LA 1 Bridge Project
Status Update
Feb. 12, 2007
Project Location
Major Project work modules

1. Mapping, Location, Topo and Utility Surveys
2. Line & Grade Study
3. Post-EIS Environmental permitting, primarily wetland
4. Construction Permitting (canals)
5. ROW acquisitions, negotiations with landowner coordination for canals
6. Special oil / gas investigations, tapping & relocations / appraisals
7. Toll studies and design for toll plaza on bridge
8. Geotech investigations and design
9. Fault studies toward design
10. Pile Load Testing Ph 1A, B and C
11. Hydrological / Scour modeling
12. Vessel Collision Analysis
13. ITS applications
14. Structures and Road Design (incl signing/lighting)
15. “Post design completion” wave and hydro studies
16. Construction submittal reviews
The WSA/DOTD production team was a La.-based operation with virtually all engineering production from Louisiana.

All major project subs were La. firms. This large project has used 19 subconsultants or subcontractors.

90% of project design work was completed within Louisiana.
Detailed Design Progress CPM helped control workflow
Major schedule milestones

- **Jan 01 2003**  EIS (Environmental) Approval
- **Apr 08 2003**  NTP for Design – 18 mo. Schedule
- **Dec 14 2004**  Final Plans subm’l Ph 1A & Ph 1B
Major schedule milestones

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- Dec 14 2004       Final Plans subm’l Ph 1A & Ph 1B
- Jan 10 2005       Team asked to Redesign for cost
- Jun 29 2005       Ph 1A / 1B – 1st Bid together
- July 05 2005      Ph 1A / 1B Redesign & separated for cost
- Aug 29 2005-------Katrina-----------------------------
- Sep 19 2005       Ph 1B Redesign Completed
- Nov 12 2005       Redesign - Higher Scour/Wave Forces
Major schedule milestones

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- **July 05 2005**: Ph 1A / 1B **Redesign & separated for cost**
- **Aug 29 2005**: -------------------Katrina -------------------
- **Sep 19 2005**: Ph 1B Redesign Completed
- **Nov 12 2005**: **Redesign** - Higher Scour/Wave Forces
- **Dec 21 2005**: Ph 1B Bid Successfully Traylor-Massman
- **Feb 22 2006**: Ph 1C Bid Successfully Traylor-Massman
- **Mar 01 2006**: WO to T-M Issued for Ph 1B
- **Oct 26 2006**: Ph 1A Redesign Completed
- **Dec 13 2006**: Ph 1A Bid Successfully James Group
Start of WSA Project: completed EIS
Precision aerial ortho-photographic mapping completed for original alignment
### Wetland Summaries from App'd Joint Use Permit

<table>
<thead>
<tr>
<th>Project Segment</th>
<th>Project Footprint Area (Acres)</th>
<th>Impacted Open Water (Acres)</th>
<th>Impacted Wetlands</th>
<th>Total Impacted Wetlands (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sta. 107-22 00 to Sta. 466-92 00</td>
<td>75.5</td>
<td>57.2</td>
<td>17.5</td>
<td>0.2</td>
</tr>
<tr>
<td>End-On Const. (124 25’ Shadow)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sta. 366-92 00 to Sta. 530-00 00</td>
<td>8.7</td>
<td>6.5</td>
<td>0.7</td>
<td>0.4</td>
</tr>
<tr>
<td>(Mainline Through Leeville)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>And North and South Connectors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area Outside of Const. Canal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Shadow = Structure Width)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sta. 530-00 00 to Sta. 945 00 00</td>
<td>118.5</td>
<td>58.4</td>
<td>55.6</td>
<td>2.0</td>
</tr>
<tr>
<td>End-On Const. (124 25’ Shadow)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL INDIRECT IMPACTS</strong></td>
<td><strong>292.7</strong></td>
<td><strong>122.1</strong></td>
<td><strong>73.8</strong></td>
<td><strong>2.6</strong></td>
</tr>
</tbody>
</table>

* Non-wet areas are conceded as wetlands

3.2 Oyster Lease Impacts

Two oyster leases are impacted by this project. Lease No. L33169 occupies 43 acres of water bottom in an area of sunken marshlands east of Bayou Lafourche and adjacent to the Leeville Bridge. Lease No. L32962 occupies 121 acres of water bottom in an area of sunken marshlands east of Bayou Lafourche and south of the existing Leeville Bridge. The proposed project impacts the southern edge of Lease 33169 (6.91 acres) and the eastern edge of Lease 32962 (13.72 acres). In addition there is a lease just south of the existing Leeville Bridge (Lease No. 33092), which is within 1500 feet of the proposed project.
- Special issues found from EIS
Post-EIS Environmental permitting

- EIS updated for Tolls
- DNR Coastal Zone Permit approved
- Mitigation Plans developed
- Joint Coastal Use Permits issued
- Wetlands Technical Report completed
- Water Quality Certification completed
- Canals for Construction approved, 1B/1C only
- USCG Permits issues for 4 opening – *but unfinished for north alignment*
Canal Permits for Constr., 1B/1C only

Construction Permitting (canals)
Dredge Spoils used for Marsh Creation
ROW acquisitions, negotiations, landowner canal coordination

- All properties have been acquired for Ph 1A, 1B, 1C
- Largest ROW risk is buying wells!
- Some Ph 2 landowners dialog started but no ROW plans for Ph 2; these urgently needed due to aggressive oil drilling activities taking place.
Complex Oil and Gas Pipeline issues
Special oil / gas investigations, tapping & relocations / appraisals

- Spanned all pipelines in Ph 1A

- Identified, moved, removed or cut 20 or more gas/oil pipelines in Ph 1B. Considerable time and effort needed to locate and coordinate their removal.

- Ph 2 has largest extent of unknown pipelines yet to be located and assessed.
Gas Lines were located prior to dredging
Toll studies and design for toll plaza on bridge

- Design team original did toll study based on traffic and sized a bridge-mounted toll plaza.
- Crescent City Connection Division reviewed and approved WSA’s concept, but then took over work with ETC.
- ETC and CCCD decided to go to ORT tolling, greatly reducing toll plaza on structure.
LA 1: Option 1, Design

Graphic Slide by ETCC of Houston, TX
LA 1: Option 2, Design

Graphic Slide by ETCC of Houston, TX
LA 1: Option 3, Design

Graphic Slide by ETCC of Houston, TX
Geotech investigations and design

- Complete project’s borings for Phase 1, but limited field work done in Ph 2 alignment.
- All Geotech design for 1A to 1C completed, much applicable to Ph 2
- Ph 2 alignment needs to be set prior to resuming borings
Earlier geophysical work used non-intrusive over-marsh equipment only
Pile Load Testing Ph 1A, B and C

- Complete detailed pile load test for many alternate pile types.

- Valuable in-situ load testing used to calibrate CPT results and allowed project Safety Factor = 2.

- Results valid for Phase 2, but no tests done in Ph 2 area.
9 test piles at 4 Pile Test Locations in project
## Summary of Pile Types and Test Methods

<table>
<thead>
<tr>
<th>Pile Type</th>
<th>Pile Length (ft)</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Site 2 - North approach to main span</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54-inch Cylinder</td>
<td>160</td>
<td>Statnamic</td>
</tr>
<tr>
<td>16-inch Square PSC</td>
<td>130</td>
<td>Static</td>
</tr>
<tr>
<td>Test Site 3 - Support for main span</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54-inch Cylinder</td>
<td>160</td>
<td>Statnamic</td>
</tr>
<tr>
<td>30-inch Square PSC</td>
<td>190</td>
<td>Static</td>
</tr>
<tr>
<td>30-inch Steel Pipe Pile</td>
<td>195</td>
<td>Static</td>
</tr>
<tr>
<td>Test Site 4 - Low level trestle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-inch Square PSC</td>
<td>210</td>
<td>Static</td>
</tr>
<tr>
<td>24-inch Square PSC</td>
<td>160</td>
<td>Static</td>
</tr>
<tr>
<td>Test Site 5 - Low level trestle - Phase 1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-inch Square PSC</td>
<td>170</td>
<td>Static</td>
</tr>
<tr>
<td>24-inch Square PSC</td>
<td>145</td>
<td>Static</td>
</tr>
</tbody>
</table>
Pile load tests were conducted earlier in project.
Hydrological / Scour modeling

- Detailed modeling completed for Bayou Lafourche.
- FHWA required subsequent re-evaluation post-Katrina.
Vessel Collision Analysis

- Detailed modeling and force recommendations completed for Bayou Lafourche, all approach piers, and special canal crossings.

- Specifies loads for main channel but also the routine service canal loads.

- Large channel loads inferred maximum main span which could be economically achieved.
Structures and Road Design

- Completed bridge and road plans under contract for 1B and 1C, and under construction

- TOP DOWN construction contract for Ph 1A just bid

- Ph 1A Abbreviated plans require contractor submittal of additional details.
• Shown is Phase 1B const. at North end of 1A & 1B project.
• Phase 1A north end access only through joint canal use with 1B contractor (dotted line)

North end of project has canal access from Southwest Louisiana Canal
“World record span” spliced girder
Structures Design
• Phase 1B is concurrent at North end of project. North end access from joint use of canals dredged for Phase 1B

• Phase 1A Bridge Length = 26,544 ft.
• Phase 1A Bridge Deck Area = 1,141,484 sq ft.
• Top Down Construction req’d throughout
• Intersection road length = 2,000 ft approx
- **Top Down or End on construction** will be utilized for length of the Phase 1A and Phase 2 bridges on this project.

- Project designed to minimize impacts to vegetated marsh. Also Ph 1B canal dredging must supply restoration of acreage loss (new wetlands) and was part of project.

- Scupper discharge pipes on the entire of the elevated highway will include additional length so as to not preclude the attachment of a highway runoff collection system, should future research indicate the need for such a system.

- Staging areas have been selected that will provide the opportunity to restore and create marsh upon completion of construction— even during construction these fill areas will provide some buffer benefits.

- All pre-construction field work must be non-damaging to the environment.
Ph 1A VECS Bidding

- Each bridge Alternate is fully engineered but some elements of the bridge will require contractor submittals of placement drawings.

- The contractor will select one of two (2) Alternates for the short bridge approach and one of six (6) bridge Alternates for the longer tangent bridge.

- It was a **conventional quantity-based bid**. Contractor must be prepared to build the Alternate proposed for the price proposed.

- After a low bid is selected, the contractor may then make a Value-Engineered proposal, with the Value Engr’g savings governed by the DOTD’s standard clause.
Top-Down schematics

**SCHEMATIC OF TYPICAL TOP-DOWN CONSTRUCTION**

- **Completed Deck**
- **Optional Haul Bridge**
- **Crane Platform**
- **Permanent Piles**

**STEP 1**
- Crane, **CR**, drives piles and sets slabs for haul bridge, optional.

**STEP 2**
- Place cap & grout in place.

**STEP 3**
- Advance crane platform, place superstructure in back span.

**STEP 4**
- Advance crane, repeat step 1.

**SCHEMATIC OF TYPICAL “MODIFIED” TOP-DOWN CONSTRUCTION**

- **Completed Deck**
- **Temporary Piles**
- **Saw Order/ Gantry Rails**
  - **Construction Platform**

**STEP 1**
- **C1** removes temporary piles from back span. **C2** drives permanent piles.

**STEP 2**
- Permanent piers & beams.
- Gantry crane for material delivery to platform and setting beams.

**STEP 3**
- **C2** advances & drives temporary piles. **C1** lays gantry rails.

**STEP 4**
- **C1** advances, platform advances. **C2** advances.

**STEP 5**
- Repeat step 1.

As deck sections are completed, gantry rails & temporary piles further back of leading bridge edge are removed, and related at leading edge. The finished structure is used to deliver materials.

Gantry crane(s) are used to:
- Set caps
- Set beams
- Deliver piles
- Deliver reinforcing and concrete
Six Primary Bridge Plan Alternates

- **Alt. 1L and 1S (Short span)**
  - Precast voided box slab at 40 ft.

- **Alt. 2L and 2S (Medium span)**
  - AASHTO Type III at 65 ft. span

- **Alt. 3L and 3S (“Long” span)**
  - AASHTO BT 63 at 95 ft. span
Alternate 2L,2S – 65’ span
Alternate 2L,2S – 65’ span
Ph 1A Plans embody pile charts to encourage value engineering
The wave analysis completed for Ph 1A and 1B was rigorous and accounted for both surface waves, buoyancy and underwater hydro-dynamic forces.

No modeling (time not available)
Post-design Wave Analysis
FBPier Modeling

Included non-linear soils-structure-interaction
Exceptionally long piles needed due to poor soils
Exceptionally long piles needed due to poor soils
North Connector in area of ORT (toll) plaza (20 ft. CIP slabs changed to Precast)
All Phase 1B substr is Cast-in-Place
South Connector - (20 ft. CIP slabs changed to Precast)
South Connector Constr. Progress
Ph 1D project currently underway

- Complete the ITS Plans
- Complete project Lighting
- ORT Tolling plaza devices
- Toll Customer Service Center
- Advance toll signs, kiosks, etc

Phase 2 North Alignment - “Yet to Go”

- Detailed alignment not yet established
- R/W needed
- Presence of significant number of pipelines is a major issue not anticipated in original Line & Grade studies