



**7 Bridges in 74 Days  
(Or Less)**



**NC 12 Detour**



Image © 2008 DigitalGlobe  
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Image NASA  
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Pointer 35°20'10.87" N 76°29'55.40" W

Streaming ||||| 100%

Eye alt 265.75 mi

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
BRIDGE REPLACEMENTS**



Bridge No. 39



Bridge No. 46



Bridge No. 31



Bridge No. 49



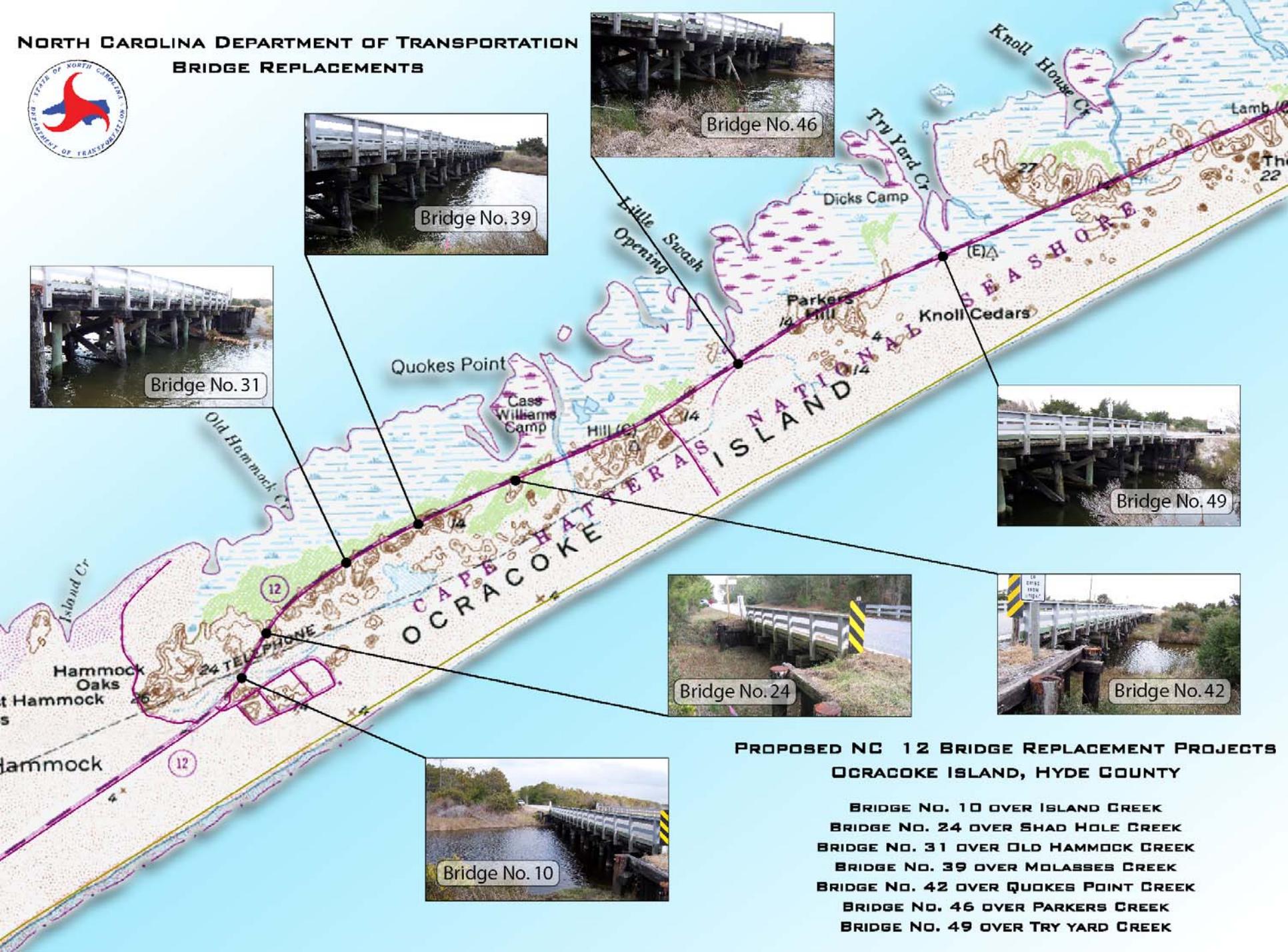
Bridge No. 24



Bridge No. 42



Bridge No. 10



**PROPOSED NC 12 BRIDGE REPLACEMENT PROJECTS  
OCRACOE ISLAND, HYDE COUNTY**

- BRIDGE NO. 10 OVER ISLAND CREEK
- BRIDGE NO. 24 OVER SHAD HOLE CREEK
- BRIDGE NO. 31 OVER OLD HAMMOCK CREEK
- BRIDGE NO. 39 OVER MOLASSES CREEK
- BRIDGE NO. 42 OVER QUOKES POINT CREEK
- BRIDGE NO. 46 OVER PARKERS HILL CREEK
- BRIDGE NO. 49 OVER TRY YARD CREEK

# Ocracoke NC 12 Bridges

## Existing

- ⌘ 7 bridges built in 1950's
- ⌘ Timber structures w/ ACP
- ⌘ Clear width 22.5 ft.
- ⌘ 36 to 152 ft. long
- ⌘ Limited redirective curb/railing
- ⌘ No approach guardrail
- ⌘ Rehabilitation project in 1980's added additional bents, i.e reduced span lengths



# Existing Ocracoke NC 12 Bridges



- ⌘ Functionally Obsolete
- ⌘ Structurally Adequate
- ⌘ Continual Maintenance

# Ocracoke NC 12 Bridges

## Proposed

- ☒ Concrete structures w/ silica fume & corrosion inhibitor
- ☒ Clear width 33.0 ft; i.e. 12.0 ft lane & 4.5 ft. shoulder
- ☒ 122 to 252 ft long
- ☒ Concrete parapet w/ guardrail
- ☒ Limit impact to the Village, no phased construction
- ☒ Replace 7 bridges in 1 construction season.

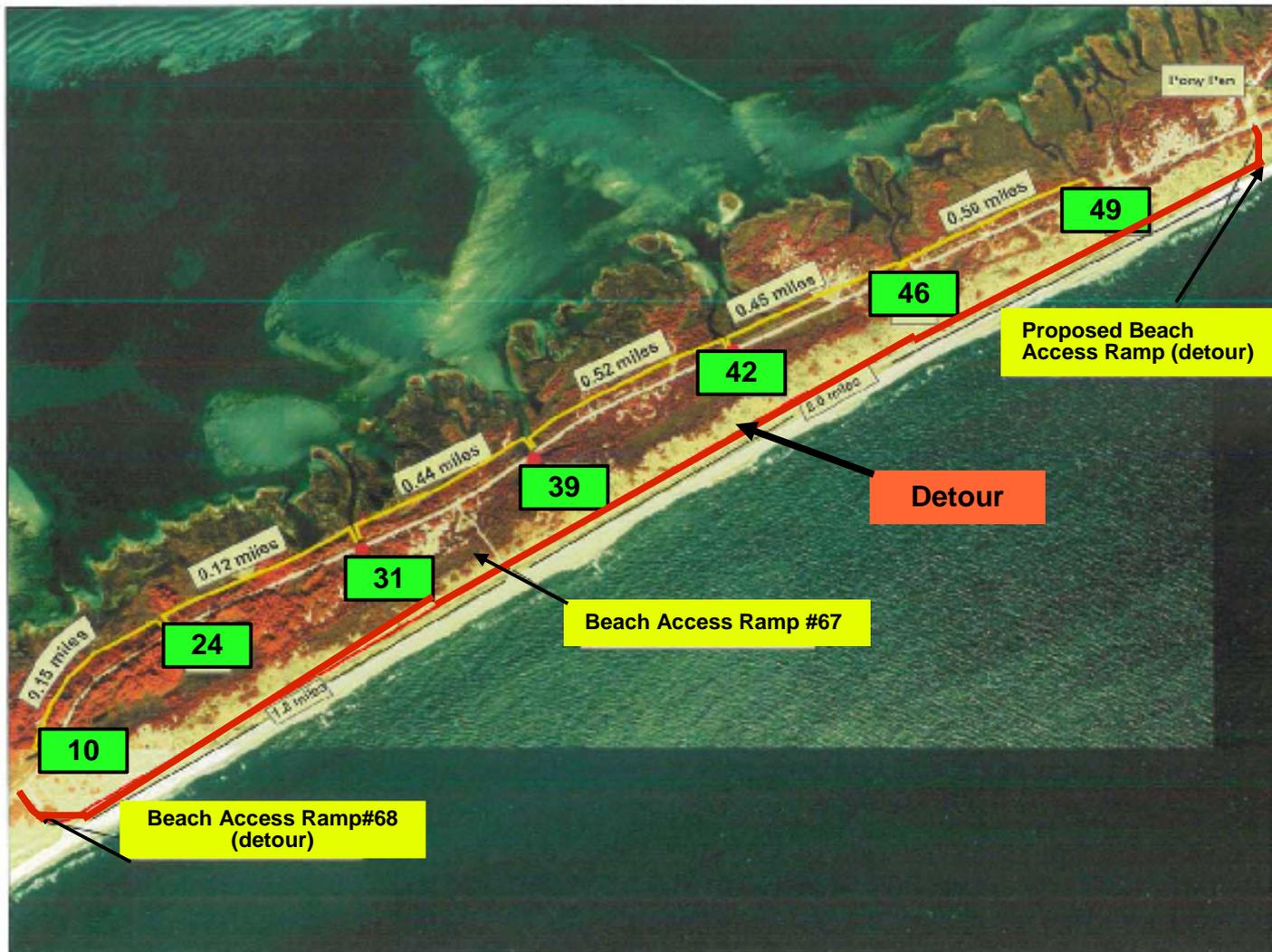


# Ocracoke NC 12 Bridges

## Least impact to Village

### ⌘ Opted for Closure of NC 12 & Beach Detour

- ☑ January 2 to March 15, 2008 non peak visitor season.
- ☑ 74 days. Must open for Easter 2008.
- ☑ All bridge members precast for speedy construction and not as weather dependent as cast in place.
- ☑ Due to limited private property on the island, NPS permitted use of 3 locations for staging.



**Beach Detour Route**  
**NPS Campground (Ramp #68) to Pony Pen (Proposed Ramp)**  
**(Ramp #67 for use by contractor only)**



Campground Staging Area



Campground Staging Area



**Campground Staging Area**

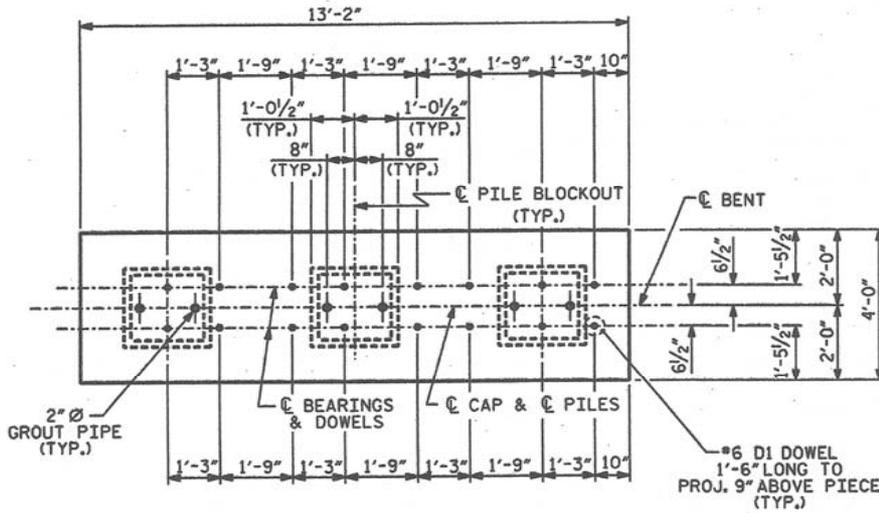
# Additional Staging Areas

North End of Project

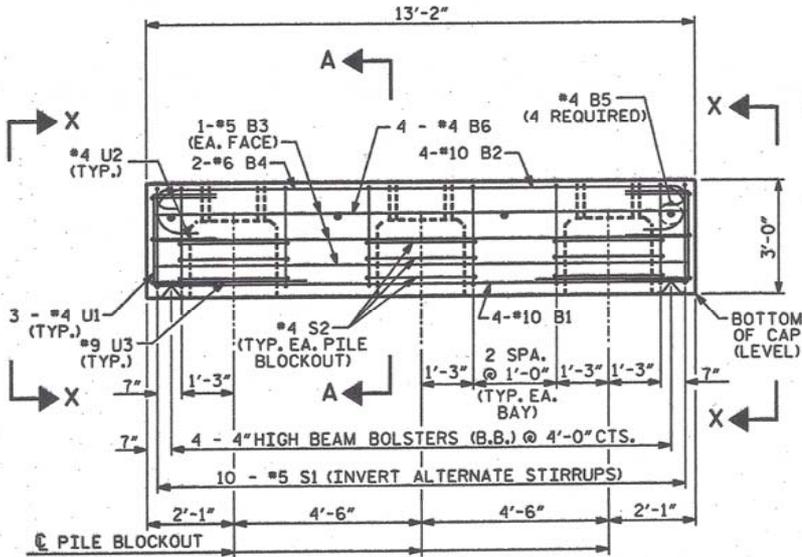


- ⌘ Water for Grouting
- ⌘ NCDOT Fuel & Lab
- ⌘ Demolition Debris Storage

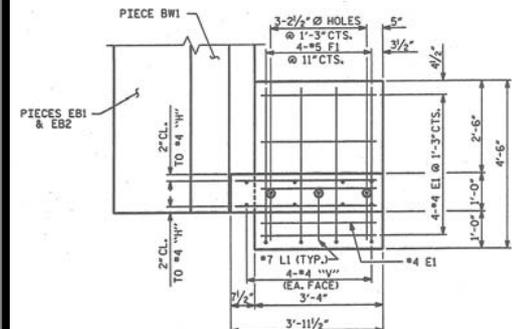
**Precast Substructure Members/Pieces  
Utilize Uniform Design Across All  
Structures**



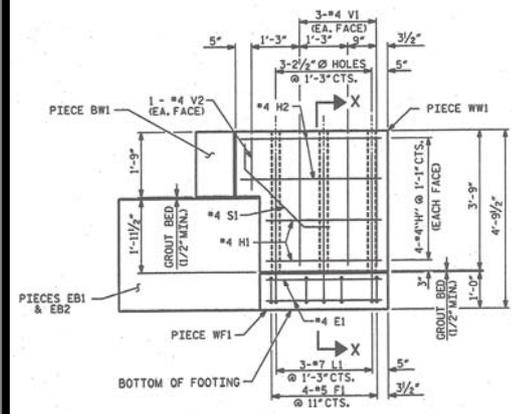
**PLAN Bent Cap**



**ELEVATION - PRECAST PIECE B1**



**PLAN Wing Wall**



**ELEVATION**



**Precast Bent Caps**



**Precast End Bent Cap**



**Precast Cap Backwalls**



Precast Wing Wall Footing

Precast Wing Wall



# Work Prior to January NC 12 Closure

## Lane Closure for Pile Driving



# Driving End Bent Piles Through Existing Road

74 12" P/S Concrete Piles with 2 ft. HP Pile Tip



# Pile Driving Crane Walks to Next Bridge End Bent

Load Distribution on Existing Structure





January 2, 2008 Begin Beach  
Detour

# First 2 days of NC 12 Closure...Begin Beach Detour

Equipment & Material Prepositioning and Bridge Preparation



# Bridge Replacement Day 1

## Select Demolition of Existing Structure



- ⌘ Chain Saws & Concrete Walk Behind Saws
- ⌘ Install Temporary Steel Decking at Wheel Paths for Continual Access to Project Limits

# Bridge Replacement Day 1

## Select Demolition of Existing Structure



- ⌘ Temporary Steel Decking Supported on Timber Cap
- ⌘ Adjust to Accommodate Crane or Vehicles
- ⌘ Remove to Allow Pile Driving
- ⌘ Replace After Pile Driving, Move Ahead



**Temporary Steel Mats**

# Bridge Replacement Days 2 & 3

## Pile Driving Through Existing Structure



JAN 13 2008

# 16" Prestressed Concrete Composite Pile

20 ft HP 10 X 57 bolted to 26.5 ft P/S Concrete



- ⌘ Dense sand – no pile jetting.
- ⌘ Eliminate early refusal before minimum tip elevation.
- ⌘ First use in NCDOT.
- ⌘ 2 Point Pick Up.



**Pile Driving Through Existing Bridge**



**Piles Driven Through Existing Bridge**



**Piles Driven Through Existing Bridge**

# Bridge Replacement Days 3 & 4

## **Bridge Demolition**



# Bridge Replacement Days 3 & 4

## Setting Precast Substructure



- ⌘ Pile Blockout Bottom Prepared
- ⌘ Equipment Dedicated to Certain Tasks
- ⌘ Availability of Work Items Dictated Time of Operation
- ⌘ Do Not Put Off Available Work



Setting End Bent Cap 9:30pm



**Pile Block Out In Cap**



**Setting End Bent Cap**



**Setting Interior Bent Cap**



Setting Interior Bent Cap

# Precast Cap Blockout & Cap Support

Limited Falsework & Quick Set Up





**Caps Completed With In Hours**



**Skewed & Sloped Cap**



End Bent Cap With Rip Rap

# Precast Wing Walls

Spread Footings Set on Consistent Material



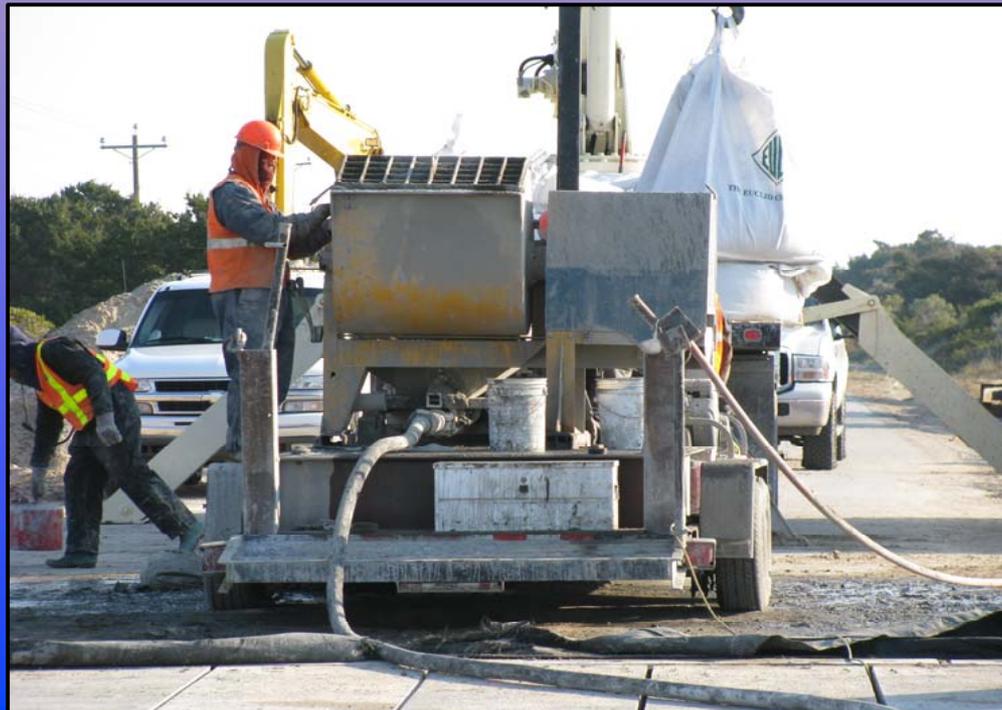
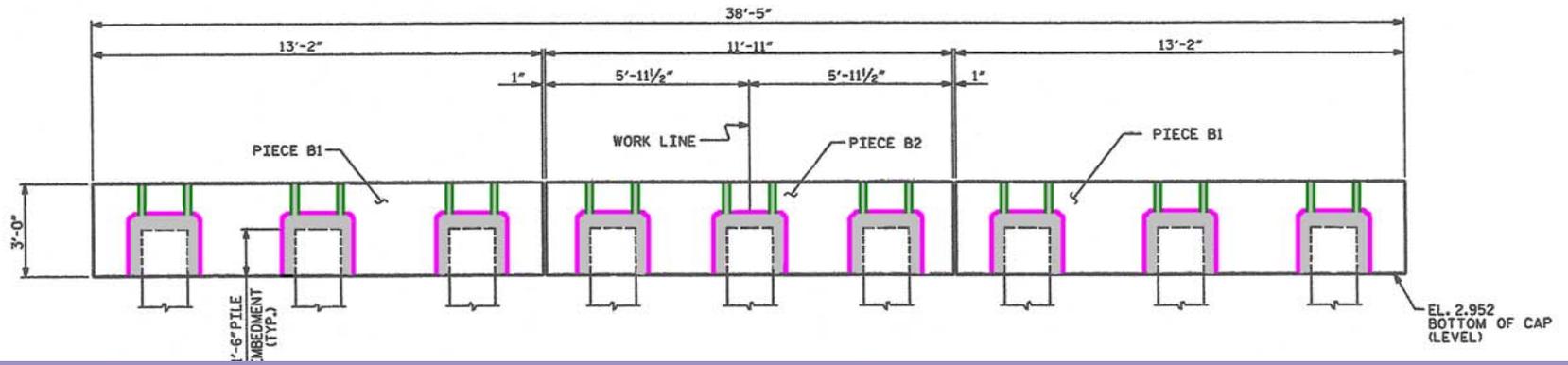
- ⌘ Level Footing for Uniform Gap
- ⌘ Wingwall Grouted to Footing
- ⌘ Take Care with Backfilling



**Pile Driving, Demolition, & Substructure**

# Bridge Replacement Day 5

## Grouting Substructure



# Bridge Replacement Day 5

## Grouting Substructure



**4,200 to 6,500 psi at 17 hours**

# Bridge Replacement Days 6 & 7

## **Erecting Cored Slabs & Barrier Rail**





**Setting Cored Slabs**

# Alternate Concrete Barrier Rail

Light Weight Concrete Barrier Cast on Cored Slab



- ⌘ Proposed by Carolina Bridge Co. and Alpha & Omega Engineers.
- ⌘ Barrier Cast on the Slab at Casting Yard.
- ⌘ Eliminates Extra Steps of Setting & Grouting Precast Barrier Pieces.
- ⌘ One Less Operation On Site.



**Setting Exterior Cored Slab & Barrier Rail**



**Crane on Work Bridge Supported on Bridge Bents**



**Setting BackWalls**



**Cored Slabs & Barrier Rail ready for Grouting & 2-Bar Metal Rail**

# Open Early To Traffic March 5, 2008

Contract did not Require Paving & Guardrail for Opening



- ⌘ All Structures Complete on February 16, 2008.
- ⌘ Elected to Pave for “BUMP” Free Corridor.
- ⌘ Carolina Bridge Awarded Incentive & Bonus: \$350,000

# One More Thing....Remove a Bridge & Install Twin Culvert

When You Have Time!



A photograph of a sunset over the ocean. The sky is a deep blue, transitioning to a bright orange and yellow glow at the horizon. The ocean is dark blue with white-capped waves breaking on a sandy beach in the foreground. The text is overlaid in the top left corner.

**Carolina Bridge Company-**  
**Scott Nickel, President**  
**Richard Nickel, Vice President**

**National Park Service**  
**Hyde County**  
**NCDOT Ferry Division**  
**NCDOT Division 1 & Resident Offices**  
**Village of Ocracoke**

