

FHWA-HEP-16-093

St. Johns River Crossing NEPA Analysis

Summary

The Florida Department of Transportation's (FDOT) First Coast Expressway project aims to provide a multi-lane limited access toll facility to connect Interstate 95 (I-95) in St. Johns County and Interstate 10 (I-10) in Duval County. This project has proposed 46.5 miles of roadway, including a new bridge over the St. Johns River. Figure 1 shows the location of the project area. In the 2013 Final Environmental Impact Statement (FEIS) for the St. Johns River

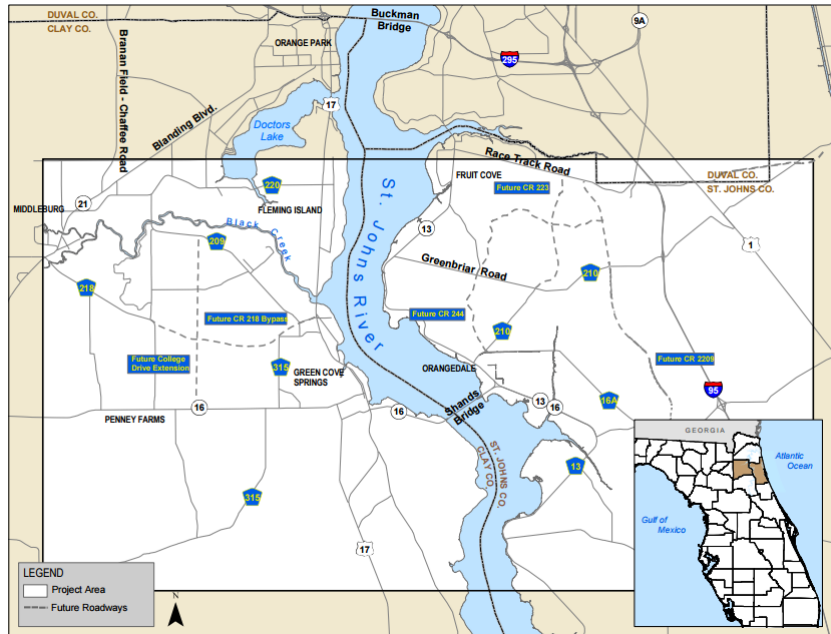


Figure 1. Project Area and Vicinity. Source: FEIS, 2013.

Crossing, FDOT and FHWA analyzed the proposed bridge for climate change impacts related to sea level rise and storm surge. They evaluated projected sea level and storm surge elevations against the vertical clearance and approach elevations for each proposed alternative. The analysis found that storm surge impacts could increase slightly due to continued sea level rise. However, the projected increases in sea level and associated storm surge through 2100 are not expected to render any of the proposed bridge Build Alternatives dysfunctional.

Project Overview

The St. Johns River Crossing is a component of the FDOT First Coast Expressway Project in Northeast Florida. The project is a new multi-lane limited access toll facility that will serve as an alternate connecting roadway between I-95 in St. Johns County and I-10 in Duval County. Currently, the Shands Bridge is the only connection between the two counties within the project area.

This new bridge is intended to provide additional capacity to improve current and future transportation network deficiencies, promote and support employment and economic development,



Figure 2. Congestion on network roadways. Source: FEIS, 2013.



Climate Change in NEPA Case Study

and improve emergency evacuation. Since the 1970s, population growth in the area has created traffic congestion in the local road networks and nearby bridges, seen in Figure 2. As population increases in St. Johns County and other coastal areas, relying on existing routes to move a large number of people inland during emergencies could impact the ability to provide safe and efficient evacuation. Ten Build Alternatives and one No Build Alternative were considered for evaluation in the FEIS.

Considering Climate Change within the NEPA Process

Project Scope

The FEIS climate change analysis grouped the 10 alternatives into two groups, a Northern Build Scenario (two northern river crossings) and a Southern Build Scenario (eight southern river crossing). This simplified the analysis, and the individual differences between alternatives in the north and south did not significantly alter the estimated potential effects of climate change. Figure 3 shows the location of the 10 alternatives. The climate change analysis included an evaluation of sea level rise and storm surge effects on each proposed alternative. FDOT also released a *Climate Change Technical Memorandum* that provides additional detailed technical information on current climate studies, uncertainties, and the various possible scenarios for the next century.

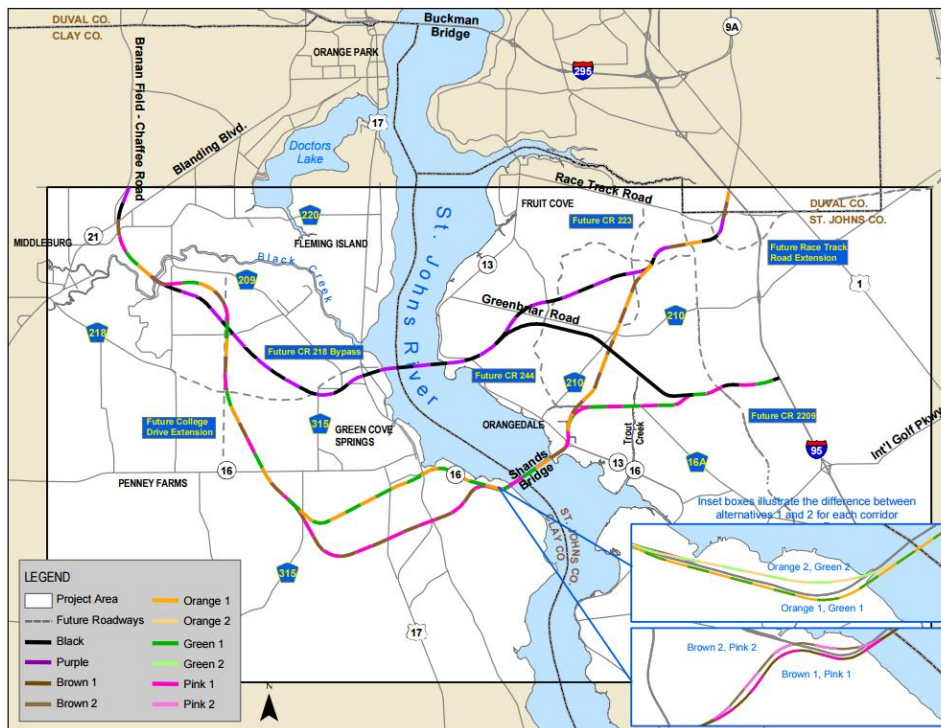


Figure 3. Final Build Alternatives. Source: FEIS, 2013.



Approach

FDOT and FHWA combined historical sea level data with projected global sea level rise projections, global hurricane projections, and localized storm surge modeling to assess whether each proposed alternative could be affected by future coastal flooding.

The analysis was based on:

- Historical satellite-measured sea surface anomaly data in the area, from the University of Colorado's online interactive sea level wizard.
- *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report* projections of 0.18 to 0.59 meters (7.1-23.2 inches) of sea level rise by 2100 (across the range of emissions scenarios).
- Storm surge projections from the National Hurricane Center's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model that some areas of the inland counties along the St. John's River could receive surges of up to 10 feet during a Category 5 event.
- Projections from the IPCC that sea level rise could potentially add 10 to 20 percent to maximum anticipated hurricane storm surge levels.
- Data from the National Hurricane Center indicating that there is no clear trend toward greater hurricane intensity.

FDOT and FHWA then compared the projected sea level and storm surge heights to the vertical clearance and approach elevations of each proposed alternative. Under all alternatives, the proposed bridge would have a 65-foot vertical clearance from the mean high water mark of the St. Johns River. The existing Shands Bridge has a vertical clearance of 45 feet from the mean high water mark. The bridge approaches on either side of the river would be at approximately 11 feet above sea level.

Findings

Based on the IPCC projections and assuming that a rise in sea level elevation would result in an equivalent rise in the St. Johns River, the FEIS concluded that the 20-foot difference in bridge height is sufficient to allow for a potential two-foot increase in sea level elevation by 2100 due to climate change for any of the Build Alternatives. Based on the potential sea level increase of up to two feet, the proposed elevation of the bridge approaches and roadway at the edge of the river would be sufficient to protect against the potential for sea level rise. Projected increases in sea level are not expected to be enough to substantially affect the levels of storm surge such that the proposed bridge Build Alternatives would be dysfunctional.

Actions to Address Risk

The FEIS did not recommend action to address sea level and storm surge. The climate change impacts analysis found that the vertical clearance and the approaches would be sufficient to protect against the potential for sea level rise. Additionally, the storm surge resulting from projected increases in sea level over the present century would not render the proposed Bridge Alternatives dysfunctional.



Links to Further Resources

Florida Department of Transportation (FDOT). First Coast Expressway Project Resources.

<http://firstcoastexpressway.com/>

FHWA and FDOT. St. Johns River Crossing Final Environmental Impact Statement. August 2013.

<http://firstcoastexpressway.com/documents/2013-10-11-st-johns-river-crossing-final-environmental-impact-statement.pdf>

FHWA and FDOT. St. Johns River Crossing Project Development & Environment Study. Climate Change Technical Memorandum. July 2013

http://firstcoastexpressway.com/SJRBridge/documents/Final%20Technical%20Discipline%20Reports/SJRC_Climate%20Change%20Technical%20Memorandum.pdf

Intergovernmental Panel on Climate Change (IPCC). Fourth Assessment Report (AR4). 2007.

<https://www.ipcc.ch/report/ar4/>

National Oceanic and Atmospheric Administration (NOAA). National Hurricane Center. Sea, Lake, and Overland Surges from Hurricanes (SLOSH).

<http://www.nhc.noaa.gov/surge/slosh.php>

National Oceanic and Atmospheric Administration (NOAA). National Hurricane Center.

<http://www.nhc.noaa.gov/>

