed SH 146 from Fairmont Parkway to Red Bluff Road project (See Attachment E – Agency Coordination). After SWG-2006-00484 was authorized TxDOT determined that additional unavoidable impacts to Ditch 2, Ditch 3, Ditch 4, Wetland 6, Wetland 7, Wetland 9, Wetland 10, and Wetland 18 were required. These additional unavoidable impacts were due to fill required to accommodate the appropriate grade on banks along the main lane and frontage road locations as well as a concrete batch plant that is required to construct the project. No work has occurred in these wetlands and no work shall occur within these wetlands until this Standard Permit (SP) is authorized. TxDOT purchased 1.8 wetland credits for unavoidable impacts to Crossing 3 (0.476 acre) and Crossing 12 (0.24 acre). The previously permitted and mitigated portions of Crossing 3 and Crossing 12 would be deducted from the impact totals and compensatory mitigation under this permit application.

### **PURPOSE AND NEED**

The existing SH 146 is a main highway that is often utilized as a hurricane evacuation route. The existing roadway is not wide enough to handle the anticipated growth in the area, creating an increased safety risk during emergency situations and evacuations. A widened roadway would accommodate the anticipated population increase for both daily traffic and in times of emergency situations, greatly reducing the threat to human life.

Due to the poor drainage of the area, the roadway cannot be widened without redesigning the drainage systems including the addition of detention ponds along the entirety of the project. Drainage upgrades would accommodate roadway runoff from the increased impermeable surface area. Impacts from the roadway expansion have been minimized to the extent possible but are not altogether avoidable as a roadway expansion to either side of the roadway would cause impacts to potentially jurisdictional Waters of the U.S (WOTUS). It is likely that the new roadside ditches would eventually create similar characteristics to the roadside drainage ditches and wetlands currently present.

## ALTERNATIVES

Pursuant to Section 404(b)(1) of the Clean Water Act, the USACE defines practicable alternatives as those that are "...available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose." Furthermore, the proposed action must be demonstrated to be the Least Environmentally Damaging Practicable Alternative.

TxDOT considered several conceptual alternatives using a systematic, interdisciplinary approach. This approach focused on input from the public as well as resource agencies during the Major Investment Study (MIS) phase and the NEPA planning phase of the proposed project. Onsite alternatives for this project were constrained by a number of factors. As SH 146 is an existing roadway, the overall alignment of the proposed project is constrained by the roadway's existing footprint and existing ROW, as unnecessary deviations from the existing roadway geometry would result in additional environmental impacts. The proposed build alternative is designed to meet both roadway engineering design standards and drainage standards. Adherence to design safety criteria in the placement and alignment of new roadway elements would result in the unavoidable impacts to waters of the U.S. but are necessary to meet the design and safety criteria.

The reasonable alternatives that were considered for this project included those that satisfied the need for and purpose of the proposed project while minimizing potential effects to the environment. These alternatives were further evaluated based on determining an alignment that used the existing roadway as a portion of any future facility to maximize the existing resources and minimize adverse environmental effects, construction costs, utility adjustments, community disruptions, and ROW acquisitions. The range of alternatives considered by TxDOT is documented in the MIS. The alternatives considered for this project are the build and no build alternatives. The following factors were considered when considering these two alternatives:

- Need – Necessity to accommodate for growth and traffic increase
- Purpose – Reduce congestion and improve safety for increased vehicular traffic in the area, particularly during emergency situations and evacuations
- Logistical – Amount of fill material, cost, agency coordination, and regulatory impacts
- Environmental – Impacts to existing aquatic and terrestrial habitats/resources

No off-site alternatives were considered in the original Environmental Assessment for the proposed project, dated April 2013. SH 146 is the only existing north-south roadway serving the study area and therefore the primary evacuation route during pre-storm conditions and emergency evacuations. Other roadways in the area such as SH 3 and IH 45 only provide limited relief to this primary route, which is designated as a hurricane evacuation route for the surrounding communities. An off-site alternative would not meet the purpose and need of the project of improving this primary evacuation route.

### **Alternative 1 – No Build Alternative**

Under Alternative 1, the existing conditions would continue and the roadway would experience daily increased congestion and gridlocked evacuation scenarios.

No new ROW would be needed for this alternative; therefore, no displacements would occur.

There would be no immediate cost to this alternative, but indirect costs could accumulate. These indirect costs would result in as-needed repairs of the existing roadway, drainage system, and existing traffic signal maintenance.

There would be no net increases of base flood elevation or to the Digital Flood Insurance Rate Map (DFIRM) regulatory floodplain, changes to the Mean High Tideline (MHT), or any excavation and fill below the Taylor Bayou MHT under this alternative. Flow rates downstream of the corridor would not be affected.

A total of 14.96 acres of jurisdictional waters including twenty freshwater wetlands (9.18 acres), five estuarine wetlands (2.80 acres), and one tidal perennial stream (2.98) were identified during the field reconnaissance for this project. There would be no impacts to wetlands under this alternative. Additionally, this alternative would not involve any impacts to cultural resources.

No environmental impacts such as land use change would occur as a result of this alternative. Environmental impacts downstream of the corridor would remain the same as they currently are.

No permits or approvals from the Texas Commission on Environmental Quality (TCEQ), USACE, Coastal Management Program (CMP), United States Fish and Wildlife Service (USFWS), or Texas Parks and Wildlife Department (TPWD) would be necessary for this alternative. There would be no adverse effects or changes to wildlife habitat under this alternative.

Alternative 1 does not satisfy the purpose and need of the project to reduce congestion and improve the safety of those utilizing SH 146 from Fairmont Parkway to Red Bluff Road. Considering population in the area is increasing at a rapid rate, the existing dangerous conditions to human health and safety from increased congestion and travel times are expected to grow. Therefore, Alternative 1 would not assist in improving human health and safety and is not a viable alternative.

### **Alternative 2 - The Build Alternative**

Under Alternative 2, the expanded SH 146 would allow for smoother traffic flows and safer evacuation procedures. Safety for vehicular and pedestrian traffic utilizing the roadway would be improved from the decreased congestion.

Drainage improvements would occur along the roadway to accommodate for the increased impermeable cover including the construction of detention ponds along the corridor to store stormwater. Channel conveyance in Taylor Bayou is not anticipated to change as a result of this alternative.

No new ROW would be needed for this alternative; therefore, no displacements would occur.

The estimated construction cost for the build alternative is \$101,581,000. There will be an initial cost associated with the construction, and potentially minor maintenance fees associated with upkeeping roadways.

No net increases of base flood elevation or to the DFIRM regulatory floodplain or changes to the MHT of Taylor Bayou are anticipated under this alternative. Flow rates downstream of the SH 146 Bridge over Taylor Bayou are not anticipated to be affected.

A total of 14.96 acres of jurisdictional waters including twenty freshwater wetlands (9.18 acres), five estuarine wetlands (2.80 acres), and one tidal perennial stream (2.98) were identified during the field reconnaissance for this project. Of those, 3.3413 acres of unavoidable permanent impacts to estuarine and freshwater jurisdictional areas are anticipated as a result of the proposed project. NWP 14 (SWG-2006-00484) authorized 0.7423 acres of permanent impacts to freshwater (0.737 acre) and estuarine jurisdictional areas (0.0053 acre) on April 13, 2022. Previously permitted and mitigated impacts would be deducted from the 3.3413 acres of permanent impacts; therefore, 2.599 acres of permanent impacts would be included in this permit. No temporary impacts to jurisdictional waters are proposed.

Four estuarine wetlands would be avoided entirely while minor impacts are anticipated within Taylor Bayou (perennial stream) and the other estuarine wetland, 0.005 acre and 0.0003 acre, respectively. The 0.0053 acre of impacts to estuarine habitat was authorized under NWP 14 (SWG-2006-00484) which was authorized on April 13, 2022, and excluded from this permit.

Seven of the 20 freshwater wetlands would be avoided entirely. The remaining 13 freshwater wetlands would incur a total of 3.336 acres of permanent impacts under this alternative; however, 0.737 acres were authorized and mitigated for under NWP 14 (SWG-2006-00484) on April 13, 2022. A total of 2.599 acre of additional impacts to jurisdictional waters would occur in Crossing 3, Crossing 6, Crossing 7, Crossing 8, Crossing 9, and Crossing 12; therefore, these impacts will be permitted under this permit. In portions of the project area, these wetlands line both sides of the roadway; therefore, any degree of roadway expansion would impact them. These impacts were minimized to the extent possible through alignment shifts, grading, and the use of elevated overpasses or ramps where possible. Sidewalks were included for the length of the project to connect future state, city, or county projects. Constructing the sidewalks at this time would minimize overall construction costs, community disruptions, and repeated impacts to wetlands. This alternative would not involve any impacts to cultural or historic resources.

The proposed project would be constructed within existing ROW which is mostly maintained roadway vegetation and jurisdictional wetlands which the majority are associated with drainage ditches along the project area. No major land use changes are anticipated as a result of the proposed project. Environmental impacts downstream of the project area are anticipated to remain the same as they currently are.

Approvals from the TCEQ, USACE, CMP, and TPWD would be required for this alternative. At this time, TxDOT has received approval from TPWD and USACE for SWG-2006-00484 for the proposed project. Coordination with the CMP and a Tier II Checklist for coordination with TCEQ would be required. No coordination with the USFWS would be necessary as no critical habitat is located within the project area and no federally listed threatened or endangered species would be impacted by this alternative. Approval from TPWD was received on October 20, 2020, and the NWP 14 (SWG-2006-00484) was issued on April 13, 2022. All coordination efforts to date are included in **Attachment E**.

Alternative 2 does satisfy the purpose and need of the project to reduce congestion and improve the safety of those utilizing SH 146 from Fairmont Parkway to Red Bluff Road. Therefore, Alternative 2 is the recommended alternative for the proposed project.

## **SUMMARY**

The existing facility of SH 146 from Fairmont Parkway to Red Bluff Road is not able to accommodate the expected increase in traffic and congestion of the area adequately and safely. Pursuant to the requirements of Section 404(b)(1) of the Clean Water Act, design standards in the Texas Administrative Code Title 43, Part 1, §15.120-122, and after the evaluation of the MIS, only two alternatives were able to be considered to determine which potential solution would be the Least Environmentally Damaging Practicable Alternative. Alternative 1 would not meet the need or purpose of the proposed project and would leave the roadway as is with inadequate capacity and drainage. For this reason, Alternative 1 is not a viable alternative. Alternative 2 would meet the need and purpose of the proposed project and greatly improve the safety and travel times for vehicles using the roadway. Therefore, it is recommended that the project proceed under Alternative 2 as described above and in the Application for Department of the Army Permit Form 4345.