



# US 80 BRIDGES REPLACEMENT STUDY

P.I. No. 0009379

Chatham County - Savannah Metropolitan Planning Commission (MPC)

18.1.1

on behalf of the Coastal Region MPO (CORE MPO)

#### CDM Smith

In Association with Lott + Barber Thomas & Hutton Symbioscity McMillan and Associates



December, 2012



# US 80 BRIDGES REPLACEMENT STUDY GDOT P.I. No. 0009379

# FINAL REPORT

**Prepared for** 



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December, 2012

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Prepared in cooperation with the Department of Transportation, Federal Highway Administration.

# **RESOLUTION OF SUPPORT** US 80 Bridges Replacement Study

#### A RESOLUTION IN SUPPORT OF THE RECOMMENDATIONS OF THE US 80 BRIDGES REPLACEMENT STUDY AND ADVANCEMENT OF IMPLEMENTATION PHASES

WHEREAS, US 80 to Tybee Island provides the only land-based access to and from the island; and

WHEREAS, several times per year, crashes on the bridges block travel in one or more directions; and

WHEREAS, the Lazaretto Creek Bridge has a sufficiency rating below 50; and

WHEREAS, the corridor is currently a hostile environment for bicyclists and pedestrians, which increases demand for road capacity and for parking at the McQueen's Island Trailhead, at Fort Pulaski National Monument, and on Tybee Island; and

WHEREAS, the Coastal Region Metropolitan Planning Organization (CORE MPO) initiated the US 80 Bridges Replacement Study in order to identify a solution to improve the safety of the bridges and roadway for multiple modes and to address flooding in low spots, as a more implementable alternative to the previously planned four-lane widening; and

WHEREAS, the recommended alternative shall address the need to maintain access to and from Tybee Island during clearance of crashes on the bridges, during other special situations such as evacuations, and the need to improve bicycle and pedestrian access in general in this scenic and crucial corridor; and

WHEREAS, the study initially looked at multiple options for each of bridges and for the corridor between the bridges, which were combined into six end-to-end alternatives for further evaluation; and

WHEREAS, after evaluation of the six alternatives and after three sets of stakeholder meetings and four public meetings, where the study team gathered comments from the stakeholders and the public, Alternative 3 became the recommended alternative; and

WHEREAS, Alternative 3 would replace Bull River Bridge and Lazaretto Creek Bridge with new bridges having two lanes, ten-foot shoulders, and a barrier-separated multi-use path, would increase the paved shoulder on the road between the bridges to ten feet, would provide turn lanes at the entrances to McQueen's Island Trailhead and Fort Pulaski National Monument, would raise the elevation of low spots, and would provide bicycle and pedestrian connections from bridges to existing trail; and

WHEREAS, Alternative 3 obtained a higher score than the other alternatives and the previous four-lane widening concept in the evaluation which considered the meeting of needs, benefit-cost ratio, life-cycle costs, maintenance of traffic, environmental impacts, bicycle and pedestrian access, and constructability; and

WHEREAS, current cost estimates indicate the project will cost approximately \$64 million for all phases of implementation; and

WHEREAS, the Coastal Region Metropolitan Planning Organization has included the US 80 Bridges and Road Improvements project in the 2035 Long Range Transportation Plan as the implementation project resulting from the US 80 Bridges Replacement Study, and has programmed the Scoping and other portions of Preliminary Engineering in the Transportation Improvement Program; and WHEREAS, the Georgia Department of Transportation had agreed to be project sponsor for the US 80 Bridges and Road Improvements project and has assigned a project manager; and

WHEREAS, the Coastal Region Metropolitan Planning Organization, will partner with Georgia Department of Transportation, in moving towards an approved concept to implement the recommendations of the US 80 Bridges Replacement Study.

NOW, THEREFORE, BE IT RESOLVED, that on December 19, 2012, the Coastal Region Metropolitan Planning Organization Board declare their support for the recommendations of the US 80 Bridges Replacement Study and the advancement of the implementation phases.

Sete Liakakie

Pete Liakakis, Chairman Coastal Region Metropolitan Planning Organization

12/19/2012



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# **EXECUTIVE SUMMARY**

The US 80 Bridge Replacement Study was conducted to evaluate deficiencies along the portion of US 80 in Chatham County, GA, which connects mainland Savannah to Tybee Island, and to identify alternatives to correct these deficiencies.

The Chatham County - Savannah Metropolitan Planning Commission, on behalf of the Coastal Region Metropolitan Planning Organization, retained a team lead by CDM Smith (formerly Wilbur Smith Associates) to undertake a study, in order to respond to concerns in the community about reliability of access to and from Tybee Island and safety for multiple modes in this segment of US 80.

The study area consists of approximately 5.5 miles of US 80 from west of Bull River Bridge, on the Savannah side, to east of Lazaretto Creek on the Tybee Island side. US 80 is the only landbased transportation corridor connecting Tybee Island to the mainland of Savannah and is a twolane facility with limited passing lanes. The area includes two bridges, one over the Bull River near Savannah and one over Lazaretto Creek at Tybee Island.

The US 80 corridor is the sole emergency evacuation route for Tybee Island. The study area is shown in Figure 1.



Figure 1: Study area



#### US 80 Bridges Replacement Study Final Report



Current and future deficiencies in the corridor were evaluated. Roadway capacity was found to be generally sufficient, according to a comparison of the capacity calculations with the estimated demand from the travel demand model and with the observed demand from special traffic counts during a summer holiday period. Capacity is sometimes exceeded when holidays overlap weekends. Deficiencies in the corridor relate to issues with system linkages for certain modes, various aspects of safety, and roadway design.



System linkages are poor for bicyclists and pedestrians, due to current characteristics of the road and bridges and lack of connections to the existing McQueen's Island Trail. Narrow shoulders, or shoulders filled with rumble strips, as well as high motor vehicle speeds are the problematic characteristics for bicyclists and pedestrians. McQueen's Island Trail runs parallel to US 80 for most of the corridor, but because the trail has no connection to bridges, it does not currently meet its potential as an off-road alternative for non-motorized transportation. The trail functions for recreation only, at this time, and most users choose to drive to it, in order to access it safely. Parking is a problem at the trailhead.

Regarding safety in general, the concerns include crash rates, bridge sufficiency ratings, and roadway flooding. The crash rate, from 2006 through 2008, was higher in the corridor than the statewide average for rural principal arterials in that period – 45% higher on average, although with much variation among years. The Lazaretto Creek Bridge had a sufficiency rating of 41.45 at the time of this evaluation; a rating below 50 means it is a candidate for some type of improvement in the bridge prioritization process of the Georgia Department of Transportation. Flooding, due to peak high tides, affects both directions of travel on US 80 for one to three hours on an average of three days per year. The eastbound lane is affected another two times per year.

The identified design deficiencies were related to the clear zone, the shoulders, and driver expectations. Trees exist in the recommended clear zone; however, local planning documents indicate that this part of US 80 is a corridor in which the palm-lined character should



be preserved. The usable shoulders on the bridges and the causeway are narrower than recommended for a high-speed road that serves as a bikeway, and also do not allow space for disabled vehicles to be adequately cleared from traffic flow. Expectations of drivers wishing to go through the corridor with no delay are in conflict with the needs of some drivers to access local sites, as the latter must slow or stop in the travel lane, sometimes even in a passing lane.

In the development of alternatives to address the deficiencies, various solutions for the bridges and various solutions for the road between the bridges were combined to form six end-to-end alternatives. These six were compared to each other, and to the older four-lane widening concept, in an evaluation that included the following criteria:

- Extent that the need and purpose is addressed
- Benefit-cost ratio





- Life-cycle cost
- Maintenance of Traffic
- Environmental Impacts
- Extent that bicycle and pedestrian needs are addressed
- Constructability
- Public Preferences

"Alternative 3" had the highest score in the evaluation and is recommended as the option to move forward to the next steps of project development. The elements of this recommendation are as follows:

• Replace existing bridges at Bull River and Lazaretto Creek with new bridges that have ten-foot bikeable shoulders and a ten-foot barrier separated multi-use path on the north side of the bridge, as illustrated in the figure below. The new bridges would be located adjacent to the existing bridges on the north side of US 80. The existing bridges would be removed.

Figure 2: Recommended bridge treatments at Bull River and Lazaretto Creek



• Roadway improvements include widening the existing road to accommodate a ten-foot paved, bikeable shoulders, as shown in the figure below.







• The roadway near Fort Pulaski would be restriped to allow for a left hand and right hand turn lane, as shown below. McQueen's Island Trail would be extended to reach the barrier-separated path on the new Lazaretto Creek Bridge.



Figure 4: Recommended turn lanes at Fort Pulaski entrance

• An 18-space parking area would be constructed at the entrance to McQueen's Island Trail and have a left hand turn lane for improved access, as shown below. A side-path would connect the existing trail to the path on the new Bull River Bridge.



Figure 5: Recommended turn lanes at McQueen's Island Trailhead entrance

In the next step, Georgia Department of Transportation is sponsoring the implementation project (US 80 Bridges and Road Improvements, PI 0010560), and Scoping and Preliminary Engineering currently are funded in the MPO's Transportation Improvement Program. The scoping phase will include environmental approval of a preferred alternative. CORE MPO will remain involved with Georgia DOT, local stakeholders, and the public throughout the process.





# FINAL REPORT

# Introduction

The US 80 Bridge Replacement Study was conducted to evaluate the existing deficiencies along the portion of US 80 in Chatham County, GA, which connects mainland Savannah to Tybee Island, and to identify alternatives to correct these deficiencies.



The Coastal Region Metropolitan Planning Organization undertook the study, with the use of funds from the American Recovery and Reinvestment Act, in order to respond to concerns in the community about reliability of access to and from Tybee Island and safety for multiple modes in this segment of US 80.

The CORE MPO 2035 Framework Mobility Plan, which is the adopted Long Range Transportation Plan, lists the US 80 Bridges and Road Improvements in the financially constrained portion of the plan. The recommendations of this study will inform the development of that construction project.

# **Study Area**

The study area consists of approximately 5.5 miles of US 80 from west of Bull River Bridge, on the Savannah side, to east of Lazaretto Creek on the Tybee Island side. US 80 is the only transportation corridor connecting Tybee Island to the mainland of Savannah and is a two-lane facility with limited passing lanes. The area includes two bridges, one over the Bull River near Savannah and one over Lazaretto Creek at Tybee Island.

Several facilities are located along the project including marina and commercial fishing facilities at Lazaretto Creek Bridge with public fishing access, the McQueen's Island Historical Trail, the Fort Pulaski National Monument, and the Coast Guard Station Tybee.

The US 80 corridor is the sole emergency evacuation route for Tybee Island. The study area is shown in Figure 1.



US 80 Bridges Replacement Study Final Report



Figure 1: Study Area







# **Previous Studies**

The purpose of this section is to identify aspects of previous studies, plans, or projects that are pertinent to the US 80 corridor in the eastern part of Chatham County. Studies from area municipalities and agencies were considered, including a design concept from the Georgia Department of Transportation (GDOT).

Relevant projects in the corridor are listed here.

Current or Previously Planned Projects	Source and additional information
US 80 Bridges and Road Improvements (PI #0010560), from west of Bull River to east of Lazaretto Creek	Currently planned, partially funded. CORE MPO 2035 Long Range Transportation Plan and FY 2013-2016 Transportation Improvement Program. This project was recently programmed to be the US 80 Bridges Study's implementation project, the design of which is to be finalized in the state DOT's Plan Development Process.PE has been authorized to initiate "scoping" phase.
Historic Bicycle/Pedestrian Greenway Trail, (a.k.a. Marsh Hen Trail) from east of Lazaretto Creek to Byers St.	<i>Currently planned and funded. Transportation Enhancement project, managed by GDOT.</i>
McQueen's Island Trail Phase II, extending rail trail from Fort Pulaski to Lazaretto Creek	NPS General Management Plan for Fort Pulaski; partial funding in Chatham County Capital Improvement Program
<i>Tybee Island Bikeway Corridor on US</i> 80, from Thunderbolt to Tybee Island	CORE MPO Bikeway Plan. Bikeway currently not funded as a stand-alone project, but portions could be accomplished in road projects
Riverfront Corridor (on railbed) and US 80 Corridor for non-motorized transportation between Savannah and Tybee Island	Coastal Georgia Land Trust's Connecting the Coast Master Plan. Projects are not currently funded as stand-alone projects, but portions of US 80 Corridor could be accomplished in road projects
US 80 Widening Project (PI #522490), from west of Bull River to east of Lazaretto Creek	Previously planned, not currently funded. GDOT's design concept was finalized in 2003. Environmental process was not finished before MPO removed from funded list in long range plan.





Area plans' visions, goals, objectives, or strategies that are relevant to the study area are listed below.

Visions, goals, strategies, zoning	Source and additional information
Current and future land uses are mostly "Tidal Marsh "with some Commercial uses near bridges at each end of study area.	Chatham County – Savannah Comprehensive Plan
Current zoning is mostly Marsh Conservation, with Waterfront Industry and Maritime Districts near bridges.	Chatham County Zoning Map
Tybee Island community vision: "As concerned citizens of The City of Tybee Island, we will be conscientious stewards of our unique historic and cultural heritage, environmental resources, and diverse economic community. We will also ensure that our growth does not exceed the Island's carrying capacity"	Tybee Island Comprehensive Plan
US 80, between Bull River and Lazaretto Creek, is designated an Amenity Corridor of three different types: Palm-lined Causeway, Scenic Vista, and Historic Roadway.	CORE MPO Transportation Amenities Plan
Expand the opportunity for multi-modal transportation opportunities linking employees to employers.	Chatham County – Savannah Comprehensive Plan
Encourage the use of remote parking with responsive shuttle service to employment centers.	Chatham County – Savannah Comprehensive Plan
In all transportation projects, where not prohibitedconsider and include components for the following roadway amenities: tree preservation, planting, landscaping, sidewalks/pedestrian features, and bikeways.	Chatham County – Savannah Comprehensive Plan
Reduce the negative impacts of road building on the natural environment and historic resources that are the basis of the tourist industry.	Chatham County – Savannah Comprehensive Plan
Integrate facilities designed for tourists with facilities needed by residents.	Chatham County – Savannah Comprehensive Plan
Identify and preserve protected species habitat.	Chatham County – Savannah Comprehensive Plan



Continue to develop the Tybee Greenway/Bikeway and connect it to McQueen's Trail and ultimately to downtown Savannah.

Investigate potential to offer an off-island public transportation system.

If Highway 80 widening project is scheduled for implementation, ensure that a bike lane over the bridges is included in the project design and funding.

Conduct a transportation engineering study that evaluates parking needs and alternatives.

# **Conditions and Identified Deficiencies**

Conditions were reviewed in order to identify deficiencies along this stretch of US 80. The deficiencies that were found relate to issues with system linkages for certain modes, various aspects of safety, and roadway design.

# Travel Demand and Operational Conditions

The current and future demand for travel on this part of US 80 and the ability of the road to handle it were evaluated.

Level of service is a qualitative measure describing operational conditions within a traffic stream. There are six categories of LOS with each identified by a letter, A through F. LOS "A" represents optimal operating conditions and LOS "F" represents gridlock. LOS A through LOS D are considered acceptable levels of service in an urban area.

According to actual counts performed by GDOT in 2011, the corridor on average operates at an acceptable level of service (LOS B or C). Despite continued regional growth in the county, the 2035 CORE MPO Travel Demand Model predicts that the level of service on the two bridges and on the roadway also will be acceptable in 2035 (LOS C). See the values for the bridges and the road in Table 1 below.

Less than ten percent of property on Tybee Island is vacant or undeveloped. The City's growth plans include a 35-foot height limit for development and essentially the island is built out. Average daily traffic is lower than the highest daily volumes which occur in the tourist season.



Tybee Island Comprehensive Plan

Tybee Island Comprehensive Plan

Tybee Island Comprehensive Plan

Tybee Island Comprehensive Plan







Segment	201	1	2035 No-Build	
	ADT	LOS	ADT	LOS
Bull River Bridge	12,210	С	13,820	С
US 80 between Bull River Bridge	12,210	С	13,820	С
and Lazaretto Creek Bridge				
Lazaretto Creek Bridge	8,080	В	13,581	С

Source: ADT – 2035 CORE MPO Travel Demand Model

LOS – Table 3 from 2012 FDOT Level of Service Handbook for uninterrupted flow highways in developed areas. LOS B-D volumes adjusted 125% for available passing lanes.

Due to the number of tourist destinations located along US 80 and on Tybee Island, US 80 experiences significant increases in traffic volume during peak times (i.e. holiday weekends in summer). Although peak times see about twice as much traffic as an average day, US 80 still operates at a LOS "D" at such times, according to traffic data collected during the weeks around July 4, 2012. See the values for peak samples on the bridges and road in Table 2 below.

#### Table 2: Peak Daily Traffic Volume (PDT) and LOS for July 4, 2012 Weekend

Segment	July 4 Weekend, 2012			
	Date	PDT	LOS	
Bull River Bridge	06/30/2012	24,391*	D	
US 80 between Bull River Bridge and	07/07/2012	26,747	D	
Lazaretto Creek Bridge				
Lazaretto Creek Bridge	07/07/2012	25,852	D	

Source: PDT – Traffic Data Collection, Inc., US 80 Traffic Surveys, July 18, 2012.

LOS – Table 3 from 2012 FDOT Level of Service Handbook for uninterrupted flow highways in developed areas. LOS B-D volumes adjusted 125% for available passing lanes.

\* Tube failures at the Bull River count station resulted in missing data for some days.

Previously, the Wave Ecology and Highway 80 Challenge Study had collected traffic data for the Independence Day holiday period in 2010. According to that study the peak day was July 3, 2010 with a PDT of 32,346. The higher PDT in 2010 could be because July 4 fell on a Sunday that year, while in 2012, July 4 fell on a Wednesday. It is likely that there was more significant traffic in 2010 because the holiday was during a weekend.

Roadway capacity is the maximum hourly rate at which vehicles can reasonably be expected to cross a point during a specified time period. The capacity of US 80 was calculated for three separate roadway segments: Bull River Bridge, Lazaretto Creek Bridge, and the roadway portion in between. Both Bull River Bridge and Lazaretto Creek Bridge have a capacity of 26,600 vehicles per day. The roadway portion of US 80 has a slightly higher capacity of 26,860 vehicles per day due to the availability of passing lanes.

Comparing the peak daily traffic and average daily traffic to the roadway capacity shows that US 80 is operating at capacity during peak events but well below capacity the remainder of the year.





# System Linkages



Although the US 80 corridor in the study area already provides system linkage for motor vehicles, the current characteristics of the bridges and roadway, as well as lack of connections to the McQueen's Island Trail, create a gap in the bicycle and pedestrian network. The existing bridges over Bull River and Lazaretto Creek have shoulders of about two feet in width. The roadway between the bridges has existing paved shoulders that are zero to four feet wide and that contain rumble strips. These shoulders are not wide enough to provide bicyclists or pedestrians with useful separation from motor vehicle traffic in the 45 mph and 55 mph speed zones. There are no sidewalks on the bridges or roadway in between.

The US 80 corridor in the study area is flat and scenic. Bicycle and pedestrian trip generators exist in the corridor under study and at ends of the linkage: McQueen's Island Trail access point and Fort Pulaski

National Monument entrance are on the US 80 causeway; Tybee Island attractions are to the east of the study area; bicycle lanes exist on US 80 just west of the study area. The City of Tybee Island has been designated as a Bicycle Friendly Community by the League of American Bicyclists.

A few bicycle and pedestrian trips currently are made on US 80 within the study area in spite of conditions. McQueen's Island Trail is well-known in the county for bicycle and pedestrian recreation, but is currently useless for bicycle and pedestrian transportation due to lack of connection as already described above.

# Safety

The review of existing conditions revealed some safety concerns with the crash rate, bridge sufficiency, and flooding.

## CRASH HISTORY

Eighty-six crashes occurred in the study area from 2006 to August 2009. Of those, 51 involved injuries and three involved fatalities. On the bridges alone, there were 36 crashes, which included 15 injuries and two fatalities. Table 3 shows the number of crashes, injuries and fatalities on the bridges by year, and Table 4 summarizes the number of crashes, injuries and fatalities in the study area by year.

Year	Crashes	Injuries	Fatalities
2006	12	5	0
2007	7	3	0
2008	11	3	0
2009*	6	4	2
Total	36	15	2

Table 3: Cr	ashes on	Bridges	by Year
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\* Through August 2009





Year	Crashes	Injuries	Fatalities
2006	23	16	1
2007	19	13	0
2008	25	11	0
2009*	19	11	2
Total	86	51	3

#### Table 4: Total Crashes in Study Area by Year

\* Through August 2009

Between 2006 and 2008, the crash rates on US 80 between the two bridges are consistently higher than the statewide average for similar types of roads. Table 5 summarizes the crash rate per 100 million miles traveled in the study area and the corresponding statewide average for a similar facility (Rural Principal Arterial, on the National Highway System).

Year	US 80 Study Area	Statewide Averages
2006	138	73
2007	129	114
2008	172	116
2009*	112	113
Average	137.75	104

#### Table 5: Crash Rates (# of Crashes per 100 Million VMT)

\* Through August 2009

Among the total 36 crashes on the Bull River and Lazaretto Creek bridges from 2006 to 2009, 21 (58.3%) were rear ends and seven (19.4%) were collisions with a non-motor vehicle (Table 6). Crashes by collision type are listed in Table 6.

#### Table 6: Collision Types on Bridges

	Collision Type						
Year	Angle	Head	Collision with a	Rear	Sideswipe-	Sideswipe-	Total
		On	Non- Motor	End	Opposite	Same	
			Vehicle		Direction	Direction	
2006		2	3	6		1	12
2007				7			7
2008	1		4	4	1	1	11
2009*	1			4		1	6
Total	2	2	7	21	1	3	36

\* Through August 2009

The location of accidents between 2007 and 2009 are shown in Figure 2.



US 80 Bridges Replacement Study Final Report



Figure 2: Crash Locations 2007-2009







## BRIDGE RATING

The Georgia Department of Transportation regularly inspects bridges on state routes throughout Georgia. Bridge sufficiency ratings are determined based on structural safety, whether the bridge meets current design standards, and how essential the bridge is for public use. The route is the only evacuation route for Tybee Island which is a contributing factor to the essential public use of the bridge.

Structure ID# 051-0065-0, the bridge over Bull River, is assigned a sufficiency rating of 61.00. The bridge, which was built in 1960, currently has minor flaws such as cracking and exposed rebar but is considered structurally sound. The sufficiency rating of 61 is based on the substandard bridge width (narrow shoulders) and the lack of an available detour.

Structure ID# 051-0066-0, the bridge over Lazaretto Creek, is identified as having a sufficiency rating of 41.45. The bridge has structural flaws in the substructure due to scour, cracking, and general wear. The sufficiency rating for this bridge is also accounts for substandard bridge width (narrow shoulders) and the lack of an available detour.



In general, GDOT considers a sufficiency rating below 50 as a concern and uses the rating to rank bridges based on need to maintain or upgrade. One bridge already below 50 and the other one close to dropping below 50 justifies the consideration of improvements to this segment of US 80.

## EMERGENCY EVACUATION AND FLOODING

Hurricane and other emergency evacuation is a primary safety concern for the study area. US 80 must remain open for residents to evacuate by roadway and to return to their property after the emergency. In modern times, weather-related evacuations begin well before the storm reaches the area; however, the roadway's low elevation may be cause for concern during hurricane/storm event evacuation of Tybee Island. On average it would take an estimated 2.3 foot storm surge to flood the roadway.



Flooding that is not related to storms also can be a concern for safety and accessibility. The existing US 80 roadbed is five feet above sea level; therefore major segments of the roadway and/or shoulders are flooded during spring tide conditions. Data collected from National Oceanic and Atmospheric Administration monitoring station located at Fort Pulaski indicates that, in certain sections, lanes in both directions are submerged an average of three times a year and the east-bound lane is submerged an additional two times a year. The flooding is about one to three hours in length per occurrence depending on the elevation of the tide. It is possible that the roadway could flood twice a day depending on the tidal cycle and tide elevation.





Of the four miles of US 80 that is parallel to the Savannah River, approximately 1.3 miles is currently at an elevation low enough to be susceptible major flooding that would require road closure.

# Roadway Design

Several design deficiencies were identified along US 80 between Savannah and Tybee Island that diminish the safety of the roadway. These are clear zone violations, substandard shoulders, and design that does not reflect driver expectations.

## CLEAR ZONE

The clear zone is the area bordering a roadway that is safe for travel by errant vehicles. Clear zones allow drivers to stop or regain control of a vehicle that has left the travel-way and the required width is determined by traffic volume and speed. The existing roadway between the Bull River Bridge and Lazaretto Creek Bridge contains hazards within the suggested clear zone. These hazards are predominately trees located immediately outside the edge of the paved shoulder.

## **SHOULDERS**

Shoulders are an important component to safe roadways. They allow disabled vehicles to pull over outside of the travel-way and emergency vehicles to maneuver around slower traffic. Shoulders also provide space for bicyclists to



travel parallel to and separated from motor vehicle traffic. A minimum shoulder width of ten feet is required for disabled vehicles; a twelve foot paved shoulder is recommended for roadways that are heavily-traveled with high-speed motor vehicles that share the road with cyclists.

The roadway between Bull River and Lazaretto Creek has paved shoulders that are zero to four feet wide and total shoulder width that is less than the minimum ten-foot width. The bridges over Bull River and over Lazaretto Creek have minimal shoulders that are much less than the eight-foot minimum recommended by current bridge design guidance.

# DRIVER EXPECTATION



Conflicting needs exist between drivers wishing to slow or stop to access the trail or the fort and those who wish to get through the corridor with no delay. The mixture of site visitors making stops and through traffic exceeding the speed limit greatly increases the likelihood of accidents along this stretch of roadway.





The entrance to the McQueen's Trail and Fort Pulaski do not have dedicated left-turn lanes. Vehicles making a left turn to access the McQueen's Trail must stop in the travel way. Vehicles wishing to make a left turn to access Fort Pulaski must stop in the left lane of a two-lane passing zone. This creates a situation in which the slower vehicles traveling in the right lane continue on, while the faster moving drivers attempting to pass must stop unexpectedly behind an already stopped vehicle.

The entrance to the Lazaretto marina, boat ramp, and fishing areas has a dedicated left-turn lane and is not subject to the unexpected stops that the other two facilities experience.

# Public Input on Existing Deficiencies

The purpose of the initial public and stakeholder meetings, in addition to introducing the study, was to learn of the community's concerns in the corridor. These meetings took place in September of 2010. Thirteen people attended the stakeholder meeting at MPC, while 46 attended the public meeting on Tybee Island. The complete Public Involvement Summary for all meetings, including surveys and sign-in sheets, is available in Appendix A.



One method of collecting information at the first meetings was through a survey. Survey results revealed the following about public perceptions of deficiencies:

- 100% of respondents believe some type of improvements are needed in the segment of US 80 under study.
- Issues that were considered to be "high concern", on a 0-5 scale, by over 50% of respondents were in descending order of consensus: overall safety, narrow bridges, congestion, and narrow shoulders on causeway.
- Bicycle access was considered a "high concern" for 41% of respondents.
- Flooding was considered a "high concern" for only 35% of respondents.
- Turtle crossings and pedestrian access were of "high concern" for fewer than 30%, although another 21% considered the turtle crossings to be a somewhat high concern.





# **Development of Alternatives**

The development of alternatives was completed as a two-part process. The first part developed specific options for individually addressing the roadway and bridge deficiencies discussed above. A summary of the first part is provided below.

In the second part, the ones that best address the deficiencies were carried forward and combined to form end-to-end alternatives for further evaluation. These are summarized after Part I below. Later sections of this report explain why certain options were not carried forward and provide details of the evaluation process.

# Part I of Alternatives Development: Options to Address Deficiencies

In the first step of the development of alternatives, several options were considered to address the indentified deficiencies. These alternatives represent potential solutions to each individual deficiency.

In Part I of Alternatives Development, these initial options can generally be categorized as roadway improvements, bridge improvements, and bicycle/pedestrian improvements.

# **ROADWAY IMPROVEMENTS**

Deficiencies in roadway safety can be addressed through several minor roadway improvements. These improvements include clear zone improvements, shoulder widening, the addition of left-turn lanes, and raising the roadway in flood-prone areas.

# • Clear Zone Improvements

The existing roadway does not have the minimum roadway clear zones required for the traffic volume and speed. Most of the clear zone violations are due to hazards alongside the edge of the shoulder. Clearing of trees and other hazards can improve the available clear zone and allow errant vehicles to safely regain control or stop.



While clearing of trees and hazards alongside a roadway can improve the safety of a roadway for vehicle users, it also encourages drivers to exceed the speed limit. Trees alongside the road can reduce driver speeds as well as provide shade for bicyclists, allowing for a safer and more pleasant shared facility. The MPO's Transportation Amenities Plan designated the corridor as a "Palm-lined Causeway," meaning that characteristic should be preserved or restored.





### Shoulder Widening

The existing roadway does not have paved shoulders of sufficient width to allow disabled vehicles to pull out of the travel way or for emergency vehicles to pass. The existing shoulders for the entire project would need to be widened to a minimum of ten feet. Two options under consideration are a 6.5 foot paved with a 3.5 foot grassed shoulder or a full 10 foot paved shoulder. Because of the varying widths and condition of the existing shoulders, the amount of grading and fill placement would vary to establish a consistent shoulder width for the length of the corridor. The use of the shoulders to support bicycles is discussed in the section on Bicycle/Pedestrian Improvements. The options for shoulder expansion are shown in Figures 3 and 4.



#### Figure 3: Partial paved and partial grassed shoulder

#### Figure 4: Full paved shoulder







## • Addition of Left-Turn Lanes

To eliminate conflicts between the needs of stopping traffic and the expectations of through traffic at the entrances to McQueen's Trail and Fort Pulaski, left-turn lanes could be provided. These turn lanes would remove stopped traffic from the travel way and greatly increase the safety of these intersections.

**McQueen's Trail.** A left-turn lane at McQueen's Trail entrance could be constructed in two ways: widening the roadway six feet on either side to provide a 12-foot turn lane or widening 12 feet on the south side of US 80. Widening six feet on either side of the roadway would require a shorter taper and therefore a smaller footprint because each lane would only require a transition for six feet. Widening 12 feet on the south side of US 80 would require a taper twice as long because one direction of travel would have to transition 12 feet and therefore would have a larger footprint.

In addition to the turn-lane at McQueen's Trail, a small parking area would be constructed to discourage vehicles from parking along US 80. Three options for parking were developed for the trail area. The options include a six space parking area with a west-bound exit ramp, a 15-space parking area with two-way exit and an 18-space parking area with a two-way exit. The turn lane and parking options are shown in Figures 5, 6 and 7.

#### Figure 5: 6-space parking area with one-way exit



Figure 6: 15-space parking area with two-way exit







Figure 7: 18-space parking area with two-way exit



**Fort Pulaski.** At the entrance to Fort Pulaski, the existing passing lane would be striped to transition from a passing lane to a turn lane. A minimum length of 1,000 feet is required for a passing lane with an optimal passing length of 0.5 mile to two miles. West of Fort Pulaski, approximately 2,500 feet of passing lane would remain which is adequate for a passing lane. However, Fort Pulaski is located relatively close to the existing end of the passing lane and the addition of a left turn lane would not leave enough distance for vehicles to safely pass. Therefore, the remainder of the passing lane would be striped to keep vehicles from using the lane. A deceleration lane would be provided for west-bound traffic turning right into the Fort.

#### Figure 8: Turn lane at Fort Pulaski National Monument Site



• Construction of a Roundabout at Fort Pulaski Entrance

Another option for addressing turning and through traffic at the Fort entrance is to construct a three-legged roundabout. This would reduce the need for turning traffic to stop in the roadway, while also slowing through traffic. Use of a roundabout would require that the approaches have a speed limit no higher than 45 mph and a speed limit no higher than 35 mph within the roundabout.

The roundabout would be offset slightly to the north of the existing roadway in order to minimize marsh impacts. The eastbound passing lane would become a turning lane that merges into the roundabout. As in the option for turn lanes, the passing lane would not continue east of the Fort. Eastbound through traffic would remain in the outside lane on the south side of the roundabout. All westbound traffic would merge into the roundabout and would need to yield to any left-turning drivers within the roundabout.





#### Figure 9: Roundabout at Fort Pulaski National Monument Site



#### • Raising the Roadway in Flood-Prone Areas

In order to prevent flooding that requires road closure and cuts off Tybee Island from the mainland, the existing roadway needs to be raised to above the flood stage.

This can be accomplished in two ways. The first is identifying the most flood-prone areas that are the first to flood and the most likely to cause road closure and raise the profile of the road in these specific areas. This option will require re-grading of shoulders and potentially adding fill to side slopes. The second option would be to overlay the entire roadway, thereby raising the profile and reducing the chance for flooding. This option would also require some minor re-grading of shoulders.

#### **BRIDGE IMPROVEMENTS**

## • Bull River Bridge

The bridge over the Bull River needs to be widened to provide the minimum shoulder width required for disabled vehicles to pull over. In addition to widening shoulders for safety, additional improvements can be made to accommodate bicyclists and pedestrians. Several options are available for improvements to the Bull River Bridge:

• Widen existing bridge from 30 feet to 40 feet – This option provides eight-foot shoulders which are adequate to handle disabled vehicles, emergency vehicles, and on-road bicyclists. A dedicated bicycle and pedestrian facility is not provided.





#### **US 80 Bridges Replacement Study Final Report**

- Widen existing bridge from 30 feet to 52 feet This option provides eight-foot shoulders which are adequate to handle disabled and emergency vehicles as well as a barrier-separated multi-use trail for bicyclists and pedestrians.
- Widen existing bridge from 30 feet to 46 feet This option provides eight-foot shoulders which are adequate to handle disabled vehicles, emergency vehicles, and on-road bicyclists as well as a six foot sidewalk behind curb on one side for pedestrians. This option can be considered only in speed zones up to 45 mph; therefore it is considered for Bull *River Bridge only.*
- *Replace existing bridge with a 40-foot bridge This* option provides eight-foot shoulders which are adequate to handle disabled vehicles, emergency vehicles, and on-road bicyclists. A dedicated bicycle and pedestrian facility is not provided.
- *Replace existing bridge with a 52-foot bridge This* • option provides eight-foot shoulders which are adequate to handle disabled and emergency vehicles as well as a barrier-separated multi-use trail for bicyclists and pedestrians.

#### Lazaretto Creek Bridge •

The bridge over Lazaretto Creek has a sufficiency rating less than 50 and is a condition that would require either replacement or major rehabilitation. In either circumstance, the new or rehabilitated bridge would need to have shoulders at least eight feet wide to accommodate disabled and emergency vehicles. Additional improvements can be made to accommodate bicyclists and pedestrians. Several options are available for improvements to the Lazaretto Creek Bridge:











12"-0" 8"-0" TRAVEL LANE SHOULDER

8'-0" 12'-0"
SHOULDER TRAVEL LANE



#### US 80 Bridges Replacement Study Final Report

- Widen existing bridge from 28 feet to 40 feet This option provides eight-foot shoulders which are adequate to handle disabled vehicles, emergency vehicles, and on-road bicyclists. A dedicated bicycle and pedestrian facility is not provided. Due to the existing condition of the bridge, extensive rehabilitation would be required as part of the widening.
- Widen existing bridge from 28 feet to 52 feet This option provides eight-foot shoulders which are adequate to handle disabled and emergency vehicles as well as a barrier-separated multi-use trail for bicyclists and pedestrians. Due to the existing condition of the bridge, extensive rehabilitation would be required as part of the widening.
- Replace existing 28-foot bridge with a 40-foot bridge - This option provides eight-foot shoulders which are adequate to handle disabled vehicles, emergency vehicles, and on-road bicyclists. A dedicated bicycle and pedestrian facility is not provided.
- Replace existing bridge with a 52-foot bridge This option provides eight-foot shoulders which are adequate to handle disabled and emergency vehicles as well as a barrier-separated multi-use trail for bicyclists and pedestrians.

# BICYCLE/PEDESTRIAN IMPROVEMENTS

Improvements to the bicycle and pedestrian facilities along US 80 would increase the connectivity of this area by linking the Savannah mainland to McQueen's Trail and Tybee Island. Improvements to bicycle and pedestrian facilities can be completed in several ways:

• Widen existing paved roadway shoulders to 12 feet (with rumble strips) – The existing paved shoulders along the roadway can be widened from zero to four feet to 12 feet. The existing rumble strips could remain to discourage motor vehicles from leaving the roadway. This width allows for at least four feet of usable space for bicyclists that is free from rumble strips and separated from motor traffic. This option does not provide a dedicated facility for pedestrians















- Widen existing roadway shoulders to 10 feet (without rumble strips) The existing paved shoulders along the roadway can be widened from zero to four feet to ten feet. Any existing rumble strips would have to be removed and replaced with smooth pavement. Rumble strips can act as an impediment to the "sweeping" action of traffic that generally keeps shoulders clear of debris. Therefore, the presence of rumble strips results in debris accumulation that can be hazardous to bicycle traffic. Thermoplastic edgeline rumblestrip material can be applied on the outside of travel lanes to deter motor vehicles from leaving the roadway without impeding debris removal and requires less shoulder for installation than rumble strips. This option does not provide a dedicated facility for pedestrians.
- Multi-use Path Bicycle and pedestrian traffic can be provided with the option of avoiding on-road travel by the construction of a separate multi-use trail. These types of facilities are generally eight to ten feet wide and generally separated from motor vehicle traffic in some way. Multi-use paths can accommodate two-way bicycle and pedestrian traffic and would provide connectivity between Savannah, McQueen's Trail, and Tybee Island.
- Attach Cantilever Structure to Bull River Bridge for Bicyclists and Pedestrians – A cantilever structure could be attached to the existing bridge to accommodate bicycle and pedestrian traffic. However, the existing support structure for the bridge over Bull River is currently not capable of supporting this type of structure. Major rehabilitation of the existing bridge beams would be required.
- Separate Parallel Bridge for Bicycle and Pedestrian Facilities over Bull River – A separate bridge could be constructed to accommodate bicycle and pedestrian traffic, parallel to the vehicular bridge over Bull River.
- Attach Cantilever Structure to Lazaretto Creek Bridge for Bicyclists and Pedestrians – A cantilever structure could be attached to the existing bridge to accommodate bicycle and pedestrian traffic. However, the existing support structure for the bridge over Lazaretto Creek is currently not capable of supporting this type of structure. Major rehabilitation of the existing bridge beams would be required.










• Separate Parallel Bridge for Bicycle and Pedestrian Facilities over Lazaretto Creek– A separate bridge could be constructed to accommodate bicycle and pedestrian traffic, parallel to the vehicular bridge over Lazaretto Creek.



## PUBLIC INPUT ON INITIAL OPTIONS TO ADDRESS DEFICIENCIES

The second rounds of public and stakeholder meetings were arranged for the purpose of getting feedback on the initial menu of potential solutions to address deficiencies. These meetings took place in March of 2011. Fourteen people attended the stakeholder meeting at MPC and 25 attended the public meeting on Tybee Island. The complete Public Involvement Summary for all meetings, including surveys and sign-in sheets, is available in Appendix A.

A survey was conducted regarding preferences on the different options, which included the option to "Do Nothing." Results indicated the following:

- For the roadway between the bridges, 81% favored the wider paved shoulders (10 feet, instead of 6.5 feet paved, or doing nothing).
- 62% preferred the addition of turn lanes at the entrance to Fort Pulaski (instead of a round-about or doing nothing).
- 67% favored the higher number of paved parking spaces, and a two way exit, at the McQueen's Island Trailhead.
- For both the Bull River and Lazaretto Creek Bridges, more than 60% favored the designs having multi-use path in addition to the standard shoulders, with most of that 60% preferring that this be accomplished by replacing with new bridges instead of through widening the existing bridges.

Another solution for the water crossings was suggested at the public meeting and seemed to have a consensus of support, although this solution was not presented on the survey: retain and rehabilitate the existing bridges and also build new parallel two-lane bridges, so that each of the crossings would have two structures and have more than two lanes in total. One reason the idea received support was because the provision of two separate structures would allow one bridge to be open even when authorities have to completely close the other bridge for a few hours after a crash to confirm that structure is still safe. Another reason was that several attendees assumed that the rest of the corridor would eventually be widened to four lanes.

An additional suggestion at the stakeholder meeting was that US 80 traffic would likely operate more smoothly on peak days if the existing passing lanes were removed, as this would reduce the number of the merging points. Many agreed. However, most attendees also believed that there would be public outcry against that solution. Stakeholders, like the public, also had concerns about the functioning of a round-about at Fort Pulaski, even though it would create an attractive entrance feature. Specific negative statements were that it would hamper evacuations, would be a





daily annoyance to commuters, and would require shifting the Fort guard station back to avoid queuing into the roundabout.

# Part II of Alternatives Development: End-to-end Alternatives

The second part combined the options into end-to-end alternatives for the length of the project. In total six alternatives were evaluated for feasibility. These are distinguished hereafter by a number from 1 to 6 in the names. Conceptual layouts of each end-to-end alternative can be found in the Technical Memorandum on Evaluation of Alternatives.

The initial alternatives that were developed for the feasibility study were options for either widening or replacing the existing bridges. Due to the discussion at the second public meeting, mentioned above, the idea of building new bridges *and* retaining the old bridges, for the purpose of having parallel structures with more capacity, was incorporated into some of the end-to-end alternatives. Those are Alternatives 4 and 5, discussed here in Part II of Alternatives Development.

# LOGICAL TERMINI

The proposed termini for the improved segment are the locations on US 80 where the road narrows from four to two lanes near the end of each bridge. The termini are logical and rational in that the physical characteristics, travel lanes, diminish by one-half at each point, creating a segment between the termini appropriate for study.

Often, the most common logical termini are points of major traffic generation, particularly intersecting roadways because, in most cases, traffic generators determine the size and type of facility proposed. However, proposed project improvements are not solely related to congestion due to traffic generators; therefore, the choice of termini based on generators is not appropriate. In this case, proposed project improvements are based on safety factors, i.e. crash history. As a result, the logical termini on this segment of US 80 are the points where the roadway section changes from four to two lanes just west of Bull River and just east of Lazaretto Creek.

## **DESCRIPTION OF END-TO-END ALTERNATIVES**

## • Elements common to all Alternatives

For the roadway between Bull River and Lazaretto Creek Bridges, each of the proposed alternatives would have these improvements in common:

A paved, ten-foot, bikeable shoulder would be added to the length of the causeway for all of the alternatives except Alternative 1, which would have less of the shoulder width paved;

Improvements would be made to restripe the lanes in front of Fort Pulaski to provide for safe left and right turns into the National Monument site;

The roadway would be restriped at the entrance to the McQueen's Island Trailhead parking lot to provide for safe left and right turns.

Lowest points of the roadway would be elevated to reduce flooding from peak tide events.





# Bridge and Parking Treatments

Given the common elements above, the alternatives are primarily distinguished by types of bridge treatments, as described below. The treatment of the parking area for the trail access differs for some alternatives. The previous four-lane widening concept, also described below, was included in the evaluation for comparison.

Alternative 1 – Widen existing bridges to accommodate 8-foot bikeable shoulder. (Unlike the other alternatives, the shoulder option on the causeway for this alternative is a 6.5-foot paved bikeable shoulder and 3.5-foot grassed shoulder.) The parking area for the McQueen's Island Trailhead would be improved for six paved spaces.

Alternative 2 – Widen existing bridges to accommodate 8-foot bikeable shoulder and 10-foot multiuse path. (Shoulder widths on bridges in this alternative were modified to 10 feet in the final evaluation, in order to match the proposed 10-foot causeway shoulder for possible use as a lane in evacuation.) The parking area for the McQueen's Island Trailhead would be improved for 15 paved spaces.

Alternative 3 – Replace existing bridges with new two-lane bridge with 8-foot bikeable shoulder and 10-foot multiuse path. Remove old bridges. (Shoulder widths on bridges in this alternative were modified to 10 feet in the final evaluation, in order to match the proposed 10-foot causeway shoulder for possible use as a lane in evacuation.) The parking area for the McQueen's Island Trailhead would be improved for 18 paved spaces.

Alternative 4 – Construct new two-lane parallel bridge with 8-foot shoulders and 10-foot multiuse path and restripe existing to one lane with 10-foot bikeable shoulder. The parking area for the McQueen's Island Trailhead would be improved for 18 paved spaces.

Alternative 5 – Construct new two-lane parallel bridge with 8-foot shoulder and 10-foot multiuse path and widen existing bridges to accommodate two lanes and 8-foot bikeable shoulder. The parking area for the McQueen's Island Trailhead would be improved for 18 paved spaces.

Alternative 6 – Widen existing Bull River Bridge to accommodate 8-foot bikeable shoulder with 10-foot multiuse path. Replace Lazaretto Creek Bridge with new two-lane bridge with 8foot bikeable shoulder and 10-foot multiuse path. Remove the old Lazaretto Creek Bridge. (Shoulder widths on bridges in this alternative were modified to 10 feet in the final evaluation, in order to match the proposed 10-foot causeway shoulder for possible use as a lane in evacuation.)

**2003 GDOT Alternative** (for comparison in evaluation) – Widen the existing roadway to four lanes with a raised grass median and 10' bikeable shoulders, widen the existing bridges and construct two additional new bridges over bull River and Lazaretto Creek for a total of four lanes on the bridges. Elevate roadbed by four feet.

A conceptual layout of each alternative is provided in Appendix B of this report.





# Alternatives Considered but Dismissed

The intent of the feasibility study was to explore alternative options to address the deficiencies in the existing bridges and causeway. Various options were considered through discussions with stakeholders and the public, but were ultimately ruled out because they would not address the area needs. This section explains why some options were not carried forward.

Early on, the study team decided that all proposals for shoulders would meet guidelines for bicycle use, due to the fact that US 80 is the only roadway connection to and from Tybee Island and is identified as a bikeway in the MPO Bikeway Plan. Therefore solutions not meeting guidelines for bicycle use were dismissed.

An option for a partial paved and partial grassed shoulder was considered as an improvement for the causeway. This would have provided a 6.5-foot paved bikeable shoulder and 3.5-foot grassed shoulder. This option was removed from most of the alternatives due to stakeholder and public feedback: Emergency responders argued a need for a ten foot paved shoulder to provide a firm and wider paved area for attending crashes; other stakeholders preferred the wider shoulder for flexibility in peak events, emergencies, and evacuations; bicycling advocates also favored the larger paved shoulder for safety reasons. Therefore the 6.5-foot paved shoulder was dismissed except for Alternative 1, to serve as a least cost option that meets standards and guidelines.

A roundabout was considered at the entrance to Fort Pulaski National Monument. This option was not supported by the public and some stakeholders, particularly in regards to evacuation, and it created complications for including separated bicycle facilities along the roadway.

The Georgia Department of Transportation had a concept, which is no longer funded, for widening this portion of US 80 to a four-lane divided highway and reconstructing both bridges for four-lane crossings. As described above, US 80 is forecasted to operate at a level of service of "C" in 2035 with no improvements to the roadway. Despite the roadway operating at capacity during peak events, the average projected traffic volumes do not warrant widening the roadway to four lanes. Also the impetus for this MPO-sponsored study was to find a less controversial, safety solution that potentially could be implemented sooner. Therefore the four-lane design was not proposed as an alternative in this US 80 Bridges Study.

Although the concept of a four-lane, divided roadway was not considered an alternative, this concept of widening US 80 to four lanes has existed for many years, and several local residents and stakeholders have knowledge of it and express interest in its status. Because of this local interest, the 2003 GDOT four-lane concept has been carried through the evaluation of alternatives for purposes of comparison.

There had been suggestions from the public, during this study, for the addition of a middle, reversible lane throughout this segment of US 80. This potential solution was not included among the alternatives for several reasons: capacity is not deficient on most days and substantial directional imbalances are less common in the busiest hours; the suggestion fails to address the safety-related need for removing turning traffic from the flow of through traffic; and finally, a





three-lane concept (although perhaps not reversible) had been considered by GDOT in the development of the four-lane concept, and was estimated to have more impacts than a typical three-lane project due to aspects of the construction staging in this corridor, giving it no overall advantage above a four-lane project, if demand warranted such.

# **Environmental Screening**

An environmental screening of the project area was conducted to determine potential environmental impacts that may occur as a result of the US 80 alternatives. The results from the environmental screening were used as criteria in the evaluation of alternatives. Federally funded projects must be evaluated for potential impacts to the physical, natural and social environment under the regulations of the National Environmental Policy Act (NEPA). Environmental impacts are evaluated and documented during the preliminary engineering stages of project development. As a part of this feasibility study an environmental screening was completed to identify areas of concern that may impact future project development stages.

# Physical Environment

Analysis of the physical environment includes the assessment of the project on the built environment. This project is located in an area with little overall development and few property owners. The majority of the project is within National Park Service property associated with the Fort Pulaski National Monument site. There would be limited property impacts to businesses and no property impacts to residences. Because US 80 is the only roadway connecting Tybee Island to the mainland, it is the only evacuation route for Tybee Island residents and visitors. An analysis of the evacuation route and potential impacts would need to be assessed as part of the environmental documentation.



The Fort Pulaski National Monument site is both a public park and a historic site which receives protection under Section 4(f) of the US DOT Act. Coordination with the Federal Highway Administration and the National Park Service would be needed to determine the appropriate evaluation of the site as a Section 4(f) resource and the potential impacts that may result from the US 80 project. The McQueen's Island Trail is a recreational facility that is also protected under Section

4(f). Improvements to the trail that are proposed as part of this project would need to be coordinated with FHWA, NPS and Chatham County to determine the appropriate evaluation of the site and potential impacts of the US 80 project.

Archeological and historic sites have been identified in the project area and would likely not be affected, other than the Fort Pulaski National Monument site. The previously documented cultural resources surveys will need to be reevaluated and submitted to the State Historic Preservation Office for concurrence on the findings of impacts to cultural resources within the project limits.





# Natural Environment

The project corridor lies along the coast and is adjacent to a significant marsh area. The National Park Service is proposing, in the current draft of their General Management Plan, that large portions of the marsh area be designated by Congress as a Wilderness Area. This designation will provide protection to the marsh to ensure preservation. The boundaries of the wilderness area are defined by the US Congress and cannot be changed without a Congressional act. Ongoing coordination will need to be continued with the National Park Service in the boundary designation to account for the proposed improvements to the corridor.



The marsh is not only a significant wetland but is also habitat to numerous species. The area's rivers and creeks are also habitat to many species. An ecological survey of the area will be required to assess potential impacts as part of the environmental documentation. Based on previous work conducted along the project area, several federally protected species may be affected including: Wood stork, West Indian manatee, Marine turtles (loggerhead sea turtle, green sea turtle, leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle), Shortnose sturgeon, Kirtland's warbler, Bachman's warbler and the Diamondback terrapin. Through initial coordination the diamondback terrapin has been identified as species of management of concern because they cross US 80 for nesting. Section 7 consultation with the US Fish and Wildlife Service is anticipated in later project development stages to address potential impacts to the diamondback terrapin and other identified protected species.

The US Army Corps of Engineers regulates impacts to Waters of the US as governed by Section 404 of the Clean Water Act. A permit will be required for the replacement or rehabilitation of the bridges over Bull River and Lazaretto Creek, as well as for impacts to wetlands. The level of permit will be determined during the environmental documentation.

Lazaretto Creek is a navigable waterway and the project may require a permit from the US Coast Guard. Continued coordination with the US Coast Guard will be required to assess impacts to the navigability of the creek.

## Social Environment

The population of Tybee Island is variable because of the high number of tourists to the Island. The resident population in 2010 was 2,990 and 3,366 housing units according to the Census Bureau. The population decreased by approximately 12 percent from 3,392 in 2000. However, the housing units increased by approximately 25 percent from 2,696 in 2000. Although there have been fluctuations in the resident population on the Island, it is relatively stable around 3,500





residents because of the limited opportunities for growth on the Island. According to 2010 Census data, the population of the island is more homogenous than Chatham County as a whole: About 95 percent of the population of Tybee Island is white; approximately 35 percent of the population is age 60 or older, while in Chatham County overall, approximately 53 percent is white, 40 percent is African American, and approximately 17 percent of the population is age 60 or older.



Tybee Island is one of many major tourist destinations in the Savannah metropolitan area. The tourist population during peak season can average as many as 10,000 additional people, based on the Tybee Island Tourism Council's assessment of rental units and vacancy rates. Absent from that calculation are visitors from nearby areas who don't spend the night. This high variability in the number of people visiting the Island presents a challenge in addressing the needs of the community, because some improvements may only be warranted during small windows of time during the tourist season. Improving overall traffic management and safety may be the right balance between addressing the needs of the full-time residents and the needs of the visitors.

# **Evaluation of Alternatives**

The six alternatives were compared to a no-build option and an earlier GDOT concept that is a widening of the roadway and the bridges to four lanes with a median. Evaluation criteria were developed based on public and stakeholder input as well as on aspects that may impede implementation. Several alternatives were modified based on public and stakeholder comment. The shoulder width on the bridges for Alternatives 2, 3 and 6 were increased from eight feet to ten feet. The purpose of this increase was to have the shoulder width be the same as the roadway and to provide more room for emergency vehicles and options for traffic management within a two lane road.

The section is structured to communicate: 1) description of each criteria and how the alternatives performed against it; and 2) the compilation of evaluation showing the resulting matrix of scores for all alternatives against all criteria.

# Performance of Alternatives by Criteria

There were eight criteria applied for the comparison of the alternatives. For each criterion, the application included a translation to a 0-4 scale of points, with higher being better. For reference, the criteria were:

- Extent that the need and purpose is addressed
- Benefit-cost ratio
- Life-cycle cost





- Maintenance of Traffic
- Environmental Impacts
- Extent that bicycle and pedestrian needs are addressed
- Constructability
- Public Preferences

The following sections explain the application of the criteria and how the alternatives performed on each.

# EXTENT THAT PURPOSE AND NEED IS ADDRESSED

A draft purpose and need statement was developed to guide the evaluation and comparison of alternatives, although the purpose and need statement would not be finalized until later when the implementation project would go through the State's plan development process.

Safe and efficient connectivity, for motorized and non-motorized modes, between Tybee Island and the mainland is currently limited by the existing conditions of US 80 between and including the Bull River Bridge and the Lazaretto Creek Bridge. Improvements are needed to ensure the only route between Tybee Island and the mainland is consistently and reliably available to yearround and seasonal residents, and to tourists. The purpose of the US 80 Bridges Study is to:

- Correct the substandard conditions of the existing bridges The bridge over Lazaretto Creek scored below 50 on the bridge sufficiency rating and thus is a candidate for improvement. At 61, Bull River's bridge sufficiency rating is not low enough to trigger automatic consideration for replacement or rehabilitation. However, because the bridge does not meet current design standards it is considered to be functionally obsolete.
- Improve roadway safety The need for safety improvements is shown by:
  - Crash Rate Analysis of historic crash data revealed crash rates on the study area segment of US 80 have been consistently higher than the statewide average for similar roads.
  - Access Points The locations of the significantly high number of crashes are generally near access points along the study area corridor. The entrance to the Fort Pulaski National Monument is on a straight stretch of US 80 where higher speeds are predominant. Also the access point at the McQueen's Trail parking facility is located near the taper from two lanes to one east of Bull River Bridge, which creates conflics between merging traffic and traffic trying to access the trail. As a result, this location has a high number of crashes.
  - Emergency Evacuation The existing roadway experiences flooding during storm events and hurricanes. The roadway flooding can cause the roadway to be closed, and as such, limits emergency evacuation from Tybee Island.
- **Provide multimodal connections** Bicycle and pedestrian facilities and trip generators exist within and at each end of the US 80 study area, but conditions on the roadway and bridges and lack of connection to the parallel trail limit the existing facilities' usefulness





for transportation. Most users of McQueen's Island Trail, a popular destination for pedestrians and cyclists, arrive by automobile, and on-site parking is not sufficient for the number of users.

In the application of this criterion, alternatives received points from 0-4, according to how many of the three areas above would be addressed by the alternative. The results are shown in the table below.

The no-build option does not meet the project purpose and need. Alternative 1 and the GDOT option do not provide barrier protection on the bridges and off-road trail connections, and thus do not address multimodal connections very well in this high-speed corridor. They received three points on this criterion. Alternatives 2, 3, 4, 5 and 6 all received maximum scores for addressing all purposes.

Alternative	Number of Purposes addressed	Points
No-build	Does not meet purpose and need	0
Alternative 1	Meets 2 out of 3 purposes	3
Alternative 2	Meets 3 out of 3 purposes	4
Alternative 3	Meets 3 out of 3 purposes	4
Alternative 4	Meets 3 out of 3 purposes	4
Alternative 5	Meets 3 out of 3 purposes	4
Alternative 6	Meets 3 out of 3 purposes	4
GDOT Alternative	Meets 2 out of 3 purposes	3

Table 7:Meets Purpose and Need by Alternative

## **BENEFIT-COST RATIO**

A cost benefit analysis is done to compare the incremental benefit from safety improvements versus the incremental cost of the project. GDOT has developed analysis tools using an excel spreadsheet to determine a benefit cost ratio for different levels of projects. One of the tools is specifically to look at the cost benefit ratio for safety projects. The following criteria are used to calculate the cost benefit ratio.

- annual number of collisions involving fatalities during study period
- average annual number of collisions involving injured people for the period of the study
- average annual number of collisions involving only property damage for the period of the study
- reduction of fatal and injury collisions by type
- reduction of property damage only collisions by type
- average cost, in thousands of dollars, per property damage only collision
- weighted cost, in thousands of dollars, of fatal and injury collisions
- average cost per injury in thousands of dollars
- average cost per fatality in thousands of dollars
- capital recovery factor based on countermeasure life
- *estimated initial cost of the countermeasure (cost of the improvement including r/w) in thousands of dollars*
- *estimated annual maintenance and operating cost of the countermeasure in thousands of dollars*





A benefit cost ratio equal to one means that the benefit equals the cost. The higher the number is above one, then the greater the net benefit. The ratio calculated for each alternative is shown in Table 8. There is not an analysis of the no-build alternative because no safety improvements would be made for the alternative. The highest benefit cost ratio was for Alternative 1 and the lowest was for the GDOT option and for Alternative 5, among those alternatives developed as part of the feasibility study. The benefit cost analysis sheets for each alternative are located in Appendix C.

The benefit-cost ratios were indexed to a 0-4 scale, with the highest ratio receiving four points. Alternative 1, with the highest ratio, received the maximum score, and all others scored proportionally lower.

Alternative	<b>Benefit Cost Ratio</b>	Points
No-build Alternative	N/A	N/A
Alternative 1	6.34	4
Alternative 2	3.88	3
Alternative 3	2.54	2
Alternative 4	2.65	2
Alternative 5	2.26	2
Alternative 6	3.39	3
GDOT Concept	1.54	1

Table	8:	Benefit	Cost	Ratio	bv	Alternative
					~,	

# LIFE CYCLE COST

Life cycle costs are estimated to determine the maintenance, operations and possible replacement cost of an infrastructure asset throughout its useful life. This cost estimation is useful in understanding the true cost of an asset beyond its construction cost. The life cycle cost provides a picture of when an asset may need to be replaced based on its existing conditions and the level of improvement that is viable to maintain it until it needs to be replaced. The older an asset, the more likely the asset is in need of replacement.

Planning level capital cost estimates were developed for each of the alternatives for comparative purposes but were not included as a separate evaluation criteria. The intent of the feasibility study was to determine the alternative that best meet the needs while being cost effective. The life cycle cost is a better measure of cost effectiveness than the initial capital cost because it takes into consideration the long term cost of the project in addition to the initial outlay of funds.

The life cycle costs were calculated for 50 year timeframe. The alternatives that included an initial rehabilitation of a bridge have a replacement of the bridge at 20 years for Bull River and 15 years for Lazaretto Creek. Table 9, showing each alternative's life cycle cost, also explains which alternatives have eventual bridge replacements influencing their total life cycle costs. The calculations of life cycle costs and initial capital costs are in Appendix D of this report.





The resulting life cycle dollar figures were indexed to the 0-4 point scale in an inverted manner so that the alternative with the lowest life cycle cost, which was Alternative 1, received four points, and all others scored proportionally lower.

#### Table 9: Lifecycle Cost Estimates

Alternative	Type of Replacement Bridge during Life Cycle Period	50-year Project Lifecycle Cost	Planning Level Initial Capital Cost	Points
No-build Alternative	N/A	N/A	N/A	N/A
Alternative 1	Expanded bridges would be eventually replaced with a new bridge with two 12-foot travel lanes with 8-foot shoulders.	\$58.7 M	\$25.4	4
Alternative 2	Expanded bridges would be replaced with a new bridge with two 12-foot travel lanes with 10- foot shoulders.	\$84.2 M	\$42.9	3
Alternative 3	New initial bridges. No additional bridge replacement needed during period of analysis.	\$77.1 M	\$64.2	3
Alternative 4	Expanded bridges would eventually be replaced with a new bridge with two 12-foot travel lanes with 8-foot shoulders.	\$98.4 M	\$61.5	3
Alternative 5	Expanded bridges would eventually be replaced with a new bridge with two 12-foot travel lanes with 8-foot shoulders.	\$109.0 M	\$71.7	2
Alternative 6	Expanded Bull River bridge would eventually be replaced with a new bridge with two 12-foot travel lanes and 10-foot shoulders. Lazaretto Creek Bridge has new initial bridge, no additional replacement needed.	\$79.7 M	\$48.7	3
GDOT Concept	No additional bridge replacement needed.	\$176.2 M	\$101.4	0

## **MAINTENANCE OF TRAFFIC**

US 80 is the only land connection to and from Tybee Island. Because of this, it was critical to consider the impacts of project construction on the ability for the travelling public to use the





roadway. Types of impacts considered were reduction in number of lanes open in any part of segment, as well as required reductions in traffic speeds during construction. More points were given, on the 0-4 scale, to project alternatives that have the least disruption to traffic movement during construction.

The No-build Alternative and Alternatives 3 and 4 scored the highest.

Alternative	Affected Criteria for Maintenance of Traffic	Points
No-build Alternative	No improvements, thus no related disruption.	4
Alternative 1	Would restrict travel to one lane on bridges.	1
Alternative 2	Would restrict travel to one lane on bridges.	1
Alternative 3	Would maintain traffic flow on bridges.	4
Alternative 4	Would maintain traffic flow on bridges.	4
Alternative 5	Would require reduction in travel speed on bridges.	3
Alternative 6	Would restrict travel to one lane on bridges.	1
GDOT Concept	Would require reduction in travel speed on bridges.	3

#### Table 10: Maintenance of Traffic by Alternative

#### **ENVIRONMENTAL IMPACTS**

The environmental documentation required by the National Environmental Policy Act (NEPA) will follow conclusion of this study and finalization of a design concept. The environmental screening described previously in this report was conducted to inform the development of alternatives with regard to minimizing impacts.

Because of US 80's proximity to sensitive marsh lands and its crossings of waterways, impacts to Waters of the US (wetlands, streams, rivers) were estimated to understand the requirements for a Section 404 permit from the US Army Corps of Engineers.

Additionally, the project is predominantly within the property of the National Park Service with the historic Fort Pulaski National Monument. A preliminary review of existing studies was conducted to determine the level of coordination that may be required with the National Park Service and with the State Historic Preservation Officer (SHPO). The previous GDOT concept had been surveyed by the environmental staff at GDOT and there are good records of their findings. The information from these reports was used to measure and compare potential impacts of alternatives.

# • Cultural Impacts

Regarding cultural resources there is little variability between the alternatives' anticipated impacts because of the homogenous nature of the corridor.





# Protected Species

Regarding protected species, most of the alternatives provide an opportunity to include protection measures, and therefore received the same moderate score. The GDOT concept received the maximum score, as it already includes protective measures to prevent wildlife from entering the roadway. The No-build Alternative provides no opportunity to increase protection of species and therefore received no points.

# Wetlands Impacts

The primary area of difference between alternatives on the environmental impacts is in wetland impacts. The alternatives with the smallest overall footprint would have the least potential for impact on environmental resources.

In application of this criterion, the calculated acres of impact were indexed to the 0-4 point scale, in an inverted manner so that fewer acres of anticipated impact resulted in a higher score. Thus the No-build Alternative and Alternative 1 scored the highest.

Alternative	Estimated Wetland Impact (Acres)	Points
No-build	0.00	4
Alternative		
Alternative 1	0.09	4
Alternative 2	6.09	3
Alternative 3	6.09	3
Alternative 4	9.50	3
Alternative 5	9.70	3
Alternative 6	7.98	3
GDOT Concept	27.98	0

## Table 11: Wetlands Impacts by Alternative

# EXTENT OF IMPROVEMENT FOR BICYCLISTS AND PEDESTRIANS

One of the purposes of this project is to explore options for bicycle and pedestrian access from Wilmington Island to Tybee Island. An off-road trail currently exists in the corridor but it has no off-road connections to and across the bridges. Some alternatives would provide on-road connections and off-road connections, and thus more buffering from motor traffic, while others would provide only on-road connections. The alternatives were scored according to connectivity provided to pedestrians and cyclists through the corridor, the amount of buffering provided between these non-motorized modes and motor vehicles, and the number of lanes.

Table 12: Bicycle and Pedestrian Criteria by Alternative
--

Alternative	Bicycle and Pedestrian Criteria	Points
No-build	Essentially lacks connections, due to almost no buffer from motor	0
Alternative	traffic on bridges and road.	0





Alternative	Bicycle and Pedestrian Criteria	Points
Alternative 1	Continuous connections through corridor, but minimal buffering	1
	from motor traffic.	1
Alternative 2	Continuous connections through corridor with good buffering from	1
	motor traffic.	4
Alternative 3	Continuous connections through corridor with good buffering from	1
	motor traffic.	+
Alternative 4	Continuous connections through corridor with good buffering from	
	motor traffic. But more lanes of motor traffic for portion of	3
	corridor.	
Alternative 5	Continuous connections through corridor with good buffering from	
	motor traffic. But more lanes of motor traffic for portion of	3
	corridor.	
Alternative 6	Continuous connections through corridor with good buffering from	1
	motor traffic.	4
GDOT Concept	Continuous connections through corridor, but with minimal	1
	buffering from motor traffic and more lanes of motor traffic.	1

## **CONSTRUCTABILITY**

Constructability is a review of the feasibility to build a project efficiently, economically and with minimal disruption to function. Considerations included potential for lane closures, impacts on the construction schedule (due to avoiding peak season traffic impacts for example), speed reductions and travel delays. This analysis was completed at a very conceptual level, as the details of the construction and construction staging would not be determined until the final design of the project. The table below shows the results of the preliminary analysis.

#### Table 13: Constructability by Alternative

Alternative	Lane Closure on Bridge for Greater than 6 Months	Construction Schedule Increased due to Traffic Staging (Minor)	Construction Schedule Increased due to Peak Season Restrictions (9M-1Y)	Reduced Speed on Bridges during Construction	Minor Traffic Delays/Reduced Speed during Bridge Tie-ins	Safety Issues during Construction for Workers and Vehicles	Construction of Bridge Completed with Minimal Traffic Staging
1	Х		Х	Х	Х	Х	
2	Х		Х	Х	Х	Х	
3					Х		Х
4					Х		Х
5					Х		X
6	X		X	X	X	X	
GDOT		X			X		X





Alternatives 3, 4, 5, and the GDOT Alternative are estimated to have fewer negative aspects in construction, and as a result fared the best on this criteria.

## PUBLIC INPUT ON EVALUATION OF ALTERNATIVES

The third public and stakeholder meetings occurred in August of 2011, in order to consider public preferences in the evaluation process. Four people attended the stakeholder meeting. Due to the unexpectedly low turn-out at that meeting, a memo was subsequently sent to all stakeholders, along with diagrams of all alternatives and instructions on where to find all available information on the US 80 web pages. The public meeting was attended by 34 people, some of whom also were stakeholders.

Diagrams and descriptions of all six end-to-end alternatives were provided, in addition to comparisons of the performance of each alternative on the criteria.

A written survey asked for rankings of the alternatives. Although evaluation results for the GDOT four-lane alternative were displayed due to awareness of that previous concept, that four-lane concept was *not* included in this question on public ranking because the focus of this study was safety; capacity was not found to be a major deficiency. It was therefore desirable to avoid giving the impression in the ranking exercise that the four-lane concept might be a recommendation of this study.

There was much similarity among the responses received at or shortly after the public meeting. Tabulations can be found within Appendix A of this report, which provides summaries from all meetings. A consensus rank order was evident, with four-lane water crossings being preferred, as shown in the table below. This rank order was translated into scores in the evaluation of alternatives by inverting the rank number and indexing that number to the 0-4 scale used for all criteria.

Public Consensus Rank	Points	
Most Preferred	Alt. 5	4
	Alt. 4	3
	Alt. 3	3
	Alt. 2	2
	Alt. 6	1
	Alt. 1	1
Least Preferred	No-build	0

#### Table 14: Public Ranking of Alternatives

Survey participants were also asked the following question: "If you had to choose between having some improvements sooner (i.e., less expensive alternative) OR having more improvements later (i.e., more expensive alternative), which would you choose?" Of the responses received, 68% chose a less expensive alternative sooner rather than a more complex, expensive alternative later (32%). This detail of public feedback did not figure directly into evaluation of alternatives but reveals a sense of urgency in the public that may be at odds with the public consensus for the largest amount of improvements.





# Compilation of Evaluation Results

The following table shows the results of the comparison of alternatives based on the evaluation criteria. Alternative 3 received the best overall score.

#### Table 15: Comparison of Alternatives in the Evaluation

	No- Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	GDOT Concept
Meets Purpose and Need	0	3	4	4	4	4	4	3
Benefit-Cost Analysis	N/A	4	3	2	2	2	3	1
Life Cycle Costs	N/A	4	3	3	3	2	3	0
Maintenance of Traffic	4	1	1	4	4	3	1	3
Wetlands and Streams	4	4	3	3	3	3	3	0
Protected Species	0	2	2	2	2	2	2	4
Bicycle and Pedestrian Accessibility	0	1	4	4	3	3	4	1
Constructability	N/A	1	1	4	4	4	1	4
TOTAL (before Public Meeting)	8	20	21	26	25	23	21	16
Public Meeting Ranking Results Indexed	0	1	1	3	3	4	2	Not ranked
TOTAL (including Public Input)	8	21	22	29	28	27	23	16
(Higher is better)								
Average score per Applicable Number of Criteria	1.33	2.33	2.44	3.22	3.11	3.00	2.56	2.00
(Higher is better)								

0-4 scale, with higher being better





# **Recommended Alternative**

Alternative 3 is recommended as the option to move forward to the next steps of project development. The proposed alternative would replace existing bridges at Bull River and Lazaretto Creek with new bridges that have ten-foot bikeable shoulders and a ten-foot barrier separated multi-use path on the north side of the bridge. Off-road paths would connect the existing McQueen's Island Trail to the proposed paths on the bridges. The new bridges would be located adjacent to the existing bridges on the north side of US 80. The existing bridges would be removed. See the figure below.



#### Figure 10: Bridge Treatments in Alternative 3 (Recommended Alternative)

Roadway improvements include widening the existing road to accommodate ten-foot paved, bikeable shoulders. The roadway near Fort Pulaski would be restriped to allow for a left hand and right hand turn lane. An 18-space parking area would be constructed at the entrance to McQueen's Island Trail and have a left hand turn lane for improved access. See the figure below.







#### Figure 11: Roadway Treatments in Alternative 3 (Recommended Alternative)

The primary purpose of the US 80 Bridges study was to identify feasible alternatives for improving safety along the corridor and on the bridges while providing bicycle and pedestrian access. Alternative 3 was recommended as the most feasible alternative because it provides improvements to safety through added shoulders, restriping for turning movements and safe access to the McQueen's Island Trail. Before beginning the evaluation of all alternatives, the recommendation for the width of the shoulders on the bridges (in this alternative and similar ones) was expanded from eight feet to ten feet to better accommodate emergency vehicles and provide more options for traffic management during peak events, including evacuations.

Alternatives 4 and 5, which provide more lanes on the crossings, had identical total scores in the comparison of alternatives but did not score as well as Alternative 3. The additional lanes on the crossings would not eliminate congestion as long as the causeway is not four lanes. Ultimately the traffic data does not support the need to expand capacity on the roadway. The roadway operates at an acceptable level of service the majority of the time. During the peak tourist season, specifically on high demand days around holidays, such as the 4<sup>th</sup> of July, the traffic volume exceeds the available capacity. The traffic capacity data is available in Appendix E. Regarding seasonal congestion, the ten foot paved shoulder along the length of the project corridor, proposed in Alternative 3, allows for more traffic management options during these peak travel times. By maintaining a two lane facility versus a four lane facility the project can be implemented more quickly because there are less overall impacts to property and the environment and the overall capital cost is lower, which places less demand on limited available funds.

The provision of additional lanes on the bridges in Alternatives 4 and 5 involved reuse of the existing bridges. The Lazaretto Creek bridge has a sufficiency rating below 50 and would likely be replaced rather than rehabilitated. The level of rehabilitation may be limited by the existing conditions of the bridge which would be further evaluated by GDOT during concept design.





Based on ongoing conversation with GDOT during the course of the study, it is likely that the Lazaretto Creek Bridge would need to be replaced sooner than 15 years as anticipated in the life cycle cost analysis. This would make an investment in rehabilitation less feasible. Although Alternative 4 has a lower estimated capital cost, approximately \$2.7 million less than Alternative 3, the life-cycle cost is approximately \$21.3 million more than Alternative 3. Additionally, implementation of Alternative 3 would not eliminate the possibility of a future four lane facility along the corridor if it becomes warranted. A new two-lane bridge could be constructed at each crossing, parallel to those provided in the implementation of Alternative 3, if and when a four lane facility is reasonable.

For these reasons Alternative 3 is being recommended to move forward for further design to improve the safety conditions, for multiple modes, along the roadway as well as on the bridges in a timelier manner without limiting the opportunity for widening in the future.

# Public Outreach on the Recommended Alternative

An extra public meeting was held in December of 2012 on Tybee Island to communicate results of the study. Thirty-one people attended. A video was shown to fully describe the study recommendation and to provide an animated "tour" of the project as it would appear after construction. The figure below shows a graphic from the video.

The video also was available before and after the meeting, on the MPC web site and through a link in the Savannah Morning News' online version of news story about the public meeting. At the meeting, the diagrams of the recommended alternative and the matrix comparing the performance of all alternatives in the evaluation were all displayed again. Although the study's recommendation differed from the public preference that was indicated at the previous meeting, only a few people provided written comments at or after the final public meeting. The majority of comments were positive. Details are provided in the Memorandum on Public Involvement.



Figure 12: Example of rendering from the animation shown at the study's final public meeting





# **Next Steps**

A DRAFT Concept Report and design layout with the information known to date is included in Appendix F of this report.

The Georgia Department of Transportation is sponsoring the implementation project (US 80 Bridges and Road Improvements, PI 0010560), and Scoping and Preliminary Engineering currently are funded in the MPO's Transportation Improvement Program. The scoping phase will include environmental approval of a preferred alternative.

This final report, the technical memoranda, and the DRAFT Concept Report are provided by CORE MPO to facilitate the initial steps in the Department's Plan Development Process on the implementation. CORE MPO will remain involved with Georgia DOT, local stakeholders, and the public throughout the process.





APPENDIX A: Public Involvement Materials from the US 80 Bridges Study





# **Study Overview**

US 80 is the only transportation corridor that connects Tybee Island to the Savannah mainland. The two bridges each have two lanes with no shoulders. However, the highway has four lanes on the Savannah side of Bull River and also has four lanes on the Tybee side of Lazaretto Creek; thus the bridges can act as traffic bottle necks. When accidents occur on the bridges, traffic is usually blocked in both directions, due to the absence of shoulders. The lack of shoulders also prohibits use of the bridges by bicyclists and pedestrians, although scenic qualities of the area and proximity to tourist destinations generate bicycle and pedestrian demand. The roadway between the two bridges has "low spots" that flood under certain conditions. Traffic incidents and flooding can shut down US 80, isolating Tybee Island from the mainland. Given the above, the study of this portion of the corridor will address bridge replacement/modification of the Bull River and Lazaretto Creek bridges to include shoulders, flood prone areas along the causeway and bicycle and pedestrian access.

A four-lane concept that includes reconstruction/rehabilitation of the two bridges and causeway has been developed by the Georgia Department of Transportation (GDOT). The GDOT concept currently is not federally funded in the MPO's long range plan that looks out to 2035.









# **Study Objectives**

The purpose of this study is to identify potential interim solutions that will improve bridge and roadway conditions in the short term while allowing the potential to integrate with GDOT's widening concept in the future.

The study is to determine the feasibility of:

- Replacing or modifying the existing bridges to accommodate wider lanes and shoulder,
- Constructing bicycle and pedestrian facilities that link to Tybee Island and McQueen's Island Trail,
- Providing additional capacity at specific locations to provide congestion or incident relief,
- Improving conditions of flood prone areas.

# **Project Schedule**

The US 80 Bridges Replacement study will take approximately 12 months and will include the following major tasks.

- Data Collection and Evaluation of Previous Studies
- Determination and Evaluation of Alternatives
- Identification and Evaluation of Potential Funding Options
- Environmental Screening
- Definition and Selection of a Preferred Alternative
- Concept Development of the Preferred Alternative
- On-going and Proactive Public Participation Process

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**Metropolitan Planning Commission** 





# US 80 BRIDGES REPLACEMENT STUDY GDOT P.I. No. 0009379

# Memorandum PUBLIC INVOLVEMENT SUMMARY

**Prepared** for



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December, 2012

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Prepared in cooperation with the Department of Transportation, Federal Highway Administration.



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# Introduction

The public involvement for this project has consisted primarily of three rounds of meetings, with each round including a stakeholder meeting and a public meeting.

A stakeholder database was developed at the beginning of the project to identify interested parties that could influence decision making or be impacted by the project. Invitations were sent to 35 people identified in the stakeholder database. The stakeholder database is intended to be a dynamic product and be updated and amended as needed to include additional stakeholders. The initial stakeholder database is included in Appendix A, as well as the handouts from the stakeholder meeting.

All public meetings were held on Tybee Island, as it was anticipated that the majority of attendees would be Tybee Island residents. Press releases for each meeting were sent to all media contacts in the CORE MPO database. Each meeting was noticed in the Savannah Morning News and on the MPC web pages. In addition, multiple roadside signs were posted along the U.S. Highway 80 corridor. The City of Tybee Island also posted the meeting information on the electronic marquis in front of City Hall. Members of the stakeholder committee and regular CORE MPO committees were also encouraged to invite interested parties.

# **Meeting One: Project Introduction**

The purpose of the first round of meetings was to introduce the study and to identify and receive feedback on those issues that are of most concern.

Two project kick-off meetings were conducted in September 2010 for the US 80 Bridges Study. A stakeholder meeting was held on September 15, 2010 at 3:00 pm in the Chatham County-Savannah Metropolitan Planning Commission's Hearing Room. There were 13 people in attendance. The sign-in sheet is available in Appendix A. A public Information Meeting was held on September 16, 2010 at 6:00 pm at City Hall on Tybee Island. There were 46 people in attendance. The sign-in sheet is available in Appendix B.

The stakeholder meeting and public meeting both focused on similar issues, so comments received from each meeting are presented side-by-side in order to convey the information for the topic overall. The meetings focused on the following primary topics: safety, environmental concerns, tourism and bicycle / pedestrian access, coordination / communication and congestion management.





Overview				
Stakeholder Meeting	Public Meeting			
The meeting began with a presentation of the project, which presented the project corridor, potential issues, and the study purpose and approach. The meeting was then opened for discussion.	The public information meeting opened with the presentation of the project, which presented the project corridor, potential issues, and the study purpose and approach. Following this presentation, the meeting participants were divided into two groups			
important for laying the groundwork for addressing some of the issues Tybee Island is facing and should focus on issues that can be addressed in the near future.	for a facilitated discussion. At the end of the meeting, each breakout group reported back to the full group.			
Safety				
Stakeholder Meeting	Public Meeting			
Safety discussions focused on emergency response – primarily the inability of the responders to access the accident scene due to the bottleneck created by the two two- lane bridges without shoulders. The absence of shoulders restricts the movement of emergency vehicles. The lack of enforcement and routine patrols of the study area were discussed. The	Safety was a major point of discussion, from a number of various perspectives. Some safety concerns are by virtue of the roadway itself – no shoulders, accidents blocking travel lanes, and bottlenecks that occur when two lanes transition into one. When accidents occur on the bridge, emergency vehicles cannot access the island.			
attendees indicated that overall presence of law enforcement staff patrolling the area is lacking or at least not patrolled at the level the attendees think is necessary. Driving in excess of the posted speed limits was also discussed and considered a major safety issue. This relates to the lack of routine patrols and the enforcement of the	Other safety concerns relate more to driver behavior – people driving too fast, spectators slowing down to look at accidents, and visitors who stop and/or slow down to enjoy the views. Comments were made that while the addition of shoulders can address some of these issues, wider bridges could also encourage higher			
posted speed limits. Several accidents have occurred where the two lane passing areas merge to one lane. These areas should be considered for improvements. Evacuation was also an issue. Based on	speeds. There were also comments about the curve to the east of the Bull River bridge – this is a blind spot for eastbound traffic and a hazardous curve for westbound traffic, especially at night. The importance of Highway 80 as an			



several comments, an emergency evacuation plan for Tybee Island is not in place. This will be further investigated by the consultant team.

The need to address the flooding of the roadway during seasonal high tides was also discussed.

evacuation route was also mentioned.

Flooding was mentioned, but did not seem to be a significant issue of concern.

Environmental Concerns			
Stakeholder Meeting	Public Meeting		
Discussions centered on the possible impacts resulting from any construction activities within the study area. The study area is within a salt marsh and a state protected turtle, the diamondback terrapin, is common to the area. Any widening or modification to the roadway or bridges would result in impacts to the marsh (wetlands).	<ul><li>While flooding was not identified as a major concern, comments were made that the roadway may not be able to withstand the over-wash associated with a major storm event.</li><li>Vegetation adjacent to the roadway should be enhanced, both for erosion control and for aesthetics.</li></ul>		
Elevated mortality occurs to the terrapin during egg-laying season due to road kills. This mortality occurs in other Georgia coastal areas also and there is ongoing research/ studies looking at ways to address/reduce the mortality.			
Tourism and Bicycle/Pedestrian Access			

Tourism and Bicycle/Pedestrian Access			
Stakeholder Meeting	Public Meeting		
At present, the traffic congestion occurs during the typical summer tourist season. Participants discussed an evolving trend, eco/heritage tourism. This includes bird watching, and other wildlife, environmental, historic related activities. The peaks for this type of tourism occur at different times of the year (non-peak summer season), with some of the activities tracking wildlife migration activities. These eco/heritage tourism activities would stress the use of bicycle and pedestrian	Tourism was cited as justification for addressing congestion issues. In addition, there was support for improving cycling and recreational facilities – the Tampa Causeway was referenced as an example of recreational facilities. Fort Pulaski is prioritizing a multi-use trail as part of their Master Plan. There was generally support for having a separate facility for bikes; people felt that if US 80 were safe, then cyclists would use it. The bridges in particular (especially		





Lazaretto) are very dangerous for pedestrians and cyclists. McQueen's Island Trail is very popular, and although there aren't many recorded accidents along US 80, there are a lot of near misses.

(suggested through Wave Ecology

the time it takes to clear an accident.

There was also a question raised regarding

initiative).

# Coordination/Communication

Stakeholder Meeting	Public Meeting	
The stakeholder group stressed the need to coordinate with other advocacy groups and agencies. These include the Audubon Society, National Marine Fisheries Service, and the Department of Interior/National Park Service, specifically Ft. Pulaski.	There were several comments made suggesting that public information strategies could be helpful. For example, when there is an accident on the bridge, there is no notification and traffic is blocked. Signs should be posted for "No stopping on bridges." Signage could also inform the public about the availability of parking on the island.	
Conception Management		
Congestion Management		
Stakeholder Meeting	Public Meeting	

Stakeholder MeetingPublic MeetingPark and Ride facilities were discussed to<br/>reduce congestion during the tourist<br/>season.Suggestions were also made that traffic<br/>management could be helpful for weekend<br/>events. Busses should be used for events

Adding additional capacity to US 80 using a double decker road was also a discussion topic.





# **Survey Results – Meeting One**

The first round of meetings with stakeholders and the public also included written surveys. A total of 4 stakeholder and 47 public responses were received, including mail-in responses. The results of these surveys are shown below.

# Question: In your opinion, are improvements needed to the US 80 corridor?

Yes	No
100%	0%

Why or why not?

- Safety
- Future expansion of population
- More day-trippers have right to public beach
- People need jobs
- Need a safe, separated bike/ped facility. Especially on the bridges
- From an emergency service perspective, it is a dangerous road and difficult to respond on and to for emergency incidents.
- To alleviate traffic congestion, and for safety.
- All the items identified as safety problems it would be great to see a bike path.
- Need to be able to get off the island in the event of an evacuation. How many incidents on corridor per year?
- Safety
- The major issue is safety of residents and visitors to Tybee. Chatham County previously voted SPLOST funds to widen US 80. These funds were diverted to other road projects in Chatham County where a few local citizens objected to the DOT. We lost ground here.
- Safety and Congestion
- Widening of shoulders; turn lanes at McQueen's Trail; bike lanes; bridges; bike and pedestrian paths
- Safety improvements are needed. Capacity is not a problem except on a few days (Doesn't warrant the expense for more capacity). Should be more accessible for cyclists and walkers. Access at McQueen Trail is dangerous! Traffic is turning and backing out.
- This is a stupid question.
- To prevent isolation when accidents or other issues arise.
- Traffic levels, flow of traffic, bottlenecks, recurrent pockets of unsafe areas as indicated by repeated accidents.
- All of the issues mentioned in the ratings section.
- Safety and Congestion
- N/A
- We need emergency and bike lanes for public safety.





- Road was never planned. As an "entity" by "improvements" made piece meal have made same safety issues such as: left turning vehicles from eastbound lanes to bike trail, passing lanes on wrong exits.
- For safety, evacuation and traffic safety and congestion-particularly if there is an accident or during the holidays and special events such as July 4th, Beach Bum parade, New Year's Eve fireworks
- Primarily safety. Also traffic jams for 6 months of the year.
- Tybee Road bull River to Lazaretto has been neglected for years. It is unsafe and a trash dump that is nearly never cleaned or maintained. Over the summer months congestion is horrible.
- The road and bridges (Bull River and Lazaretto Creek) are extremely dangerous and present a major safety issues for Tybee residents and beach visitors. The bridges are outdated and cause traffic to bottle neck coming on and off the island. There are no shoulders on the bridges or road between them to accommodate cars in distress or emergency vehicles. One accident on either bridge shuts down traffic sometimes for hours. This is a major safety issue especially during peak summer traffic where there may be in excess of 50,000 people coming to Tybee. The road built in the late twenties and thirties has settled and becomes impassable during extreme high tides or heavy rain, making the road inconvenient and dangerous to those trying to drive thru standing water.
- The Bull River and Lazaretto Creek bridges are dangerous, lacking shoulders for emergencies while being very narrow. During heavy traffic periods, bottlenecks are created that increase driving hazards. The roadway between these two bridges is low and extremely hazardous during periods of rain and high tide. When autos heading towards Tybee Island are in the turn lane for Ft. Pulaski, an extreme driving hazard is created for unsuspecting motorists.
- Unimpeded Ambulance Service
- Convenience for Residents and Visitors
- Safety! This corridor was designed to handle the volume of traffic that travels it daily.
- Walking and running/riding needed all along all of Hwy 80 for local access w/out vehicles and for fitness. The option to walk or ride to Savannah would be good. People would like to use US80 but are afraid of the corridor due to heavy traffic.
- bridges need to be widened to accommodate accidents, bicycles
- To ease traffic on and off the island for emergency reasons. And to provide bicycle lanes.
- no comment
- It will clear all traffic problems by allowing bicyclists to have their own lanes, and allowing more traffic to flow.
- But only if ecologically and scenic alternatives can be provided with 4 lanes from Wilmington Island to Tybee Island.





Question: Please rate the following issues along US 80 to show your level of concern. Rate each issue on a scale of 0 to 5, with 0 representing no concern and 5 representing highest level of concern.



















# Question: What other comments do you have about this study?

• I think the general public will say yes to this project. However, it would be helpful if the people could justify the cost as to the benefit. Just how much will the total project cost? How much inconvenience of one-way traffic and river congestion of crane and bridges by contractors? Will it be worth it? How long will it take?




- Long term planning should include a train to Tybee (versus assuming a 4 lane road a train would not add to Tybee's challenging parking situation) and perhaps no 4 lane in 2035. Additionally, putting electric and other utilities underground.
- It is most important to build a project sensitive to the local environmental and safety concerns. Not build an urban cloverleaf such is currently proposed.
- Consider a second route to Tybee.
- The study is long overdue.
- Funding
- Based on criteria for funding. Come up with plausible ideas to increase safety.
- Come up with something that can be done! Don't look for "perfect" solutions. (Don't 4/5 lane no elevated road).
- Why are we paying you and not just spending the money on bridge and road repair!!
- That it includes comprehensive environmental concerns, issues of use of environmentally friendly materials and processes.
- Realizing money is the biggest factor, why doesn't GDOT and the Feds contribute funds annually (savings account) to be used when the study is complete? It's called budget planning, folks! Even at \$1 million per mile, \$5 million is chump change. Or even \$5 million/mile. Smart planning is needed. I would like to see a raised roadway for 5.5 miles to allow animals to pass underneath without injury as well as high tides. You should also build 2 bridges at Lazaretto and Bull River. Two lanes going east and two west. Parallel bridges will reduce accidents.
- Use what you already have.
- Bridges need safety lanes and bike lanes. Rumble strips should be moved onto road striping and should be widened for bikes.
- We have had numerous "studies" with no apparent results what is time frame for actual improvements? Also, the road and drive are a major scenic attraction for Tybee Please keep the memorial palms, and [illegible], and our beautify roadway.
- It seems to me that if the two passing lanes were reversed, it would ease congestion. If you get behind slow traffic going in either direction, you could pass them without having to wait several miles (double yellow lines) to do so.
- There have been so many accidents and some fatalities on these bridges. More will occur is nothing is done.
- I am a 56 year old resident of Tybee and a business owner of the oldest [illegible] bus on Tybee. I would love to share my thoughts on upgrade to Hwy 80 in person with anyone that will listen. I can propose a 'fix' to the causeway mess with little to no affect on traffic flow as we now know it. Please call if interested
- I am assisting in the assembling of a substantial number of concerned residential and commercial people to present a formal proposal to CORE about the needed improvements to the US 80 corridor. There is a minority, but educated and vocal, number of people who for selfish reasons, mainly not wanting any more visitors to come to what they consider their island, that think that any improvements to the causeway of US 80 will defeat their desires. If given enough time we will present





our list of names, including our local government, to state our desires for improvements.

- If the study can bring to life the urgency and the current need to replace the bridges, four lane and raise the existing low lying elevations of the road, then the study would be a good thing. This project has been studied many times before with the same conclusions. There is no doubt that the highway needs to be brought up to current federal highway standards. This is the reason that the Ga Department of Transportation initiated the 2003 Concept Design. The inclusion of bike paths and turtle protection is nice, but the safety of humans should be the first priority. Another consideration when making four lanes and raising the roadway would be to run a utility pipeline beneath the road to connect Tybee to natural gas, run electric lines, and pump the sewage from Tybee back to the President Street Sewage treatment plant.
- Improvements are needed immediately to lessen the possibilities of death, injury and property damage. Currently this is an extremely hazardous stretch of roadway. Low areas leave Tybee Is. inaccessible (and the mainland, also) during times when emergency access or evacuation are most necessary. Tybee Island's popularity is increasing rapidly. Remedial actions must be taken quickly before problems escalate to the unimaginable.
- The restoration of boat ramp at Alley 3 would help eliminate traffic to Lazaretto that requires a left turn and backs traffic over bridge especially on holidays when everyone is on the water.
- We have seen accidents with cyclists getting hit (and killed). Most motorists have little appreciation for anyone but themselves and this is reflected by the number of problems on Hwy 80. Cycling and running/walking to Sav and beyond would be very good for overall health and eco-tourism.
- The road is fine; just bridges need to be widened
- This has been needed for a very long time and no further delays of this project should occur!
- Would like for it to be a fast & speedy process. Shouldn't take 8 yrs. to do I pay my Tybee taxes, so let's hurry up & begin and Finish.
- I believe the study should be done to research the benefits of widening Hwy 80 to Tybee Island. I believe they will find that it will benefit everyone in the end.
- I feel unless the Tybee Road is 4-laned all the way from Wilmington Island to Hwy 80's 4 lanes on Tybee Island that widening sections or bridges is a waste of time and money, if the goal is only to reduce congestion and accidents.

#### Question: What is your relationship to Tybee Island?

Public Meeting

- Full time resident (25)
- Part time resident (6)
- Stakeholder Meeting
- Full time resident (1)
- Don't usually go to Tybee (2)





## Question: How did you hear about today's meeting?

Public Meeting

- Roadside signs (12)
- Word of mouth (9)
- Newspaper (4)
- Email (2)
- City's website (1)
- Water bill (1)
- Stakeholder Meeting
- MPC invitation (2)





## Meeting Two: Project Alternatives

The purpose of the second round of meetings was to present a range of alternative solutions for improvements to the bridges, roadway shoulders, and access points to Fort Pulaski and McQueen's Island Trail.

The stakeholder meeting was held on March 8, 2011, at 2:00 pm in the Chatham County-Savannah Metropolitan Planning Commission's Hearing Room. There were 14 people in attendance. The sign-in sheet is available in Appendix A. A public Information Meeting was held on March 8, 2011, at 6:00 pm at the Old School Cafeteria on Tybee Island. There were 25 people in attendance. The sign-in sheet is available in Appendix B.

Each meeting opened with an overview presentation about the project, the process, and the alternatives developed. The stakeholder meeting and public meeting both focused on similar issues, so comments received from each meeting are presented side-by-side in order to convey the information for the topic overall. The meetings focused on the following primary topics: roadway options, Fort Pulaski access options, McQueen's Trail parking options, and bridge options.

Stakeholder Meeting	Public Meeting
Discussion about the roadway focused primarily on safety issues. The group discussed concerns about the passing lane and raised the question if it was better to eliminate it. Many attendees expressed a believe that the passing lanes create more problems than they solve; however most also agreed that removing passing lanes would be extremely unpopular. There was also discussion of reducing the speed limit and adding traffic calming. EMS/Fire expressed support for the fully paved shoulders.	In general, there was support for paving the entire shoulders so they could be used as extra lanes for emergencies or for evacuations. Comments were made that something should be done immediately for cyclists. A question was raised regarding speeding and enforcement, which is the responsibility of Chatham County. In general, option C (paving full shoulders) was preferred so there would be extra capacity for emergencies/evacuations.
A comment was made that if McQueen's Trail was paved, it would need a retaining wall to avoid being washed out. A question was asked if the trail could be elevated, but this would result in additional marsh impacts.	For McQueen's Island Trail, comments were made that it is already washed out in areas and paving would require significant work.

### Roadway/McQueen's Trail Options





Fort Pulaski Access Options					
Stakeholder Meeting	Public Meeting				
The group expressed serious concern with the roundabout. While the aesthetics would be nice, there was concern about its function, including its function in an evacuation and if the Ft. Pulaski station would have to be relocated. In general, the group supported modifying the turn lanes.	The roundabout option was not generally supported. Concerns included stacking issues for westbound traffic, bottleneck issues, and problems for large vehicles, such as RVs.				
McQueen's Z	Trail Options				
Stakeholder Meeting	Public Meeting				
The group was in favor of removing parking altogether from the existing site, because this is a dangerous location. This area could be used as a drop-off and maintenance access. In the immediate future for a low-cost immediate impact, option I was preferred (15 parking spaces with two-way exit). The group supported looking at additional parking facilities, perhaps at Fort Pulaski and/or on the Wilmington Island side of Bull River.	The group did not discuss parking for McQueen's Trail as much as some of the other topics for the evening, but support was expressed for considering formal parking for the trail at Fort Pulaski.				
Bridge	Options				
Stakeholder Meeting	Public Meeting				
Support was expressed for having a separate bike/ped facility, either as a separate structure (option Q) or separated with a Jersey barrier.	The bridge options generated significant discussion. In general, the group supported building two new parallel bridges with two lanes on each bridge, with barrier-separated multi-use facilities. Specific comments were made that the height of the Lazaretto bridge causes lost business at the marina; support for pedestrian facilities on Lazaretto was expressed, as this is a popular spot for taking pictures.				





Suggestions were made to add lighting on the bridges. In particular, there is an optical illusion on the Bull River bridge that makes it look straight at night.

## **Survey Results – Meeting Two**

The second round of meetings with stakeholders and the public also included written surveys. In total 7 stakeholder and 14 responses public responses were received. The results of these surveys are shown below.

#### Question: The current posted speed limit is 55 mph, except for the Bull River Bridge which is 45 mph. Please indicate your preference for the posted speed limit.

Johnny Me parkin	Johnny Mercer to trail parking area		g area to west aski entry	West of Ft. P of Lazaretto	ulaski to east Creek Bridge
45 mph	55 mph	45 mph 55 mph		45 mph	55 mph
56%	44%	44%	56%	53%	47%

#### Question: Which option do you prefer for the US 80 causeway?

A. Do Nothing (Keep existing roadway)

10.001



B. Existing 12' Travel Lane with Addition of 6'6" Paved Bikeable Shoulder and 3'6" Unpaved Shoulder (McQueen's Trail Option; Paved or Unpaved)

C. Existing 12' Travel Lane with Addition of 10' Paved Bikeable Shoulder (McQueen's Trail Option; Paved or Unpaved)

9% No response

5%

Additional comments:

• C, better for emergency vehicles





- C, with barrier between cars and bikes
- C, with rumble strips

#### Question: Should McQueen's Trail be paved or unpaved?

38%	Paved

- 43% Unpaved
- 19% No response

### Question: Which option do you prefer for Ft Pulaski access?

- 5% D. Do Nothing (Keep existing access)
  - E. Modify Turn Lanes



#### F. Roundabout (Maximum speed 35 mph)



### 14% No response

62%

Additional comments:

- F, with 2 turn lanes for stacking/lower speed limit
- E, with right turn lane
- F, roundabout, but not functional
- E, add acceleration/deceleration lane
- E, if possible, keep 2 eastbound lanes past Fort Pulaski

## Question: Which option do you prefer for McQueen's Island Trail Parking?

67%

9.5% G. Do Nothing (Keep existing)

H. 6-Space Parking with One-Way Exit



I. 15-Space Parking with 2-Way Exit





9.5%



#### 14% No response

Additional comments:

- H, with no parking- drop off only parking before 1st bridge
- I, park on Talahi build bridge
- I, with right turn lanes
- I, with blinking lights

#### Question: Which option do you prefer for Bull River Bridge? Which option do you prefer for Lazaretto Creek Bridge?



0% 0% J. Do Nothing



K. Expand ExistingBridge to Include8'Bikeable Shoulder





L. Expand Existing Bridge to Include 8' Bikeable Shoulder w/10' Multiuse Trail

M. Expand Existing Bridge to Include 8' Bikeable Shoulder

and Sidewalk (Max speed 45 mph)







4%

4%



Bull River Bridge	Lazaretto Creek Bridge	Bridge Options	
8%	8%	N. Replace Existing Bridge with New Bridge with 12' Travel Lane with 8' Bikeable Shoulder	HP-4" SHATELER TRAVELEAND TRAVELAND SHOLEDR
38%	40%	O. Replace Existing Bridge with New Bridge with 12'Travel Lane with 8' Bikeable Shoulder w/ 10' Multiuse Trail	12-4"
4%	8%	P. Expand Existing Bridges with Cantilevered Multiuse Trail	NULTI-IS NOR
8%	4%	Q. Construct Separate Multiuse Trail Bridge	
8%	8%		No response

Additional comments:

Bull River Bridge

- Q add 8' bikeable shoulder
- L or O, depends on sufficiency rating





- N, plus McQueen's Trail for pedestrians
- N, as multi-use trail
- Q, none-need 4 lanes for traffic

Lazaretto Creek Bridge

- O, multiuse on north side
- L or O, depends on sufficiency rating
- N, with separated barrier
- O, multiuse on north side
- O, keep old bridge for Ped/Bike
- N, with existing bridge
- K, + 4 lanes for traffic
- M, + new 2 lane bridge

#### **Question:** What is your relationship to Tybee Island?

Public Meeting

- Full time resident (11)
- Work on Tybee (2)

Stakeholder Meeting

- Full time resident (4)
- Don't usually go to Tybee (1)

#### Question: How did you hear about today's meeting?

Public Meeting

- Roadside signs (4)
- Word of mouth (3)
- Newspaper (4)
- Email (5)

Stakeholder Meeting

- MPC invitation (2)
- Word of mouth (2)

### **Additional Comments**

- Reduce speed (45mph) and add traffic calming devices; remove passing lane; road diet, add median & landscaping. Keep turning lanes. Extend multi use trail on north side to Lazaretto Bridge & Keep on north side of bridge. Local parking on mainland; no parking at McQueen Trail just a drop off with one way exit East. T-SPLOST
- Is it possible to reduce roadway lane width to 11' to minimize ROW impacts and make more room for bike/pedestrian accommodations? Speed limit can be reduced to 45 mph in combination. Separated bike lane for bikers and McQueen's Island Trail unpaved for pedestrians. So no more ROW needed for multi-use trails. Connection to the trail is necessary.
- Get construction underway.





- From cost standpoint, I prefer 12' lanes with 8' shoulders that would serve as bike lanes and/or emergency access.
- 1)all bridge options are a waste of taxpayers funds; 2)both bridges should be expanded to include 2 lanes of traffic in both directions; 3)the expanded shoulders/bike lanes & other things are a luxury when compared to need for traffic capacity; 4) paving McQueen's path is a waste of funds as long as people can walk on it, it serves its purpose; 5) presenters did not listen well to questions & were generally unresponsive; 6) advertising this as a bridge study was misleading plus designs should have been made public before meeting so people would have been informed first more people would have come also.
- I'm definitely in favor of reducing the speed limit especially on the bridges. Safety is my first concern - widening the bridges and widening the road to 4 lanes both address safety. If there is nothing wrong with the Lazaretto Creek Bridge, just build a new 2 lane bridge beside it and leave the original.
- first: no bridge should cross salt water without provision for the largest recreation - fishing. Why not follow the old railroad path from east of Bull River bridge to President St & East Broad? Make Option "O" shoulders back, 4' wider and you have 4 lanes! This would be a lot better than the present 2 lane with no shoulders. H Levy, PO Bx 2390 31328
- As our island is becoming more popular, our traffic is becoming more and more dangerous. We have heard talk about 4 laning 80 for 20 years. Please, please, please 4 lane this road. It's a permanent fix.
- Go with using the existing bridges & adding two new bridges with bike baths & pedestrian lanes. This is the safest option and would relieve congestion. I continue to object to GDOT's plan to raise the roadway. It s/b at surface level for recreational opportunities adjacent to the road.
- I am against 4 laning. Tybee is pretty much at its capacity with its resources. (H2O, sewage, parking). There is a plan in place in case of evacuation whereby all traffic would move west.

## **Meeting Three: Alternatives Ranking**

The purpose of the third round of meetings was to present six end-to-end alternatives, combining improvements to the bridges, roadway shoulders, and access points to Fort Pulaski and McQueen's Island Trail, as well as the criteria used to evaluate the alternatives.

The stakeholder meeting was held on August 29, 2011, at 3:00 pm in the Chatham County-Savannah Metropolitan Planning Commission's Hearing Room. There were 4 people in attendance. The sign-in sheet is available in Appendix A. Due to the low turnout of stakeholders, a memo was subsequently sent to all stakeholders with diagrams of the alternatives and instructions on where to find those and other information on the US 80 Bridges Study web pages.





A public Open House was held on August 30, 2011, from 5:30 p.m. to 7:30 p.m.at the Old School Cafeteria on Tybee Island. There were 34 people in attendance. The sign-in sheet is available in Appendix B.

During this phase of the study, stakeholders and community members were provided with additional information and detail regarding the analysis of the six alternatives. Criteria used to evaluate the six "build" alternatives and the "no build" alternative included:

- Benefit-Cost Analysis
- Life Cycle Costs
- Maintenance of Traffic
- Environmental Impacts
- Bicycle and Pedestrian access
- Constructability
- Public input

To collect the information for the last criteria, public input, meeting participants were asked to review the information, discuss the alternatives with the project team, and complete a survey to rank the alternatives (including the No-build Alternative) from most preferred (1) to least preferred (7). The results of the rankings were tabulated as shown below. For each alternative, the rank it most frequently received is highlighted. For instance, Alternative 5 was considered the top choice in 15 responses, more often than any other alternative was ranked at the top.

Number of people choosing a given rank for each alternative							
	Alternatives						
Rank	No Build	1	2	3	4	5	6
1		1	4	3	3	15	
2			1	5	15	1	2
3		1	1	13	1	1	4
4		1	4		2	2	12
5		3	11	1	3	2	1
6		15	1			2	3
7	23						

Since there was much similarity in the individual rankings, a general consensus was implied, as shown in the table below.





Public Consensus Rank Order				
Most Preferred	Alt. 5			
	Alt. 4			
	Alt. 3			
	Alt. 2			
	Alt. 6			
	Alt. 1			
Least Preferred	No-build			

Survey participants were also asked the following question: "If you had to choose between having some improvements sooner (i.e., less expensive alternative) OR having more improvements later (i.e., more expensive alternative), which would you choose?" Of the responses received, 68% chose a less expensive alternative sooner rather than a more expensive alternative later (32%).

Additional comments:

- I think the fifth option would be the wisest choice when considering the long-term impacts. It is the only option which offers four lanes which is a necessity for the safety of our residents and visitors. While the preliminary costs associated with this project are the highest it provides the solutions needed along with the benefits for pedestrians and bicyclists.
- Biking in Georgia is a growing sport/recreation. Preservation of options that include bike paths the full length of Hwy 80 from Wilmington Island to Tybee would provide a special and much used resource for Georgia's cyclists, not to mention the vast enhancement to cycling safety.
- Recommend slower speeds as you approach Tybee: 1 Slow to 45 as approach Fort Pulaski turn off and Lazaretto Creek boat ramp area; 2 - slow to 35 as coming off Lazaretto Bridge onto Tybee. This 35 mph allows slow speed electric vehicles full access to all areas of Tybee.
- 4 lane bridges = 4 lane roadway later
- I think the 10' bikeable shoulder and the multi-use path are absolutely essential and I commend the CORE MPO and the study participants for coming up with these alternatives that are all a vast improvement over the no-build option.
- Great job laying out the alternatives! Given age of Bull River bridge now, ~40 years, it seems prudent to replace both bridges at this time. Thank you.
- I am disappointed that there was only one option that allows for 4 lanes when we have identified that we have a safety & traffic issue. Only one proposed plan allocates 2 lanes for both east and west bound traffic. I don't agree with spending millions and millions of dollars for the passive use of a roadway bridge that is needed to safely move vehicles first before adding recreational uses and their associated expense.
- Improving safety and creating a 4-lane highway are the most important things to consider. Time is of the essence.





## **Meeting Four: Recommended Alternative**

A final meeting was held to present the recommended alternative developed during the study. A public Open House was held on December 10, 2012, from 5:30 p.m. to 7:30 p.m.at the Old School Cafeteria on Tybee Island. There were 31 people in attendance. The sign-in sheet is available in Appendix B.

In order to present an overview of the study purpose, process, as well as recommended alternative, a video was developed to share at the open house and to post on the US 80 Bridges Study website. This video is approximately ten minutes in length and was very well received at the public open house. By portraying the recommended alternative in a video, viewers can more easily visualize the improvements to both bridges, the causeway, and to the McQueen's Island Trail and Fort Pulaski access points.

Because this meeting was held at the conclusion of the study and the recommended alternative had already been identified, there was less emphasis on seeking ideas from the public. However, asking for public comment and determining whether there was support remained important. Of the meeting attendees, eight completed a comment form. The comment form asked specific questions and also allowed for open-ended comments. Results are shown below.

Do you support the recommended alternatives? Why or why not?

- Yes this is the best of the alternatives.
- Yes. Meeting bikes on the bridges is very scary.
- Yes; agree with alternative 3; cost/benefit analysis supports it and it meets the needs of the residents/tourists as appropriate.
- I like the recommended solution. I also liked alternatives 4, 5, but the life cycle cost is prohibitive. (response written under question 4)
- Yes. It's a good plan overall. It's a lot of information all at once. Not sure I understand if the road will be elevated to prevent flooding due to rain and high tide. I also feel strongly about bike lanes. According to the GA driver's handbook, all bicycles have a right to the road. Multi-purpose paths are confusing because cars/drivers don't know how to treat people who ride on the path. Bike lanes are on the road and sharing the road.
- No should not add pavement on shoulders of roadway or in parking area for rails to trails. Should keep costs down and reduce environmental impacts by reusing Bull River bridge don't need pedestrian path and 10' shoulder.
- No this will only affect emergency traffic, pedestrians and bicyclists will not change the traffic flow (or lack thereof). We really need 4 lanes!

Was this meeting helpful in learning more about the need for this study and the recommendations?

- Yes, thanks.
- Loved the video!





- Yes.
- Yes. Just want to stress that 10' multi-use path needs to be maintained REGULARLY. The ones in other parts of savannah have debris, glass, branches, road kill, nails, etc. Please keep in mind that the whole thing has to be maintained for a better road for all. (Roads are clear but paths are not in other parts of Savannah).
- Yes

Do you have additional questions?

- Citizens expressed concern about bridge closings after car fires. Bridge must be certified as safe before it can be reopened resulting in hours of delay. This plan does not solve the problem.
- No, not that come to mind right now. Thanks.
- 18 McQueens parking places insufficient.

What do you think is most important to consider as the implementation of the project moves forward?

- Getting it done.
- Access to Tybee.
- I like the plan for <u>both</u> 10' shoulder and a multi-use lane.
- Make sure you elevate roads and bridges to eliminate flooding. Emergency vehicle access to attend to bad wrecks and accidents.
  Bicycle and pedestrian safety for road bikes, hybrids/cyclocross, fat tires, and "touries(sp?)"
- Keep costs down how wide is Bull River bridge? Can you make shifted shoulders on existing bridge?
- The possibility of expansion at a later date.

Additional comments

- Would love to see recreation areas along the causeway. Best example is the causeway between Tampa and Clearwater: biking, fishing, swimming, etc.
- Wow! As I recall, this is the first substantial project since the creation of the CORE MPO concept (locally). I am/was really impressed with the content and quality of the info provided at the meeting tonight. <u>Thank You</u>!
- We ride road bicycles and would love to be able to ride safely to/from Tybee. It is a beautiful drive. I am opposed to 2 lanes in each direction because slower drivers (~55-60) will be in the right lanes and fast (65+) will ride in the left lanes.
- It's a good layout overall. For any info on bicycle safety input contact Savannah Bicycle Campaign, Coastal Bicycle Touring Club or The Savannah Wheelmen. The driver's handbook for GA is also good for bike laws and cars sharing the road in GA.
- Another alternative is to only replace Lazaretto Creek bridge.
- I am very disappointed that we cannot 4-lane our road like the other public islands on the coast of Georgia.





• US 80 from Bull River to Lazaretto Creek should be entirely on structure. This would: have less impact than filling; prevent collisions of autos and wildlife in the roadway; and solve flooding issues. There is a roadway like this on structure in Wilmington, NC.

## Conclusion

Throughout the U.S. 80 Bridges Study, public input was a vital part of the process. The intent of the study was to identify improvements for the overall safety of the bridges and roadway. A prior proposal to 4-lane the corridor was considered beginning in the late 1990s and ultimately did not move forward because consensus on the most appropriate alternative could not be reached. A primary goal of the feasibility study was to define an alternative that satisfied the purpose and need of the project and that could be supported by the community. At the conclusion of the study, most people who were interested in participating seemed satisfied with the outcome and understood the process utilized to select the recommended alternative.



# Original Stakeholder List

First Name	Last Name	Title	Organization	Address	Address2	City	State
Anthony	Abbott		CORE MPO Citizens Advisory Committee			Savannah	GA
Russ	Abolt	Manager	Chatham County Government			Savannah	GA
Teresa	Brenner		CORE MPO Advisory Committee on Accessible			Savannah	GA
Vicky	Buck		Tybee Island Tourism Council			Tybee Island	GA
Jason	Buelterman	Mayor	City of Tybee Island			Tybee Island	GA
Owner	Bull River Marina L	LC	Bull River Marina			Savannah	GA
Bengie	Cowart	Chief	Med Star at Memorial Health System			Savannah	GA
Jason	Crane	Transportation Planner	Georgia Department of Transportation			Atlanta	GA
Leon	Davenport	Assistant Co. Engineer	Chatham County Engineering			Savannah	GA
Robert	Drewry	Director	Chatham County Public Works			Savannah	GA
Glenn	Durrence	District 5 Engineer	Georgia Department of Transportation			Jesup	GA
Patrick	Farrell	County Commissioner	District 4			Savannah	GA
Jeffrey M. (Colonel)	Hall	District Commander	US Army Corps of Engineers			Savannah	GA
Jo	Hickson	Ex. Director	Coastal Georgia Greenway			Savannah	GA
Owner	Lazaretto Developi	ment Inc.	Lazaretto Development Inc.			Savannah	GA
Pete	Liakakis	Chairman	Chatham County Commission			Savannah	GA
Jonathan	Lynn	Planning & Zoning Mgr	City of Tybee Island			Tybee Island	GA
Joseph	Marinelli	President	Savannah Convention and Visitors Bureau			Savannah	GA
Patrick T.	Mathews					Savannah	GA
Helen	McCracken		CORE MPO Citizens Advisory Committee			Savannah	GA
Wesley	Meadows	Chief	Southside Fire Department			Savannah	GA
Chantel	Morton	Better Hometown Program	City of Tybee Island			Tybee Island	GA
Charles	Odimgbe	Ex. Director	Chatham Area Transit			Savannah	GA
United States	of America		United States of America			Savannah	GA
Maria	Procopio	Executive Director	Tybee Marine Science Center			Tybee Island	GA
Iris & Michael	Scarbrough		Tybee Island Marina			Tybee Island	GA
Diane	Schleicher	City Manager	City of Tybee Island			Tybee Island	GA
Clayton	Scott	Director	Chatham County Emergency Management			Savannah	GA
Trip	Tollison	Vice President	Savannah Area Chamber of Commerce			Savannah	GA
Drew	Wade	President	Savannah Bicycle Campaign			Savannah	GA
Randy	Wester	Superintendent	Fort Pulaski National Monument			Savannah	GA
Owner	Williams Seafood I	Restaurant				Savannah	GA
Spud	Woodward	Executive Director	DNR - Coastal Resources Division			Brunswick	GA
		Officer in Charge	US Coast Guard Station Tybee			Tybee Island	GA
			Marine Rescue Squadron				

# Stakeholder List as Updated During Study

First Name	Last Name	Title	Organization	Address	Address2	City	State	Zip
Anthony	Abbott		CORE MPO Citizens Advisory Committee			Savannah	GA	31401
Russ	Abolt	Manager	Chatham County Government			Savannah	GA	31401
Teresa	Brenner		CORE MPO Advisory Committee on Accessible Trar			Savannah	GA	31406
Kim	Webster		Tybee Island Tourism Council			Tybee Island	GA	31328
Jason	Buelterman	Mayor	City of Tybee Island			Tybee Island	GA	31328
Owner	Bull River Marina I	LC	Bull River Marina			Savannah	GA	31410
Bengie	Cowart	Chief	Med Star at Memorial Health System			Savannah	GA	31413
Leon	Davenport	Assistant Co. Engineer	Chatham County Engineering			Savannah	GA	31401
Robert	Drewry	Director	Chatham County Public Works			Savannah	GA	31406
Sonny	Emmert		DNR - Coastal Resources Division			Brunswick	GA	31520
Patrick	Farrell	County Commissioner	District 4			Savannah	GA	31401
Jeffrey M. (Colonel)	Hall	District Commander	US Army Corps of Engineers			Savannah	GA	31401
Jo	Hickson		Coastal Georgia Greenway			Savannah	GA	31405
Bill	Hubbard	President and CEO	Savannah Area Chamber of Commerce			Savannah	GA	31401
Karon	lvery	Acting District 5 Engineer	Georgia Department of Transportation			Jesup	GA	31598
Stan	Knight		US Army Corps of Engineers			Savannah	GA	31402
Owner	Lazaretto Develop	ment Inc.	Lazaretto Development Inc.			Savannah	GA	31405
Pete	Liakakis	Chairman	Chatham County Commission			Savannah	GA	31401
David	Libman	Project Leader	National Park Service, Southeast Region			Atlanta	GA	30303
Joseph	Marinelli	President	Savannah Convention and Visitors Bureau			Savannah	GA	31401
Patrick T.	Mathews					Savannah	GA	31410
Frank C.	Mathews		Lazaretto Parking			Savannah	GA	31405
Helen	McCracken		CORE MPO Citizens Advisory Committee			Savannah	GA	31410
Frank	McIntosh	Executive Director	Savannah Bicycle Campaign			Savannah	GA	31405
Wesley	Meadows	Chief	Southside Fire Department			Savannah	GA	31406
Kaycee	Mertz	Transportation Planner	Georgia Department of Transportation			Atlanta	GA	30308
Patrick	Monahan		Chatham County			Savannah	GA	31401
Chantel	Morton	Better Hometown Program	City of Tybee Island			Tybee Island	GA	31328
David	Moyer	Associate Project Manager	Georgia Department of Transportation			Atlanta	GA	30308
Diane	Otto	Planning & Zoning Mgr	City of Tybee Island			Tybee Island	GA	31328
Maria	Procopio	Executive Director	Tybee Marine Science Center			Tybee Island	GA	31328
Chad	Reese	Executive Director	Chatham Area Transit			Savannah	GA	31412
Brad	Saxon		Georgia Department of Transportation			Jesup	GA	31598
Iris & Michael	Scarbrough		Tybee Island Marina			Tybee Island	GA	31328-0787
Diane	Schleicher	City Manager	City of Tybee Island			Tybee Island	GA	31328
Clayton	Scott	Director	Chatham County Emergency Management			Savannah	GA	31401
Dom	Sullens		CEMA			Savannah	GA	31401
Drew	Wade	President	Savannah Bicvcle Campaign			Savannah	GA	31405
Randy	Wester	Superintendent	Fort Pulaski National Monument			Savannah	GA	31410
Owner	Williams Seafood	Restaurant				Savannah	GA	31410
Spud	Woodward	Executive Director	DNR - Coastal Resources Division			Brunswick	GA	31520
Steve	Wright	Planning & Compliance	National Park Service. Southeast Region			Atlanta	GA	30303
			United States of America			Savannah	GA	31412-8082
		Officer in Charge	US Coast Guard Station Tybee			Tybee Island	GA	31328
			Marine Rescue Squadron			.,	200	01020







## US 80 Bridges Study – Sign-In Stakeholder Meeting

Wednesday September 15, 2010

Name	Organization	E-Mail	Address
Sonny Emmert	PNR-CRD		
FRANK C. MATHEWS	LAZARETTO POCKING		
DON SILLENS	CEMA		
Tereze Brenner	CORE MPO ACAT		
Jo Hickson	Carefa GA GReenway		
Chantel Moston	City of Type Blandt	-	
Jonatheshy	City of Typer	-	
BRAD SAXON	GDOT		
Dinne Schleich	COTE		
JANH BUEUTERMA	GTI		
CLAYTON SCOTT	COMA		
St. J Knight	Comps of Engineers		
Patrick Monahan	Chatham County		







## US 80 Bridges Study – Sign-In Stakeholder Meeting Tuesday March 8, 2011

Name	Organization	E-Mail	Address
HUGH FUTRECC	SOUTHELFILE FIRE/EMS/SEC		
Vicky Buck	N beet stand jourism	-	
Star Knight	USACE	-	
THAKIM	Vcolia Tran	-	
Sonny Emmert	GADUR-CRD	-	
BRAD SAXON	GDOT	_	
Jo Hickson	Coestal GA-GENINY	_	
Pat Monahan	Chatham County	-	
Mark Wilkes	/	_	
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# US 80 Bridges Study – Sign-In **Stakeholder Meeting** Tuesday March 8, 2011 Organization Name E-Mail Address Dik RCD a SYMBIAS CITY KRABQ DAKI lterman 11 TYBEC 5. OF 1.154 Pialoski NPS n hipsle







# US 80 Bridges Study – Sign-In Sheet

Stakeholder Meeting

Monday, August 29, 2011

Name	Organization	E-Mail or Mailing Address
Sonn, Emmert	DNS-CFD	
Teresa Scott	6207	
HUGH FORREd	SOUTHSTOF FERRE / EUS/SEC	
CLAY TO SOT	CEMA	
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## US 80 Bridges Study – Sign-In Public Information Meeting Thursday September 16, 2010

Name	Organization	E-Mail	Address
Charles Williams			
Juny ansdorff		_	
Margaret J. Mathem	Lagaretto Packin	4	
Eric Cy-l	Gav Morning News		
PATRICIA F. GIBBS		4	
PAUL WALFF	MASS GUNAL	1	
Cyndi Kinkel	The Typee Times	<u>1</u>	
Edward Rutedys	sélf	<u>(</u>	
Menanno Derres	seef	_	
TG Veck	( ' )	2	
Bethany Jewell		_	
George Fidler, P.E.	Sav Airport Commission	<u>ı</u>	
Wanda Doyle	City Council Julea	<u>L</u>	
Diak Smith	0 0	-	
Wilson Tilloten	Sall	<u>u</u>	
EUL CANNOW	Salf	_	







	US 80 Bridges Study Public Information	r – Sign-In Meeting		
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Name	Organization	E-IVIdII	Audress	
Many ME Grackon	BTF			
Juda Rutulul	11 Deach Test Force			
and Benden )-	BTF			
Frank C. Mather	LAZARETTO PACKING			
Hour lasser				
Stan Lanu				:
A:LI GARBETT	Types Island			
JAM O'BRIEN	TYBEE ISLAND			
Dian 2. Sho	COII			
Jam Bultom	GTS			
Julih	City of Typee			
Mam- Jo Bush				
Hom Rush				
Am 122. Jon h	Rendent			
Joth BENNETT.	SAVANNAH BICKLE CAMPAIGN			
Mestor Gerroy				
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## US 80 Bridges Study – Sign-In Public Information Meeting Thursday September 16, 2010

Name	Organization	E-Mail	Address
all'ce toffman			
ANNE 5 Milla			
MAPIAUNE RRAMBLE			
FRANK LATA			
TomThomson	MPC		
Carolyn Smith			
LINDA GERNAY			
Jeannie Glass			
Jim Glass			
Shirley Session	-		
Deporal Brooks			
Vara Seal			
Kathryn Williams	City of Typee	_	
Anna Butler	citizen		
		_	

CORE COASTAL REGION MPO





US 80 Bridges Study – Sign-In Public Information Meeting Tuesday March 8, 2011			
Name	Organization	E-Mail	Address
HENRY LERY	C1712EN		
Prana Scarwich	٦ ٠٠١		
X V. C. L. SASSER	<i>c( c</i> ,		
A Stane Jasser	citizen .		
dsalallalin	11		
therese Spot	Citizen -		
Vpm North	CITY CONFIL		
Jimmy Bron	~ City of Tybee		
Ronald Chadwick			
BARRY A. BROWN	Cotan		
Chip Zullisa	Resident		
8 Mary Con Theller	Ranfieta		
S Jem Thella	15		
V			







		US 80 Bridges Stud Public Information Tuesday March	y – Sign-In n Meeting 8, 2011	
	Name	Organization	E-Mail	Address
	Genven Powell	Pirate ledicate	_	
$\sim$	LARRY NESBITT	CITIZEN - TIRPOA	_	
J	Jonathan Hagan	Type Police	4	
$\checkmark$	Ronald Cleadwich	e	-	
J	Roberta Chadwick		-	
$\checkmark$	melvin Weddle	-	-	
illegible	TENSC FUPLEOUTO	Lybe Merine.	-	
(	PULL BURNS,	LALADETTO POV UC	-	
/ ~	Freda R. Hand	types Cutizer	-	
*)~	Dick Snivela	Cotiza	-	
~ ZZ ~	Anna Butler	resident	-	
anger ) ~	Wanda Dayle	City Council	-	
r/~	Jaam Juelteman	TYBEE	-	
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que			-	







## US 80 Bridges Study – Sign-In Public Information Meeting

Tuesday August 30, 2011









## US 80 Bridges Study – Sign-In Public Information Meeting

Tuesday August 30, 2011









## US 80 Bridges Study – Sign-In Public Information Meeting

Tuesday August 30, 2011

	Name	Organization	E-Mail	Address
1	Carl milles	· · · · · · · · · · · · · · · · · · ·		frite
2	JC BUREL			
3	Rob Callohan			
4	HAN O'BRIEN	RES, DENT		
Ś	Dick Smith	RESIDENC		
6	PAT Farrell	Commissioner		
1	Wilson Tillotson	Resident		
8	Sidie O. Guster	Resident		
9_	KEITH L. GNY	Reapent		
	<u> </u>			
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US 80 Bridges Study – Sign-In Public Information Meeting Monday December 10, 2012

	Name	Organization	E-Mail	Address
	Steve Fox	City of Types		
2	Jan Fox	City of Typee		
3	KillGarbett	Typen		
4	Chin Zullison	1 ι ι		
5	PATRICE COLE	Coastal Bicycle Turing Club		
6	Peggy Cole			
7	Lyn Randall	resident		
8	Mary Lou Vandanburg	Residence Typee		
9	D'anne Otto	City of Typee Island		
		<u>i</u> .		
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US 80 Bridges Study – Sign-In Public Information Meeting Monday December 10, 2012

	Name	Organization	E-Mail	Address
I	PAUL WOLFF	GTT OF THESE		
2	Mike Knott	Moffatt & Nichol		
3	Jimm, Brown	City of tybee		
4	KimVetster	TypeIsbud Tourism(		
5	Melum Brown	HNTB		
6	DiANE Schleicher	COTI		
7	BILLCANNON	CITIZEN		
9	Chartel Morton	COTI-BHT		
9	REISKA ALKSON	GNOT		
0	PAT Farrell	County Commission		
i(	Tom + Jo Bush	Citizen		
			-	







US 80 Bridges Study – Sign-In Public Information Meeting Monday December 10, 2012

	Name	Organization	E-Mail	Address
1	Freda Hotherson	Citizen		
24	ton + Kon Ktanderten	CITIZZW	1	
3	Dia D.Shh	COTI		
4	Randy Wester	NPS/Fort Pulaski	<u>I</u>	
5	Karen Rhodes	Citizen		
6	Hac Snith	Certyen		
7	Kathing Bhost	citizen		
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US 80 Bridges Study – Sign-In Public Information Meeting Monday December 10, 2012

Name	Organization	E-Mail	Address
Honor Hutton	Motfatt + Nichol		
Pam O'Brien	verident -		
Anna Butter	resident		



APPENDIX B: Conceptual Layouts of End-to-end Alternatives
























































































APPENDIX C: Benefit-Cost Analysis



# **BENEFIT COST ANALYSIS FACTOR DEFINITIONS**

- F: annual number of collisions involving fatatlities during study period
- I: average annual number of collisions involving injured people for the period of the study
- P: average annual number of collisions involoving only property damage for the period of the study
- R: reduction of fatal and injury collisions by type (from Table A Appendix E)
- Rp: reduction of property damage only collisions by type (from Table A Appendix E)
- Pc: average cost, in thousands of \$, per property damage only collision
- Q: weighted cost, in thousands of \$, of fatal and injury collisions
- Ic: average cost per injury in thousands of \$
- Fc: average cost per fatality in thousands of \$
- Ek: capital recovery factor based on countermeasure life (from Table B Appendix E)
- Ci: estimated intial cost of the countermeasure (cost of the improvement including r/w) in thousands of \$
- Cm: estimated annual maintenance and operating cost of the countermeasure in thousands of \$

# **BENEFIT COST ANALYSIS WORKSHEET**

US 80 Bridges Alternative 1 (Special Comments)

### ACCIDENT DATA

Description	Symbol	Value
Property Damage Accidents (no fatality or injury)	Ρ	41
Fatalities	F	2
Injuries		35

FIXED VALUES			
Description	Symbol	Value	
Fatality Cost	Fc	\$5,800,000	
Injury Cost	lc	\$333,500	
Property Damage Cost	Pc	\$4,400	
Maintenance/Operating Cost	Cm	\$50,000	

# TABLE VALUES

Description	Symbol	Value
Reduction Factor (fatalities and injuries) (Appendix E)	R	0.848
Reduction Factor (property damage) (Appendix E)	Rp	0.896
Capital Recovery Factor (Appendix E)	Ek	0.135
Initial Improvement Cost (Itemized Cost Estimate)	Ci	\$22,868,003.00

### **Q** = Weighted cost of fatal and injury collisions

 $Q = \frac{(Fc \times F) + (Ic \times I)}{F + I}$ Q = 628986.4865

#### B = Benefit

B = Q (F + I) ( R ) + Pc (P) (Rp) B = 19896718.4

# C = Cost

C = Ek (Ci) + Cm

C = 3137180.405

## B/C = Benefit/Cost Ratio

B/C = 6.342229592

# **BENEFIT COST ANALYSIS WORKSHEET**

US 80 Bridges Alternative 2 (Special Comments)

### ACCIDENT DATA

Description	Symbol	Value
Property Damage Accidents (no fatality or injury)	Ρ	41
Fatalities	F	2
Injuries	I	35

FIXED VALUES			
Description	Symbol	Value	
Fatality Cost	Fc	\$5,800,000	
Injury Cost	lc	\$333,500	
Property Damage Cost	Pc	\$4,400	
Maintenance/Operating Cost	Cm	\$50,000	

# TABLE VALUES

Description	Symbol	Value
Reduction Factor (fatalities and injuries) (Appendix E)	R	0.904
Reduction Factor (property damage) (Appendix E)	Rp	0.896
Capital Recovery Factor (Appendix E)	Ek	0.135
Initial Improvement Cost (Itemized Cost Estimate)	Ci	\$40,151,457.00

### **Q** = Weighted cost of fatal and injury collisions

 $Q = \frac{(Fc \times F) + (Ic \times I)}{F + I}$ Q = 628986.4865

#### B = Benefit

B = Q (F + I) (R) + Pc (P) (Rp)B = 21199978.4

# C = Cost

C = Ek(Ci) + Cm

C = 5470446.695

### B/C = Benefit/Cost Ratio

B/C = 3.875365136

# **BENEFIT COST ANALYSIS WORKSHEET**

US 80 Bridges Alternative 3 (Special Comments)

### ACCIDENT DATA

Description	Symbol	Value
Property Damage Accidents (no fatality or injury)	Ρ	41
Fatalities	F	2
Injuries		35

FIXED VALUES			
Description	Symbol	Value	
Fatality Cost	Fc	\$5,800,000	
Injury Cost	lc	\$333,500	
Property Damage Cost	Pc	\$4,400	
Maintenance/Operating Cost	Cm	\$50,000	

# TABLE VALUES

Description	Symbol	Value
Reduction Factor (fatalities and injuries) (Appendix E)	R	0.904
Reduction Factor (property damage) (Appendix E)	Rp	0.896
Capital Recovery Factor (Appendix E)	Ek	0.135
Initial Improvement Cost (Itemized Cost Estimate)	Ci	\$61,511,935.00

### **Q** = Weighted cost of fatal and injury collisions

 $Q = \frac{(Fc \times F) + (Ic \times I)}{F + I}$ Q = 628986.4865

#### B = Benefit

B = Q (F + I) (R) + Pc (P) (Rp)B = 21199978.4

# C = Cost

C = Ek (Ci) + Cm

C = 8354111.225

### B/C = Benefit/Cost Ratio

B/C = 2.537670116

# **BENEFIT COST ANALYSIS WORKSHEET**

US 80 Bridges Alternative 4 (Special Comments)

### ACCIDENT DATA

Description	Symbol	Value
Property Damage Accidents (no fatality or injury)	Ρ	41
Fatalities	F	2
Injuries		35

FIXED VALUES			
Description	Symbol	Value	
Fatality Cost	Fc	\$5,800,000	
Injury Cost	lc	\$333,500	
Property Damage Cost	Pc	\$4,400	
Maintenance/Operating Cost	Cm	\$50,000	

# TABLE VALUES

Description	Symbol	Value
Reduction Factor (fatalities and injuries) (Appendix E)	R	0.904
Reduction Factor (property damage) (Appendix E)	Rp	0.896
Capital Recovery Factor (Appendix E)	Ek	0.135
Initial Improvement Cost (Itemized Cost Estimate)	Ci	\$58,788,954.00

### **Q** = Weighted cost of fatal and injury collisions

 $Q = \frac{(Fc \times F) + (Ic \times I)}{F + I}$ Q = 628986.4865

#### B = Benefit

B = Q (F + I) (R) + Pc (P) (Rp)B = 21199978.4

# C = Cost

C = Ek(Ci) + Cm

C = 7986508.79

### B/C = Benefit/Cost Ratio

B/C = 2.654473808

# **BENEFIT COST ANALYSIS WORKSHEET**

US 80 Bridges Alternative 5 (Special Comments)

### ACCIDENT DATA

Description	Symbol	Value
Property Damage Accidents (no fatality or injury)	Ρ	41
Fatalities	F	2
Injuries	I	35

FIXED VALUES			
Description	Symbol	Value	
Fatality Cost	Fc	\$5,800,000	
Injury Cost	lc	\$333,500	
Property Damage Cost	Pc	\$4,400	
Maintenance/Operating Cost	Cm	\$50,000	

# TABLE VALUES

Description	Symbol	Value
Reduction Factor (fatalities and injuries) (Appendix E)	R	0.904
Reduction Factor (property damage) (Appendix E)	Rp	0.896
Capital Recovery Factor (Appendix E)	Ek	0.135
Initial Improvement Cost (Itemized Cost Estimate)	Ci	\$69,008,662.00

### **Q** = Weighted cost of fatal and injury collisions

 $Q = \frac{(Fc \times F) + (Ic \times I)}{F + I}$ Q = 628986.4865

#### B = Benefit

B = Q (F + I) (R) + Pc (P) (Rp)B = 21199978.4

# C = Cost

C = Ek(Ci) + Cm

C = 9366169.37

## B/C = Benefit/Cost Ratio

B/C = 2.263463062

# **BENEFIT COST ANALYSIS WORKSHEET**

US 80 Bridges Alternative 6 (Special Comments)

### ACCIDENT DATA

Description	Symbol	Value
Property Damage Accidents (no fatality or injury)	Ρ	41
Fatalities	F	2
Injuries	I	35

FIXED VALUES			
Description	Symbol	Value	
Fatality Cost	Fc	\$5,800,000	
Injury Cost	lc	\$333,500	
Property Damage Cost	Pc	\$4,400	
Maintenance/Operating Cost	Cm	\$50,000	

# TABLE VALUES

Description	Symbol	Value
Reduction Factor (fatalities and injuries) (Appendix E)	R	0.904
Reduction Factor (property damage) (Appendix E)	Rp	0.896
Capital Recovery Factor (Appendix E)	Ek	0.135
Initial Improvement Cost (Itemized Cost Estimate)	Ci	\$45,947,188.00

### **Q** = Weighted cost of fatal and injury collisions

 $Q = \frac{(Fc \times F) + (Ic \times I)}{F + I}$ Q = 628986.4865

#### B = Benefit

B = Q (F + I) (R) + Pc (P) (Rp)B = 21199978.4

# C = Cost

C = Ek(Ci) + Cm

C = 6252870.38

### B/C = Benefit/Cost Ratio

B/C = 3.390439448



APPENDIX D: Life Cycle Cost Estimation


## Discount Rate 4% Analysis Period 50 years

Letter Description		Costs																Time	Period (Years)									
	Qty	Unit L	Jnit Cost	0 1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	5 16	17	18	19	20	21	22	23	24	25
Existing Bull River Bridge Annual Maintenance	84,672	sf \$	1.18 \$ 99,9	13 \$ 99,913	\$ 99,913 \$	99,913 \$	99,913	\$ 99,913	\$ 99,913 \$	99,913 \$	99,913 \$	99,913 \$	99,913 \$	99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	8 \$ 99,913	\$ 99,913	\$ 99,913 \$	99,913	\$ 99,913 \$	99,913 \$	99,913 \$	99,913 \$	99,913	\$ 99,913
Existing Bull River Bridge Inspection	3,528	lf \$	15.00 \$ 52,9	20 \$ -	\$ 52,920 \$	- \$	52,920 \$	\$ -	\$ 52,920 \$	- \$	52,920 \$	- \$	52,920 \$	- 9	\$ 52,920	ş -	\$ 52,920	\$ -	\$ 52,920	\$-	\$ 52,920 \$		\$ 52,920 \$	- \$	52,920 \$	- \$	52,920	\$ -
Existing Bull River Bridge Rehab	84,672	sf \$	10.00 \$ 1,002,2	65 \$ -	ş - ş	- \$	- \$	\$ -	ş - ş	- \$	- \$	- \$	- \$	- 5	ş -	ş -	\$-	\$ -	\$ - I	\$-	\$ -	1	\$ 846,720 \$	- \$	- \$	- \$		\$ -
Existing Lazarretto Creek Bridge Annual Maintenance	34,488	sf \$	2.18 \$ 75,1	84 \$ 75,184	\$ 75,184 \$	75,184 \$	75,184 \$	\$ 75,184	\$ 75,184 \$	75,184 \$	75,184 \$	75,184 \$	75,184 \$	75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184 \$	75,184	\$ 75,184 \$	75,184 \$	75,184 \$	75,184 \$	75,184	\$ 75,184
Existing Lazarretto Creek Bridge Inspection	1,437	lf \$	15.00 \$ 21,5	55 \$ -	\$ 21,555 \$	- \$	21,555 \$	\$ -	\$ 21,555 \$	- \$	21,555 \$	- \$	21,555 \$	- 9	\$ 21,555	ş -	\$ 21,555	\$ -	\$ 21,555	\$-	\$ 21,555 \$		\$ 21,555 \$	- \$	21,555 \$	- \$	21,555	\$ -
Existing Lazarretto Creek Bridge Rehab	34,488	sf \$	10.00 \$ 868,2	90 \$ -	\$-\$	- \$	- \$	\$ -	\$ - \$	- \$	- \$	- \$	- \$	- 9	\$-	\$ -	\$-	\$ -	\$ -	\$-	\$-\$		\$ 344,880 \$	- \$	- \$	- \$		\$ -
Existing Pavement Resurfacing	690,400	sf \$	1.74 \$ 1,201,2	96 \$ -	\$ - \$	- \$	- \$	\$ 1,201,296	\$ - \$	- \$	- \$	- \$	1,201,296 \$	- 5	\$-	ş -	\$-	\$ 1,201,296	5 \$ - :	\$-	\$ - \$		\$ 2,200,000 \$	- \$	- \$	- \$	1	\$ 1,201,296
Existing Pavement Annual Maintenance	690,400	sf \$	0.12 \$ 82,8	48 \$ 82,848	\$ 82,848 \$	82,848 \$	82,848 \$	\$ 82,848	\$ 82,848 \$	82,848 \$	82,848 \$	82,848 \$	82,848 \$	82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	8 \$ 82,848	\$ 82,848	\$ 82,848 \$	82,848	\$ 82,848 \$	82,848 \$	82,848 \$	82,848 \$	82,848	\$ 82,848
B Proposed 6'6" Roadway Pavement Widening & Resurfacing	294,450	sf \$	1.74 \$ 11,011,9	83 \$ -	\$ - \$	- \$	- \$	\$ 512,343	\$ - \$	- \$	- \$	- \$	512,343 \$	-	\$-	\$ -	\$-	\$ 512,343	3 \$ - :	\$-	\$ - \$		\$ 780,000 \$	- \$	- \$	- \$	/	\$ 512,343
B Proposed 6'6" Roadway Pavement Widening Annual Maintenance	294,450	sf \$	0.12 \$ 35,3	34 \$ 35,334	\$ 35,334 \$	35,334 \$	35,334 \$	\$ 35,334	\$ 35,334 \$	35,334 \$	35,334 \$	35,334 \$	35,334 \$	35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334 \$	35,334	\$ 35,334 \$	35,334 \$	35,334 \$	35,334 \$	35,334	\$ 35,334
C Proposed 10' Roadway Pavement Widening & Resurfacing	453,000	sf \$	1.74 \$ 14,372,6	05 \$ -	\$ - \$	- \$	- \$	\$ 788,220	\$ - \$	- \$	- \$	- \$	788,220 \$	- 5	\$-	ş -	\$-	\$ 788,220	) \$ - :	\$-	\$ - \$		\$ 1,800,000 \$	- \$	- \$	- \$		\$ 788,220
C Proposed 10' Roadway Pavement Widening Annual Maintenance	453,000	sf \$	0.12 \$ 54,3	60 \$ 54,360	\$ 54,360 \$	54,360 \$	54,360 \$	\$ 54,360	\$ 54,360 \$	54,360 \$	54,360 \$	54,360 \$	54,360 \$	54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360 \$	54,360	\$ 54,360 \$	54,360 \$	54,360 \$	54,360 \$	54,360	\$ 54,360
K Expanded Bull River Bridge - 8' Bikeable Shoulder	56,448	sf \$	1.18 \$ 7,961,2	82 \$ -	\$ - \$	- \$	- \$	\$ 66,609	ş - ş	- \$	- \$	- \$	66,609 \$	- 5	\$-	ş -	\$-	\$ 66,609	9 \$ - :	\$-	\$ - \$		\$ 24,687,108 \$	- \$	- \$	- \$	- /	\$ 66,609
K Expanded Lazarretto Creek Bridge - 8' Bikeable Shoulder	22,992	sf \$	1.18 \$ 3,882,6	85 \$ -	\$ - \$	- \$	- \$	\$ 27,131	\$ - \$	- \$	- \$	- \$	27,131 \$	- 5	\$-	ş -	\$-	\$ 10,138,796	5 \$ - :	\$-	\$ - \$		\$ 27,131 \$	- \$	- \$	- \$	- /	\$ 27,131
L Expanded Bull River Bridge - 10' Bikeable Shoulder & 10' MU Trail	105,864	sf \$	1.18 \$ 17,846,9	54 \$ -	\$-\$	- \$	- \$	\$ 124,920	\$ - \$	- \$	- \$	- \$	124,920 \$	- 9	\$-	ş -	\$-	\$ 124,920	) \$ - :	\$-	\$-\$		\$ 33,411,701 \$	- \$	- \$	- \$		\$ 124,920
L Expanded Lazarretto Creek Bridge - 10' Bikeable Shoulder & 10' MU Trail	43,110	sf \$	1.18 \$ 7,919,8	45 \$ -	\$ - \$	- \$	- \$	\$ 50,870	\$ - \$	- \$	- \$	- \$	50,870 \$	- 5	\$-	ş -	\$-	\$ 13,715,576	5 \$ - :	\$-	\$ - \$		\$ 50,870 \$	- \$	- \$	- \$		\$ 50,870
O Proposed New Bull River Bridge w/ 10' Bikeable Shoulder & 10' MU Trail	199,356	sf \$	1.18 \$ 33,411,7	01 \$ -	\$ - \$	- \$	- \$	\$ 235,240	\$ - \$	- \$	- \$	- \$	235,240 \$	- 5	\$-	ş -	\$-	\$ 235,240	) \$ - :	\$ -	ş - ş		\$ 235,240 \$	- \$	- \$	- \$	/	\$ 235,240
O Proposed New Lazarretto Creek Bridge w/ 10' Bikeable Shoulder & 10' MU Trail	81,191	sf \$	1.18 \$ 13,715,5	76 \$ -	\$ - \$	- \$	- \$	\$ 95,805	\$ - \$	- \$	- \$	- \$	95,805 \$	-	\$-	\$ -	\$-	\$ 95,805	5 \$ - :	\$-	\$ - \$		\$ 95,805 \$	- \$	- \$	- \$	/	\$ 95,805
R Proposed New Parallel Bull River Bridge w/ 8' Bikeable Shoulder & 10' MU Trail	185,220	sf \$	1.18 \$ 31,383,1	80 \$ -	\$ - \$	- \$	- \$	\$ 218,560	\$ - \$	- \$	- \$	- \$	218,560 \$	- 5	\$-	ş -	\$-	\$ 218,560	) \$ - :	\$-	\$ - \$		\$ 24,905,668 \$	- \$	- \$	- \$		\$ 218,560
R Proposed New Parallel Lazarretto Creek Bridge w/ 8' Bikeable Shoulder & 10' MU Trail	75,443	sf \$	1.18 \$ 13,021,1	15 \$ -	\$ - \$	- \$	- \$	\$ 89,023	ş - ş	- Ş	- \$	- \$	89,023 \$	- 5	\$-	ş -	\$-	\$ 10,227,819	9 \$ - :	\$-	\$-\$		\$ 89,023 \$	- \$	- \$	- \$		\$ 89,023
S Prop. New Parallel Bull River Bridge w/ 8' Bikeable Shoulder & 10' MU Trail & Expand Exist. Bridge	241,668	sf \$	1.18 \$ 37,268,9	56 \$ -	\$ - \$	- \$	- \$	\$ 285,168	\$ - \$	- \$	- \$	- \$	285,168 \$	-	\$-	\$ -	\$-	\$ 285,168	3 \$ - :	\$-	\$ - \$		\$ 24,972,276 \$	- \$	- \$	- \$	/	\$ 285,168
S Prop. New Parallel Lazarretto Creek Bridge w/ 8' Bikeable Shoulder & 10' MU Trail & Expand Exist, Bridge	98,435	sf \$	1.18 \$ 17.355.0	48 Ś -	\$ - \$	- S		\$ 116.153	s - s	- S	- \$	- Ś	116.153 \$	- 5	s -	s -	s -	\$ 10.254,949	) S - 1	s -	s - s		\$ 116.153 \$	- \$	- \$	- \$	- /	\$ 116.153

	Net Present Value
Alternative 1 (K+B+K+E)	\$ 58,742,107
Alternative 2 (L+C+L+E)	\$ 84,257,873
Alternative 3 (O+C+O+E)	\$ 77,117,989
Alternative 4 (R+C+R+E)	\$ 98,403,575
Alternative 5 (S+C+S+E)	\$ 108,997,973
Alternative 6 (L+C+O+E)	\$ 79,690,221

#### Notes:

estimates
Inspection of new bridges is estimated at same cost for inspection of existing bridge at same crossing
Inspection assumes 3 man crew at \$1500 / day, inspecting 100 ft / day
Vearly maintenance of Lazaretto Creek Bridge is higher than that of the Bull River Bridge due to the age and condition of the existing structure
Vearly maintenance of Lazaretto Creek Bridge is higher than that of the Bull River Bridge due to the age and condition of the existing structure
Statuse of bridge maintenance schedule and value provided by GODT
Pavement resurfacing schedule and value provided by GODT
Atternatives provided by CDM Smith
Ocstos of turn lane treatments and trial connections are omitted from ICCA because treatments are identical among al alternatives. Costs of parking area treatments are omitted because the different treatments are interchangeable and not inherent to any particular alternative. (Parking capacity was not counted as a benefit in the BCA.)
Obicount rate used for Calculations was the average discount rate as presented by ASHTO in the Life-Cycle Cost Analysis in Pavement Design Technical Bulletin
Or for the purposes of this exercise, slavage value of the bridges and asphalt pavement were not calculated. It should be noted that the newly installed bridges and pavement will have additional value (service life) at the end of the 50 year analysis period
The initia construction costs associated with the proposed atternatives are included at time area.
Alternatives with bridge expansions have replacement costs. Bull River expansion replaced at 20 years and Lazaretto Creek expansion replaced at 15 years. Option K replaced with Option N, Option R&S replaced with Option N + bridge maintenance cost.
Rehabilitation costs for Bull River Bridge are included in zero year.

26	27	28	29	30	21	32	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	NPV
\$ 99,913 \$	99,913	\$ 99,913 \$	99,913 \$	99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913 \$	99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913	\$ 99,913 \$	2,232,202.60
\$ 52,920 \$		\$ 52,920 \$	- \$	52,920	\$ -	\$ 52,920	\$ 52,920	\$-	\$ 52,920	\$ -	\$ 52,920	\$ -	\$ 52,920	\$-\$	52,920	\$ -	\$ 52,920	\$-	\$ 52,920	\$ -	\$ 52,920	\$ -	\$ 52,920 \$	613,937.63
\$ - \$	-	\$ - \$	- \$	-	\$ -	\$ -	Ş -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$-\$	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ - \$	1,404,154.23
\$ 75,184 \$	75,184	\$ 75,184 \$	75,184 \$	5 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184 \$	75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184	\$ 75,184 \$	1,679,717.66
\$ 21,555 \$		\$ 21,555 \$	- \$	21,555	\$ -	\$ 21,555	\$ 21,555	\$-	\$ 21,555	\$ -	\$ 21,555	\$ -	\$ 21,555	\$-\$	21,555	\$ -	\$ 21,555	\$-	\$ 21,555	\$ -	\$ 21,555	\$ -	\$ 21,555 \$	250,064.73
\$ - \$		\$-\$	- \$	-	\$ -	\$-	\$ -	\$-	\$ -	\$ -	\$ -	\$ -	\$ -	\$-\$	-	\$ -	\$-	\$-	\$ -	\$ -	\$ -	\$ -	\$ - \$	1,025,688.73
ş - ş		\$-\$	- \$	1,201,296	\$ -	\$-	Ş -	\$ 1,201,296	\$ -	\$ -	\$ -	\$ -	\$ 1,201,296	\$-\$	-	\$ -	\$ -	\$ 1,201,296	\$ -	\$-	\$ -	\$ -	\$ 2,200,000 \$	6,604,989.25
\$ 82,848 \$	82,848	\$ 82,848 \$	82,848 \$	82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848 \$	82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848	\$ 82,848 \$	1,850,946.27
\$ - \$		\$ - \$	- \$	512,343	\$ -	\$-	\$ -	\$ 512,343	\$ -	\$ -	\$ -	\$ -	\$ 512,343	\$ - \$	-	\$ -	\$ -	\$ 512,343	\$ -	\$ -	\$ -	\$ -	\$ 780,000 \$	13,221,213.31
\$ 35,334 \$	35,334	\$ 35,334 \$	35,334 \$	35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334 \$	35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334	\$ 35,334 \$	789,413.57
\$ - \$	-	\$ - \$	- \$	788,220	ş -	\$ -	Ş -	\$ 788,220	\$ -	Ş -	\$ -	\$ -	\$ 788,220	\$ - \$	-	\$ -	\$ -	\$ 788,220	\$-	\$ -	\$ -	\$ -	\$ 1,800,000 \$	18,133,057.60
\$ 54,360 \$	54,360	\$ 54,360 \$	54,360 \$	54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360 \$	54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360	\$ 54,360 \$	1,214,482.42
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\$ - \$		\$ - \$	- \$	27,131	ş -	\$ -	Ş -	\$ 27,131	\$ -	Ş -	\$ -	\$ -	\$ 27,131	\$ - \$	-	\$ -	\$ -	\$ 27,131	\$ -	\$ -	\$ -	\$ -	\$ 27,131 \$	9,605,778.69
\$ - \$		\$-\$	- \$	124,920	\$ -	\$-	\$ -	\$ 124,920	\$ -	\$ -	\$ -	\$ -	\$ 124,920	\$-\$	-	\$ -	\$-	\$ 124,920	\$ -	\$ -	\$ -	\$ -	\$ 124,920 \$	33,537,927.15
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ş - ş		ş - ş	- \$	235,240	\$ -	\$ -	Ş -	\$ 235,240	Ş -	Ş -	\$ -	\$ -	\$ 235,240	\$-\$		\$ -	\$ -	\$ 235,240	\$ -	\$ -	\$ -	Ş -	\$ 235,240 \$	34,351,988.15
\$ - \$		\$ - \$	- \$	95,805	\$ -	\$-	\$ -	\$ 95,805	\$ -	\$ -	\$ -	\$ -	\$ 95,805	\$ - \$	-	\$ -	\$ -	\$ 95,805	\$ -	\$ -	\$ -	\$ -	\$ 95,805 \$	14,098,523.36
ş - ş		\$-\$	- \$	218,560	\$ -	\$-	Ş -	\$ 218,560	\$ -	\$ -	\$ -	\$ -	\$ 218,560	\$ - \$	-	\$ -	\$ -	\$ 218,560	\$ -	\$-	\$ -	\$ -	\$ 218,560 \$	43,523,666.79
ş - ş		ş - ş	- \$	89,023	\$ -	\$ -	\$ -	\$ 89,023	\$ -	Ş -	\$ -	\$ -	\$ 89,023	\$-\$		\$ -	\$ -	\$ 89,023	\$ -	\$ -	\$ -	\$ -	\$ 89,023 \$	19,006,664.73
\$ - \$		\$ - \$	- \$	285,168	\$ -	\$ -	\$ -	\$ 285,168	\$ -	Ş -	\$ -	\$ -	\$ 285,168	\$ - \$	-	\$ -	\$ -	\$ 285,168	\$ -	\$ -	\$ -	\$ -	\$ 285,168 \$	49,675,686.74
s - s	-	s - s	- 5	116.153	s -	s -	S -	\$ 116,153	S -	S -	S -	S -	\$ 116,153	s - s	-	S -	S -	\$ 116,153	S -	s -	s -	S -	\$ 116,153	23,449,042,33

## US 80 Bridges Study Capital Cost Estimates - Cost Per Design Option

			Preliminary				Proposed	
	Options	<b>Right of Way</b>	Engineering	Utility	Construction	Total	Width	Demolition
Lazaretto Creek Bridge	J	\$0	\$0	\$0	\$0	\$0	34	3
Lazaretto Creek Bridge	K	\$15,550	\$302,955	\$201,600	\$3,362,580	\$3,882,685	43	3
Lazaretto Creek Bridge	L	\$39,471	\$617,357	\$201,600	\$7,061,418	\$7,919,845	59.:	5
Lazaretto Creek Bridge	М		\$283,901	\$201,600	\$3,138,408	\$3,623,909	49	)
Lazaretto Creek Bridge	N		\$794,284	\$201,600	\$9,142,913	\$10,138,796	43	\$646,650
Lazaretto Creek Bridge	0	\$39,470	\$1,004,220	\$201,599	\$11,612,756	\$12,858,045	55.	5 \$646,650
Lazaretto Creek Bridge	O (10' foot shoulder)	\$39,470	\$1,071,400	\$201,600	\$12,403,106	\$13,715,576	59.:	5 \$646,650
Lazaretto Creek Bridge	Р		\$225,054	\$181,800	\$2,465,892	\$2,872,746	44	3
Lazaretto Creek Bridge	Q		\$183,402	\$181,800	\$1,975,875	\$2,341,077	12	2
Lazaretto Creek Bridge	R	\$121,018	\$1,010,607	\$201,600	\$11,687,891	\$13,021,115	90	)
Lazaretto Creek Bridge	S	\$130,327	\$1,349,402	\$201,600	\$15,673,718	\$17,355,048	12	1
Lazaretto Creek Bridge	X	\$121,018	\$1,352,334	\$201,600	\$15,708,206	\$17,383,158	79.:	5
Bull River Bridge	J	\$0	\$0	\$0	\$0	\$0	35.0	5
Bull River Bridge	K	\$9,369	\$622,961	\$162,000	\$7,166,952	\$7,961,282	43	3
Bull River Bridge	L	\$25,321	\$1,396,165	\$162,000	\$16,263,468	\$17,846,954	59.:	5
Bull River Bridge	М		\$646,391	\$162,000	\$7,442,604	\$8,250,995	49	)
Bull River Bridge	Ν		\$1,934,013	\$162,000	\$22,591,095	\$24,687,108	43	\$ \$1,696,320
Bull River Bridge	0	\$25,320	\$2,450,308	\$161,999	\$28,665,158	\$31,302,785	55.:	5 \$1,696,320
Bull River Bridge	O (10' shoulder)	\$25,321	\$2,615,523	\$162,000	\$30,608,858	\$33,411,701	59.:	5 \$1,696,320
Bull River Bridge	Р		\$529,239	\$162,000	\$6,064,344	\$6,755,583	44.2	3
Bull River Bridge	Q		\$426,806	\$162,000	\$4,859,250	\$5,448,056	12	2
Bull River Bridge	R	\$46,545	\$2,454,944	\$162,000	\$28,719,691	\$31,383,180	90	)
Bull River Bridge	S	\$55,855	\$2,915,312	\$162,000	\$34,135,790	\$37,268,956	12	1
Bull River Bridge	X	\$46,545	\$3,297,408	\$162,000	\$38,631,038	\$42,136,991	79.:	5
US 80 between the two bridges	А	\$0	\$58,914	\$0	\$693,104	\$752,018		
US 80 between the two bridges	В	\$260,189	\$842,306	\$4,328,280	\$5,581,208	\$11,011,983	13.0	)
US 80 between the two bridges	С	\$400,291	\$1,094,605	\$4,328,280	\$8,549,429	\$14,372,605	20.0	)
McQueen's Trail	Unpaved	0	\$32,413	0	\$381,333	\$413,746		
McQueen's Trail	Paved	\$0	\$193,306	\$0	\$2,274,183	\$2,467,488		
Roundabout		\$109,009	\$44,869	\$6,600	\$521,270	\$681,749		
Parking Lot	Н	\$1,444	\$6,202	\$0	\$72,967	\$80,613		
Parking Lot	I	\$4,196	\$18,104	\$0	\$212,985	\$235,284		
Parking Lot	Т	\$4,775	\$20,603	\$0	\$242,388	\$267,766		
Modify turn lanes		\$0	\$944	\$0	\$11,109	\$12,053		
Additional Cost for Option R								
Lazaretto Concrete Modifications	\$190,000.00							
Lazaretto Marking Modifications	\$27,800.00							
Bull River Concrete Modifications	\$454,300.00							
Bull River Marking Modifications	\$62,700.00							

Capital Cost Estimates completed using assumptions in GDOT's Cost Estimation Tool

Capital Cost Estimates are subject to change as project advances through design

# US 80 Bridges Study Capital Cost Estimates - Alternative Totals

			Lazaretto Creek		Total without Trail and	
Alternative	Bull River Option	<b>Roadway Option</b>	Option	<b>Turn Lanes</b>	Parking	TOTAL
Alternative 1	K	В	K	Ε		
	\$7,961,282	\$11,011,983	\$3,882,685	\$12,053	\$22,868,003	\$25,416,104
Alternative 2	L	С	L	Ε		
	\$17,846,954	\$14,372,605	\$7,919,845	\$12,053	\$40,151,457	\$42,854,229
Alternative 3	0	С	0	Е		
	\$33,411,701	\$14,372,605	\$13,715,576	\$12,053	\$61,511,935	\$64,247,190
Alternative 4	R	С	R	E		
	\$31,383,180	\$14,372,605	\$13,021,115	\$12,053	\$58,788,954	\$61,524,208
Alternative 5	s	C	S	F		
	\$37,268,956	\$14,372,605	\$17,355,048	\$12,053	\$69,008,662	\$71,743,917
Alternative 6	L	С	0	Е		
	\$17,846,954	\$14,372,605	\$13,715,576	\$12,053	\$45,947,188	\$48,682,442
GDOT Alternative	e					\$101,424,435
Capital Cost Estima	ate from the 2003 GDOT C	oncept Report was used as the	estimate for this alte	rnative.		



**APPENDIX E: Traffic Capacity Calculations** 



#### **On Bull River Bridge**

**Two-Way Capacity** = 
$$(3,200 \text{ pch} * PHF * f_G * f_{HV}) - V_{NP}$$
  
=  $3200*0.88*1*0.995-141.75$   
=  $2660 \text{ vph}$   
=  $26,600 \text{ vehicles per day}$ 

Where:

PHF=Peak Hour Factor=0.88 $f_G$ =Adjustment factor for grades=1 $f_{HV}$ =Adjustment factor for heavy vehicles=1= $1/(1+P_T(E_T-1)) = 1/(1+0.05(1.1-1))$ =0.995 $V_{NP}$ =Volume adjustment for no passing zones== $f_{NP}/0.00776 = 1.1/0.00776$ =141.75

## Level of Service during Event Traffic

Average Traffic Speed = 
$$FFS - 0.00776V_P - f_{np}$$
  
= 52.4-0.00776(1975)-1.1  
= 36 mph  
= **LOS E** (see figure below)

Where:

FFS	=	Free Flow Speed		
	=	$BFFS-f_{LS}-f_{A} = 55 mph - 2.6 - 0$	=	52.4 mph
$V_P$	=	passenger car equivalent flow rate for peak 15-minutes	=	1975 vph (from June 30, 2012)
$f_{np}$	=	no passing zone adjustment factor from Table 20-11	=	1.1
BFFS	=	Base Free Flow Speed (or Design Speed)	=	55 mph
$f_{LS}$	=	Factor for lane and shoulder width		
	=	For a 12-foot lane and a three-foot shoulder	=	2.6 mph
$f_A$	=	Factor for access		
	=	zero access points	=	0 mph

#### **Between the Bridges**

**Two-Way Capacity** = 
$$(3,200 \text{ pch} * PHF * f_G * f_{HV}) - V_{NP}$$
  
=  $3200*0.88*1*0.995-115.98$   
=  $2686 \text{ vph}$   
=  $26,860 \text{ vehicles per day}$ 

Where:

PHF = Peak Hour Factor = 0.88  $f_G = \text{Adjustment factor for grades} = 1$   $f_{HV} = \text{Adjustment factor for heavy vehicles}$   $= 1/(1+P_T(E_T-1)) = 1/(1+0.05(1.1-1)) = 0.995$   $V_{NP} = \text{Volume adjustment for no passing zones}$   $= f_{NP}/0.00776 = 0.9/0.00776 = 115.98$ 

# Level of Service during Event Traffic

Average Traffic Speed = 
$$FFS - 0.00776V_P - f_{np}$$
  
= 54.8-0.00776(2128)-0.9  
= 37 mph  
= **LOS E** (see figure below)

Where:

FFS = Free Flow Speed  $= BFFS \cdot f_{LS} \cdot f_A = 55 \text{ mph } -0 - 0.2 \qquad = 54.8 \text{ mph}$   $V_P = \text{passenger car equivalent flow rate for peak 15-minutes} = 2128 \text{ vph (from July 7, 2012)}$   $f_{np} = \text{no passing zone adjustment factor from Table 20-11} = 0.9$  BFFS = Base Free Flow Speed (or Design Speed) = 55 mph  $f_{LS} = \text{Factor for lane and shoulder width}$  = For a 12-foot lane and a six-foot shoulder = 0 mph  $f_A = \text{Factor for access}$  = three access points/4.3 miles = 0.2 mph

#### **On Lazaretto Creek Bridge**

**Two-Way Capacity** = 
$$(3,200 \text{ pch} * PHF * f_G * f_{HV}) - V_{NP}$$
  
=  $3200*0.88*1*0.995-141.75$   
=  $2660 \text{ vph}$   
=  $26,600 \text{ vehicles per day}$ 

Where:

PHF = Peak Hour Factor = 0.88  $f_G = \text{Adjustment factor for grades} = 1$   $f_{HV} = \text{Adjustment factor for heavy vehicles}$   $= 1/(1+P_T(E_T-1)) = 1/(1+0.05(1.1-1)) = 0.995$   $V_{NP} = \text{Volume adjustment for no passing zones}$   $= f_{HV}/0.00776 = 1.1/0.00776 = 1.41.75$ 

$$= f_{NP}/0.00776 = 1.1/0.00776 = 141.75$$

#### Level of Service during Event Traffic

Average Traffic Speed = 
$$FFS - 0.00776V_P - f_{np}$$
  
= 52.4-0.00776(2140)-1.1  
= 35 mph  
= **LOS E** (see figure below)

Where:

FFS = Free Flow Speed = BFFS-f<sub>LS</sub>-f<sub>A</sub> =55 mph -2.6 - 0 = 52.4 mph = passenger car equivalent flow rate for peak 15-minutes = 2140 vph (from July 7, 2012)  $V_P$ = 1.1 = no passing zone adjustment factor from Table 20-11  $f_{np}$ *BFFS* = Base Free Flow Speed (or Design Speed) = 55 mph = Factor for lane and shoulder width  $f_{LS}$ = For a 12-foot lane and a three-foot shoulder = 2.6 mph  $f_A$ = Factor for access = 0 mph= zero access points

Calculations made using the Rural Two-Lane Capacity from FHWA's Highway Performance Monitoring System Appendix N: Procedures for Estimating Highway Capacity http://www.fhwa.dot.gov/ohim/hpmsmanl/appn3.cfm



LOS F applies whenever the flow rate exceeds the segment capacity.



# APPENDIX F: DRAFT Concept Report with Conceptual Design of Recommended Alternative



# DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA PROJECT CONCEPT REPORT

Project Type:	Bridges Replacement	P.I. Number:	0010560
GDOT District:	5	County:	Chatham
Federal Route Number:	US 80	State Route Number:	26
	Project Number:	TBD	
	-		-
Project Description (prov	ide a very brief description	on of the project)	
Submitted for approval:	(email to "Concept Rep	orts"; delete any inapplicat	le signature lines)
Consultant Designer & Firm or	GDOT Concept/Design Phase	Office Head & Office	DATE
Local Government (if applicab	nle)		DATE
Office Head (GDOT Project Mo	anager's Office)		DATE
GDOT Project Manager			ΠΔΤΕ
Recommendation for ap	proval: (Delete any inap	plicable signature lines)	DATE
Program Control Administrato	זר		DATE
State Environmental Administ	rator (recommendation requ	ired)	DATE
State Traffic Engineer (recomm	nendation required for rouna	labout projects)	DATE
Project Review Engineer			DATE
State Utilities Engineer			DATE
District Engineer (projects not	originating in District Office)		DATE
State Bridge Design Engineer (	(if applicable)		DATE
State Transportation Financial	I Management Administrator		DATE

The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Plan (RTP) and/or the State Transportation Improvement Program (STIP).

State Transportation Planning Administrator (recommendation required)

# **PROJECT LOCATION**



## **PLANNING & BACKGROUND DATA**

**Project Justification Statement:** US 80/SR 26, between Talahi Island and Tybee Island, is a two-way, twolane, rural principal arterial with intermittent passing lanes and no dedicated bicycle or pedestrian facilities. The proposed project area includes the bridges over Bull River and Lazaretto Creek. As the only connection between Tybee Island and the mainland, US 80 is designated as a hurricane evacuation route. This roadway is also designated as a future bikeway according to the MPO's current Long Range Plan.

This project originated from the Coastal Region Metropolitan Planning Organization's (CORE MPO's) ARRAfunded US 80 Bridges Replacement Study, which concluded that travel between Tybee Island and the mainland is currently limited, especially for alternative transportation modes, by the existing conditions of US 80 between and including the Bull River Bridge and the Lazaretto Creek Bridge. The MPO also conducted the US 80 Wave Challenge Study, which documented the mobility challenges associated with tourism and special events on Tybee Island. This project was consequently added to the program in 2011 at the request of the Savannah MPO. Scoping and PE phases for this project are programmed in the TIP period while ROW and CST are in the Long Range Plan.

The Lazaretto Creek Bridge has a sufficiency rating below 50, which is considered structurally deficient and indicates that the bridge is eligible for replacement. The existing roadway experiences flooding during peak tide events, storm events, and hurricanes. The roadway flooding can cause the roadway to be temporarily closed, and thus can limit emergency exits or evacuation from Tybee Island.

According to the volume to capacity ratio calculated in the travel demand model developed by GDOT for Savannah's 2035 Long Range Transportation Plan, US 80 from west of the Bull River to east of Lazaretto Creek currently operates at an acceptable level-of-service, in accordance with statewide performance measures. These conditions are anticipated to remain acceptable through the year 2035. However, as documented by the US 80 Wave Challenge Study and US 80 Bridges Study, the roadway often experiences unacceptable congestion on weekends, during peak tourist season, during special events, and during emergency evacuation.

The crash rate on this segment of US 80 is 25 percent higher than the statewide rate for comparable roadways for the last three years of data available. Crashes on the bridges sometimes temporarily block travel in both directions due to their narrow width and the lack of alternate routes.

McQueen's Island Trail, paralleling US 80, is a popular destination for walking, jogging, and bicycling, but lacks connections from and across the existing US 80 bridges. On-site parking at the trail is not sufficient for the number of users. The lack of connections currently also limits the usefulness of the trail as an off-road, pedestrian or bicycle transportation facility to Fort Pulaski National Monument or to Tybee Island. Surveys conducted by the MPO have documented latent demand for a safe Savannah-Tybee bicycle connection.

Improvements are needed on US 80 to ensure that the only route to from Tybee Island from the mainland can accommodate future travel for residents and tourists by reducing congestion and delay due to road closures and special events. Improvements are also needed to reduce the frequency and severity of crashes, accommodate non-motorized travel and access to Ft. Pulaski and McQueen's Island Trail. The

limits of this project are from just west of the Bull River to just east of Lazaretto Creek. These limits are adequate to meet the purpose of this project, which is to improve travel between Savannah and Tybee Island and to ensure the integrity of the US 80 bridges.

**Description of the proposed project:** The proposed project would replace existing bridges at Bull River and Lazaretto Creek with new bridges that have ten-foot bikeable shoulders and ten-foot barrierseparated multi-use trail. Roadway improvements would widen the existing road with ten-foot paved, bikeable shoulders. The existing bridges would be removed. The roadway near Fort Pulaski would be restriped to allow for a left hand and right hand turn lane. An 18-space parking area would be constructed at the entrance to McQueen's Island Trail and have a left hand turn lane for improved access. Off-road paths would connect the proposed McQueen's Island Trail to the proposed paths on the bridges.

Federal Oversight: 🛛 Full Oversight 🗌 Exempt	State Funded Other
MPO: Chatham Urban Transportation Study (CUTS)	MPO Project ID 2012-BRI-01
Regional Commission: Coastal Georgia RC	RC Project ID
Congressional District(s): 1	
Projected Traffic: ADT	
Current Year (2011): 12,210 Open Year (2020): TBD Traffic Projections Performed by: <i>GDOT Office or Consult</i>	Design Year (2035): 13,820 ing Firm name
Functional Classification (Mainline): Rural Principal Arter	ial
Is this a 3R (Resurfacing, Restoration, & Rehabilitation) P	roject? 🛛 No 🗌 Yes
Is this project on a designated Bike Route, Pedestrian Pla	n <b>, or Transit Network?</b> n Plan

## **CONTEXT SENSITIVE SOLUTIONS**

**Issues of Concern:** Briefly list potential project impacts that have been identified which may require Context Sensitive Solutions. Refer to GDOT's Context Sensitive Design Online Manual and AASHTO's Guide for Achieving Flexibility in Highway Design.

**Context Sensitive Solutions:** Describe how the Issues of Concern listed above are to be addressed by the project.

## **DESIGN AND STRUCTURAL DATA**

#### Mainline Design Features: US 80

Feature	Existing	Standard*	Proposed
Typical Section			
- Number of Lanes	2	2	2/3
- Lane Width(s)	12	12	12
- Median Width & Type	NA	NA	NA
- Outside Shoulder or Border Area Width	>4	8'	10'
- Outside Shoulder Slope		6%	6%
- Inside Shoulder Width	NA	NA	NA
- Sidewalks	None	None	None
- Auxiliary Lanes	None	None	None
- Bike Lanes	None	4'	4'
Posted Speed	55		55
Design Speed		45	55
Min Horizontal Curve Radius	1115′	643'	1300'
Superelevation Rate		6%	5.8%
Grade		7%	
Access Control	Limited	Limited	Limited
Right-of-Way Width	150'	NA	150'-220'
Maximum Grade – Crossroad			
Design Vehicle			

\*According to current GDOT design policy if applicable

**Major Structures:** (If no major structures on project, N/A and delete table below)

Structure	Existing	Proposed
051-0065-0,	3,534' x 30' Bridge with two 12-ft	3,600' x 50' with two 12-ft travel
Bull River	travel lanes and 3-ft shoulders.	lanes, 10-ft shoulders, and a 10-foot
Bridge	Sufficiency rating = 61.00	barrier-separated multi-use path.
051-0066-0,	1,433' x 28' Bridge with two 12-ft	1,378' x 50' with two 12-ft travel
Lazaretto	travel lanes and 2-ft shoulders.	lanes, 10-ft shoulders, and a 10-foot
Creek Bridge	Sufficiency rating = 42.45	barrier-separated multi-use path.
Retaining		
walls		
Other		

Major Interchanges/Intersections: None

**Utility Involvements:** None

Public Interest Determination Policy and Procedure recommended (Utilities)?

Yes

See Policy and Procedures Subject Nos. 6863-12 and 3E-1 for guidance. If yes, describe the Concept Team's findings and recommendations. Attach Utility Risk Management Plan with Risk Acceptance or Risk Avoidance recommendations if applicable.

SUE Required:	No	Yes		
Note: By policy, S	SUE is required j	for all projects w	with a Commissioner approved Publi	c Interest
Determination Re	commendation			

#### Railroad Involvement: None

omplete Streets - Bicycle, Dedestrian, and/or Transit Warrants:
Warrants met: None Bicycle Pedestrian Transit
heck all that apply. Attach summary of Bicycle, Pedestrian, and Transit Warrant Studies or summarize
esults here. See Chanter 9 of the GDOT Design Policy Manual for further auidance. Note: If it is not
ractical to provide appropriate accommodations for GDOT Standard Criteria. Design Variance(s) will
e required
ight-of-Way: Refer to Chanter 3 of GDOT's Design Policy Manual for guidance
equired Right-of-Way anticipated: $\Box$ No $\Box$ Yes $\Box$ Undetermined
asements anticipated: None X Temporary Permanent Utility Other
heck all easement types that apply.
Anticipated number of impacted parceles 4
Displacements anticipated: Total: 0
Businesses: 0
Residences: 0
Other: 0
ocation and Design approval:
ote: Location and Design approval is needed for all projects where ROW or easements are to be
cquired.
ff site Deteurs Anticipated No. Undetermined Vec
detour is needed provide a brief justification for detour type selected. Provide date of detour
neeting and/or approval date of Detour Report, if available.
ransportation Management Plan [TMP] Required: 🛛 🗌 No 🛛 🖂 Yes
If Yes: Project classified as:
TMP Components Anticipated: 🛛 🗍 TTC 👘 🔀 TO 👘 🖄 PI

		Undeter		Appvl Date
FHWA/AASHTO Controlling Criteria	No	-mined	Yes	(if applicable)
1. Design Speed		$\square$		
2. Lane Width	$\square$			
3. Shoulder Width	$\square$			
4. Bridge Width	$\square$			
5. Horizontal Alignment	$\square$			
6. Superelevation	$\square$			
7. Vertical Alignment	$\square$			
8. Grade	$\square$			
9. Stopping Sight Distance	$\square$			
10. Cross Slope				
11. Vertical Clearance	$\square$			
12. Lateral Offset to Obstruction	$\square$			
13. Bridge Structural Capacity				

#### Design Exceptions to FHWA/AASHTO controlling criteria anticipated:

If any of the above are checked "Yes" or "Undetermined", please briefly describe the anticipated Design Exception here. A Design Exception (DE) must be granted for exceeding the FHWA controlling Criteria. Please note that for Full Oversight projects, FHWA generally requires Design Exceptions and Variances to be approved prior to Concept approval. Attach any approved DE's to the Concept Report.

#### **Design Variances to GDOT Standard Criteria anticipated:**

	Reviewing		Undeter-		Appvl Date
GDOT Standard Criteria	Office	No	-mined	Yes	(if applicable)
1. Access Control	DP&S	$\boxtimes$			
- Median Opening Spacing					
2. Median Usage & Width	DP&S	$\square$			
3. Intersection Skew Angle	DP&S	$\boxtimes$			
4. Lateral Offset to Obstruction	DP&S	$\boxtimes$			
5. Intersection Sight Distance	DP&S	$\boxtimes$			
6. Bike, Pedestrian & Transit	DP&S	$\boxtimes$			
Accommodations					
7. GDOT Drainage Manual	DP&S	$\boxtimes$			
8. Georgia Standard Drawings	DP&S	$\boxtimes$			
9. GDOT Bridge & Structural	Bridge	$\boxtimes$			
Manual	Design				
10. Roundabout Illumination	DP&S	$\boxtimes$			
11. Rumble Strips	DP&S	$\square$			
12. Safety Edge	DP&S	$\square$			

**VE Study anticipated:** 

No

Completed – Date:

*If VE Study has been completed, attach VE Implementation letter.* 

## **ENVIRONMENTAL DATA**

Anticipated Environmental Document: GEPA: NEPA: CE KA/FONSI EIS
Project Air Quality:
s the project located in a PM 2.5 Non-attainment area? No Yes
s the project located in an Ozone Non-attainment area? 🛛 🗌 No 👘 Yes
s a Carbon Monoxide hotspot analysis required? 🛛 🗌 No 🗌 Yes
f yes to either PM 2.5 or Ozone Non-attainment, provide a comparison between the proposed project concept and the conforming plan's model description. Include such features as project limits, number of through lanes, proposed open to traffic year, etc. If project is exempt from conforming plan, explain why. If the project corridor contains a traffic signal, the design year traffic volumes exceed 10,000 vpd <b>and</b> the level of service is D, E or F, a CO hotspot analysis is required.
MS4 Compliance – Is the project located in an MS4 area? No Yes
f the project resides in a designated MS4 (Municipal Separate Storm Sewer Systems) area, a concept-level
preliminary) hydrology study for Detention/Water Quality will be required. The concept-level hydrology
study shall be sufficient in detail to estimate right of way needs and provide a preliminary cost estimate for
MS4 compliance for each outfall. Information on Georgia's MS4 Permit can be found at:
http://www.georgiaepd.org/Files PDF/techguide/wpb/Final DOT SW NPDES Permit MS4 Dec 2011.pdf

For more information regarding GDOT's MS4 permit, please contact the Hydraulic Studies Group in the Office of Design Policy & Support.

**Environmental Permits/Variances/Commitments/Coordination anticipated:** *List all anticipated permits, variances, commitments, and coordination needed –Section 404, TVA, Water Quality, etc.* 

Permit/ Variance/ Commitment/			
Coordination Anticipated	No	Yes	Remarks
1. U.S. Coast Guard Permit		$\boxtimes$	
2. Forest Service/Corps Land	$\square$		
3. CWA Section 404 Permit		$\boxtimes$	
4. Tennessee Valley Authority Permit	$\square$		
5. Buffer Variance		$\boxtimes$	
6. Coastal Zone Management Coordination		$\boxtimes$	
7. NPDES		$\boxtimes$	
8. FEMA		$\boxtimes$	
9. Cemetery Permit	$\square$		
10. Other Permits			
11. Other Commitments		$\square$	NPS

12. Other Coordination	
------------------------	--

Use this area below the table for more details on Permits/Variances/Commitments/Coordination Anticipated as needed.

Is a PAR required? No Yes Completed – Date:

*If PAR has been completed, attach PAR report. Note: A PAR, if required, should be completed prior to Concept Report submission.* 

**NEPA/GEPA:** It is anticipated that this project will receive federal funds and that an Environmental Assessment will be prepared under NEPA regulations. A Section 4(f) Evaluation may be required for the McQueen's Island Trail or Fort Pulaski National Monument site. Coordination with the National Park Service will be required.

**Ecology:** An Ecology Resource Survey Report and Ecology Assessment of Effects will need to be prepared. The project is within the coastal zone and the area is predominantly wetland. A protected species analysis will need to be completed with particular attention to the diamondback terrapin. US 80 is a high crossing area for the diamondback terrapin. Section 7 consultation with the US Fish and Wildlife Service may be required. The National Park Service is proposing that Congress designate the marsh area adjacent to the project corridor as a Wilderness Area, which if enacted would mean any changes to the boundaries of the Wilderness Area would then require additional Congressional action.

**History:** A Cultural Resources Survey reevaluation will be required. Areas of potential effect include the Fort Pulaski National Monument Site. A Cultural Resources Assessment of Effect will be required with SHPO concurrence.

**Archeology:** The archeology survey will be completed with the Cultural Resources Survey. Archeological sites are present in the study area based on previously recorded data. A Cultural Resources Assessment of Effect will be required with SHPO concurrence.

#### Air & Noise:

It is anticipated that an Air Quality Screening and Noise Impact Assessment will be required.

Public Involvement: Significant public involvement was conducted during the feasibility study completed by the CORE MPO. A stakeholder committee was formed during that study and should continue in the next phase. A minimum of one PIOH and a PHOH should be conducted. The following meetings were held: September 15, 2010 – Stakeholder Kick-off Meeting September 16, 2010 – Public Information Meeting March 8, 2011 – Stakeholder Meeting March 8, 2011 – Public Information Meeting

August 29, 2011 – Stakeholder Meeting

August 30, 2011 – Public Information Open House

December 10, 2012 – Public Information Open House

**Major stakeholders:** CORE MPO, City of Tybee Island, Chatham County, Fort Pulaski National Monument, National Park Service, US Army Corps of Engineers, US Coast Guard Tybee Station, DNR Coastal Resources Division, Savannah Bicycle Campaign, Coastal Georgia Greenway Alliance, Bull River Marina, Tybee Island Marina.

**ROUNDABOUTS** See GDOT Design Policy Manual - Chapter 8 for further guidance. Delete this section if project does not include a roundabout.

Roundabout Lighting agreement/commitment letter received:	No	Yes
Agreement or commitment letter should be attached		

**Planning Level assessment:** Briefly explain the findings of the Planning Level Assessment and attach Planning Level Assessment to Concept Report. Required for all projects containing roundabouts where a Roundabout Feasibility Study has not been prepared. This includes linear projects where a roundabout is proposed.

**Feasibility Study:** Summarize the findings of the Roundabout Feasibility Study and attach Roundabout Feasibility Study to Concept Report. In most cases, the components of a feasibility study can be directly incorporated into the body of the Concept Report and no separate feasibility study prepared. Not required during concept for linear projects where roundabout(s) are proposed.

Peer Review required:	No No	Yes	Completed – Date:	
Attach Peer Review Report and resp	onses to all r	eport comment	s not incorporated into the desig	gn.

# CONSTRUCTION

**Issues potentially affecting constructability/construction schedule:** Summarize any known issues which may affect the construction of the project (e.g. staging/detour issues, seasonal construction requirements, very high traffic volumes requiring off-hour construction, etc.

**Early Completion Incentives recommended for consideration:** No Yes Early Completion Incentives is a method of providing the contractor with an incentive to expedite the completion of construction. Appropriate projects are those which address severe congestion – to provide an early benefit - or where construction must be completed by a fixed date. Incentives should only be considered where recommended by the Office of Construction. If incentives for early completion are recommended for consideration, include brief explanation of major reasons why and include estimate of RUC (Road User Costs). A benefit-to-cost ratio calculation may be required.

## **PROJECT RESPONSIBILITIES**

#### **Project Activities: TBD**

Project Activity	Party Responsible for Performing Task(s)
Concept Development	TBD
Design	TBD
Right-of-Way Acquisition	TBD
Utility Relocation	TBD
Letting to Contract	TBD
Construction Supervision	TBD
Providing Material Pits	TBD
Providing Detours	TBD
Environmental Studies, Documents, and Permits	TBD
Environmental Mitigation	TBD
Construction Inspection & Materials Testing	TBD

Lighting required: No Yes

If lighting is included in the project, describe who is responsible for installation and maintenance of lighting and attach lighting agreements or commitment letters.

**Initial Concept Meeting:** (*if applicable*) - Provide date of ICM and brief summary. Attach minutes if available.

**Concept Meeting:** *Provide date of CM and brief summary. Attach minutes.* 

**Other projects in the area:** *List other projects in the area; include PI numbers and brief description.* 

**Other coordination to date:** *Attach any pertinent documentation.* 

**Project Cost Estimate and Funding Responsibilities:** Add additional rows as necessary; Attach current cost estimates to report.

	Breakdown		Reimbursable		Environmental	
	ot PE	ROW	Utility	CST*	Mitigation	Total Cost
Ву	CDM Smith	CDM Smith	CDM Smith	CDM Smith	TBD	
Whom						
\$	4,996,381	469,856	4,691,880	54,089,073	TBD	64,247,190
Amount						
Date of	12/31/2012	12/31/2012	12/31/2012	12/31/2012		
Estimate						

\*CST Cost includes: Construction, Engineering and Inspection, and Liquid AC Cost Adjustment.

## **ALTERNATIVES DISCUSSION**

**Alternative selection:** This section summarizes the findings of the CORE MPO's December 2012 US 80 Bridges Study. The detailed analysis of alternatives is documented in the final report:

**Preferred Alternative:** Alternative 3 - Replace existing Bull River and Lazaretto Creek bridges with new two-lane bridge with 10-foot bikeable shoulder and 10-foot multiuse path. Remove old bridges. Widen existing roadway to include 10-foot paved shoulder. Restripe roadway at McQueen's Island Trail and Fort Pulaski entrances for turning lanes. Provide 18-space parking at McQueen's Island Trail. Provide off-road connections from proposed paths on bridges to existing McQueen's Island Trail.

Estimated Property Impacts:	0	Estimated Total Cost:	\$64,247,190
Estimated ROW Cost:	\$469,856	Estimated CST Time:	24 months

**Rationale:** This project provides for improvements to safety and bicycle and pedestrian facilities without limiting future opportunities for expansion. Replacement of the two bridges will provide a long life span for the investment in the new bridges. The traffic analysis does not support additional lanes, but the 10-foot paved shoulders provide for more traffic management options during congested peak tourist travel and evacuations.

**No-Build Alternative:** The no-build alternative would do nothing except continued maintenance on the existing roadway and bridges.

Estimated Property Impacts:	N/A	<b>Estimated Total Cost:</b>	N/A
Estimated ROW Cost:	N/A	Estimated CST Time:	N/A
Rationale: Does not meet the purp	ose and need because	it does not address safety cond	cerns.

**Alternative 1:** Widen existing Bull River and Lazaretto Creek bridges to accommodate 8-foot bikeable shoulder. Widen existing roadway to include 6.5-foot paved and 3.5-foot grassed shoulder. Restripe roadway at McQueen's Island Trail and Fort Pulaski entrances for turning lanes. Provide 6-space parking at McQueen's Island Trail.

Estimated Property Impacts:	0	Estimated Total Cost:	\$25,416,104
Estimated ROW Cost:	\$286,552	Estimated CST Time:	24 months

**Rationale:** This project provides minimal improvements for safety. The shoulder size is less accommodating to bicyclists and is not supported by the emergency management stakeholders who prefer a wider paved shoulder. This alternative was not supported by the public.

**Alternative 2:** Widen existing Bull River and Lazaretto Creek bridges to accommodate 10-foot bikeable shoulder and 10-foot multiuse path. Widen existing roadway to include 10-foot paved shoulder. Restripe roadway at McQueen's Island Trail and Fort Pulaski entrances for turning lanes. Provide 15-space parking at McQueen's Island Trail. Provide off-road connections from proposed paths on bridges to existing McQueen's Island Trail.

Estimated Property Impacts:	0	Estimated Total Cost:	\$42,854,229
Estimated ROW Cost:	\$469,278	Estimated CST Time:	24 months

**Rationale:** This project would provide a short term solution for the safety issues. The bridges may be expanded and rehabilitated but would have to ultimately be replaced. The lifespan of the expanded bridges could be as short as 15 years.

Alternative 4: Construct new two-lane parallel bridge with 8-foot shoulders and 10-foot multiuse path

and restripe existing to one lane with 10-foot bikeable shoulder. Widen existing roadway to include 10foot paved shoulder. Restripe roadway at McQueen's Island Trail and Fort Pulaski entrances for turning lanes. Provide 18-space parking at McQueen's Island Trail. Provide off-road connections from proposed paths on bridges to existing McQueen's Island Trail.

Estimated Property Impacts:	0	Estimated Total Cost:	\$61,524,208
Estimated ROW Cost:	\$572,630	Estimated CST Time:	24 months

**Rationale:** This project was ranked closely to the preferred alternative in the overall evaluation, but the existing bridge would have to be replaced in the short term which would create a greater future expense. The traffic analysis does not justify the additional one-lane bridge.

**Alternative 5:** Construct new two-lane parallel bridge with 8-foot shoulder and 10-foot multiuse path and widen existing bridges to accommodate two lanes and 8-foot bikeable shoulder. Widen existing roadway to include 10-foot paved shoulder. Restripe roadway at McQueen's Island Trail and Fort Pulaski entrances for turning lanes. Provide 18-space parking at McQueen's Island Trail. Provide off-road connections from proposed paths on bridges to existing McQueen's Island Trail.

Estimated Property Impacts:	0	<b>Estimated Total Cost:</b>	\$71,743,917
Estimated ROW Cost:	\$591,248	Estimated CST Time:	24 months

**Rationale:** This project was ranked closely to the preferred alternative in the overall evaluation, but the existing bridge would have to be replaced in the short term which would create a greater future expense. The traffic analysis does not justify the additional two lanes on the bridges. This project has the highest capital cost estimate.

**Alternative 6:** Widen existing Bull River Bridge to accommodate 10-foot bikeable shoulder with 10-foot multiuse path. Replace Lazaretto Creek Bridge with new two-lane bridge with 10-foot bikeable shoulder and 10-foot multiuse path. Remove the old Lazaretto Creek Bridge. Widen existing roadway to include 10-foot paved shoulder. Restripe roadway at McQueen's Island Trail and Fort Pulaski entrances for turning lanes. Provide 18-space parking at McQueen's Island Trail. Provide off-road connections from proposed paths on bridges to existing McQueen's Island Trail.

Estimated Property Impacts:	0	Estimated Total Cost:	\$48,682,442
Estimated ROW Cost:	\$469,856	Estimated CST Time:	24 months

**Rationale:** This project was ranked closely to the preferred alternative in the overall evaluation, but the existing bridge would have to be replaced in the short term which would create a greater future expense. This project was not favored by the public.

**Comments:** The US 80 Bridges Study was completed by the CORE MPO in December 2012. The final report from the study describes the evaluation of alternatives and the process for recommending a preferred alternative. The feasibility study was conducted with significant public input to build consensus on a recommended alternative.

## Attachments:

- 1. Concept Layout
- 2. Typical sections
- 3. Detailed Cost Estimates:
  - a. Construction including Engineering and Inspection
  - b. Completed Fuel & Asphalt Price Adjustment forms

- c. Right-of-Way
- d. Utilities
- e. Environmental Mitigation (EPD, etc)
- 4. Crash summaries
- 5. Traffic diagrams
- 6. Capacity analysis summary (tabular format)
- 7. Summary of TE Study and/or Signal Warrant Analysis
- 8. Roundabout Data (if applicable see GDOT Design Policy Manual)
  - a. Planning level assessment
  - b. Roundabout feasibility study
  - c. Lighting agreement or commitment letter
  - d. Peer Review and responses
- 9. Bridge inventory (If applicable)
- 10. Hydrology Study for MS4 Permit (*if applicable*)
- 11. Pavement studies (e.g. Preliminary Pavement Type Selection Report, etc.)
- 12. Utility Risk Management Plan (If available Derived from the Public Interest Determination Policy and Procedure)
- 13. Conforming plan's network schematics showing thru lanes. (Note: This attachment is required for non-attainment areas only)
- 14. Highway Safety Manual Crash Reduction Factor Calculations (if applicable)
- 15. Minutes of Concept meetings
- 16. Minutes of any meetings that shows support or objection to the concept (*e.g. PIOH, PHOH, Detour Meeting, Town Hall Meeting, etc.*)
- 17. PFA's and/or SAA's.
- 18. Other items referred to in the body of the report.

# APPROVALS

Concur:

**Director of Engineering** 

Approve:	Include this signature line for Full Oversight Projects Or	
	Division Administrator, FHWA	

Date

Approve:

Chief Engineer

Date


















































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