



I-37/US 77 Nueces River TIGER Discretionary Grant Application

*Improving safety and adding capacity at
I-37/US 77 in Corpus Christi, Texas*

October 2017

TABLE OF CONTENTS

Table of Contents	ii
I. Project Description.....	3
A. Detailed Project Description	3
B. Transportation Challenges and Solutions	7
II. Project Location	8
III. Grant Funds and Sources/ Uses of Project Funds	10
IV. Merit Criteria	11
A. Primary Selection Criteria.....	11
Safety.....	11
State of Good Repair	14
Economic Competitiveness	14
Environmental Sustainability	15
Quality of Life.....	16
B. Secondary Selection Criteria.....	16
Innovation.....	16
Partnership.....	18
V. Project Readiness	18
A. Technical Feasibility	18
B. Project Schedule.....	20
Completion of Pre-Construction Activities.....	20
Quick Mobilization of Project after Receiving Funds	21
Right-of-way Acquisition.....	21
C. Required Approvals	21
Environmental Permits and Reviews	21
Public Engagement.....	22
Legislative Approvals	23
State and Local Planning.....	23
State and Federal Support	23
D. Assessment of Project Risks and Mitigation Strategies.....	23
VI. Results of Benefit-Cost Analysis	24
A. Project Costs	25
B. Monetized Benefits	26
C. Benefit Cost Analysis	26
VII. Cost Share	26
VIII. Federal Wage Certification	27

Appendices

Appendix A – I-37/US 77 Nueces River Benefit-Cost Analysis

Appendix B – Letters of Support

Appendix C – Federal Wage Certification

I. PROJECT DESCRIPTION

In August 2017, Hurricane Harvey impacted the Texas Gulf coast as a Category 4 storm with 130 mph sustained winds and storm surges up to 13 feet. Prior to this storm, voluntary evacuations were announced for the City of Corpus Christi with mandatory evacuation ordered for low lying areas and high-profile vehicles within the City and Nueces County. The City of Port Aransas also called for a mandatory evacuation. Immediately after the storm, emergency response from outside the region mobilized to assist individuals and to help get the storm impacted communities on the road to recovery. The major hurricane evacuation and emergency response route for the City of Corpus Christi and the Coastal Bend is Interstate Highway 37 (I-37), which is the subject facility for this grant application.

The Texas Department of Transportation (TxDOT) is requesting \$23.5 million in funding from the Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant program for the reconstruction of the I-37 / U.S. Highway (US) 77 Nueces River project on I-37 from the I-69E interchange to the US 77 interchange (distance of over two miles) over the Nueces River in Nueces and San Patricio Counties, Texas. The total project cost is estimated at \$90 million, including project development and construction costs. The I-37/US 77 Nueces River project intends to add travel lanes between the two interchanges and replace/elevate the northbound Nueces River bridge. I-37 is part of the National Freight Network, the Strategic Highway Network, and the National Highway System, as well as a major hurricane evacuation route for the City of Corpus Christi and the Coastal Bend region.

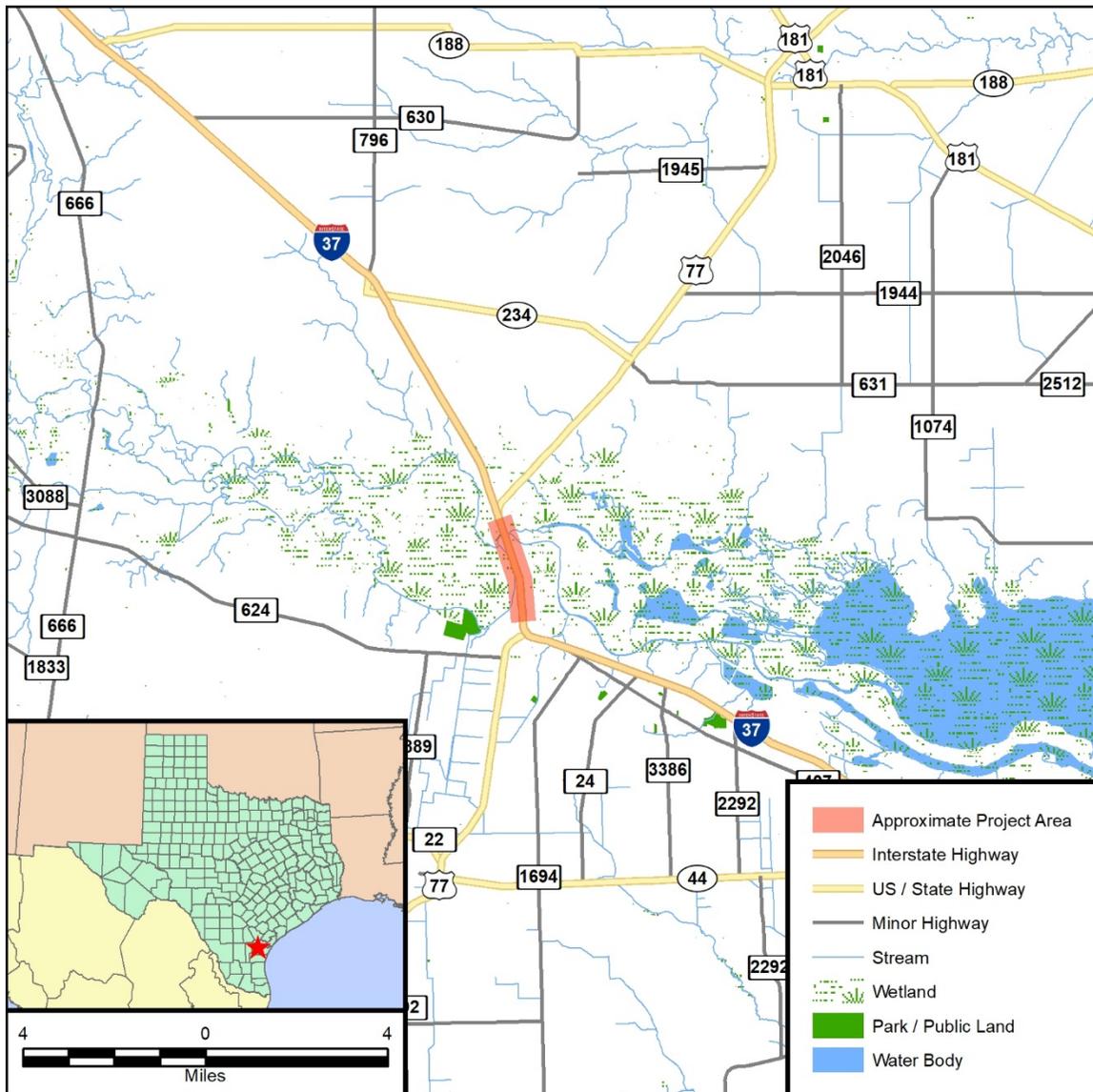
A. DETAILED PROJECT DESCRIPTION

The I-37/US 77 Nueces River project is located on I-37 between the I-37/I-69E and the I-37/US 77 interchanges in a rural-to-urban transition area in Corpus Christi, Texas. **Figure 1** provides a map of the proposed project location.

This section of I-37 carries traffic traveling between Corpus Christi and San Antonio as well as traffic traveling north and south along US 77/I-69E toward the Victoria, Houston, and Harlingen/Brownsville areas. The merging and diverging of two major freeways (I-37 and I-69E, and I-37 and US 77) causes a lane balance issue resulting in safety and mobility concerns. The statewide KAB average crash rate for interstate highways located in rural-to-urban transition areas¹ is

¹ The Statewide KAB (fatal, incapacitating, and non-incapacitating crashes) average reported has been obtained averaging the statewide averages at urban interstate highways and at rural interstate highways.

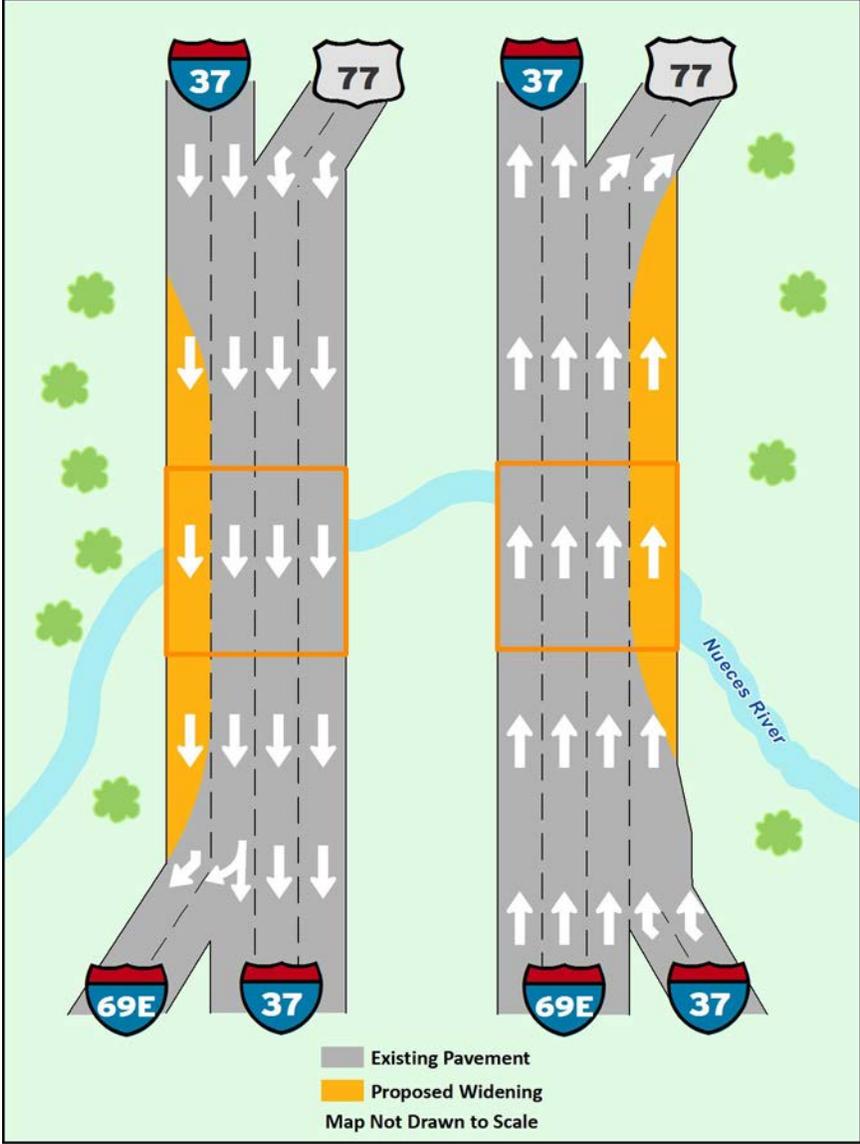
Figure 1. Project Location Map



lower than the KAB average crash rate data reported for the project area. **Figure 2** shows the existing and proposed lane configuration for northbound and southbound traffic. To address this concern, the project would add northbound and southbound travel lanes within existing right-of-way to create lane balance between the two interchanges and allow more efficient and safer movement for merging and diverging traffic. The exact number of lanes to be added will be defined depending on the engineering and environmental studies.

The existing conditions within the project limits are comprised of a northbound and southbound dual designated highway (I-37 and US 77) of 2.4 miles, of which approximately 0.5 mile is on bridge. Each direction of the bridge consists of a three-span continuous bridge over the Nueces River and a multi-span simply-supported bridge at the southbound and northbound approaches.

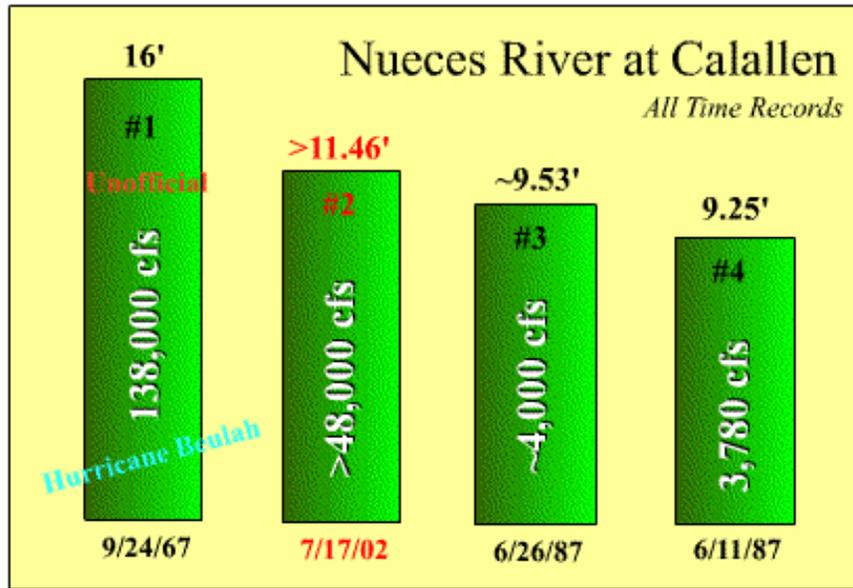
Figure 2. Proposed Lane Configuration within the Project Limits



Originally built in 1958, the northbound bridge was widened in 1986 to add a lane. Similarly, the southbound bridge, built in 1933, has also been widened by adding a lane.

The existing northbound Nueces River bridge has a low chord at the river that varies from 14 to 15 feet. This elevation results in a potential for inundation during extreme flood and/or storm surge events. Over the past 20 years flood waters have not overtopped the existing bridge but have come close. **Figure 3** shows historic crests of the Nueces River near the project site, while **Figure 4** is a photograph taken from the air of the Nueces River bridge during the 2002 flood event.

Figure 3. Historic Crests at Nueces River at Project Location



Source: www.weather.gov

An upland flood event, in conjunction with higher than normal tides and/or storm surge, could impact the existing bridges and hamper access to and from Corpus Christi and the surrounding area. In addition, the bridge superstructure and foundations could be damaged by large debris striking the underside of the structure. The project proposes to replace and elevate the northbound Nueces River bridge to reduce the potential for floodwaters overtopping and/or damaging the roadway and bridge in emergency situations.

TxDOT intends to replace and raise, at a minimum, the northbound Nueces River bridge structure to provide an evacuation route from and subsequent emergency response path to Corpus Christi and areas further south on the coast. The new bridge will be designed with bridge beams above the FEMA 100-year flood elevation as well as major storm surge levels combined with a possible high tide. Hazardous materials containment measures will also be incorporated into the design of the bridge to protect the Nueces River from potential spills.

Figure 4. Nueces River at Project Location During the 2022 Flood Event



Source: National Oceanic and Atmospheric Administration (NOAA)

B. TRANSPORTATION CHALLENGES AND SOLUTIONS

I-37 from Corpus Christi to San Antonio is one of the major evacuation routes for Corpus Christi and the surrounding area. A wider inside shoulder is striped and signed for use as an “evaculane” to be used for emergency evacuations and has been activated several times prior to major storms from the Gulf of Mexico. The potential exists for contraflowing the southbound lanes in the northbound direction in the event of a major evacuation. In 2008 at a Statewide Hurricane Planning Conference, TxDOT presented data² regarding the number of expected vehicles to be evacuated in a hurricane event and their expected destinations. From a total Coastal Bend population of 453,759, approximately 200,000 vehicles would be expected to evacuate. Of these, 57% of the total vehicles anticipated to evacuate would travel north on I-37 to the San Antonio, Central Texas and Austin areas. The data also identified the Nueces River as one of the potential Coastal Bend evacuation bottlenecks. According to the US Census Bureau, the Coastal Bend population has increased to almost 575,000 since 2008, which would only

² 2008 Texas Hurricane Conference, Ismael C. Soto, Director of Transportation Operations, TxDOT – Corpus Christi District

increase the number of vehicles anticipated to evacuate via I-37. According to the TxDOT Traffic Count Database System, the current annual average daily traffic (AADT) (2016) at the project location is 49,746³ (see **Table 1**). While this value alone does not represent an unacceptable level of service (LOS) at this location warranting additional capacity, the traffic weaving and lane balance issues observed at these two major freeways interchanges (I-37/I-69E and I-37/US 77) results in safety and mobility concerns that would be improved by the addition of more lanes.

Potential bottlenecks during evacuation events will be alleviated by the increase in the number of lanes between these interchanges. Additionally, the increase in elevation of the northbound

Table 1. Annual Average Daily Traffic for I-37 and Nearby Highways (Vehicles per Day)

Roadway	Limit From	Limit To	AADT 2016	2015 24-Hour Truck Percentage
I-37	I-69E	I-37 Access Road	49,746	16%
I-37	I-37 Access Road	US-77	48,477	(data not available)
I-37	TX-358	I-69E	72,573	14%
I-69E	Northwest Blvd	I-37	60,096	34%
I-37	US 77	TX-234	21,093	21%
US 77	I-37	TX-234	21,499	25%

Nueces River bridge would ensure the roadway would remain open and in good repair during evacuations or major flood events. Furthermore, elevating the northbound bridge would provide system redundancy in the event of damage to the southbound bridge.

II. PROJECT LOCATION

The I-37/US 77 Nueces River project is located on I-37 in Nueces and San Patricio Counties, Texas. The portion of the project in Nueces County (83% of the project limits), which is within the City of Corpus Christi, is categorized as an urban area. The portion of the project in San Patricio County (17% of the project limits) is considered a rural area.

Several existing and future transportation facilities are located in the vicinity of the I-37/US 77 Nueces River project. Major existing roadways include I-37, I-69E, US 77, Business US 77, FM

³TxDOT Transportation Planning Maps:
<https://www.txdot.gov/inside-txdot/division/transportation-planning/maps.html>

624, SH 234, and the Joe Fulton International Trade Corridor (JFITC). Also, Union Pacific Railroad (UP) runs a line parallel to the northbound I-37 lanes in the project area.

In addition to major roadways and railways, the Port of Corpus Christi (Port), is located 17 miles away from the project, along the coast, on the Gulf of Mexico approximately 150 miles north of the Mexican border. The Port Authority is a navigation district and political subdivision of the State of Texas and has boundaries coterminous with those of Nueces and San Patricio Counties. The Port is the primary driver of the local economy and it ranks as the fifth largest of the United States in terms of tonnage, with nearly 103 million tons of cargo moved in 2015. 2008 and 2015 economic reports show a steady increase in economic impact for the region. In 2008 the Port Authority created 40,560 jobs and 76,000 direct and indirect jobs were created by 2015.

According to the United States 2010 Census, Nueces and San Patricio Counties had a combined population of 405,027. The region consists of 1,532 square miles with a population density of 264 residents per square mile. The area within a one-mile radius of the project, which includes Census Tract 109 and 112 from San Patricio County and Census Tracts 37, 58.02, 58.01 and 37 from Nueces County, had a total population in 2010 of 8,558. Approximately 60 percent of the residents in Nueces and San Patricio Counties are Hispanic and 34 percent are Anglo. Projections provided by the Texas State Demographer show a projected total population in 2040 of 491,526, representing an increase of 21.4% from 2010. The per capita income in 2010 was \$22,188 for Nueces County and \$20,375 for San Patricio County.

The climate at the project location is subtropical, and the area is regularly affected by hurricanes and tropical storms. The Coastal Bend Area has been brushed or hit by hurricanes 38 times from 1874-2017, an average of once every four years, with a direct hit by a hurricane occurring every 15 years. Hurricane Celia, reported to be the costliest in the state's history prior to Harvey, hit Corpus Christi on August 3, 1970. Winds up to 161 miles an hour and gusts to 180 miles an hour were reported in the area. **Figure 5** details the hurricanes within the area for over more than a century.

Table 2. Funding and Component Splits

Project Component	Component Cost (\$M)	Component Percentage	TIGER (\$M)	TxDOT (\$M)	Funding Source							
					Category 2 (\$M)		Category 4 (\$M)		Category 4 (3C) (\$M)		Category 12 (\$M)	
					Fed	Non-Fed	Fed	Non-Fed	Fed	Non-Fed	Fed	Non-Fed
Engineering/Environmental	\$16	18%		\$16								
Construction Engineering/Inspection	\$5.5	6%		\$5.5								
Construction	\$68.5	76%	\$23.5		\$8	\$2	\$8	\$2	\$8	\$2	\$12	\$3
TOTAL	\$90	100%	\$23.5	\$21.5	\$8	\$2	\$8	\$2	\$8	\$2	\$12	\$3
Percentage of Project		100%	26%	24%	9%	2%	9%	2%	9%	2%	13%	3%

IV. MERIT CRITERIA

The following sections provide details on how the project meets each criterion.

A. PRIMARY SELECTION CRITERIA

Safety

The I-37/US 77 Nueces River project will improve safety in the region by minimizing the potential of irreparable damage to the northbound bridge for hurricane evacuation and the corresponding emergency response, by reducing the risk of traffic accidents at the merging/diverging sections between two major freeways, and by incorporating hazardous materials containment measures into design.

Hurricane Evacuation Route:

I-37 is a major hurricane evacuation route for the southern Texas Gulf coast toward the San Antonio area that consists of an additional emergency lane and the ability for the use of contraflow measures during evacuation events. Historically, hurricanes impact the project area approximately every four years and can require evacuations of large amounts of people in a matter of days. Just two months ago, Hurricane Harvey made landfall just north of the project area in August 2017. Evacuations were voluntary in the city of Corpus Christi for Hurricane Harvey but mandatory for some of the surrounding areas. **Figure 6** shows I-37 within the project area during the evacuation for Hurricane Harvey.

Figure 6. Evacuation During Hurricane Harvey, August 2017



Source: CNN.com

The evacuation lane for I-37 within the project limits utilizes the inside shoulder as the additional lane while the section north of the project (north of the I-37/US 77 interchange) uses the outside shoulder. TxDOT data shows that approximately 57% of all evacuees from the Corpus Christi area would use I-37 and the lanes within the project limits as their evacuation route. Also, the additional lane to be constructed as part of the project provides more capacity during evacuations.

Emergency Response:

After a major storm impacts the southern Texas coast there is an emergency response to assist those in need and to rehabilitate/rebuild infrastructure. However, there is the potential that roadway infrastructure could be impacted and not allow those responders to get to their destination.

The existing Nueces River northbound bridge has a low beam elevation above the river that varies from 14 to 15 feet. According to NOAA's Storm Surge Hazard Maps⁴, a Category 3 hurricane would result in a storm surge greater than 9 feet above ground level in the vicinity of the project location, not including other potential rises in river elevation change, such as high tides and flood runoff. There is the potential that during an upland flood event, in conjunction with higher than normal tides and/or storm surge, impacts could occur to the existing bridge beams or large debris could damage the structure and hamper access to and from the Corpus Christi area. If irreparable damage to the structure occurred, direct access to and from the

⁴ <http://noaa.maps.arcgis.com/apps/MapSeries/index.html?appid=d9ed7904dbec441a9c4dd7b277935fad>

Corpus Christi area could be impacted for months and emergency response directly after the storm may be threatened.

Reconstructing the northbound Nueces River bridge with a higher elevation will reduce the potential risk of overtopping and/or damage to the superstructure and foundations during a major event, therefore increasing the probability of having the bridge operable during the emergency response process and allowing for on-time first response help for the residents of the Corpus Christi area.

Reduction in Traffic Accidents:

The current lane configuration within the project area creates challenges for drivers due to weaving and lane balance issues responsible for bottlenecks at the merging and diverging areas of I-37 with I-69E and I-37 with US 77 as well as above-average crash rates at these locations as compared with the statewide average accident rates.

Lane balance challenges exist with the connections to I-37 from the interchanges. The northbound I-37/I-69E interchange entrance ramp is two lanes and is required to merge into the existing I-37 mainlines before approaching the existing Nueces River bridge structure. An additional lane must also be crossed if a vehicle from the entrance ramp is continuing northbound on I-37. This situation could be alleviated with an additional lane on the bridge to allow for extra time for weaving movements.

The project area has a higher crash rate than the state average, further compounding the need to deliver improvements. The 2014-2016 Statewide KAB average crash rate for interstate highways is 11.3 crashes/100M vehicle miles traveled for rural sections and 17.7 crashes/100M vehicle miles traveled for urban sections; since the project limits operate in a rural-to-urban transition area, the average is taken for the urban and rural sections (14.5 crashes/100M vehicle miles traveled). There have been 321 crashes from 2012 to 2016 within the proposed project limits with a 2014-2016 KAB⁵ average crash rate for this segment of 14.7 crashes/100M vehicle miles traveled, yielding a higher average crash rate than the state average (14.7 crashes/100M vehicle miles traveled vs. 14.5 crashes/100M vehicle miles traveled).

By improving the lane configuration design between the interchanges, the number of conflicts and total traffic crashes will be reduced.

Hazardous Materials Containment Measures:

I-37 is on the National Freight Network and connects the Port of Corpus Christi to inland ports such as the Port of San Antonio.

⁵ Includes only Fatal, Incapacitating, and Non-Incapacitating Crash Rates

Sixteen percent of the daily traffic within the project limits in 2015 consisted of trucks. Most of these trucks carry cargo labeled as hazardous that, in case of spills or accidents, has the potential to cause health, safety, and environmental risks if the contents of that cargo end up in the Nueces River. The project will incorporate hazardous materials containment measures during the design of the new northbound bridge over the Nueces River, minimizing those potential risks and protecting the quality of life for area residents.

State of Good Repair

The original northbound Nueces River bridge was built in 1958 and was widened in 1986; thus, the original bridge is nearly 60 years old. The bridge is inspected for routine maintenance every 24 months with the most-recent inspection completed in April 2016. The bridge has a total of 84 spans with the maximum span length of 130 feet located over the Nueces River.

A concern for the area is the resiliency of the I-37 evacuation route and subsequent emergency response access if the existing bridges at the Nueces River are damaged or destroyed due to an upland flood event in conjunction with higher than normal tides and/or storm surge from a major hurricane. The concern revolves around the potential for the bridge superstructure and foundations to be damaged by debris from the hurricane and high water; repairs or reconstruction to this type of damage could take months or years. The existing bridge has not been overtopped over the past 20 years, but storm events have come close on some occasions. Raising at least one of the structures provides increased system resiliency in case one or more of these major events should occur.

The design of the new northbound bridge over the Nueces River will incorporate materials and design components aimed at reducing future maintenance.

Economic Competitiveness

TxDOT, in cooperation with local and regional officials, is responsible for planning, designing, building, operating and maintaining the state's transportation system. This includes acquiring right of way (ROW) for state highways and other modes of transportation; researching issues to save lives and solve transportation problems; constructing roads and bridges; and improving and maintaining roadways, bridges, airports, and other transportation infrastructure. The Corpus Christi region's economy is heavily dependent on its port as well as Texas' extensive highway and rail network; therefore, it is vital that TxDOT target improvements that hold the greatest potential for long-term, system-wide impacts.

The I-37/US 77 Nueces River project has been identified to provide a safer, more efficient and reliable route for vehicles and trucks traveling in the Corpus Christi region. I-37 provides access to and from the Port of Corpus Christi for various commodities traveling via truck such as oil,

agriculture, and industrial components to Nueces and San Patricio Counties as well as to inland ports such as the Port of San Antonio.

The project limits connect with the I-69E interchange. I-69, nicknamed the “NAFTA Superhighway”, will provide a continuous nationwide route between the national borders once completed. The elimination of bottlenecks at the merging/diverging areas where I-37 intersects with I-69E and US 77 will improve operations and system reliability for current and future traffic volumes, positively impacting freight movement and connectivity to rural communities. Motorists will see reduced travel costs as a result of this project as well. Without the I-37/US 77 Nueces River project, the current bottlenecks observed over the Nueces River bridge will worsen as the passenger and truck traffic volumes in the region continue to grow as projected.

Environmental Sustainability

The project area is a rich riverine environment with several surrounding wetlands and crosses the Nueces River near the Rincon Bayou and Nueces Bay. The area is home to a large variety of state- and federally-protected species, including several species of sea turtles and coastal birds like the Reddish Egret. Labonte Park, heavily used for recreational and seasonal activities, is also adjacent to I-37.

TxDOT is committed to implementing efforts to foster environmental sustainability. During the project development process, the project team will analyze potential drainage impacts due to the additional impervious cover. Compensatory storage will be provided, if necessary, to mitigate drainage and stormwater impacts. In addition, designing to maximize mobility through the project area is anticipated to reduce air emissions and help ensure that the area remains in attainment of all National Ambient Air Quality Standards (NAAQS).

The process for National Environmental Policy Act (NEPA) compliance was recently initiated for the project. An Environmental Assessment (EA) is planned and a Finding of No Significant Impact is anticipated in approximately two years (late 2019). The project team recognizes the sensitive location of the project, particularly given the number of surrounding wetlands, and is committed to minimizing impacts by using existing right of way and minimizing and mitigating impacts where necessary. Throughout the NEPA process, environmental and engineering specialists will work concurrently to design a project that not only solves safety and mobility issues but also considers the sustainability of the surrounding natural and human environment.

A hazardous materials collection system is also to be installed on the Nueces River bridge as part of the project to minimize the potential of a spill impacting the river.

Figure 7. Local Wetlands within the Corpus Christi Area



Source: AP Photo/Corpus Christi Caller-Times, Rachel Denny Clow

Quality of Life

The project is located between two major roadways, I-69E and US 77, which carry people and goods to nearby rural areas and cities such as San Antonio and Houston. The improvements proposed for this project help reduce crashes and improve connectivity and mobility to surrounding employment centers including nearby refineries, travel destinations such as Corpus Christi, and regional and state destinations.

B. SECONDARY SELECTION CRITERIA

Innovation

Development of the project's design will incorporate the use of satellite imagery, light detection and ranging (LIDAR) data for survey applications, keyhole markup language, and geobrowsers such as Google Earth and Bing.

As part of the overall design of the Nueces River bridge, the project will incorporate hazardous materials containment measures to minimize the potential of dangerous spills impacting the river by capturing runoff in inlet-like structures along the bridge. TxDOT has recently applied similar measures on other projects within the state and region, including a recently-built direct connector bridge to the Joe Fulton International Trade Corridor as shown in **Figure 8**.

**Figure 8. Example of Hazardous Materials Containment Measures
(Joe Fulton Corridor)**



Source: Google Maps

The project will also incorporate intelligent transportation system (ITS) measures and dynamic message signing. The ITS and signage improvements will be designed for motorists traveling at high speeds with the intent to provide real-time information for traffic control, emergency evacuation and information, and incident management and are implemented statewide on most major freeway corridors. **Figure 9** details real-time data during a hurricane evacuation.

These innovative items to be incorporated within the project do not impact the project's schedule nor require extra permitting.

Figure 9. Real-Time Hurricane Evacuation Signage



Source: <http://www.express.co.uk/news/world/845896/Hurricane-Harvey-damage-pictures-Texas-USA-latest-photographs>

Partnership

The project has solid support from local and state partners, including the City of Corpus Christi, Nueces County, the Port of Corpus Christi Authority, and the Corpus Christi Metropolitan Planning Organization. There is a recognized need to improve safety along the corridor to reduce crashes and ensure that a critical hurricane evacuation route and subsequent emergency response efficiently operates, particularly given recent natural disasters in the region. Letters of support included in **Appendix C** show the staunch support of wide-ranging partners, including U.S. and State Senators and Representatives.

V. PROJECT READINESS

A. TECHNICAL FEASIBILITY

The I-37/US 77 Nueces River project is in the early stages of development; no studies have been developed to date. TxDOT is initiating the NEPA process for the proposed project, and a preliminary Scope of Work, schedule and budget are in the process of being further developed for the ultimate project design. All the studies and documentation will follow state and federal standards, design criteria, and requirements.

The project includes the widening of I-37 within the project limits (between the I-37/I-69E and I-37/US 77 interchanges) in order to add travel lanes to create lane balance between the two interchanges and allow more efficient and safer vehicular movements. This also includes the widening of the southbound Nueces River bridge and the replacement/widening and elevating of the northbound bridge. Additional scope items in the project include:

- Project development activities, such as 30%, 90%, and final design of plans, specifications, and estimates (PS&E) for the project limits;
- Project construction activities, including widening of roadway, ITS improvements such as dynamic message signing, measures to capture and report safety issues and hazmat containment measures, bridge elements, signage/pavement markings, and other ancillary construction items; and
- Relocation and adjustment of existing underground and overhead utilities in areas of conflict within the project through coordination with existing utility owners.

Estimate assumptions

The estimate for the widening to add travel lanes in each direction between the two interchanges is based on adding at least one additional travel lane for the entire 2.3 miles of project length. Approximately 2800 feet of the widening is on bridge over the Nueces River with another 500 foot of bridge widening over Ripple Road. In addition, the widening will require the reconstruction of several existing retaining walls as well as building new retaining walls in order to remain within the existing highway right of way. Since I-37 is the main artery connecting Corpus Christi to inland ports such as Port of San Antonio and Alliance, the project estimate includes additional cost for traffic control and accelerated construction methods to expedite construction and ensure that the route remains usable especially in the event of evacuation. Construction cost for this portion of the work is estimated at \$45 million.

Recent events associated with Hurricane Harvey have emphasized the need to have an evacuation route that is able to withstand inland flooding and/or storm surge occurrences without incurring inundation or substantial damage. Therefore, the proposed project will need to replace the entire northbound Nueces River bridge to elevate above the FEMA 100-yr floodplain. The construction cost estimate of \$23.5 million for this portion of work is based on not only replacing the entire northbound bridge, but raising the approach roadways to address the width of the floodplain and potential storm surge footprint. Additional work to accomplish this includes reconstructing and raising approximately 1 mile of existing I-37 mainlanes and constructing additional retaining walls.

The total construction cost estimate for both the widening and the elevating of the northbound mainlanes is \$68.5 million. Since this project is located in an environmentally sensitive area and has a higher than normal complexity of design, the estimated cost for the advanced project development activities is approximately six percent of the estimated construction cost, the

estimated cost for developing the detailed plans, specifications, and estimate is approximately 15 percent of the estimated construction cost, and the utility coordination, construction phase support, etc. is estimated at approximately 2.5 percent of the construction cost estimate. This results in an estimated cost of \$16 million for the engineering and environmental project costs.

TxDOT, due to the project complexity and potential accelerated construction methodology/schedule, anticipates utilizing construction engineering and inspection (CE&I) professional services to assist with this work. The estimated cost for the CE&I of \$5.5 million is based on being approximately eight percent of the estimated construction cost for the project.

Cost contingencies

The I-37 Nueces River project is in the early project development phase. The construction cost estimates include a 20 percent contingency to account the level of detail that is unavailable at this time.

B. PROJECT SCHEDULE

Completion of Pre-Construction Activities

The schedule for schematic design, environmental documentation, final design, utility coordination and adjustments, and project construction is detailed in **Table 3**. Critical-path project components allow for funds to be obligated for project construction before the September 2020 obligation date.

Table 3. Project Schedule

Task/Duration	2017	2018	2019	2020	2021	2022	2023
Schematic Design		■	■	■			
Environmental Document/Clearance		■	■	■			
Plans, Specifications, and Estimates (PS&E)			■	■	■		
Utilities (Coordination/Adjustment)		■	■	■			
Procurement				■	■		
Contract Award				■			
Contractor Notice to Proceed				■			
Construction				■	■	■	■
Construction Complete							■

Quick Mobilization of Project after Receiving Funds

TxDOT is ready to start this project within the next month and is currently in negotiations with a project-specific professional services contract with a consultant. The same consultant team will perform the schematic development, environmental documentation, public involvement, PS&E, and construction phase support. This will ensure that there is minimization of delays by eliminating the possibility of a new consultant beginning work where the previous consultant ended work.

Right-of-way Acquisition

No right-of-way acquisition is required, and there are no anticipated schedule impacts associated with right of way as the project will be designed and constructed within the existing I-37/US 77 right of way.

C. REQUIRED APPROVALS

Environmental Permits and Reviews

i. National Environmental Policy Act Status

It is currently anticipated that an Environmental Assessment (EA) is needed for the project to comply with the National Environmental Policy Act (NEPA). Once a consultant is under contract, the possibility of a Categorical Exclusion will be evaluated to see if it would suffice since additional right of way is not needed for the improvements. The environmental documentation will ensure that the project is thoroughly analyzed for potential impacts to the environment and to capture the highest degree of environmental documentation that could be possible for the project. The environmental documentation is anticipated to take two years, and a Finding of No Significant Impact is anticipated in late 2019.

ii. Reviews by Other Agencies

The section below describes coordination that may be required for each agency.

- **U.S. Army Corps of Engineers (USACE)**
The project is adjacent to several wetlands and the Nueces River, which may require coordination with the USACE and, if navigable, the U.S. Coast Guard. The design has not progressed to determine potential wetland or riverine impacts, but USACE coordination will be required for any impacts to wetlands or any impacts greater than 0.1 acre to other waterbodies.

- Texas Commission on Environmental Quality (TCEQ)
The project crosses the Nueces River, which is an impaired stream segment. Since the river is impaired, pre-construction coordination with the TCEQ will be required along with a Texas Pollutant Discharge Elimination System Construction General Permit.
- Local Floodplain Administrator
The project crosses the base (100-year) floodplain, but is not anticipated to increase the base flood elevation. Coordination will still be required with the local floodplain administrator prior to the start of construction.

iii. Environmental Studies or Documents

The EA is anticipated to review the following resources for potential project impacts.

- Prime Farmland
- Floodplains
- Groundwater
- Water Quality
- Essential Fish Habitats
- Air Quality
- Traffic Noise
- Hazardous Materials
- Cultural Resources
- Cemeteries
- Parks and Recreational Areas
- Vegetation
- Wildlife and Habitats, including Threatened and Endangered Species
- Socioeconomic, Community, and Environmental Justice
- Indirect and Cumulative Impacts

iv. Discussions with Appropriate DOT Office

The Federal Highway Administration (FHWA) assigned its responsibilities for NEPA and other federal environmental law compliance to TxDOT through a Memorandum of Understanding signed on December 14, 2016. This delegation authorized TxDOT to review and approve environmental documents without seeking approval from FHWA. As such, outside of the agency reviews discussed earlier, no discussions with US DOT offices or headquarters are anticipated.

Public Engagement

Public engagement will be ongoing throughout the life of the project. A project webpage, social media, public meetings, stakeholder outreach, and meetings with affected property owners will be utilized to provide wide-ranging opportunities for public engagement with the project. During public outreach opportunities, TxDOT will solicit public comments and will attempt to the

maximum extent practicable, to incorporate recommendations and design changes into the project.

Legislative Approvals

As discussed earlier, pre-construction coordination may be required with TCEQ, the local floodplain administrator, and USACE. The project is widely supported by local and state officials as evidenced in the letters of support.

State and Local Planning

The I-37/US 77 Nueces River project identified in this grant is consistent with the Corpus Christi Metropolitan Planning Organization's (MPO) 2015-2040 Metropolitan Transportation Plan. The project is also identified in TxDOT's 2018 Unified Transportation Program (UTP), which serves as a 10-year planning guide and identifies projects and programs that are planned to be constructed and/or developed within the first ten years of the 24-year Statewide Long-Range Transportation Plan; It will also be included as part of the MPO Transportation Improvement Program (TIP) and in the Statewide TIP (STIP).

State and Federal Support

Letters of support for the project have been received from the following state and federal elected officials and are attached in **Appendix C**:

- US Sen. John Cornyn
- US Rep. Blake Farenthold
- State Sen. Chuy Hinojosa
- State Sen. Judith Zaffirini
- State Rep. Abel Herrero
- State Rep. J.M. Lozano

D. ASSESSMENT OF PROJECT RISKS AND MITIGATION STRATEGIES

The I-37/U.S. 77 Nueces River project has several risks that are typical of any project of this type and magnitude at this design stage. TxDOT has been very successful in mitigating project risks, and one of the key factors contributing to this success is the implementation of a risk management process that identifies potential risks to the project at a very early planning stage and identifies mitigation strategies to manage each risk element. The process tracks each risk element as the project moves along its development phases. Some typical risks of this project type, such as acquisition of right of way, are not applicable since this project involves reconstruction/widening of an existing roadway within existing right of way. Potential risks and mitigation strategies for this project are outlined below.

Design: There is the potential that the design effort could extend beyond anticipated timeframes. To mitigate for this possibility, TxDOT intends to place strict timelines for completion of design milestone deliverables for the design team to minimize this potential risk.

- NEPA: The project has not received NEPA clearance. Once contracted, a consultant will review to see if the project could use a Categorical Exclusion (CE), which would likely require less time to receive approval than an Environmental Assessment (EA).
- Water Resources: The required USACE and TCEQ permits have not yet been obtained. However, these permits typically do not pose major complications in processing. This is considered a low-level risk element as the project design will work to avoid and minimize impacts.
- Utilities Relocation/Adjustment: Any potential utility adjustments are anticipated to be minor and relocations are not expected as the project design will work to avoid and minimize utility conflicts.

VI. RESULTS OF BENEFIT-COST ANALYSIS

A Benefit-Cost Analysis (BCA) was conducted in conformance with US DOT guidance to assess the impacts of the I-37 / US 77 Nueces River project. The grant request is for construction costs. The BCA conducted for the project indicates a *favorable* benefit/cost (B/C) ratio, with the monetized benefits of the project exceeding the estimated project-related costs. In the summary discussion to follow, individual analysis inputs and results are presented for the BCA.

The 2017 Cal-B/C TIGER and INFRA Grant Application (v 6.0) version of a model developed by the California Department of Transportation (Caltrans) was used for the BCA. This version incorporates project costs by category and benefits related to travel time, vehicle operation, accidents, and emissions. The model incorporated the parameter updates, including unit values for emissions, accidents, and other factors made by Caltrans to reflect USDOT guidance for 2017 TIGER and INFRA grants. Other parameters were revised to reflect Texas-specific values.

A summary of the BCA results is provided in this section and more detail regarding the inputs, sources, analysis, and results is provided in **Appendix A**. All monetary values presented in this appendix are presented in 2016 dollars, the default value of the Cal-B/C model. A seven percent (7%) discount rate was used to compute the net present value of benefits and costs.

Table 4 provides a project matrix highlighting how the project generates the benefits quantified in the BCA. Note that there are potential benefits resulting from the project which have not been included in the BCA summarized below. The additional benefits include (but are not limited to): improved travel time reliability, improved conditions during hurricane evacuations, emergency responsiveness, and hazardous material containment during accidents. Because the Cal-B/C model indicates a favorable B/C ratio with only the four benefit categories directly supported by the model, these additional benefit categories were not analyzed at this time.

Table 4. Project Matrix

Nueces River Bridge	
Current Status / Baseline & Problem to be Addressed	The I-37/US 77 Nueces River project is located on I-37 between the I-37/I-69E and the I-37/US 77 interchanges near Corpus Christi, Texas. Merging and diverging of two major freeways (I-37 and I-69E, and I-37 and US 77) causes a lane balance issue resulting in safety and mobility concerns and the Nueces River bridges have a low chord at the river that varies from 14 to 15 feet. This elevation results in a potential for inundation during extreme flood and/or storm surge events.
Change to Baseline / Alternatives	Project would add northbound and southbound travel lanes (without additional right-of-way), replacing and elevating the northbound bridge.
Type of Impacts	Project increases highway capacity, addresses lane balance and weaving issues, and improves conditions during hurricane evacuations, emergency responsiveness, hazardous material containment during spills, and reduces potential for traffic crashes.
Affected Population	The Nueces and San Patricio counties had a population of 405,027 in 2010 decennial census. The region consists of 1,532 square miles with a population density of 264 residents per square mile. The AADT in the project area is forecast to increase from 48,477 in 2016 to 64,770 in 2040.
Economic Benefit	The Cal-B/C model indicates that the project will result in travel time, vehicle operation, accident reduction, and emission reduction benefits.
Summary of Results	B/C = 1.5, NPV = \$31.7 million

A. PROJECT COSTS

The initial design and construction costs for the project are approximately **\$90 million**, including \$16 million for project support, as described in more detail in **Section III**. The design period is assumed to be two years beginning in 2017, followed by a construction period assumed to be three years, and ending by mid-2023. Annual design and construction expenditures were assumed to be allocated equally throughout the design and construction periods. Because the

proposed facilities are a replacement for existing facilities, no incremental costs were assumed for operations and maintenance. The total project cost is **\$69.2 million** in present value terms.

B. MONETIZED BENEFITS

Table 5 provides a summary of the monetized benefits for travel time savings, vehicle operating costs savings, accident savings, and emissions reduction over the 20-year life cycle of the project that are reflected in the B/C ratio. Annual costs and benefits are presented in constant 2016 dollars.

The Cal-B/C model calculates negligible travel time savings, vehicle operating cost savings, and emissions benefits. The majority of benefits are in the form of accident cost savings due to improved weaving conditions on I-37 and reduced exposure to extreme weather events that require evacuation via I-37. The total monetized project benefits are **\$100.8 million** in present value terms.

C. BENEFIT COST ANALYSIS

The Cal B/C model calculates the benefit/cost ratio based on inputs including the type of project, existing and future highway design and traffic data, and estimated project costs. **Table 5** provides a summary of the Cal B/C results for the project.

Table 5. Benefit-Cost Analysis Summary

Summary Item	I-37 / US 77 Nueces River Bridge
Life-Cycle Benefits (mil. \$)	\$100.8
Life-Cycle Costs (mil. \$)	\$69.2
Benefit / Cost Ratio	1.5
Net Present Value (mil. \$)	\$31.7

Note: 2016\$, 20-year life cycle

VII. COST SHARE

TxDOT has committed to using State funding for the engineering, environmental, and construction engineering and inspection services. In addition, the State will be providing the match for the \$45 million of Category 2 Metropolitan Mobility funds, Category 4 Rural Connectivity funds, Category 4(3C) Congestion and Connectivity funds, and Category 12 Strategic Priority funds. Currently the State is providing a minimum 20 percent match but if needed to maximize the non-Federal share of the project funding, could increase their cost share of the \$45 million to a 50-50 split.

TxDOT is fiscally constrained through the 10-year Unified Transportation Plan (UTP) and the financial planning scenario used to develop the UTP. Non-Federal contributions are available for this project within those constraints.

TxDOT typically provides a 20 percent match for Federal funds although other percentages can be used depending on the requirements of the specific program.

TxDOT currently utilizes preventative maintenance funding and/or bridge maintenance funding to cover maintenance and joint repair of the current bridges and roadway within the project limits. Based on review of previous construction projects, the bridge maintenance would average about \$150,000/year. Depending on type of bridge structure/components, it is envisioned that at least over the next 25 years these costs would likely be negligible but would not be more. Since the added capacity along the roadway section is anticipated to be a widening with the same pavement design as the existing roadway, future preventative maintenance costs will be roughly the same or slightly increase due to the extra roadway surface.

VIII. FEDERAL WAGE CERTIFICATION

TxDOT follows federal wage rate requirements. The federal wage rate certification is provided in **Appendix C**.