I-10 Lake Charles Urban Freeway: Challenges and Opportunities for Modernization

Louisiana Transportation Engineering Conference
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Study Area
DOTD Project Delivery Process

Elected Officials
MPO
Long Range Plan
Districts
Public

STAGE 0: Feasibility
One Year

Feasibility Analysis of
the Proposed Project
Reject

STAGE 1: Planning / Environmental
One to Two Years

Detailed Planning and
Environmental Analysis

Funding Allocation for
Design & Construction

STAGE 2: Funding Project Prioritization
Indefinite Period

STAGE 3: Final Design Process
One to Three Years

Development of Final
Plans & Specifications

STAGE 4: Letting
One Year

Bid Letting Process

STAGE 5: Construction
One to Three Years

Construction of Project

STAGE 6: Operation
Indefinite Period

Ongoing Monitoring
of Operation & Maintenance

HNTB
I-10 Calcasieu Improvements
Purpose & Need for Project

- System Linkage
- Improve Capacity
- Transportation Demand
- Geometric and Safety Concerns
- Structural and Navigation Concerns
National I-10 Freight Corridor Study

http://www.i10freightstudy.org
Study Components

• Bridge Studies

• Roadway/Interchange Studies

• Traffic and Transportation Studies

• Environmental Studies
Existing Conditions at I-10/Sampson Street Interchange
Existing Traffic Simulation at Sampson St. Interchange
Ryan St. Improvements Presently Undergoing Final Design
Study Approach

Technical Memorandums

I-10 Calcasieu Improvements
Study Approach

Comprehensive Analysis
Preliminary Studies

• Alignment
  ‣ Centerline 1
  ‣ Centerline 2
  ‣ Centerline 3
Centerline Alignment Alternatives

LEGEND

- Centerline 1 (CL1) - Alignment of existing bridge
- Centerline 2 (CL2) - Alignment offset 45' from existing bridge centerline
- Centerline 3 (CL3) - Alignment offset 170' from existing bridge centerline
Preliminary Studies

• Calcasieau River Bridge Typical Sections
  ▶ Concept A
  ▶ Concept B
  ▶ Concept C
  ▶ Concept D
I-10 Calcasieu Improvements
C-3 - CONCEPT B
I-10 Calcasieu Improvements

Concept C

Existing Bridge To Be Removed

Existing R/W

150'

170'

150'

Union Pacific Railroad

Existing Roadway @ Pier 4

Average H.W. EL. 4.3'

EL. -22' ±

C3 - Concept C
I-10 Calcasieu Improvements

C 3 - CONCEPT D

Existing R/W

100'

Existing R/W

170'

150'

150'

12', 36', 12', 36', 12'

Existing Bridge
To Remain As
Frontage Roads

Union Pacific Railroad

Existing Roadway @ Pier 4

Average H.W. EL. 4.3'

EL. -22' ±

EL. 90
Recommended Bridge Concepts A & C
Preliminary Studies

• Bridge Type (River Bridge)
  ▸ Concrete Haunched Girders
  ▸ Concrete Box Girders
  ▸ Steel Box Girders
  ▸ Steel Plate Girders
Bridge Types (River Bridge)

- Concrete Haunched Girder
- Concrete Box Girder
- Steel Plate Girder
- Steel Box Girder

Half Section at Intermediate Cross Frame
Not to Scale

Half Section at End Cross Frame
Not to Scale
Preliminary Studies

- Main Span Arrangements
  - 145′-155′-155′-145′
  - 210′-210′-210′-210′
  - 200′-250′-200′
  - 200′-270′-270′-200′
Span Arrangement: 145’-155’-155’-145’
Span Arrangement: 210’-210’-210’-210’
Span Arrangement: 200’-250’-200’

_PROFILE AT CENTER OF MAIN CHANNEL
SEGMENTAL CONCRETE GIRDER CONSTRUCTION SHOWN_
Span Arrangement: 200’-270’-270’-200’
Preliminary Studies

- River Bridge Profile
  - Profile 1
  - Profile 2
  - Profile 3
Calcasieu River Bridge Profiles

Proposed Finished Grade – 95' Elev.
Proposed Min. Vertical Clearance – 73.0'
above Elevation 4.3

Exist. Finished Grade – 152.1' Elev.
Exist. Vertical Clearance – 135'
above Elevation 8.0

LEGEND
- Existing Bridge Profile
- Proposed Bridge Profiles
- Street/Railroad Centerline
- Existing Ground
- Water
Preliminary Studies

- **Sampson Street Alternatives**
  - Elevated Diamond
    - 2 Way Frontage Roads
    - 1 Way Frontage Roads
  - Mike Hooks Road Elevated Diamond
    - 2 Way Frontage Roads
    - 1 Way Frontage Roads
  - Directional Free Flow Layout
    - 1 Way Frontage Roads
Sampson St. Elevated Diamond
2 Way Frontage Road Concept
Sampson St./Mike Hooks Road Elevated Diamond
1 Way Frontage Roads
Sampson St. Directional Free Flow Layout
1 Way Frontage Road
Recommended Elevated Diamond Interchanges at Sampson St.
4 Potential Alternatives:

- **Alternative 1** -- Centerline 3, 1 Way, Bridge Concept A
- **Alternative 2** -- Centerline 3, 1 Way, Bridge Concept C
- **Alternative 3** -- Centerline 3, 2 Way, Bridge Concept A
- **Alternative 4** -- Centerline 3, 2 Way, Bridge Concept C

**Total Cost:** $140 to $190 Million???
Issues: Contamination
Spill at Sampson
Issues: Bridge Height

- **Existing**
  - 0.00%
  - 20.00%
  - 40.00%
  - 60.00%
  - 80.00%
  - 100.00%
  - 120.00%
  - 140.00%
  - 160.00%
  - 3400+00.00
  - 3420+00.00
  - 3440+00.00
  - 3460+00.00
  - 3480+00.00
  - 3500+00.00
  - 3520+00.00
  - 3540+00.00
  - 3560+00.00

- **Mid-Level**
  - 0.00%
  - 10.00%
  - 20.00%
  - 30.00%
  - 40.00%
  - 50.00%
  - 60.00%
  - 70.00%
  - 80.00%
  - 90.00%
  - 100.00%
  - 3420+00.00
  - 3440+00.00
  - 3460+00.00
  - 3480+00.00
  - 3500+00.00
  - 3520+00.00
  - 3540+00.00
  - 3560+00.00

- **High-Level**
  - 0.00%
  - 20.00%
  - 40.00%
  - 60.00%
  - 80.00%
  - 100.00%
  - 120.00%
  - 140.00%
  - 160.00%
  - 3420+00.00
  - 3440+00.00
  - 3460+00.00
  - 3480+00.00
  - 3500+00.00
  - 3520+00.00
  - 3540+00.00
  - 3560+00.00
2 Separate Projects

I-10 Mainline River Bridge & Approaches EA

Sampson Street Interchange EA
Sampson Alternative A

ALTERNATIVE A

PROPOSED IMPROVEMENTS - Alternatives A, B, and C

• GRADE SEPARATION TO CARRY SAMPSON STREET OVER RAILROAD TRACKS
• ELEVATED INTERCHANGE OVER I-10
• NEW ELEVATED FRONTAGE ROADS PROVIDE INTERCHANGE CONNECTIONS

DISTINGUISHING FEATURES - Alternative A

• ALL ELEVATED FRONTAGE ROADS PROVIDE TWO-WAY TRAFFIC.

Figure 3-1
I-10 / SAMPSON STREET INTERCHANGE
ALTERNATIVE A

HORIZONTAL 0  400  800

I-10 Calcasieu Improvements
S Sampson Alternative B

**ALTERNATIVE B**

PROPOSED IMPROVEMENTS - Alternatives A, B, and C
- Grade separation to carry Sampson Street over railroad tracks
- Elevated interchange over I-10
- New elevated frontage roads provide interchange connections

DISTINGUISHING FEATURES - Alternative B
- Southeast and southwest elevated frontages
- Access via one-way traffic
- Northeast and southwest elevated frontage roads
- Provide two-way traffic

Figure 3-2
I-10 / SAMPSON STREET INTERCHANGE
ALTERNATIVE B

HORIZONTAL: 0 100 200

I-10 Calcasieu Improvements
Sampson Alternative C

ALTERNATIVE C

PROPOSED IMPROVEMENTS - Alternatives A, B, and C
- Grade separation to carry Sampson Street over railroad tracks
- Elevated interchange over I-10
- High-speed frontage roads provided interchange connections

DISTINGUISHING FEATURES - Alternative C
- Northeast elevated frontage road added
- Southeast elevated frontage road to provide two-way traffic
- Middle and northwest elevated frontage roads
  provide two-way traffic

Figure 3-3
I-10 / SAMPSON STREET INTERCHANGE
ALTERNATIVE C
Sampson Alternative A

ALTERNATIVE A

PROPOSED IMPROVEMENTS - Alternatives A, B, and C
- Grade separation to carry Sampson Street over railroad tracks.
- Elevated interchange over I-10.
- New elevated frontage roads provide interchange connections.

DISTINGUISHING FEATURES - Alternative A
- All elevated frontage roads provide two-way traffic.
Sampson Alternative B

ALTERNATIVE B

PROPOSED IMPROVEMENTS - Alternatives A, B, and C
- Grade separation to carry Sampson Street over railroad tracks.
- Elevated interchange over I-10.
- New elevated frontage roads provide interchange connections.

DISTINGUISHING FEATURES - Alternative B
- Northeast and southeast elevated frontage roads provide one-way traffic.
- Northwest and southwest elevated frontage roads provide two-way traffic.
Sampson Alternative C

**ALTERNATIVE C**

**PROPOSED IMPROVEMENTS - Alternatives A, B, and C**
- Grade separation to carry Sampson Street over railroad tracks.
- Elevated interchange over I-10.
- New elevated frontage roads provide interchange connections.

**DISTINGUISHING FEATURES - Alternative C**
- Northeast elevated frontage road absent.
- Southeast elevated frontage road to provide two-way traffic.
- Northwest and southwest elevated frontage roads provide two-way traffic.
Interim Traffic Simulation at Sampson St. Interchange
Existing Conditions at I-10/Sampson Street Interchange
Interim Condition at I-10/Sampson Street Interchange (Alternative A shown)
Ultimate Condition at I-10/Sampson Street Interchange (Alternative 1 shown)
Next Steps

FUNDING....
After a half-century of service, the I-10 Calcasieu River Bridge is nearing the end of its designed life span. The Louisiana Department of Transportation and Development (DOTD) began the process of replacing the bridge and its approaches in 2000.

The Calcasieu Bridge replacement project is on hold while new marine use studies are conducted for the upper Calcasieu River. These studies will influence the design of the new bridge, particularly its vertical clearance above the river.

An Environmental Assessment (EA) study is in progress for proposed improvements at the Sampson Street Interchange. Participate in the EA process by viewing proposed design alternatives for Sampson Street and by giving us your input through our comment form or in person at a public meeting.

Quality travel along I-10 tomorrow depends on quality planning today. The Louisiana Department of Transportation and Development values your input.
QUESTIONS?
I-10 Lake Charles Urban Freeway:
Challenges and Opportunities for Modernization

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