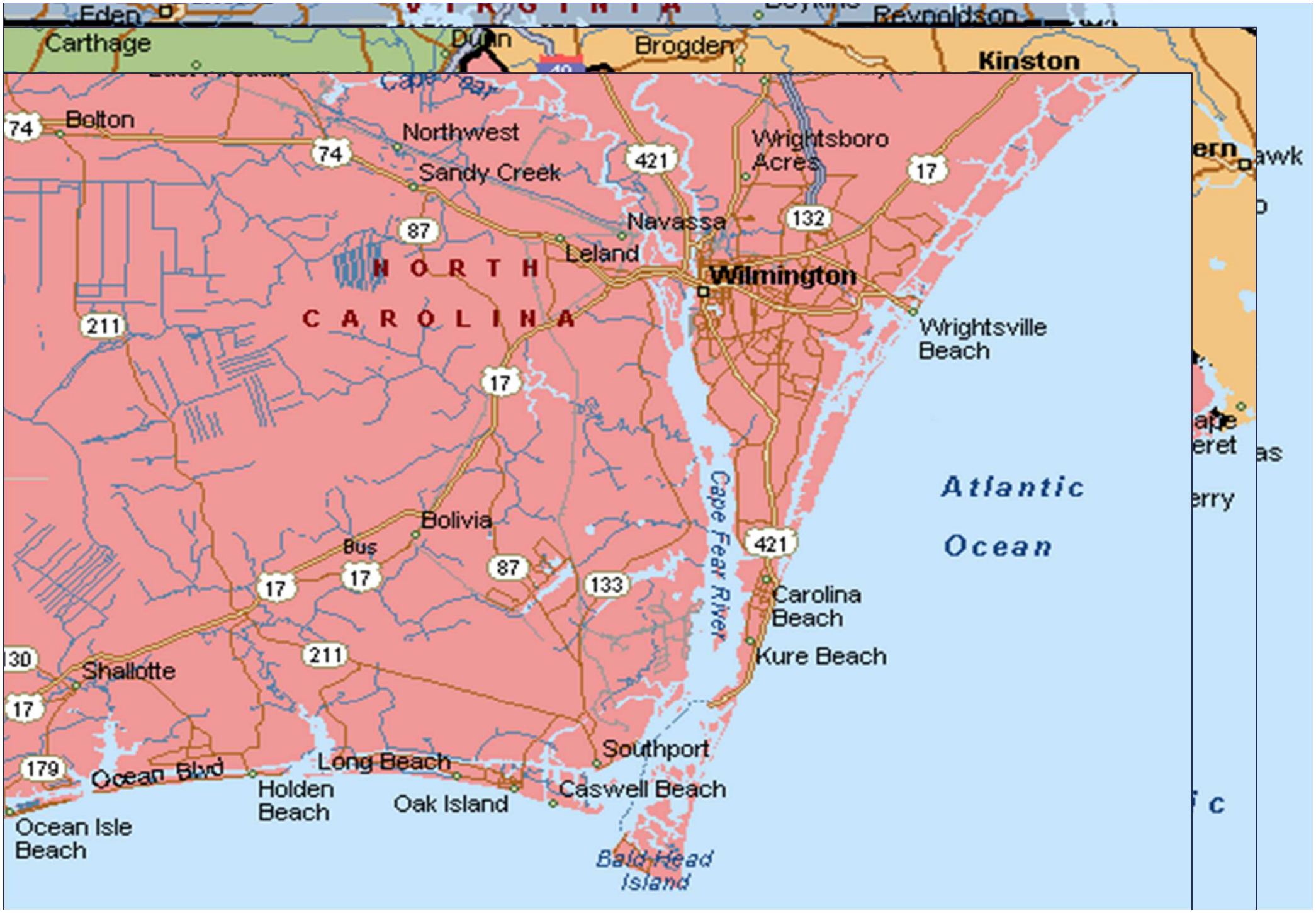

TACKLING A BIG PROJECT
Painting the
Cape Fear Memorial Bridge


Eden
Carthage
Dunn
Brogden
Reynoldson
Kinston
Cape Fear
Bolton
74
Northwest
Sandy Creek
Wrightsboro
Acres
421
17
Navassa
132
87
Leland
NORTH
CAROLINA
Wilmington
211
Wrightsville
Beach
17
Atlantic
Ocean
Cape Fear River
Bolivia
Bus
421
87
17
17
133
Carolina
Beach
Kure Beach
211
130
Shallotte
17
Southport
179
Ocean Blvd
Long Beach
Holden
Beach
Oak Island
Caswell Beach
Ocean Isle
Beach
Bald Head
Island


ElementalDigitalArt.com

The Cape Fear Memorial Bridge

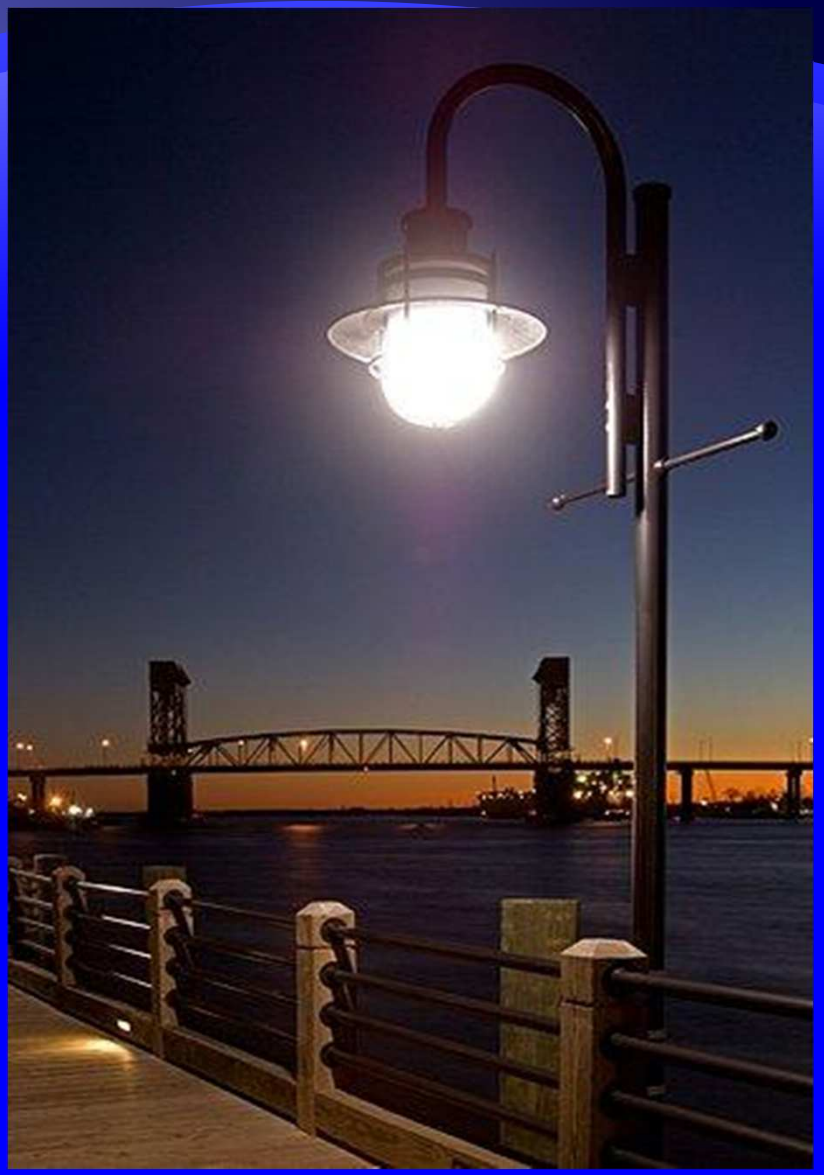
- North Carolina's tallest and only steel vertical lift span bridge
  - Span length 408.2'
  - Deck width 54'
  - Minimum vertical clearance 65'
  - Raised vertical clearance 135'

History of the Bridge

- Opened to traffic in fall of 1969

History of the Bridge

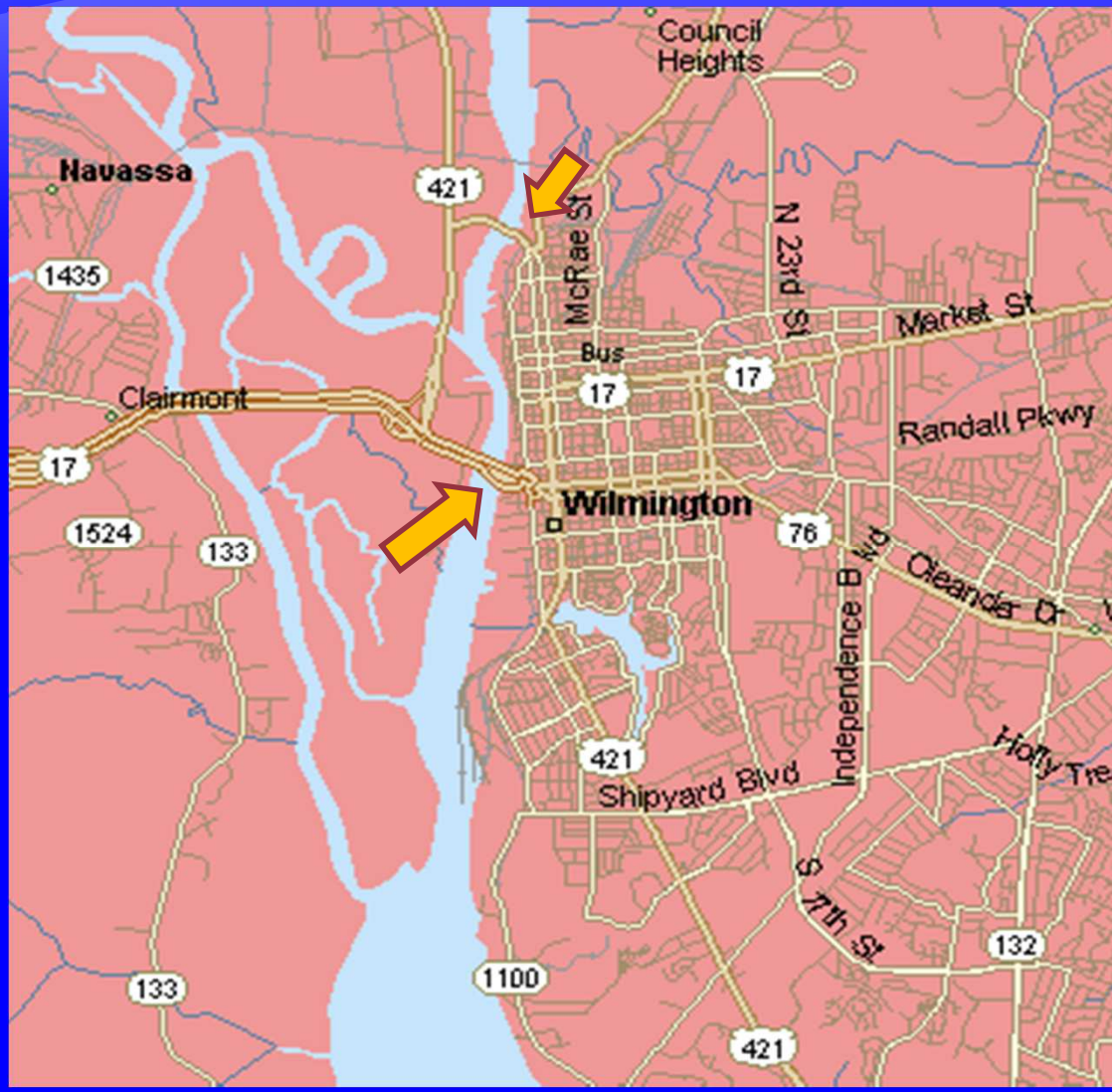
- Became the "iconic symbol of Wilmington"
  - Over 40 years later it is still one of the city's most recognized landmarks.




U.S. COAST GUARD

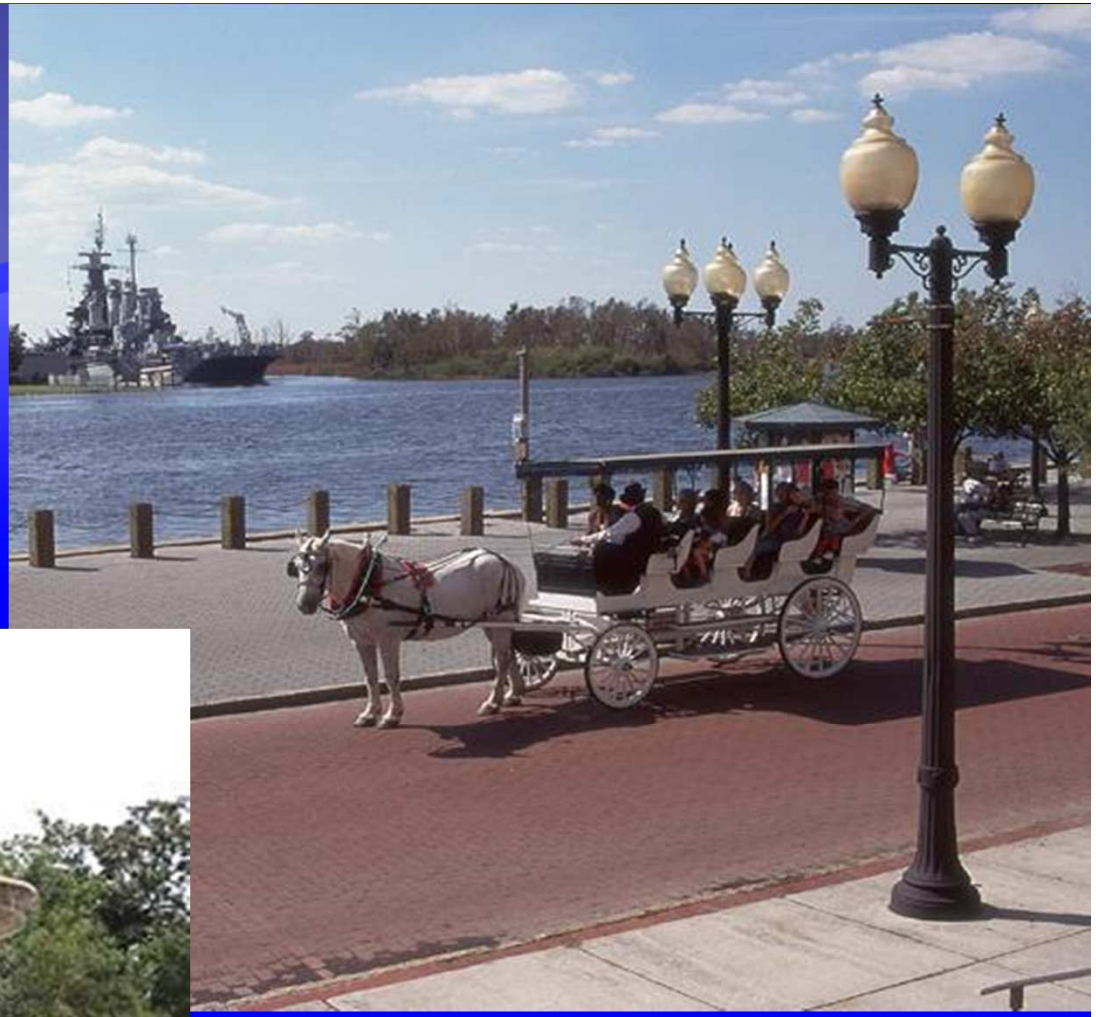
The Cape Fear Memorial Bridge

- Importance
  - 1 of 3 bridges serving Wilmington and New Hanover County
  - 1 of 2 bridges into downtown Wilmington
  - Carries US 17, US 76 and US 421 traffic



Wilmington – The Port City

Historical Attractions



Tourist attractions

Night life

Film Industry


River Tours

Wilmington

- UNC Wilmington

- Cape Fear Community College

Wilmington

- Home of the USCG Cutter Diligence

Wilmington

- Home to the North Carolina State Ports


ORT OF WILMINGTON
INDEPENDENT PURSUIT

Wilmington

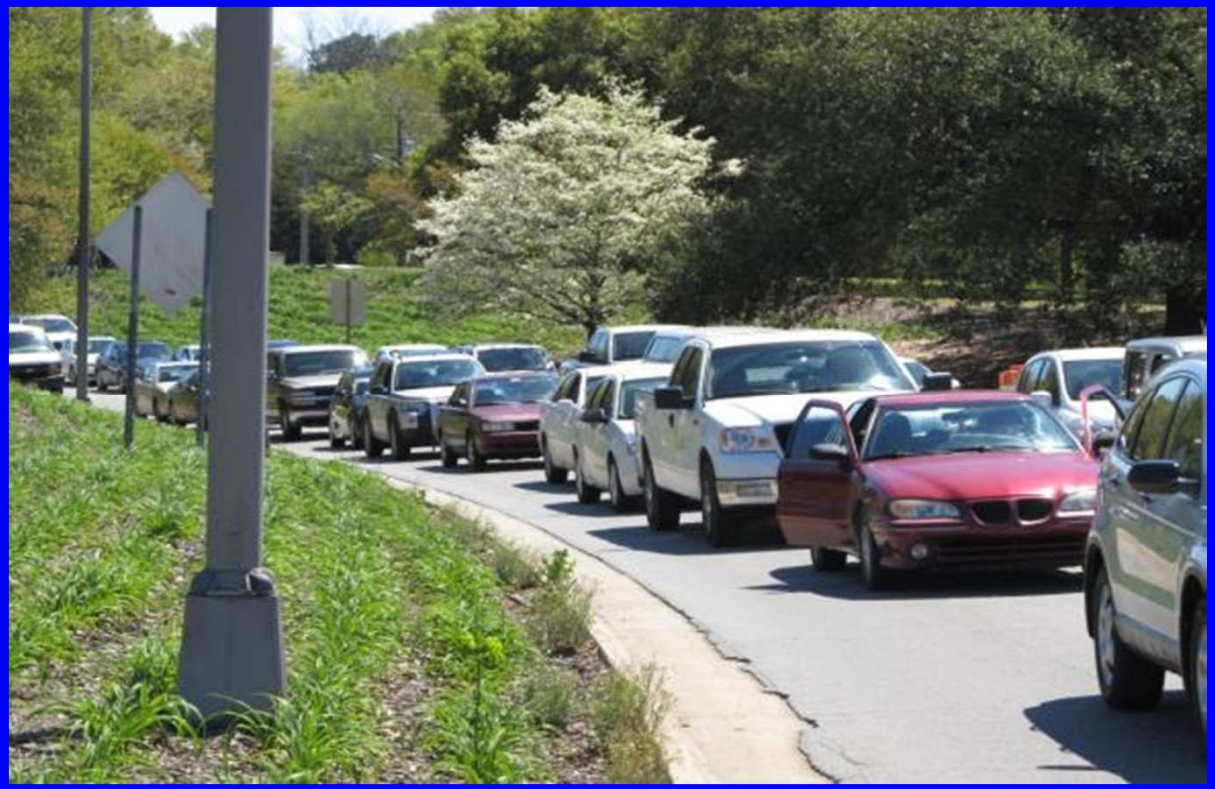
- Oil terminals south of Wilmington generate high volumes of truck traffic.

Cape Fear Memorial Bridge

- Primary vehicle crossing for the Cape Fear River
  - ADT is 52,000 VPD
  - Over capacity during rush hour

Commuter Traffic

- Bridge carries daily traffic between Leland and other communities in Brunswick County.



Cape Fear River Shipping Channel

- Shipping vessels use the Cape Fear River up to and beyond the Cape Fear Memorial Bridge
- Bridge operations must be maintained 24 hours per day, 7 days per week


OAK GALAXY
NO SMOKING
SAFETY ✦ FIRST
TOKYO


TOKYO MARINE


WRONG
WAY

Maintenance History

- High maintenance structure
  - 1985 – bridge painted
  - 1996 – lift span received new steel decking
  - 2007 – bridge electrical control system replaced
  - 2010 – second painting contract let to VHP Enterprises

After 40+ years…

- Her age is showing

Painting the Cape Fear Memorial Bridge

- Poses many challenges:
  - Primary river crossing
  - High traffic volumes limit lan and bridge closures
  - Spans a shipping channel
    - Non-scheduled bridge opening for commercial and pleasure craft
  - Huge dynamic structure

Scope of the Work

- Cleaning and recoating existing steel
  - 190,098 ft^2 of lift span
  - 129,796 ft^2 of tower surfaces
  - 7,339 ft^2 of counterweight surfaces
  - 7,836 ft^2 of control house surfaces
  - 15,726 ft^2 of machinery housing
- Updated HVAC system for control tower
- Replace guide rollers
- Replace roadway lighting system

Coordination with the US Coast Guard

- At no time can the waterway be closed or narrowed to navigation without USCG approval.
- Waterway closing/narrowing must be requested 30 days in advance.
- All work in, on, or adjacent to navigable waters must have no adverse affect on waterway traffic.
- Normal bridge operations must be maintained at all times


Advanced Recycling Systems
Ingersoll-Rand

Coordination with the US Coast Guard

- Once a request to raise the bridge is made by any river vessel, contractor must have bridge ready to raise in 60 minutes.
  - Work stops until shipping vessel passes under the bridge.
- Coast Guard has allowed a 4' variance on half the vertical lift span at one time.

Contract Time

- The date of availability
  - March 1, 2010
- The completion date for the contract
  - September 30, 2010
    - (214 days)

Intermediate Contract Time 3

- Requires the contractor to complete all bridge painting that requires bridge closures
  - Date of availability April 13, 2010
  - Completion date June 11, 2010 (60 days)

Intermediate Contract Time 3 Issues

- Contractor began work April 25, 2010
- Installation of scaffolding began on towers
- All work done at night
- Containment drawings were not approved until June 26, 2010.

Lane Closures

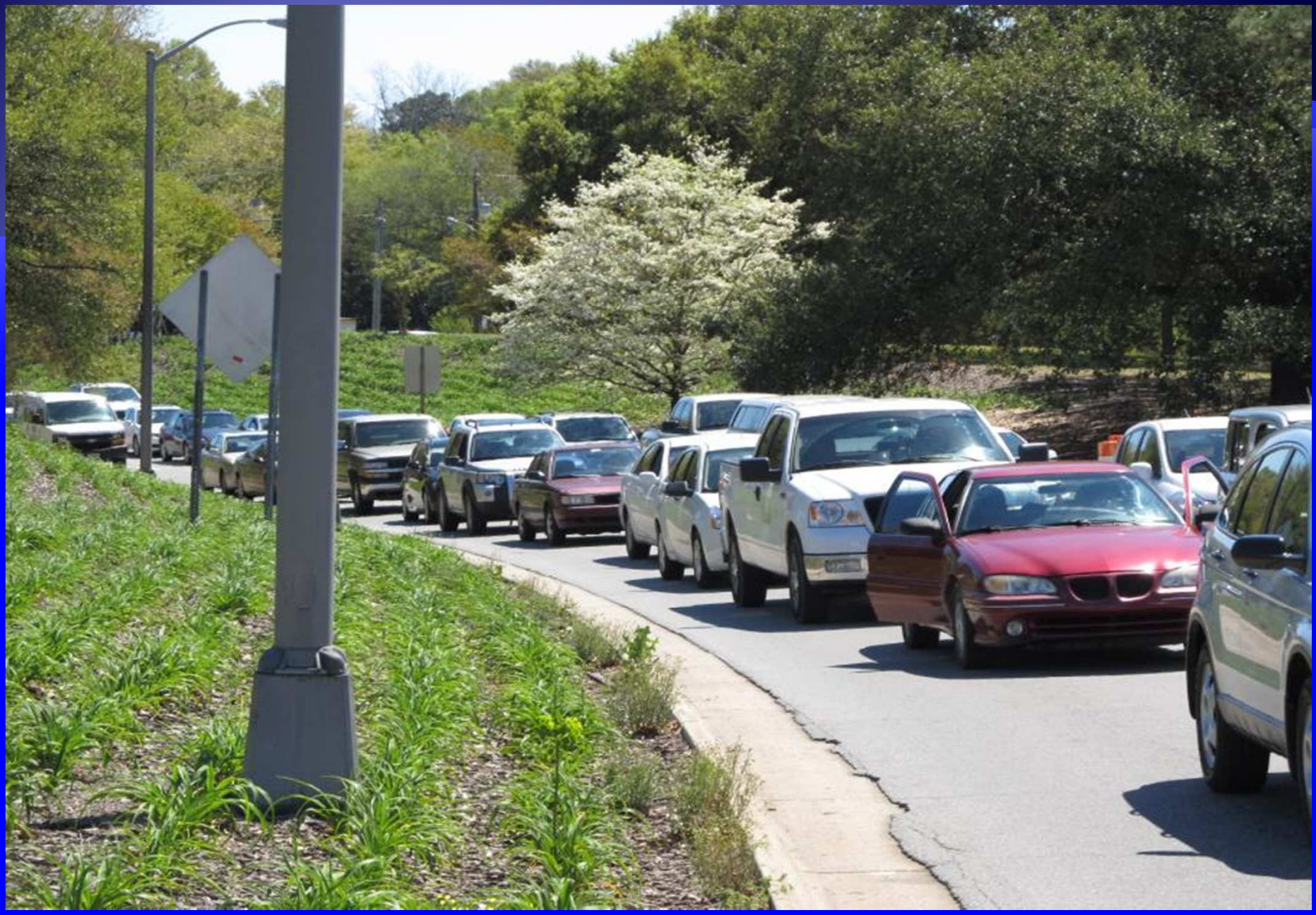
- From Memorial Day to Labor Day;
  - Sunday – Thursday:
    - 7:00 pm – 6:00 am
- From Labor Day to next Memorial Day
  - Monday – Saturday:
    - 9:00 am – 3:00 pm;
    - 7:00 pm – 6:00 am
- Holiday restrictions

Bridge Closures

- From Memorial Day to Labor Day;
  - Monday – Thursday:
    - 7:00 pm – 5:00 am
- From Labor Day to next Memorial Day
  - Monday – Saturday:
    - 7:00 pm – 5:00 am
- Holiday restrictions

Traffic Backups

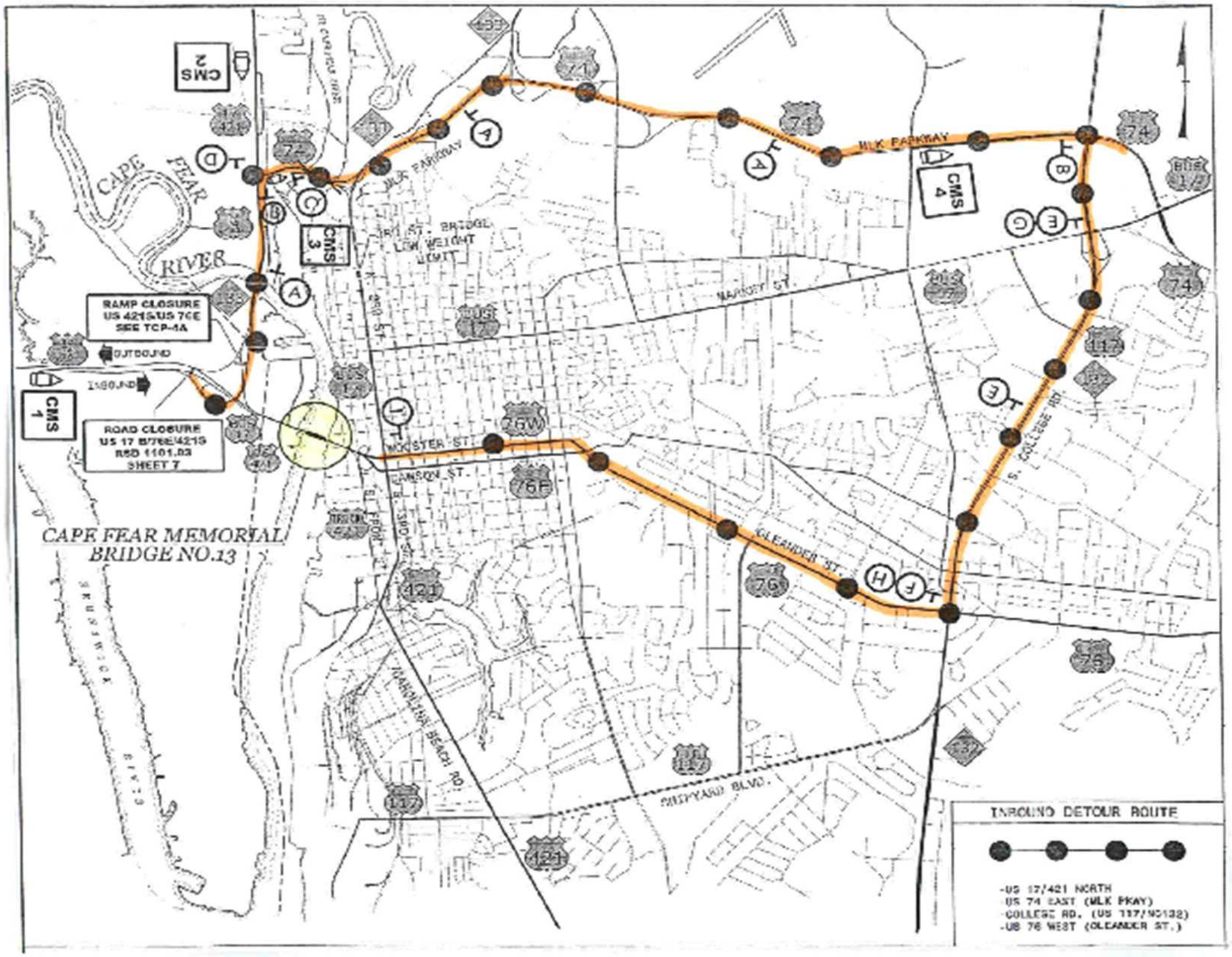
- The first Friday night traffic backed up through downtown
- Second night, Contractor delayed bridge closure.
  - Backups still occurred
- Adjustments in time restrictions began in early May
- Extension of Intermediate Contract Number 3 was granted.



Traffic Control

Bridge Closure Detour Route

- Twelve mile detour route for bridge closures
- Requires 14+/- variable message boards
- 28+/- sets of detour signing
- Type III Barricades
- Drums and cones
- Detour signing remains
- Everything else must be set up for each closure
- 1.5 hours to install

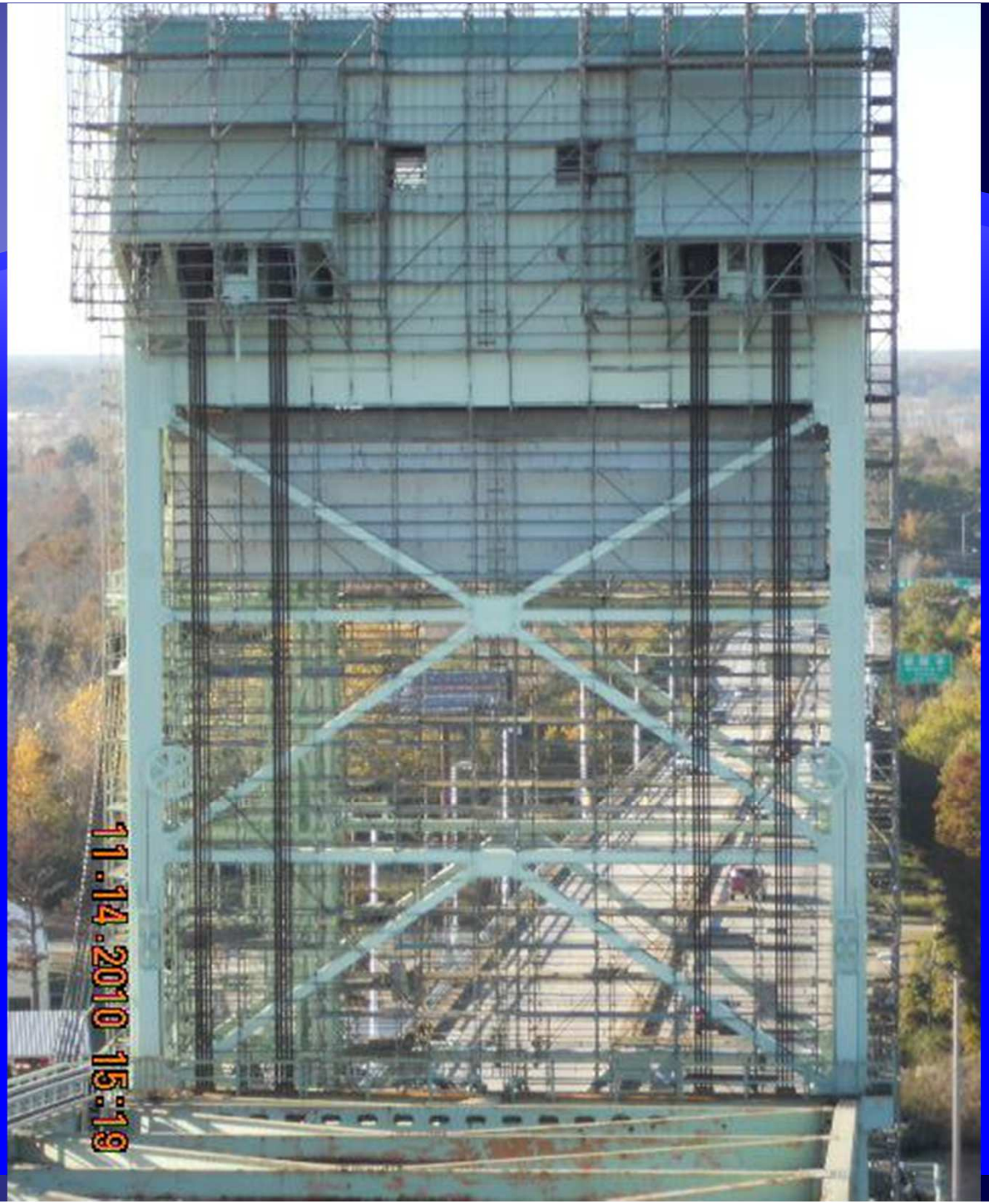

CMS 2
CAPE FEAR
RIVER
CMS 3
3RD ST. BRIDGE LOW WEIGHT LIMIT
MLK PARKWAY
CMS 4
RAMP CLOSURE
US 421S&US 76E
SEE TCP-4A
OUTBOUND
INBOUND
CMS 1
ROAD CLOSURE
US 17 B/76E/421S
RSD 1101.03
SHEET 7
WOOSTER ST.
DAWSON ST.
OLEANDER ST.
S. COLLEGE RD.
MARKET ST.
CAPE FEAR MEMORIAL
BRIDGE NO.13
CAROLINA BEACH RD.
SHIPYARD BLVD.
INBOUND DETOUR ROUTE
-US 17/421 NORTH
-US 74 EAST (MLK PKAY)
-COLLEGE RD. (US 117/NC132)
-US 76 WEST (OLEANDER ST.)


NORTH NORTH
117 132
UNCW
76 EAST
Wrightsville Be
DETOUR
WEST
76
17
NORTH
421


28
SPEED LIMIT
55

Scaffolding installation

- Installation slow
- Night time work
- Required Bridge closures



Containment Installation

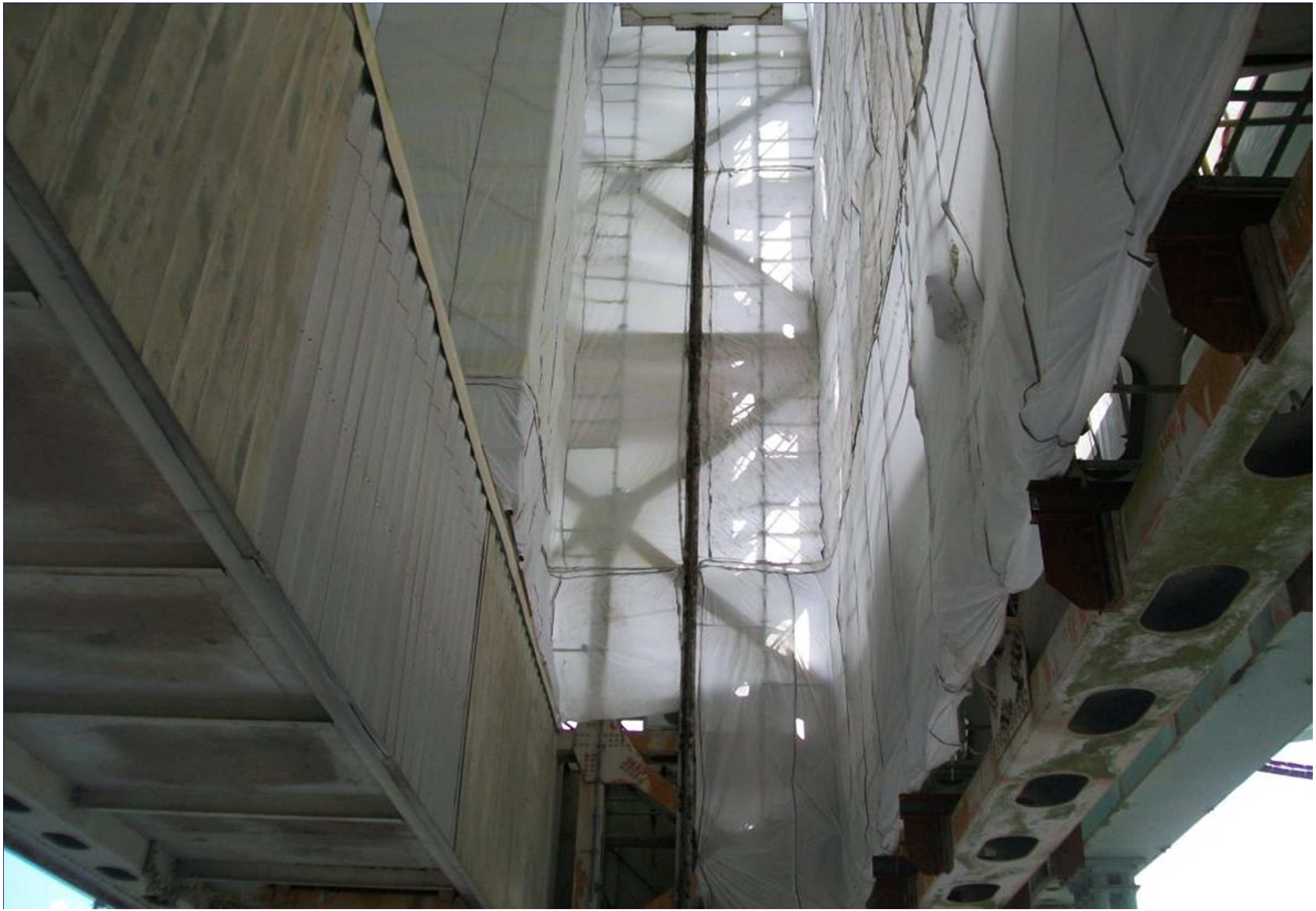
Containment Issues

- Bridge that opens daily
- Must be able to open with one hour notice
- Time restrictions on Bridge closures
- USCG variance for river clearances is half a span at a time with only a 4 ft reduction
- Span balance maintained at all times

Tower Containment Issues

- Counterweights in tower must move freely
- Lift span must also be allowed to move
- Timely cleanup prior to openings


SLIPPERY WHEN WET



Lift Span Containment Issues

- Work schedule:
- Sunday thru Thursday 9:00 Pm to 5:00AM
- Maintaining minimum temperatures for curing
- Opening bridge on time before rush hour
- Bridge openings at any time
- Considering Saturday 11:00 Pm to 10:00 Am Sunday Closures until Tourist season
- Monitoring traffic ; adjusting lane and bridge closures

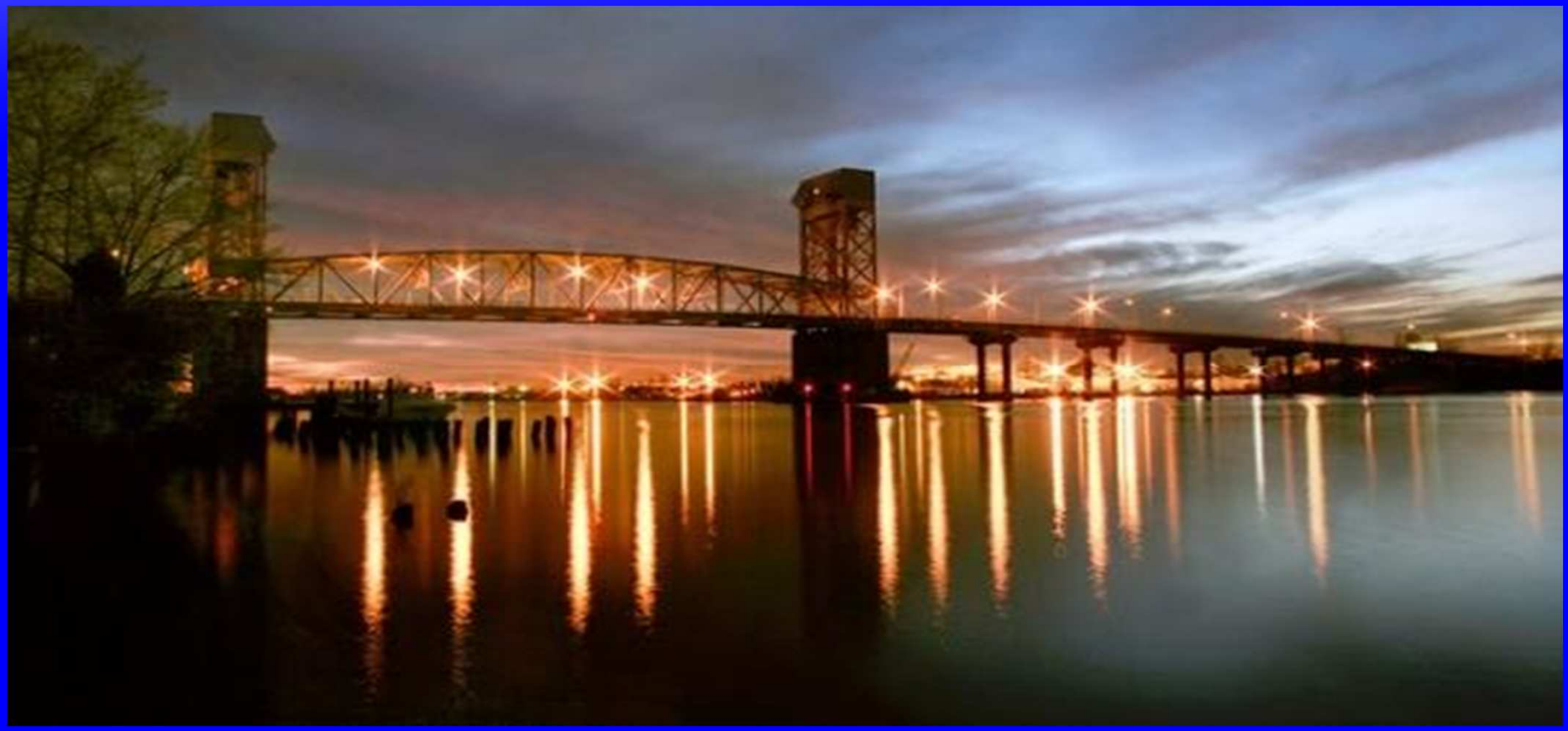
Tackling a Big project Summary and Conclusions:

- Constructability Reviews
- Pre-bid conference
- Required site visits
- Prequalification of Contractors
- Knowledgeable Inspection Staff

Tackling a Big Project Lessons learned:

- Duck and run when BMU calls!
- Expect problems/changes
- All parties need to communicate
- Experiment with contract restrictions if necessary
- Keep Municipalities and public informed
- Coordinate with Coast Guard

Questions?



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TACKLING A BIG PROJECT

PAINTING THE CAPE FEAR MEMORIAL BRIDGE

PROJECT PARTNERS

DESIGN ENGINEER FIRM

MODJESKI and MASTERS
Experience great bridges.

COATING CONTRACTOR

VHP
ENTERPRISES, INC.

COATING MANUFACTURER

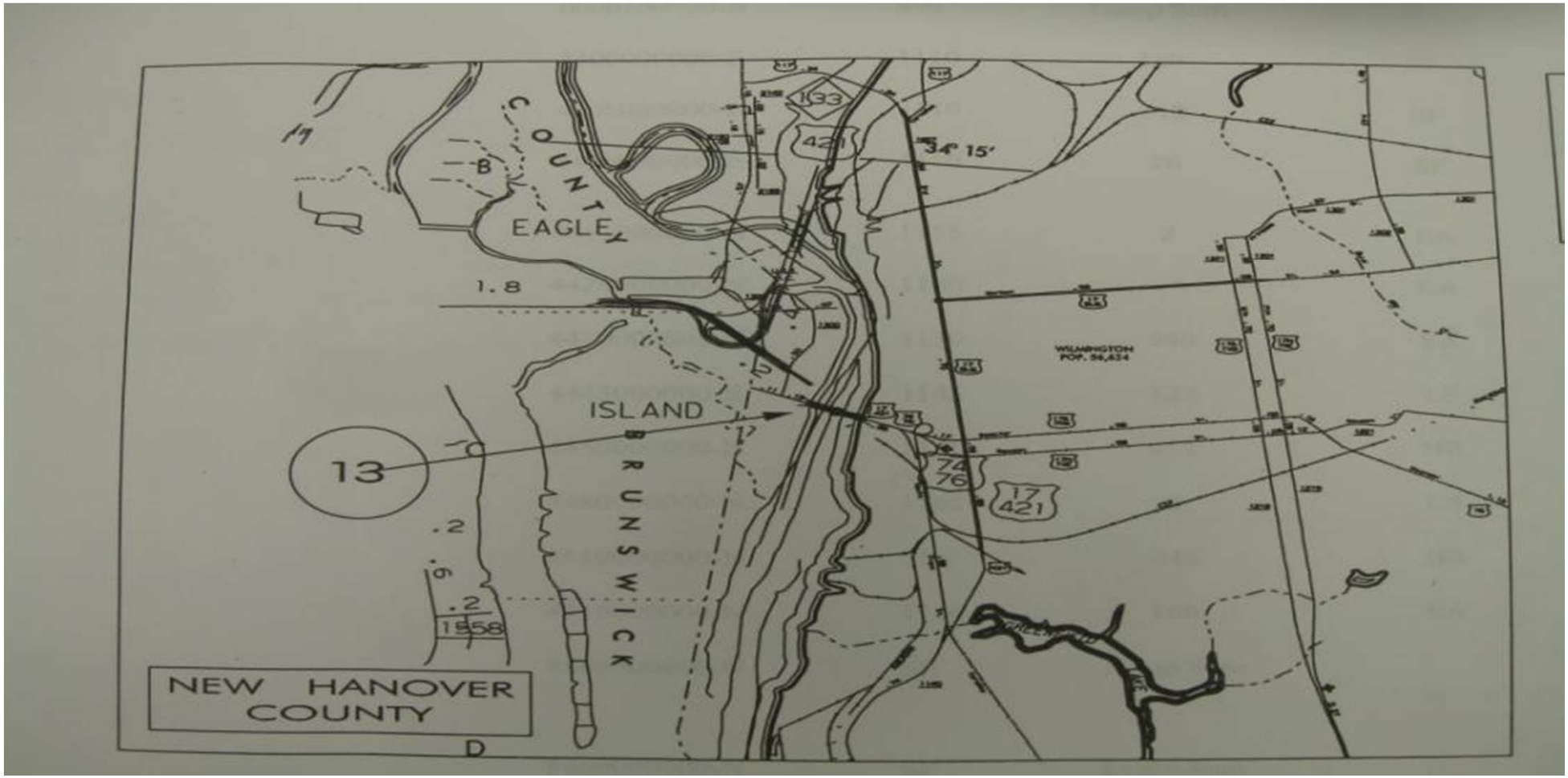
SHERWIN-WILLIAMS
Protective & Marine Coatings

QA COATINGS INSPECTION FIRM

G&O
GREENHORNE & O'MARA
CONSULTING ENGINEERS
Inspired Solutions, Improving Lives

STRUCTURE LOCATION

LOCATION: US- 17,74,76 ACROSS THE CAPE FEAR RIVER



STRUCTURE ORIENTATION

STRUCTURE IS A VITAL LINK FOR DOWNTOWN WILMINGTON THAT CARRIES US 17/74/76 AND SR 1300 ACROSS THE CAPE FEAR RIVER .

STRUCTURE DESCRIPTION

- Truss lift span structure and open steel grid deck on steel girders.
- Length of moveable lift span- 408 Feet
- Structure length- 3,033 Feet
- Deck width, out to out- 61.5 Feet
- Vertical clearance over roadway- 16.0 Feet
- Navigation vertical clearance- 135 Feet
- Channel depth – 27 Feet
- Average Daily Traffic count of 49,000 in 2007

PREVIOUS HISTORY

- 1969- Structure was erected
- 1985 -Structure was spot primed and top coated
- 2004-Electrical Maintenance was performed
- 2008-Maintenance coatings were applied on lift span portion.
- 2010- Bridge preservation project was initiated.

PLANNING CONSIDERATIONS

- Summary of steel areas to be painted:
  - Lift Span:190,098 sq. ft. (Total)
    - Exterior Chord Area : 21,246 sq. ft.
    - Interior Chord Area-:19,952 sq. ft.
  - Towers- 129,726 (Total)
    - Exterior Chord Area: 35,553 sq. ft.
    - Interior Chord Area: 32,877 sq.ft.
  - Counter Weights (2): 7,339 sq. ft
  - Control House: 7,836 sq.ft
  - Machinery Houses (2): 15, 726 sq. ft.

  - **Total Area: 350,795 sq. ft**

PLANNING CONSIDERATIONS

- April 2009- Materials and Tests Unit held multiple discussions with Carboline & Sherwin Williams paint representatives to discuss options for alternative paint systems for this project.

- May 2009 State Bridge Management Unit (SBMU) sent out a constructability survey to the major painting contractors who had performed work on similar structures in order to understand how they would tackle such a project.

PLANNING CONSIDERATIONS

- Sept 2009- SBMU conducted a constructability meeting with potential painting contractors and other key personnel.
- January 2010- Pre-Bid Meeting established
- March 2010- Pre-Construction Conference

INITIAL CONDITION
STRUCTURE EXTERIOR

LIFT TOWERS

TOWER LEGS

UNDER STRUCTURE

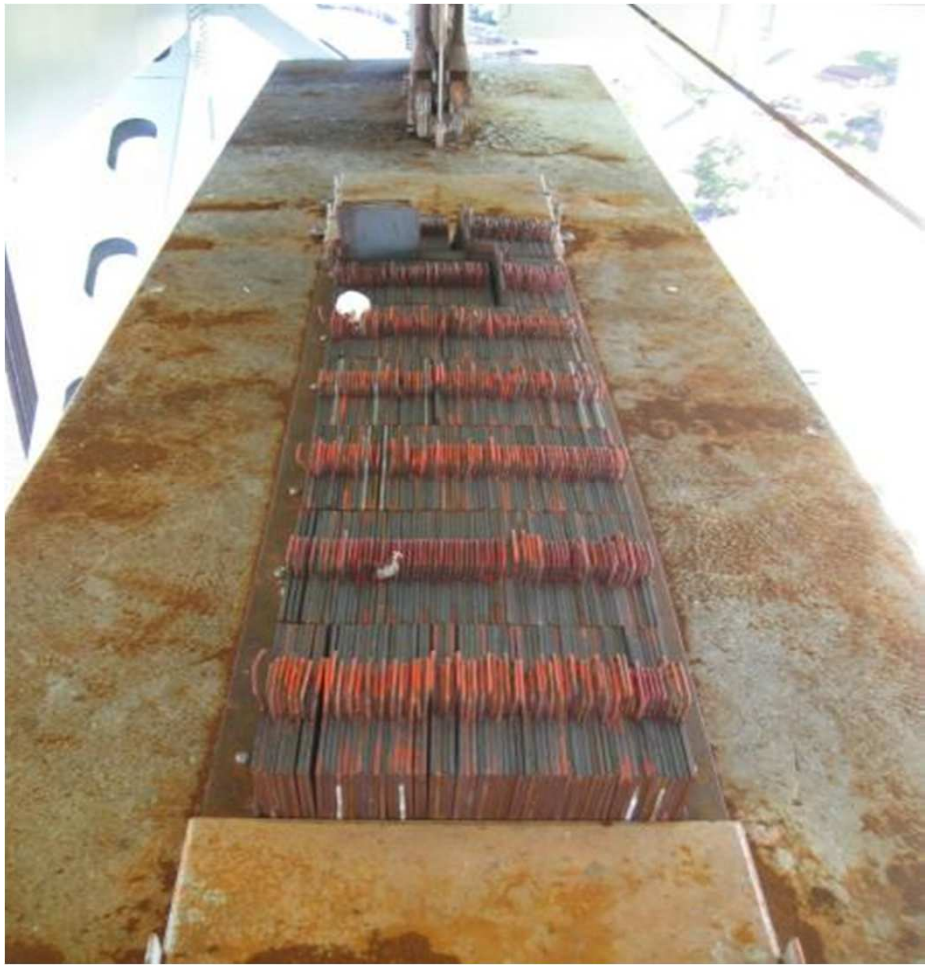
MACHINE ROOM SUPPORT STRUCTURE

BEARING & JOURNAL ASSEMBLIES

PROJECT CONSIDERATIONS

- Minimize bridge closures and other delays to the traveling public.
- Maintaining span weight balance.
- Maintain navigable waterway passage and eliminate delays in containment removal.
- Scaffolding erection on lift towers.
- Project rendering
- Coating selection
- Chloride removal
- Paint system for hollow chord members.
- Storage Area
- Quality assurance inspection

MAINTAINING SPAN BALANCE



NAVIGABLE WATERWAY PASSAGE

157’ “Pride of Baltimore” sailing into downtown Wilmington.

SCAFFOLDING ERECTION

CONTAINMENT SEQUENCING

PROJECT RENDERING

WILMINGTON TOWN COUNCIL & WILMINGTON METROPOLITAN PLANNING ORGANIZATION APPROVAL

COATING SPECIFICATION HIGHLIGHTS

- Containment- SSPC Class 2A.
- Power wash all surfaces (contain/test all wash water)
- Surface chloride levels 7 ug/cm2 or lower.
- Caulk all steel to steel contact areas under truss portion.
- Surface Cleanliness of SSPC-SP-10 except on surfaces with siding and critical machinery areas.

- Paint System
  - Organic Zinc Primer
  - Acrylic Intermediate (Brown)
  - Acrylic Stripe coat (White)
  - Acrylic Top Coat (Light Green #34670)
  - Accent Stripe (Dark Green #34325)
- Hollow Chord Members
  - Organic Zinc Primer
  - Two coats of Epoxy Aluminum Mastic
- Surfaces with Siding
  - Two coats of Acrylic

STORAGE AREA

JUNE 2010 PROGRESSION

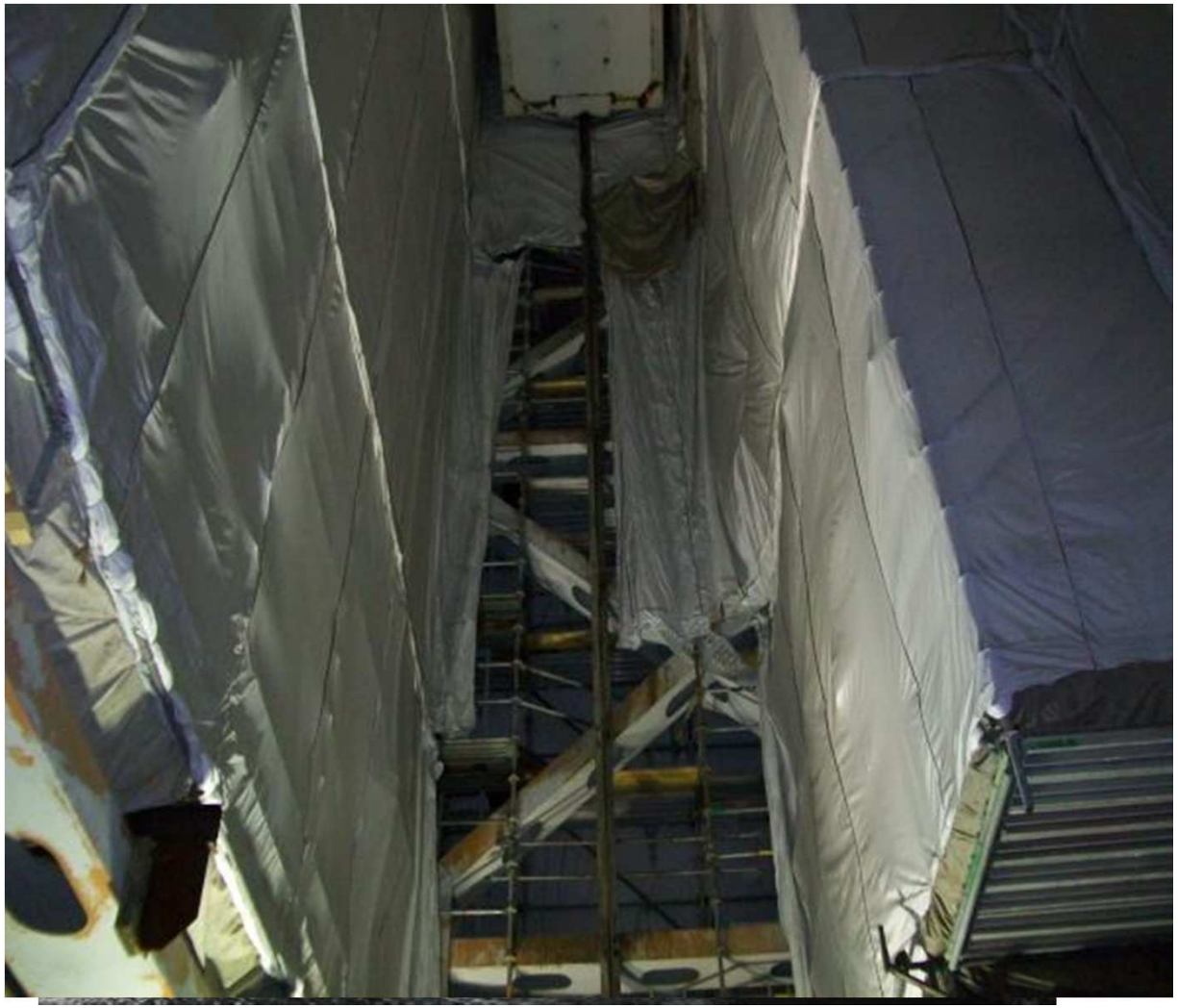
PROGRESS SUMMARY

Sunbelt Inc. erected scaffolding.

West tower containment curtain rigging.

West tower pressure washings.

T.I.C Inc. replaced guide rollers in east tower



JULY 2010 PROGRESSION

PROGRESS SUMMARY

Blasting & priming operations continue throughout west tower structure.

Touch up, repair and housekeeping in west tower.

AUGUST 2010 PROGRESSION

PROGRESS SUMMARY

Prime coat completed on west tower.

Rigged containment curtains on east tower.

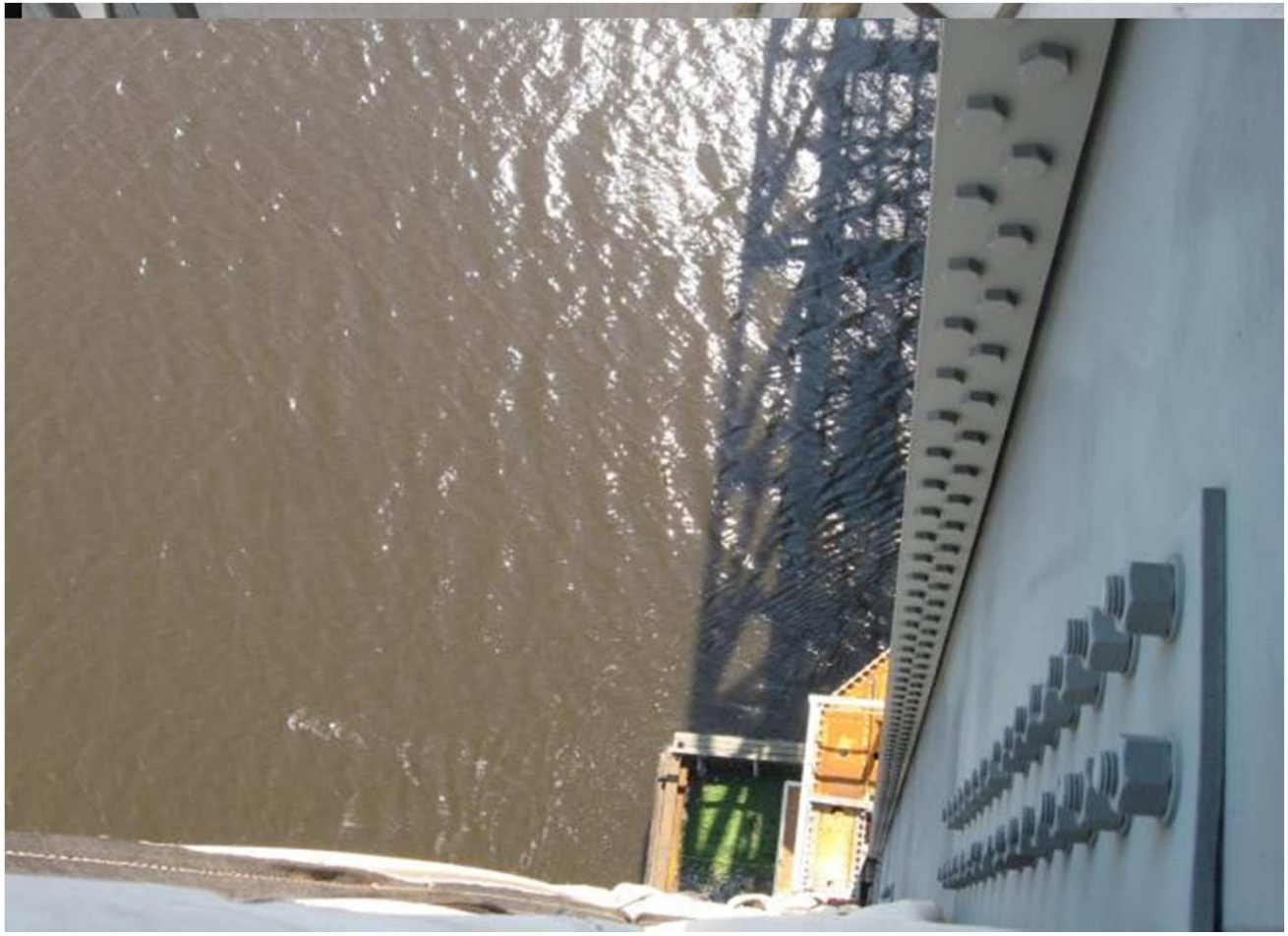
Pressure wash east tower.

SEPTEMBER 2010 PROGRESSION

PROGRESS SUMMARY

Blast & prime, east tower.

Began application of Epoxy aluminum mastic in hollow chord members in west tower



OCTOBER 2010 PROGRESSION

PROGRESS SUMMARY

East tower blast, primer and touch up primer on east & west tower

Started epoxy mastic application on east tower and completed application in west tower.

Began intermediate and stripe coat application on west tower

NOVEMBER 2010 PROGRESSION

PROGRESS SUMMARY

Intermediate & stripe coat, east tower

Finish coat, east & west tower.

Accent stripe on control house, east and west tower .

Scaffold removal on east & west tower.

Finish coat touch up east & west tower.

DECEMBER 2010 PROGRESSION

PROGRESS SUMMARY

Grit clean-up on east and west towers.

Light poles replaced on east and west bridge lanes.

Scaffolding removal on east and west towers.

Work postponed for winter weather until March 2011.

MARCH 2011 PROGRESSION

PROGRESS SUMMARY

Containment and curtain erection on lift span.

SUMMARY

PROGRESS SUMMARY

Structure below the machine house.

SUMMARY

QUESTIONS?