Crosstown Parkway Extension: Innovations Through Design-Build

APWA Florida Chapter
2016 Public Works Expo
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Presenters

» Frank Knott, City of Port St. Lucie Public Works, Project Manager

» Rachel Back, PE, CFM, RS&H, Inc., Design Project Manager

» Stephen Park, PE, RS&H, Inc., Roadway Engineer of Record
Technical Session Outline

1. Project History/Overview – Frank Knott
2. Design-Build Process – Rachel Back
3. Archer Western/RS&H Team Approach
   1. Overview
   2. Alternative Technical Concepts (ATCs) and Innovations
   3. Superstreet Intersection – Stephen Park
   4. Other Added Value
4. Design-Build Procurement Results
5. Post-Award Partnering
6. Project Visualization
7. Project Status
8. Questions
Timeline

1980s - 1990s - 3rd East-West River Crossing Planning Efforts
- Completion of the Port St. Lucie Blvd. and Prima Vista Blvd. Bridges
- City conveys over 1,000 acres of river property to FDEP

2000s
- Federalization of the Project from Manth Lane to US-1 and the PD&E Study
- Initiation of PD&E Study and conceptual alternatives/corridor analysis
- 2005 Voter Referendum, 89% approval of $165M general obligation bond to fund Project
- 2009 Opened 5 miles Crosstown Parkway Corridor from I-95 East to Manth Lane

Project History/Overview
Project History/Overview

2010s
- Representative Corridor addressing “worst case scenario” impacts
- MOU with FDEP
- Draft EIS approved and LPA Route 1C adopted
- FDEP’s Proprietary Mitigation Plan implemented

February 2014 to Present
- FHWA’s ROD Issued approving the LPA Route 1C
- 1st Amendment FDEP MOU executed: revised Proprietary Mitigation Plan
- City permit applications to SFWMD and USACE
- Design-Build Procurement as LAP Project with FDOT
City’s PD&E/EIS Process

Purpose & Need:
- Provide additional bridge capacity/accommodate existing and projected travel demand
- Relieve congested conditions on two existing river crossing corridors

EDTM: Preparation of an EIS was determined to be the appropriate course of action

Define & Evaluate Alternatives
- Numerous corridors evaluated for 6-lane roadway and bridge crossing.
- 6 of the 8 build alternatives, including a no-build evaluated in the EIS

Project History/Overview
City’s PD&E/EIS Process

Purpose and Need 2002

Efficient Decision Making

Define & Evaluate Alternatives

Prepare Draft EIS

Public Hearing 2011

Select Preferred Alternative

Prepare Final EIS

Record of Decision 2014

**Preparation of Draft EIS:**
- Minimization techniques to bridge environmentally sensitive lands/avoid temporary fill in wetlands during construction/maximize span lengths to reduce number of piers, and top down construction or use of temporary trestles
- Developed in coordination with various federal and state agencies.

**Public Hearing:** September 22, 2011 – Over 400 people attended

**Selection of Preferred Alternative:** Alternative 1C selected November 11, 2011 and adopted by City on January 23, 2012
City’s PD&E/EIS Process

|----------------------|---------------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|------------------------|

» **Final EIS:**

- FHWA concurrence with selection of Alternative 1C
- Signed by FHWA on November 14, 2013

» **Record of Decision (ROD):** February 24, 2014 signed by FHWA

» **Final approval of Project and Alternative 1C corridor.**
Representative Corridor (RC)

- RC was developed as “worst case scenario”
- ERP submitted using RC approach
- Mitigating the RC resolved FDEP’s concerns over the issuance of easements to the City to cross state park and sovereignty submerged lands (SSL)

Legend:
- Savannas Preserve State Park
- National Wetland Inventory (NWI)
FDEP Proprietary Mitigation: Water Quality Improvements

Four Restoration Projects
- Evans Creek
- Site 5 West
- Riverplace Upstream
- Baffle Boxes at five locations

Site 5 West
- Before

Site 5 West
- After
FDEP Proprietary Mitigation: Recreational

Savannas Recreation Area Trail
• 1.25 mile multi-use trail
• 8’ conc. with 3 boardwalk crossings
FDEP Proprietary Mitigation: Recreational

Halpatiokee Trail
Canoe Access Replacement

Savannas Preserve State Park
Education Center Improvements

Project History/Overview
Crosstown Parkway Segment 1

- From Manth Lane to US-1/Village Green Dr (Alt. 1C)

- 1.5 miles roadway improvements in 330 ft R/W
  - 3 lanes in each direction
  - Bicycle lanes and pedestrian paths on both sides of road
  - Landscaped berm

- 4,000 foot long bridge over North Fork of St. Lucie River
  - Signature bridge
  - Architectural towers at bridge approaches with art
Design-Build Process

» FDOT District 4 Local Agency Program (LAP) Design-Build

» Procurement by City using FDOT procedures

» 3 City staff and 1 from FDOT District 4 on Technical Review and Selection Committees

» City Engineer and 1 from FDOT District 4 on Alternative Technical Concepts (ATC) Committee

» Planned Advertisement - March 20, 2014

» Official Advertisement - July 1, 2014
Phase I

- Expanded Letter of Interest (ELOI)
  - Project Experience and Resources
  - Project Approach and Understanding of Critical Issues

- 20 Maximum Points, carried into Technical Score
- Self-Shortlist based on Scores
- 11 Design-Build Teams submitted ELOIs July 31, 2014
- CEI Selection - August 8, 2014: Target/Cardno
- ELOI Scores provided - September 9, 2014
- Shortlist - September 25, 2014, 5 teams moved forward
Phase II

» Pre-proposal Meeting/RFP Provided - October 7, 2014
» ATC Meetings/Submittals - October 28-December 2, 2014
» Final ATC Decisions - December 16, 2014
» Technical Proposals Due - January 13, 2015 (80 points max)
» Page Turn Meeting - January 16, 2015
» Question and Answer Session - February 18, 2015
» Technical Scores Announced/Price Proposals Due - May 19, 2015 (Let Date)
» Maximum Bid Price: $101,854,000
» Adjusted Scoring: Bid Price/Technical Score
Archer Western/RS&H Team Approach

» Brainstormed for ATCs/Innovations
  • How to improve project
  • Not just cut costs
  • Provide best value to City/FDOT
  • Reduce maintenance, wetland impacts

» Build Bridge from Temporary Trestle
  • Longer spans
  • Reduced cost/construction duration
  • Reduced wetland impacts
ATCs & Innovations

» Developed potential ATCs and discussed at two ATC meetings

» Submitted 19 ATCs in 4 submittals

» 8 ATCs approved and implemented in Technical Proposal. 2 resulted in RFP changes for all to implement

» Non-ATC Enhancements
  • Move U-Turns between Manth Ln and Preston Ln to improve safety (doubled distance for vehicle crossover)
  • Perform geotechnical investigations from temporary trestle, eliminating need for separate permit
  • Produce project visualization

Approach: ATCs/Innovations
Superstreet Intersection (Floresta Dr)

Intersection Design

Approach: Superstreet
Superstreet Intersection (Floresta Dr)

Superstreet is a Restricted Crossing U-Turn intersection (FHWA)

» Specifically designed to accommodate heavy through-to-side street traffic ratios.

» All turns from main road are same as traditional intersection.

» Effective in improving travel time and reducing delays

» Time savings for vehicles with simplified signal phasing

» Increased safety by reducing conflict points at major crossovers

Approach: Superstreet
Minor Street (Floresta) Turning Movements

Left Turn Movement

Through Movement
Superstreet Intersection (Floresta Dr)

Signals operate independently in each direction.

Arterial traffic movements are same as traditional intersection.

Cross street thru traffic turns right.
Cross street left turn traffic moves thru.

Cross street thru traffic turns right.
Cross street left turn and thru traffic makes a U-turn.

Approach: Superstreet
Successful Superstreets in Other States

» North Carolina
  • Chapel Hill: US 15/Erwin Road
  • Holly Springs: SR 55 Corridor (Multiple Intersections)
  • Leland: US 17 Corridor (Multiple Intersections)

» Ohio
  • Fairfield: SR 4 Corridor (Multiple Intersections)

» Texas
  • San Antonio: US 281 Corridor (Multiple Intersections)

» Michigan, Louisiana, Maryland, Utah, South Carolina

Approach: Superstreet
Superstreet Intersection (Floresta Dr)

» RS&H evaluated Traffic Level of Service (LOS) of RFP Concept intersection while preparing Alternative Technical Concepts (ATCs)

» Discovered RFP Concept design produced LOS E for 2017 and LOS F for 2037 (using traffic volumes from EIS)

» RS&H Traffic Engineers recommended analysis of superstreet intersection. Also analyzed roundabout and Michigan Left

» Superstreet intersection produced LOS B for 2017 and LOS C for 2037
# Superstreet Benefits

<table>
<thead>
<tr>
<th>Measurement Criteria</th>
<th>Traditional Intersection</th>
<th>Superstreet Intersection</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Year (2017) Level Of Service</td>
<td>E</td>
<td>B</td>
<td>3 Levels</td>
</tr>
<tr>
<td>Design Year (2037) Level Of Service</td>
<td>F</td>
<td>C</td>
<td>3 Levels</td>
</tr>
<tr>
<td>Conflict Points</td>
<td>32</td>
<td>14</td>
<td>56% fewer</td>
</tr>
<tr>
<td>Average Delay Time</td>
<td>122.6 seconds</td>
<td>14.7 seconds</td>
<td>8 times faster</td>
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Safety Improvements of Superstreet

» Conflict Points reduced from 32 to 14 (56% reduction) compared to traditional 4-leg intersection
  • Fewer crashes
  • Less severe crashes

» Pedestrian safety
  • Large median refuge
  • Conflict between pedestrians and left-turning vehicles on Crosstown Parkway eliminated
  • Conflict points reduced from 24 to 8 (67% reduction)

» Floresta Drive remains a neighborhood street.

» Emergency vehicles traverse mountable curb in median.
Safety Improvements of Superstreet

Traditional Intersection: 32 conflicts

Superstreet Intersection: 14 conflicts

Approach: Superstreet
Other Added Value

» Additional ATCs that purely add value:
  • Provide overlooks on bridge
  • Segmental block walls
  • Implement Safety Edge™

Segmental Block Walls

Bridge Overlook

Approach: Other Added Value
Design-Build Procurement Results

» Archer Western/RS&H Team achieved highest technical score and lowest bid!

» Bid price nearly $15M below maximum
Post-Award Partnering

» Project changes to improve project and reduce long-term maintenance

» Some items reducing cost

» Scope additions
  • Two additional trail heads
  • Water fountains along trail
  • Directional bore WM
Where are we now?

» 100% Plans under review
» SFWMD Permit - Administrative Hearing July 2016
» Anticipate construction to commence late 2016
» 990 total contract days
» Project completion in 2018
Questions?