

# PARTNERING Conference 2012

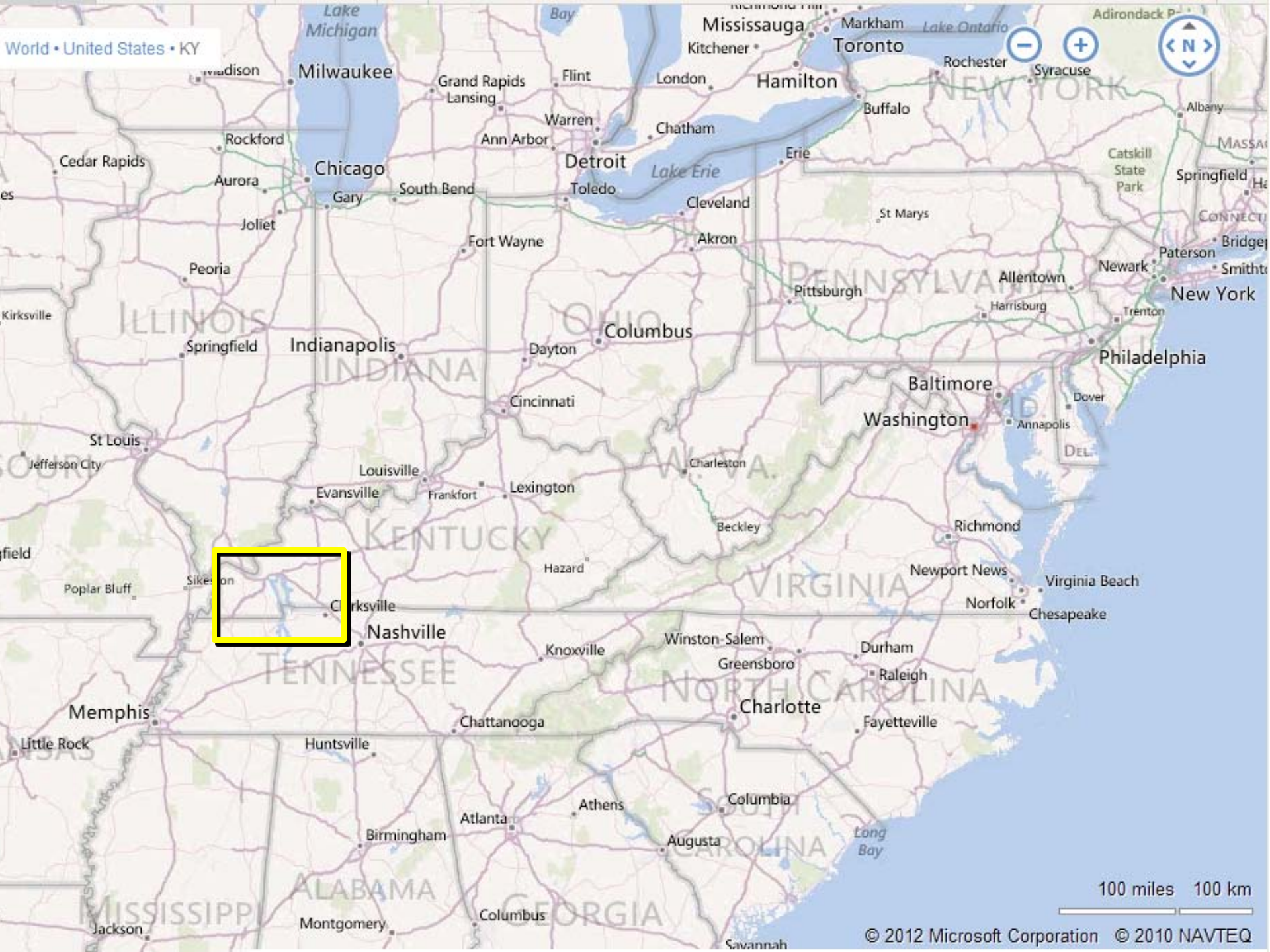
## *Eggners Ferry Emergency Repair*



*Mike McGregor, P.E. and  
KYTC, District 1*

*J.B. Williams, P.E.  
Michael Baker Jr.,  
Inc.*





100 miles 100 km





Livingston

Caldwell

Princeton

Paducah

69

24

Lyon

Lake Barkley

Kentucky Lake

Marshall

Trigg

45 Mayfield

Graves

Calloway

Murray

New Concord

Stewart

Indian Mound







**Clearance to  
low steel at  
mid point of  
span (normal  
pool)**

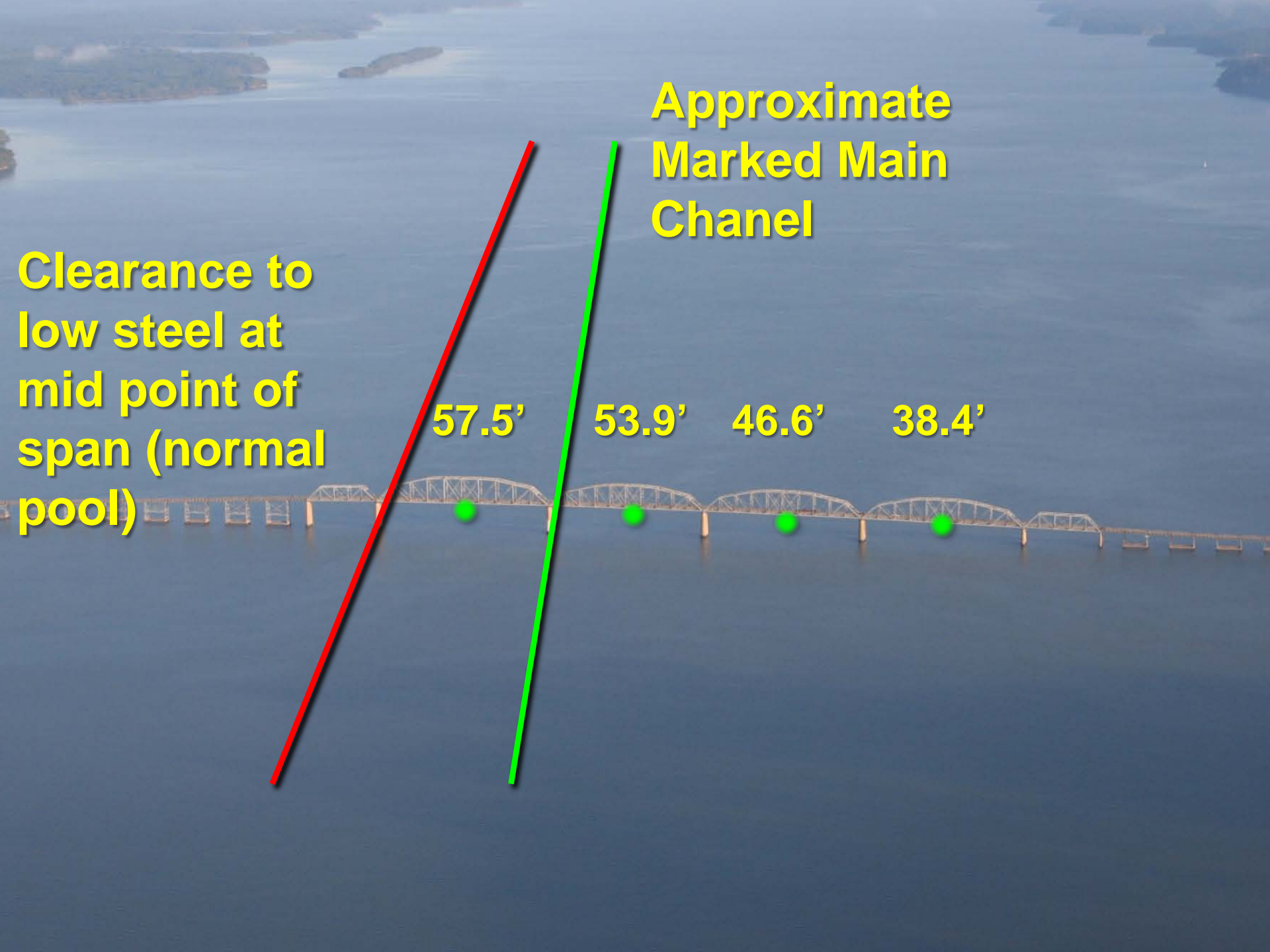
**Approximate  
Marked Main  
Chanel**

**57.5'**

**53.9'**

**46.6'**

**38.4'**



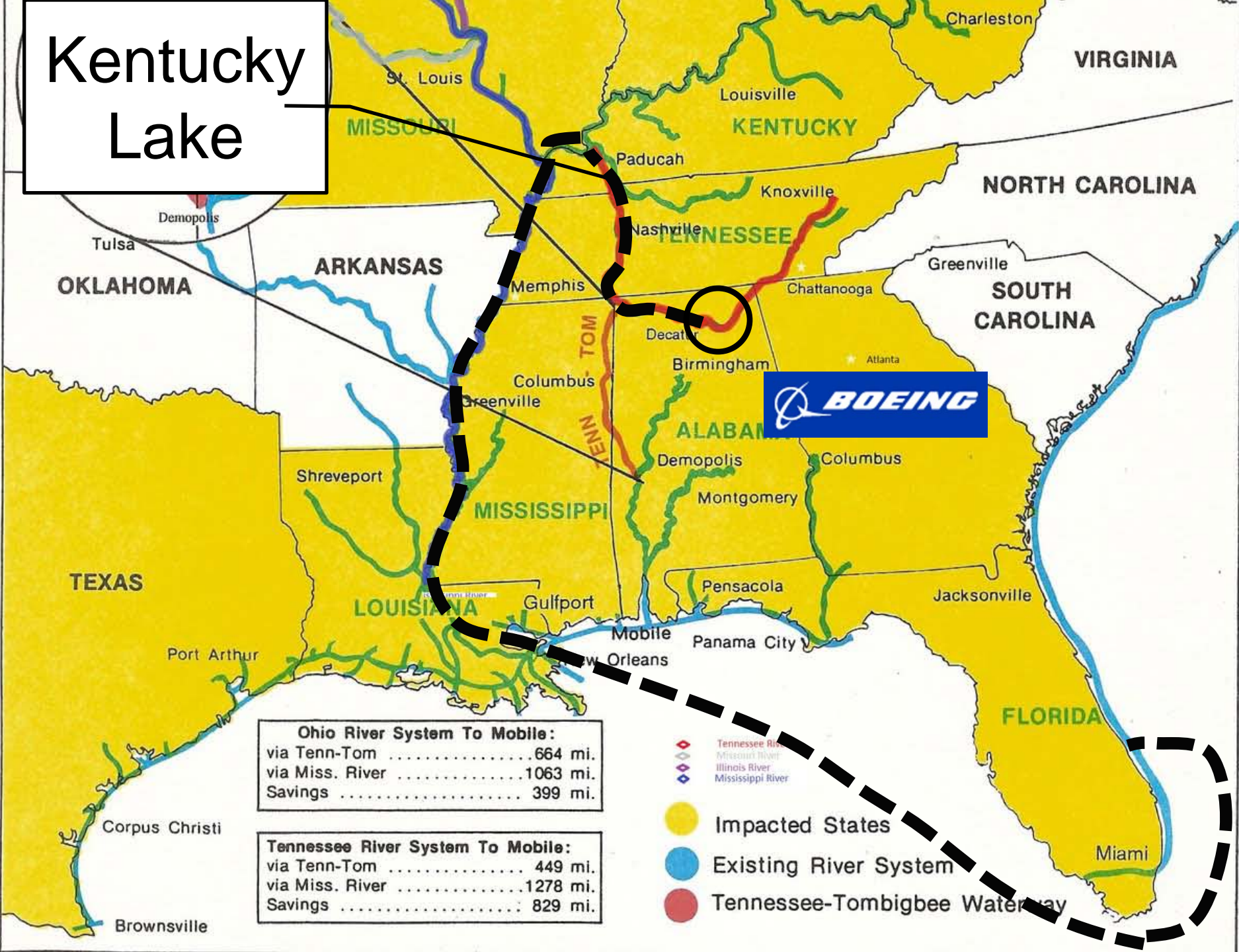


# Delta Mariner



Type:	Roll-on/roll-off cargo ship
Tonnage:	8,679 <a href="#">GT</a> ; 3,953 <a href="#">DWT</a> <sup>[2]</sup>
Length:	312 ft (95.1 m) <sup>[5]</sup>
Beam:	84 ft (25.6 m) <sup>[5]</sup>
Height:	50 ft (15.2 m) <sup>[6]</sup>
Draft:	8 ft (2.4 m) <sup>[5]</sup>

# Kentucky Lake



Ohio River System To Mobile:	
via Tenn-Tom	664 mi.
via Miss. River	1063 mi.
Savings	399 mi.

Tennessee River System To Mobile:	
via Tenn-Tom	449 mi.
via Miss. River	1278 mi.
Savings	829 mi.

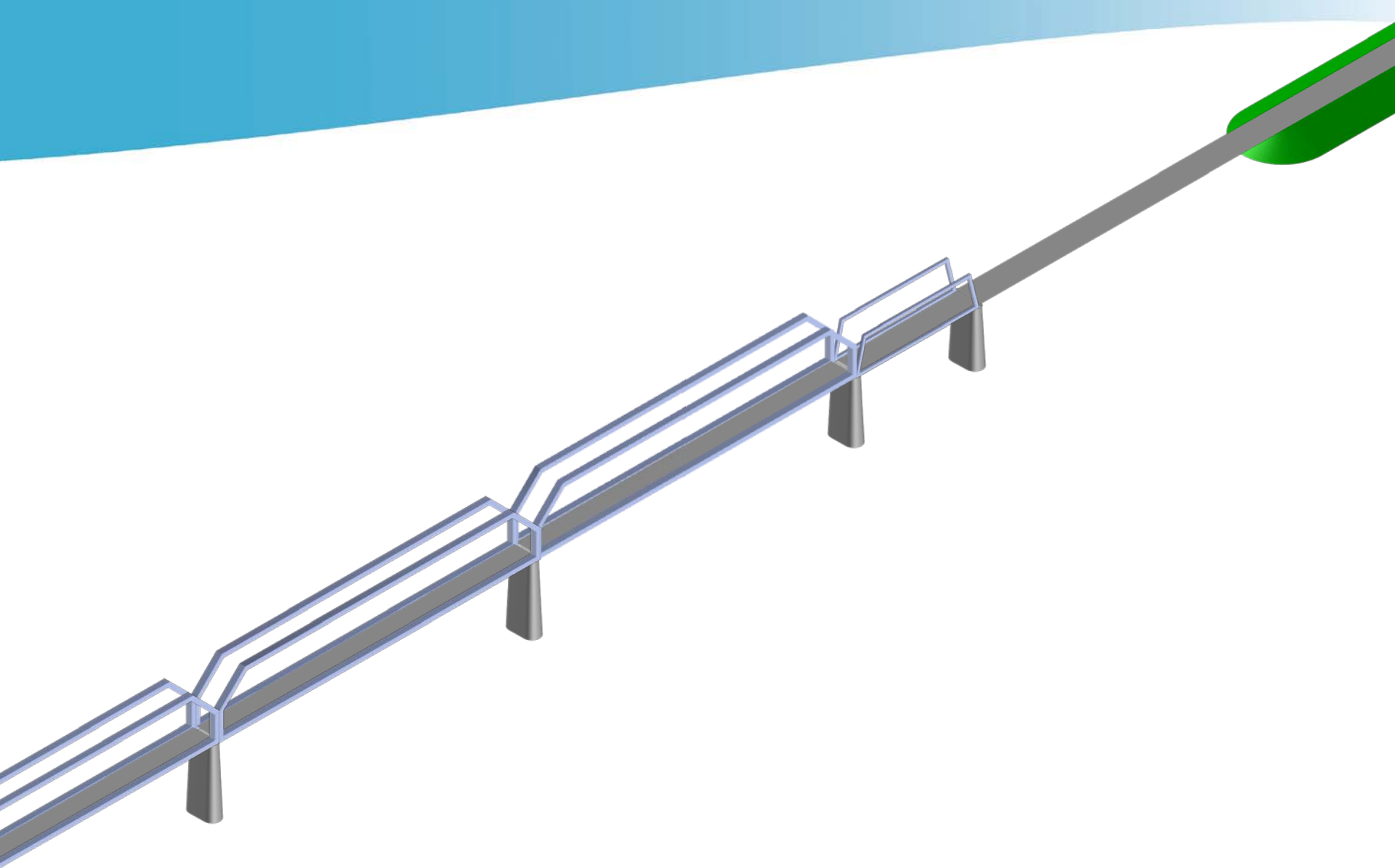
- ◆ Tennessee River
- ◆ Missouri River
- ◆ Illinois River
- ◆ Mississippi River
- Impacted States
- Existing River System
- Tennessee-Tombigbee Waterway



# The Event

- Accident: Jan. 26, 2012, around 8:10 PM
- UT-Chatt. Tennis Team among last to cross
- Robert Parker, “It got close.”
- 42 mile detour





January 26, 2012 8:10PM



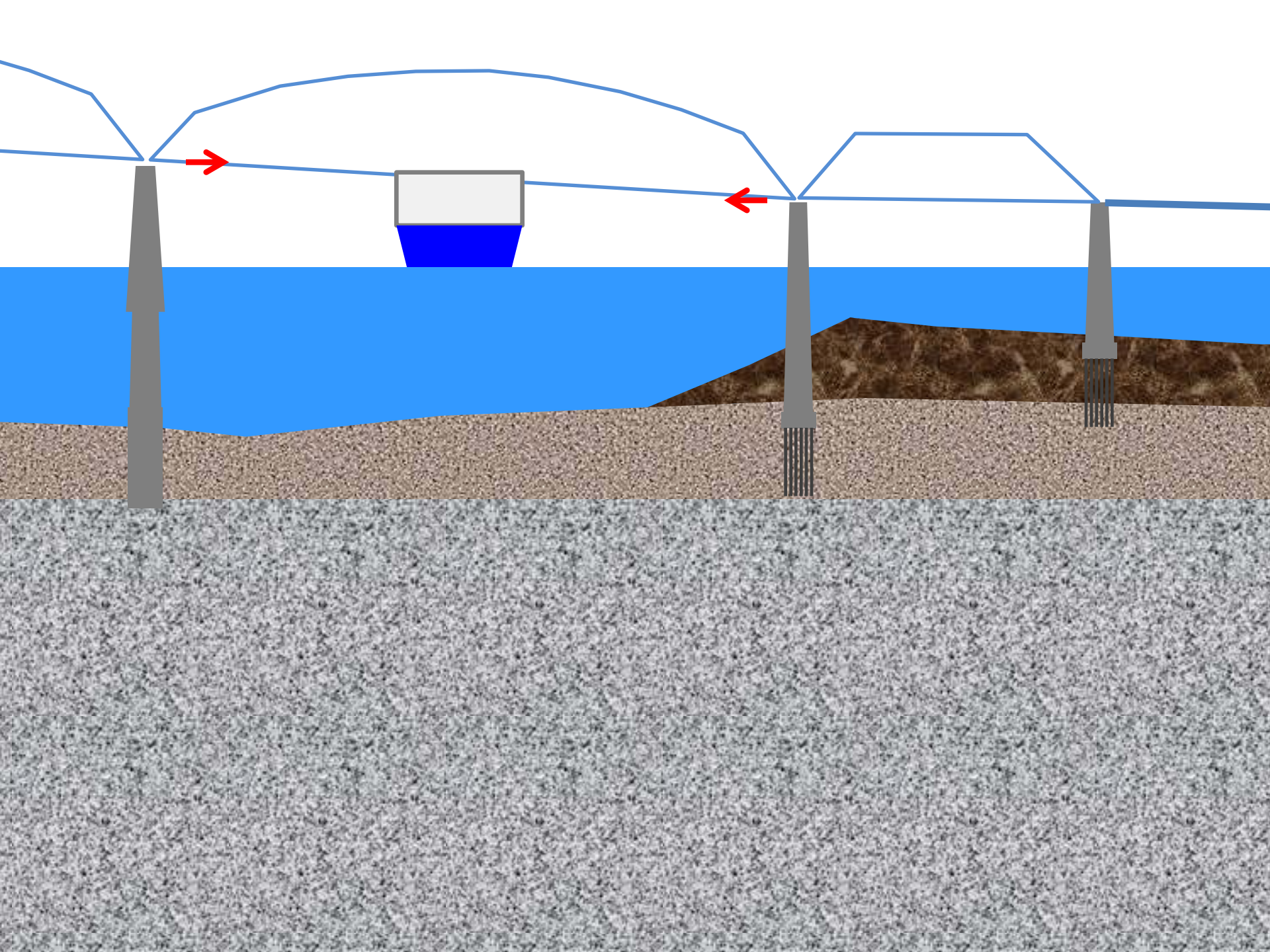




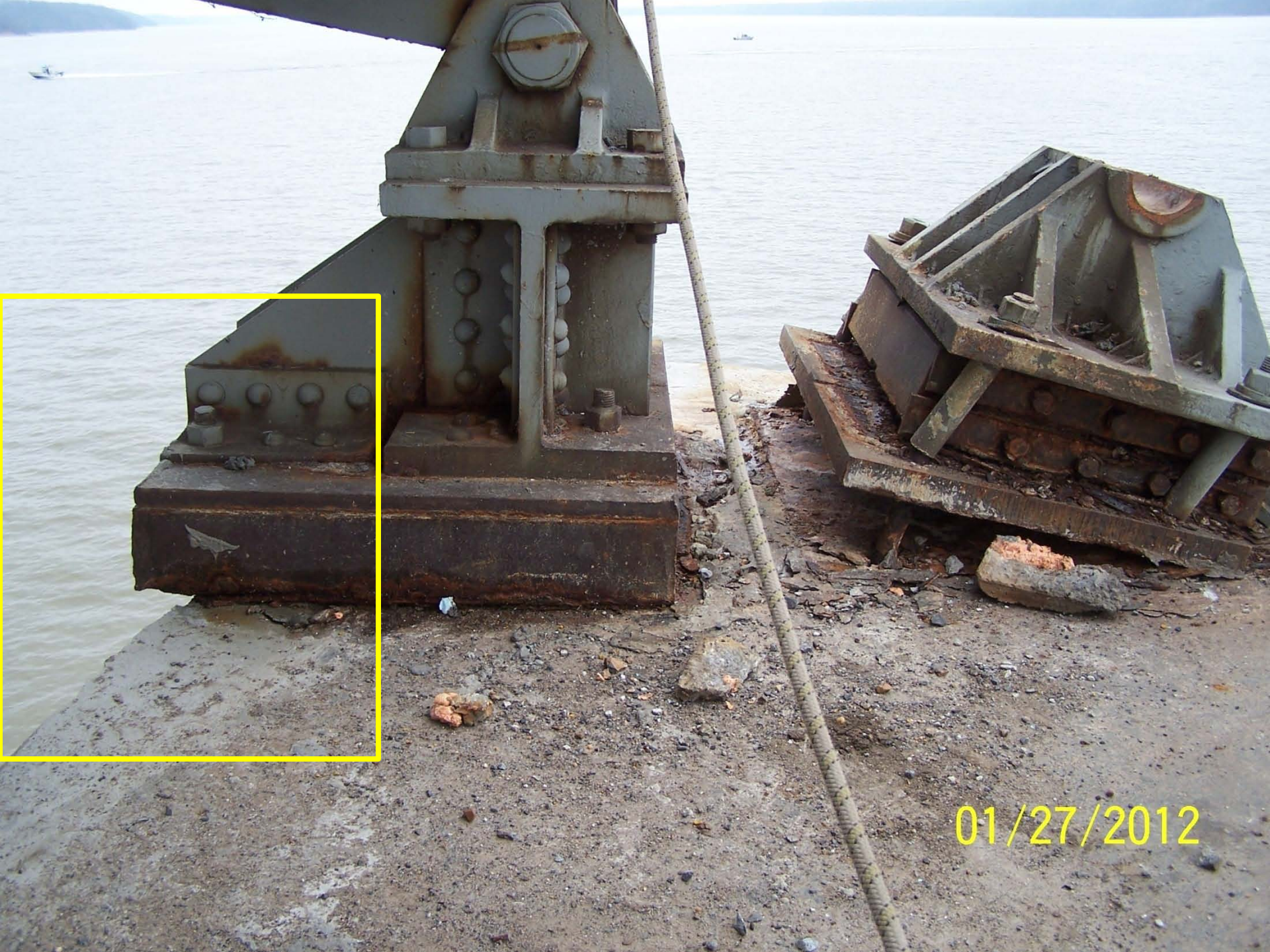












01/27/2012





01/27/2012



# Repair Concepts

## Time is Everything!

- Utilizing Existing Contracts
  - Michael Baker
  - URS
- Prefab 2 Span Bridge
- Nickajack Bridge Reuse
- New Single Span Truss
- Steel Plate Girder
- Ferry





**Nickajack Bridge**



# Replacement Considerations

- Time is Critical
- 70' Water Depth
- Existing Adjacent Pier Concerns
- Permits
- Navigation



# The Solution

- Design/Build Procurement
- Single Span Steel Truss
- Concrete or Asphalt Deck
- 20' Roadway Width (same as existing)
- HS-20 Live Load
- New DL No More Than 110% Current DL
- New Bearings
- Rehab Existing Pier Caps
- No Navigation Changes



# The Solution

- Procurement thru Div. of Purchases
- Adv. Date: February 27, 2012
- Bid Date: March, 5, 2012
- Open to Traffic: May 27, 2012 (Memorial Day Weekend)
- \$50,000/Day Penalty

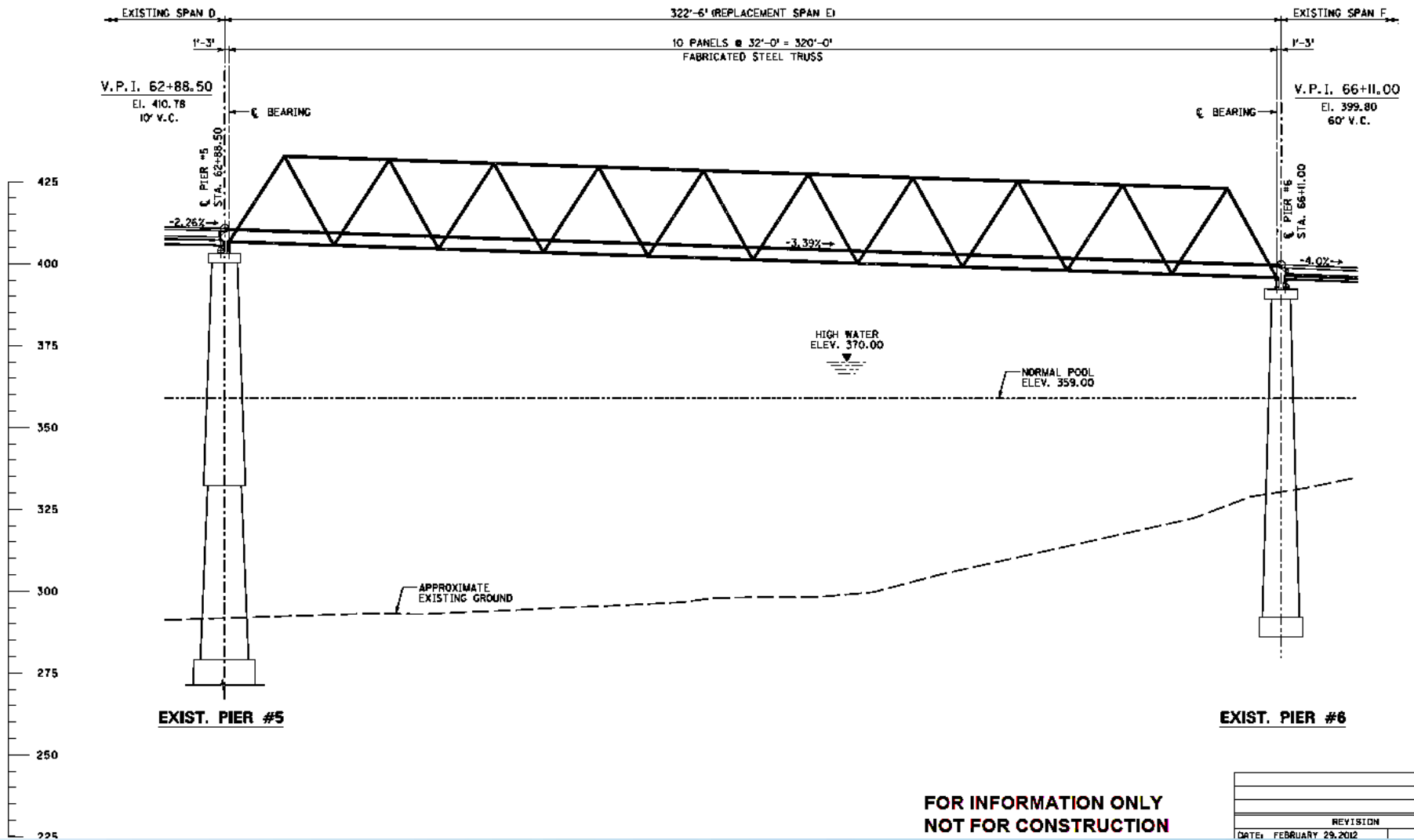




# The Result

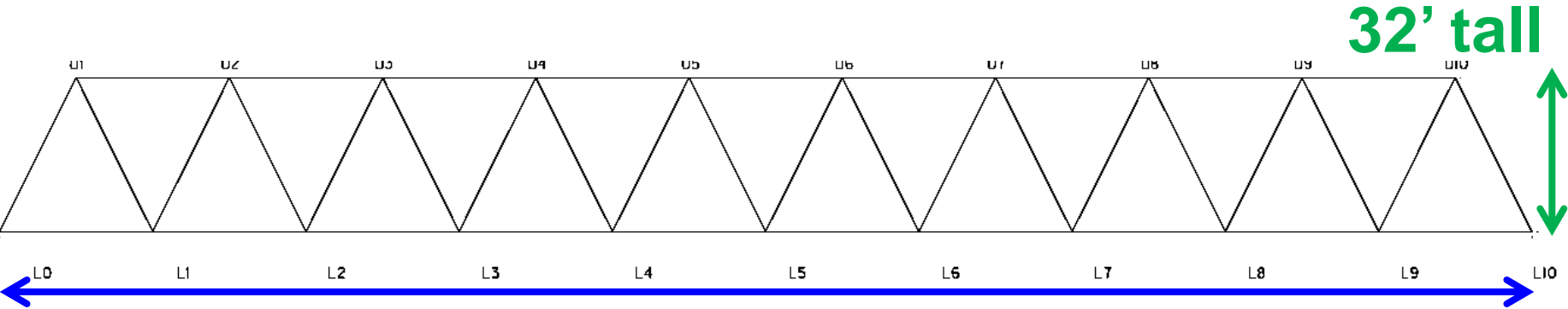
- 3 Bids Received
  - \$7M
  - \$11.2M
  - \$11.4M
- Contractor: Hall Contracting - \$7M
  - Designer: Michael Baker
  - Fabricators:
    - Beam/Angles – Padgett, New Albany, IN
    - Gussets – United Steel, Louisville, KY
- Contract Executed: 03/07/2012





# Single Span Truss

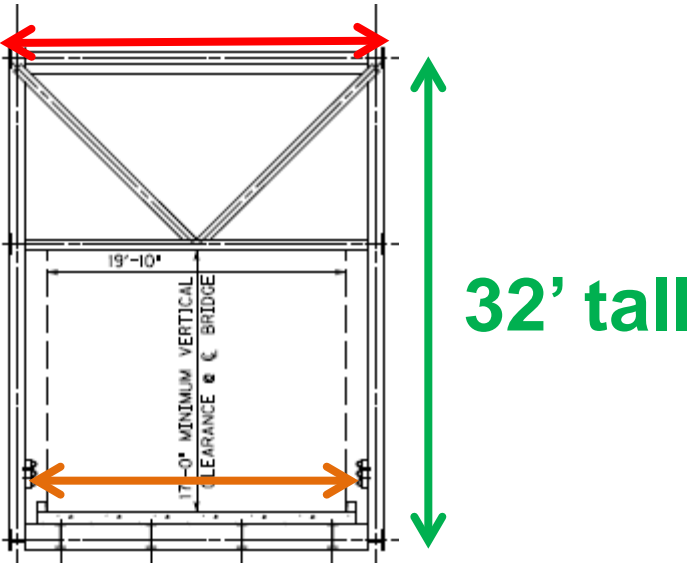
# Truss Geometry - 320' Parallel Chord Truss



**10 panels @ 32' = 320'**

**23' -8" wide CL to CL chord**

**21' deck**







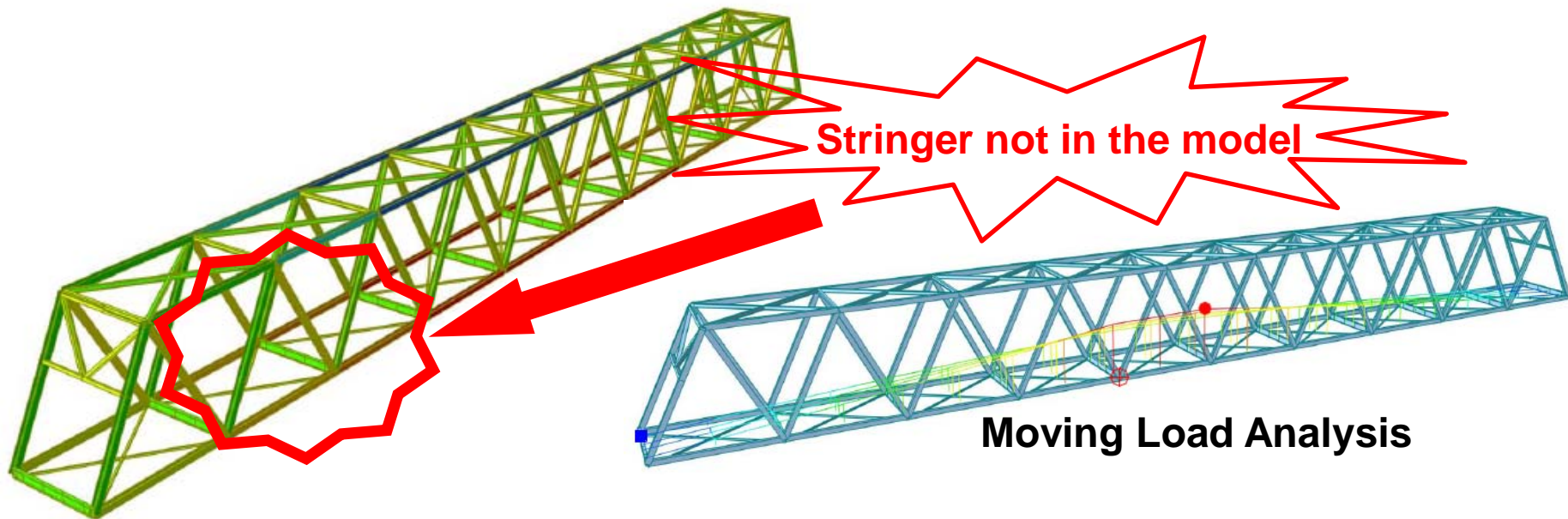
# The Design

- Single Span 320' Truss
- 295 Tons of Steel
- 6.5-inch Concrete Deck
- Integral Floor System



# Design of Truss

3D FEM using MIDAS Civil



Stringer not in the model

Moving Load Analysis

Independent check with VIRTIS





# Design of Truss

- Truss – Rolled Section

Promising Rolling Schedule

Contractor Preference

Less Fabrication Involved

FINAL RESULTS- TIME AND  
COST SAVING!

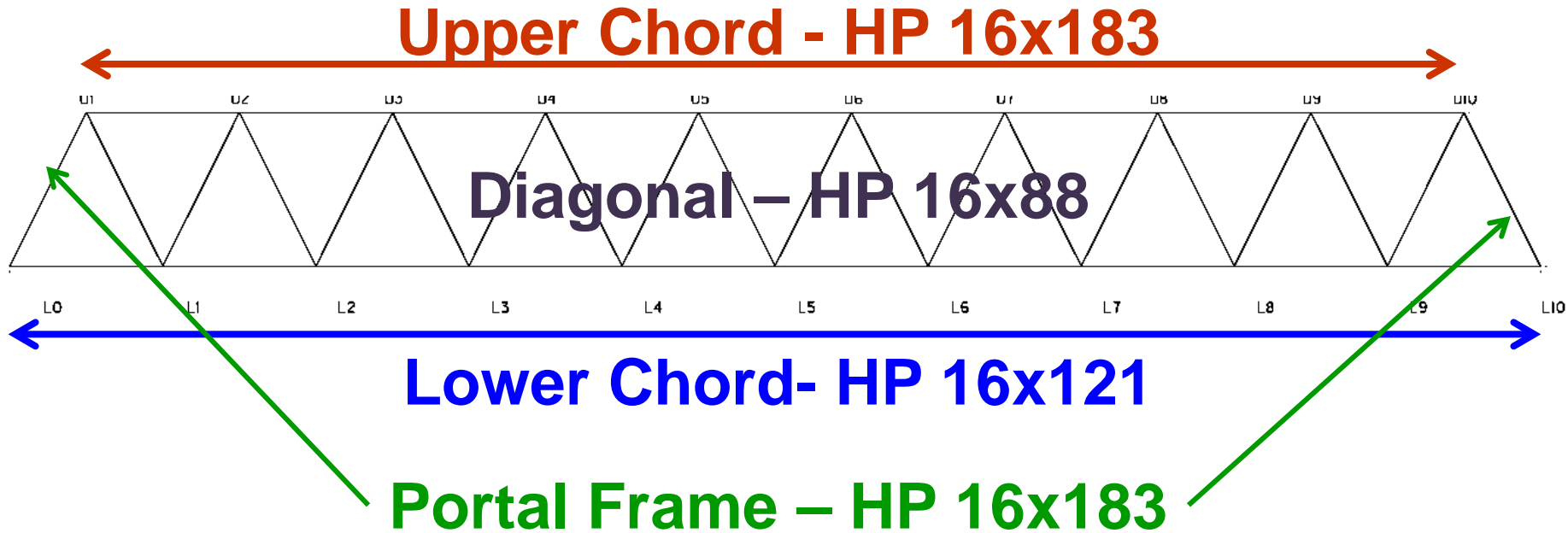
—Simplicity and Uniform Pattern Truss Design

—W Section

—HP Section



# Final Truss Member Sizes



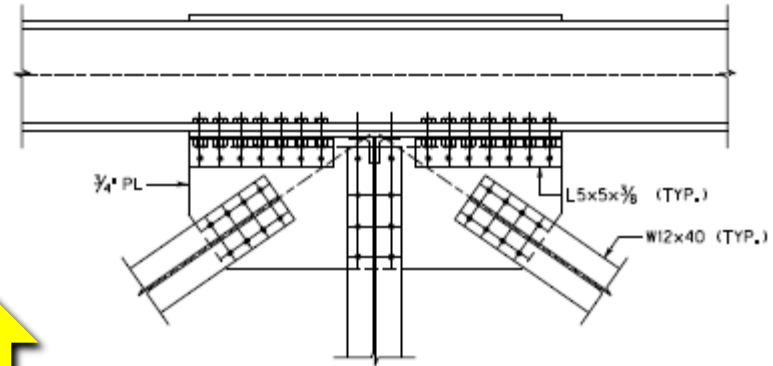
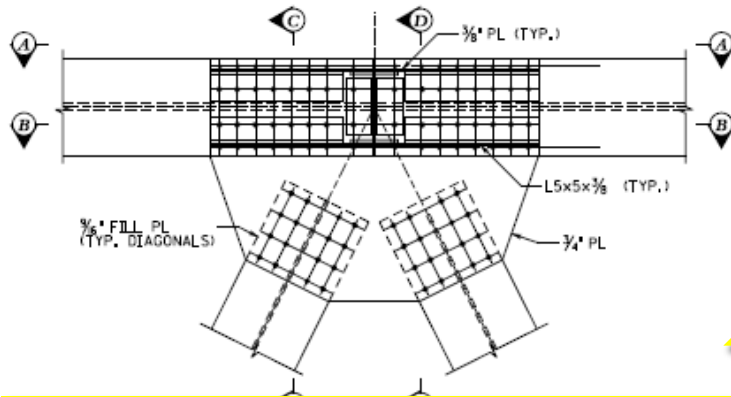
**Top strut and diagonal- W12x40**

**Lower bracing- L5x5x3/8**

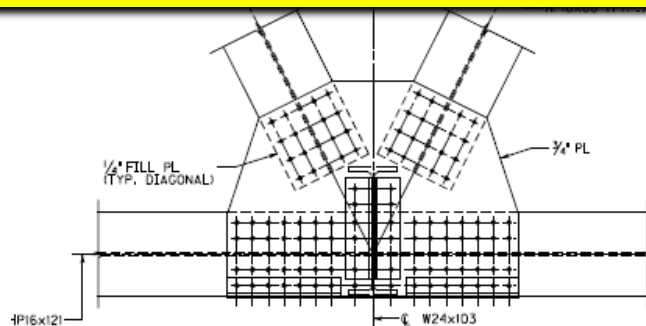


# Truss Connection

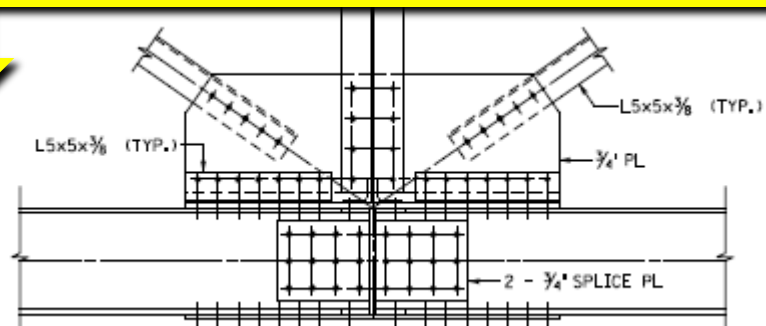
## ➤ Upper Chord Joint



**Uniform plate thickness, bolt pattern on upper chord and lower chord joint**



**ELEVATION**

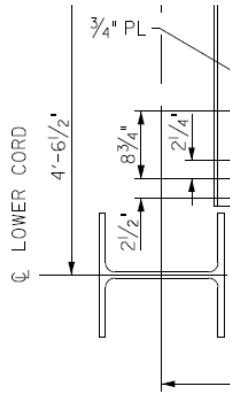
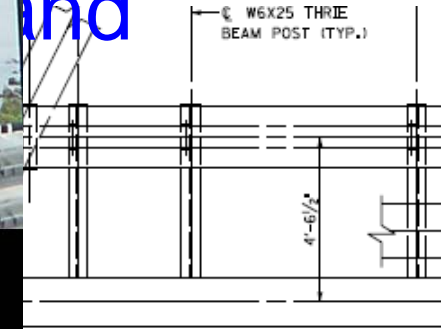




# Railing Design



and

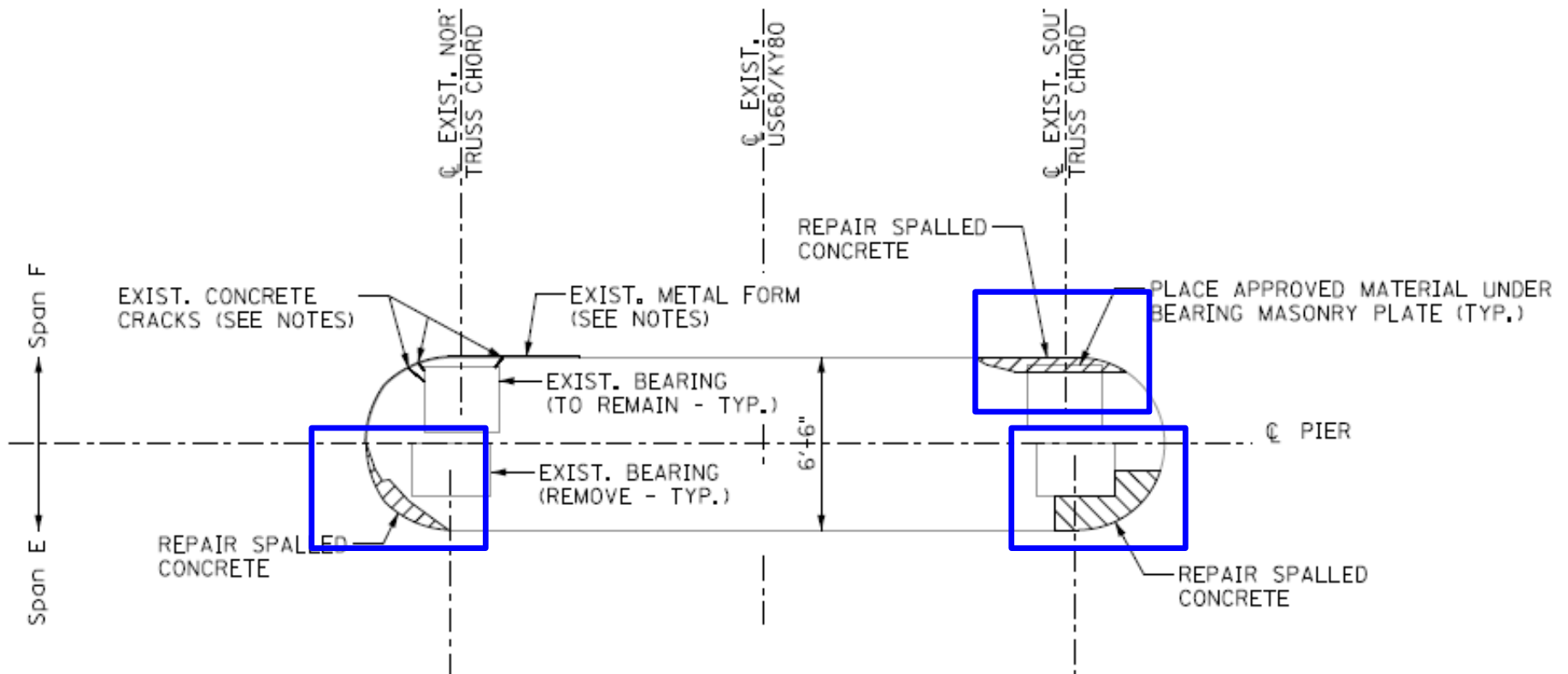


ing varies from  
-3 1/2"



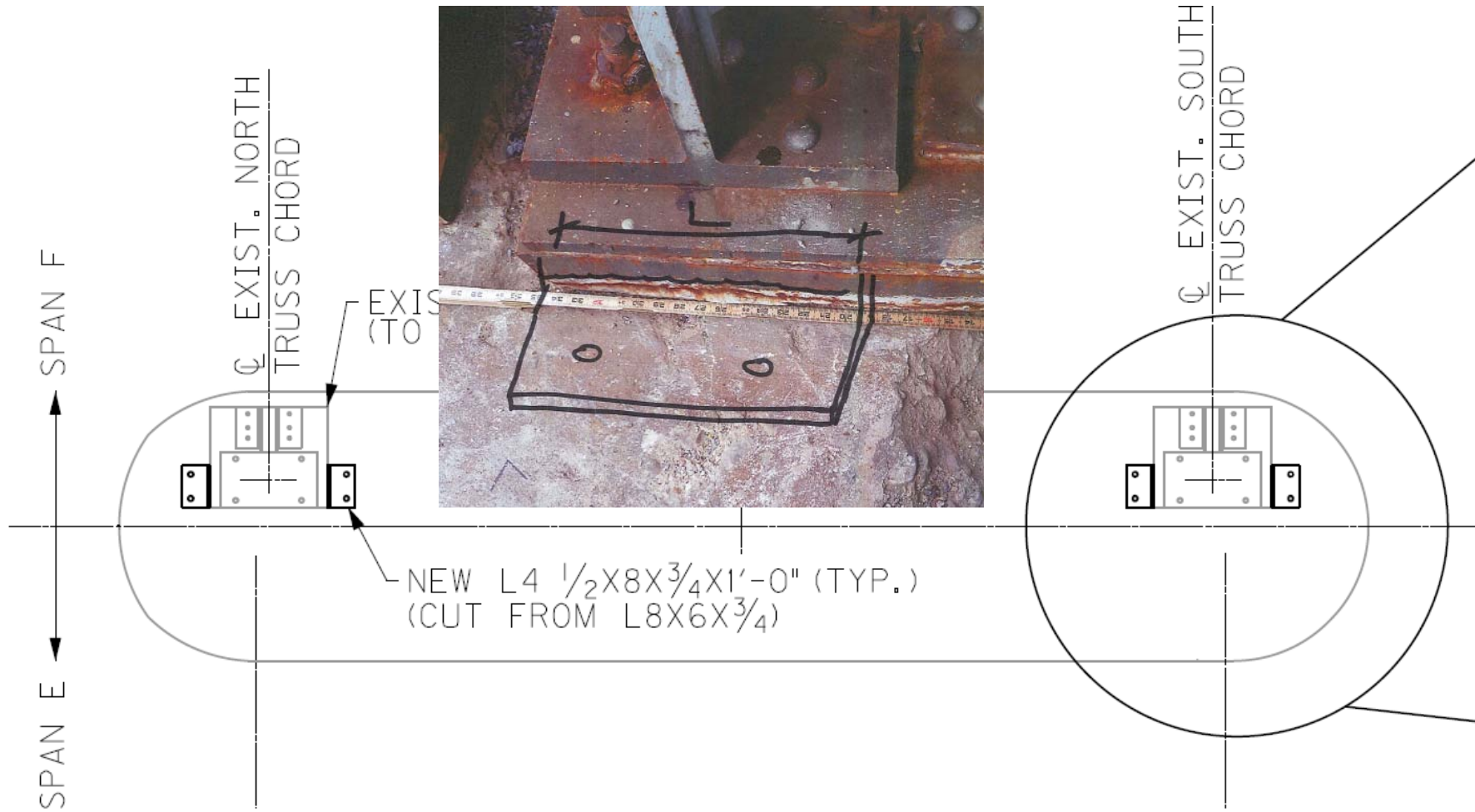
# Existing Pier Retrofit

- No jacking of the existing span



**PIER 6 - EXISTING PLAN CONCRETE REPAIR LIMITS**

# Existing Pier Retrofit





# Engineering and Shop Drawing

- Project Awarded March 7, 2012
- Final Engineering Drawing Completed on April 17<sup>th</sup>
- Quick Shop Drawing Production from Tensor:
  - Completed for Approval - March 31<sup>st</sup>
  - Final Review of Shop Drawing – April 10<sup>th</sup>
  - Total 37 Sheets of Shop Drawing



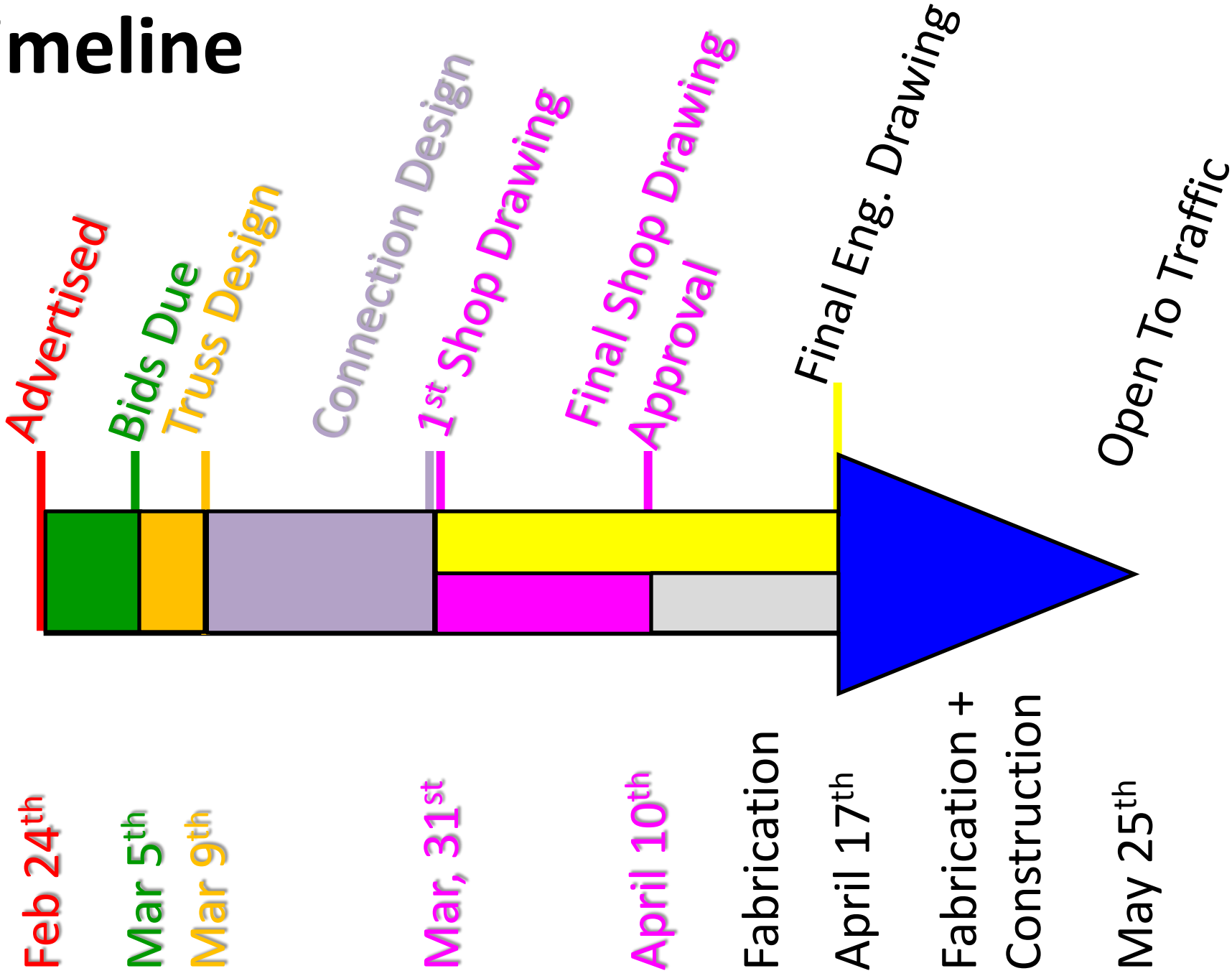
# Lessons Learned



- Simple Geometry
- Sizes All Rolled Sections
  - No Shop Welding
  - Minimal Fabrication
- Good Coordination Among Team
- 3D Model
- Hi-Tech Fabrication
  - 13,000 Bolts, No Misfits



# Timeline





# Truss Assembly at Eddyville Riverport





# Truss assembly







# Loading Truss and Cranes on Barge





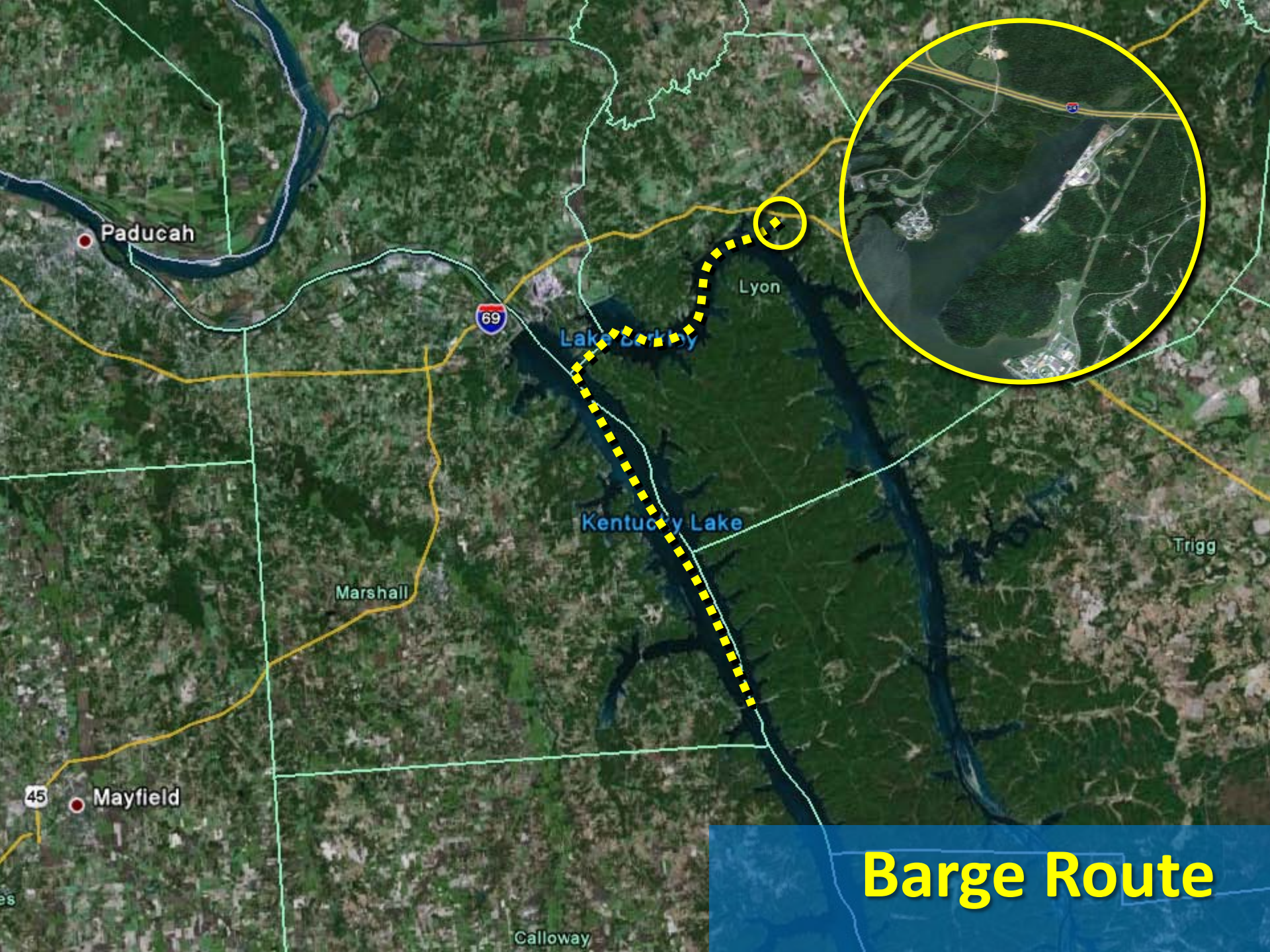
# Loading Truss and Cranes on Barge





**Loading truss and cranes  
on barge**





**Barge Route**

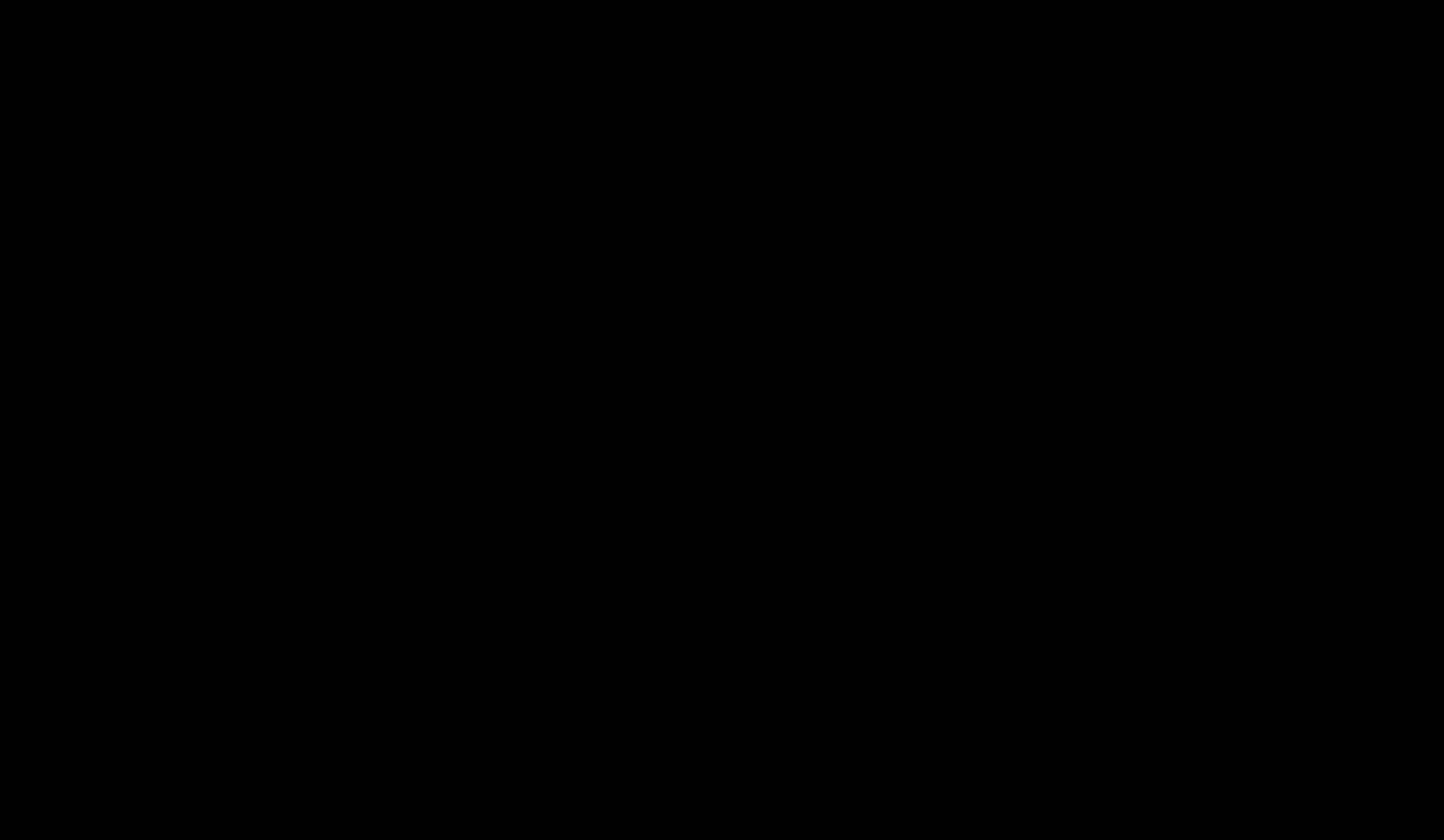




**Transport**



# Bearing Preparation







**Lifting Truss**





# Lifting Truss





Truss set down





# Stay in Place Forms and Reinforcing







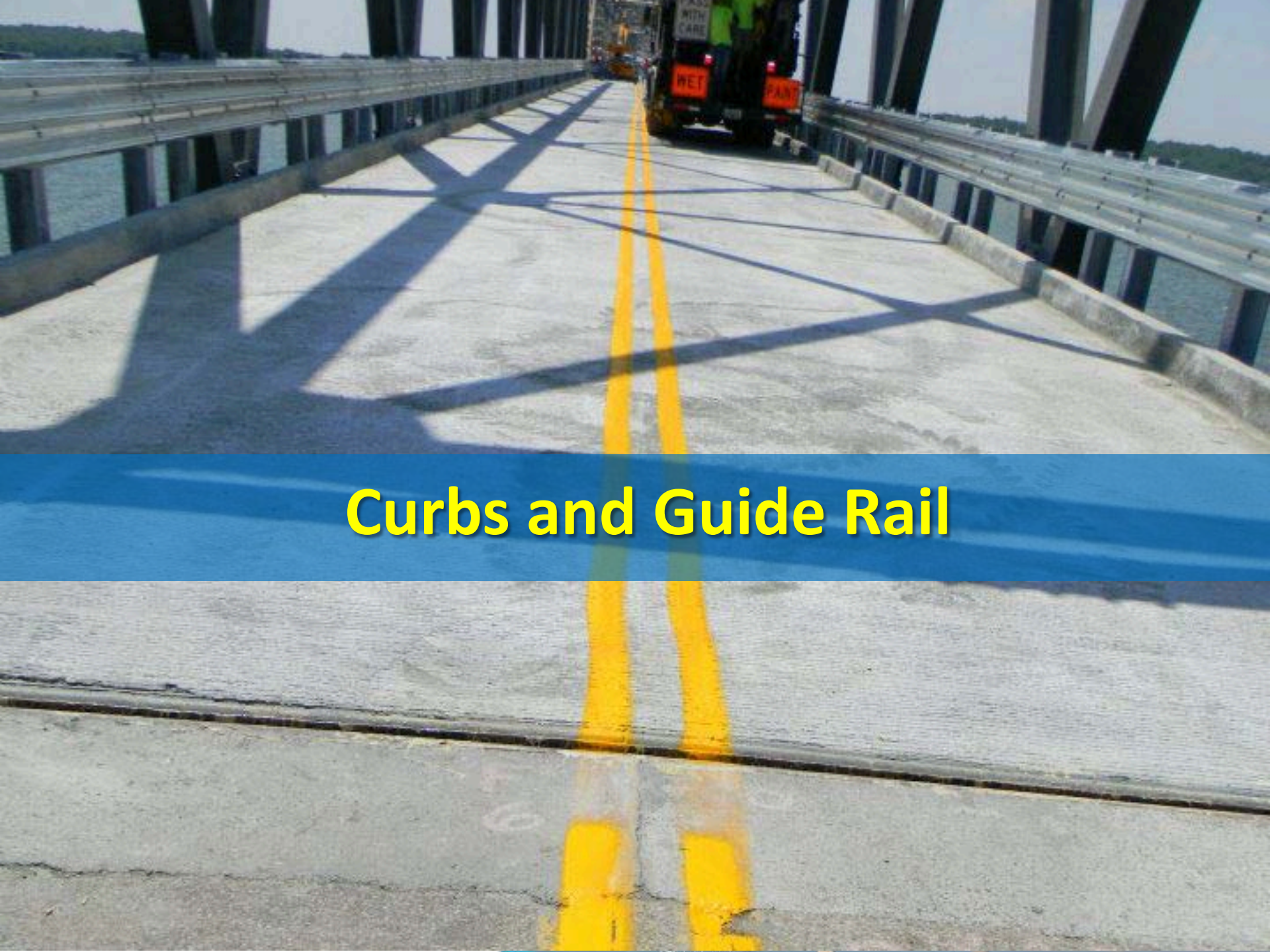




# Deck Pour







## Curbs and Guide Rail







# The Opening

- Open to Vehicles Friday May 25, 2012, at 1:00 PM
- Open During Entire Memorial Day Weekend with Festivities on Friday
  - Bridge Walk
  - Model A Cruise
- 2.5 Days Before Contract Deadline
- Incident to Opening: **17 Weeks**





**Open to Traffic**



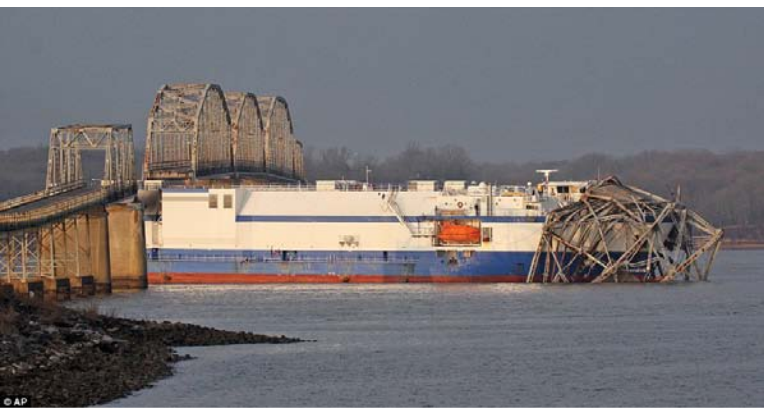


# A Success Story

- Thorough Vetting
- Quick Decisions
- Expedited Procurement
- Rapid Design
- Aggressive Fabrication Schedule
- Opening Date Ahead of Schedule
- A Win for All







**2012**