



2009 / 2010

Responding to Emergencies - Together

Jon Nance, PE

Chief Engineer - Operations





NCDOT Emergency Projects



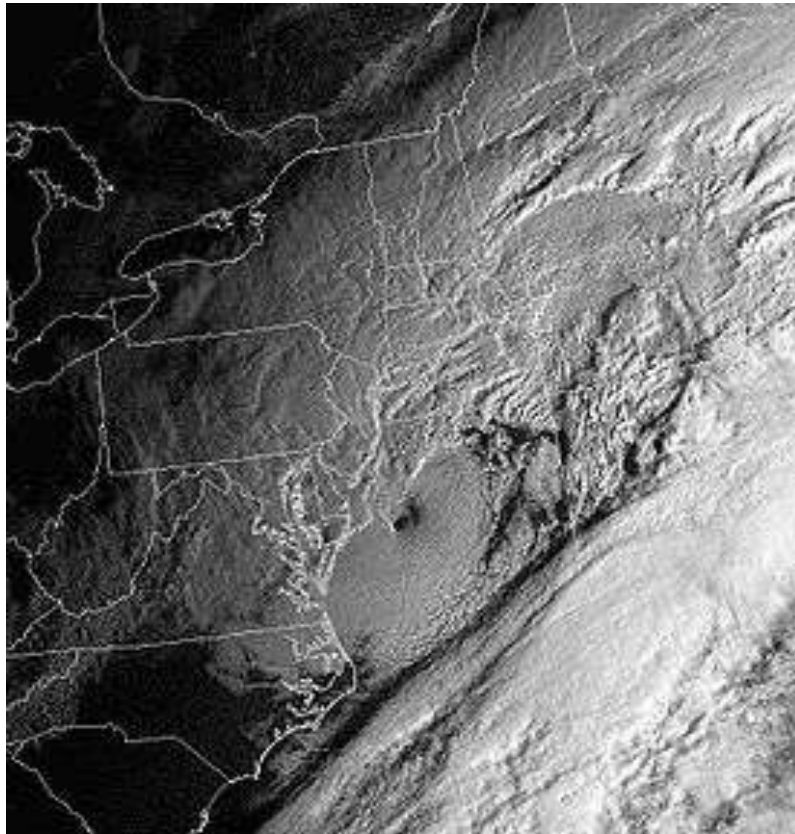
- I-40 Rockslide
- Division 14
- October 2009

- NC 12 Nor'easter
- Division 1
- November 2009





Nor'easters



- Type of storm along the East Coast
- Storm travels from the south. Winds come from the northeast
- Mostly occurs in late fall and winter
- Can cause coastal flooding and hurricane force winds





First day of storm on Nov. 12, 2009

* Damage to dunes and flooding on NC 12 *

Tropical Storm Ida



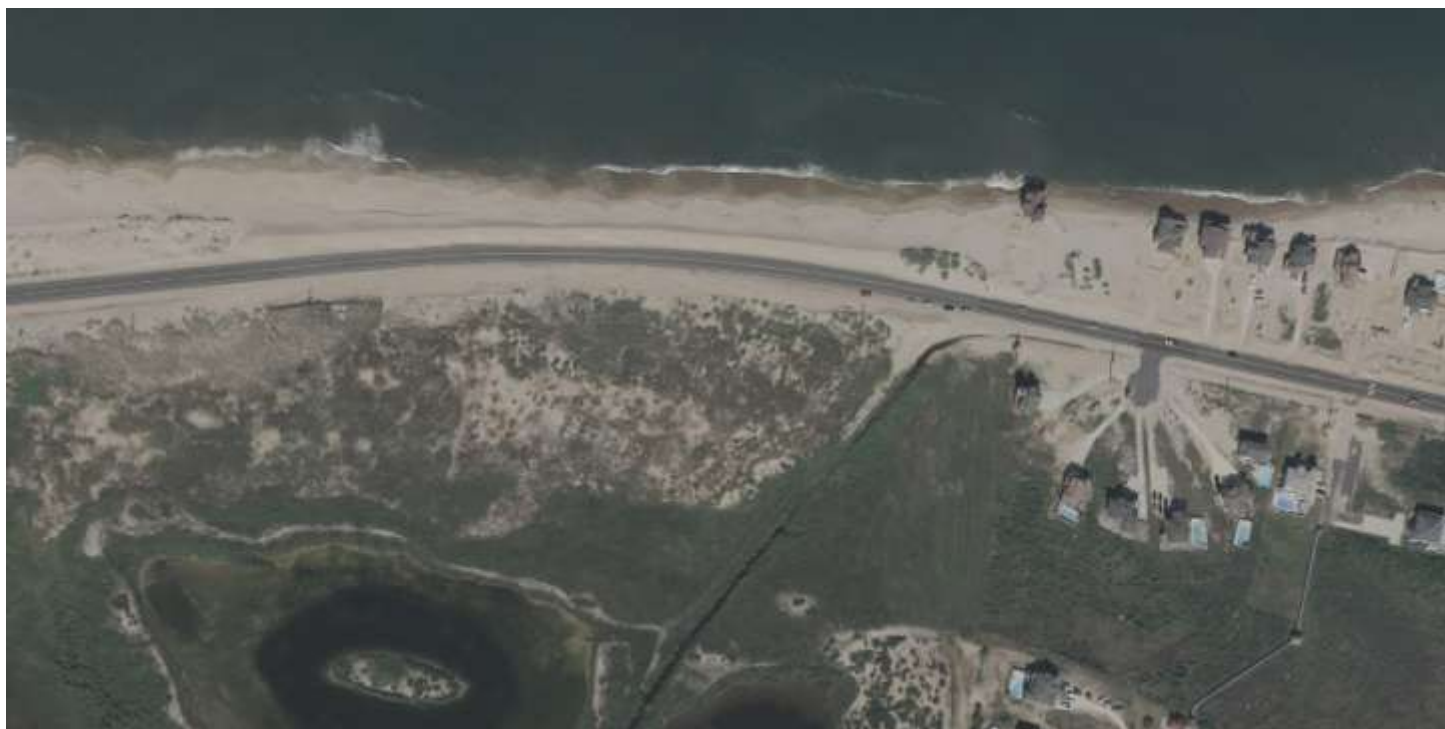


NC 12 – Repair work begins next day 11/13/09





NC 12 Aerial view before Nor'easter





NC 12 Aerial view w/ One-lane detour



- Nor'easter occurred in Nov. 2009
- One-lane off road detour established





NC 12 Broken Pavement





Challenges for NCDOT

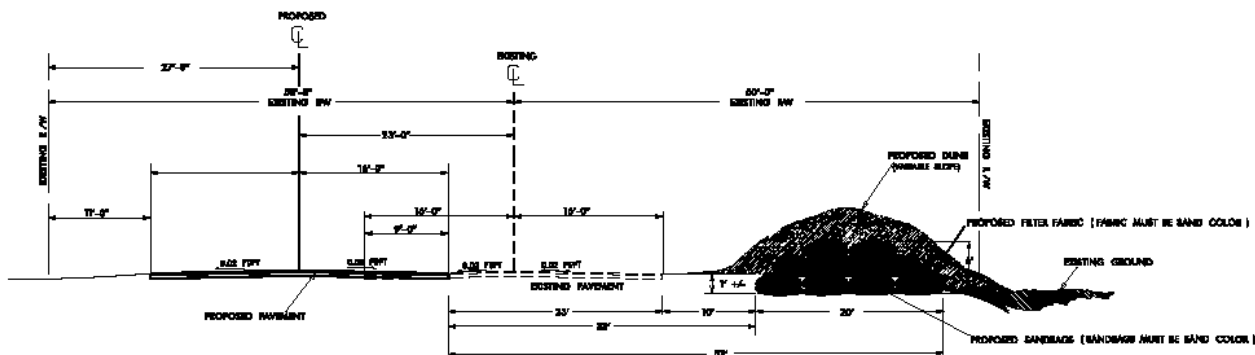
- **Establishing one-lane thru traffic for 4-wheel drive vehicles on Pea Island Refuge**
- **Restoring passenger traffic thru damaged area by Thanksgiving as promised by the Governor**
- **Had to let the Road Relocation project at same time without any road closures**





Design detail of Sandbag Repair

EROSION PROTECTION, NC 12 { "S" CURVES } PROPOSED TYPICAL SECTION



SEQUENCE FOR BAG PLACEMENT

1. BOTTOM ROW WILL CONSIST OF FOUR BAGS PLACED PARALLEL TO THE EDGE OF PAVEMENT.
2. MIDDLE ROW WILL CONSIST OF BAGS PLACED PERPENDICULAR TO THE EDGE OF PAVEMENT.
3. TOP ROW WILL CONSIST OF TWO BAGS PLACED PARALLEL TO THE EDGE OF PAVEMENT.

NOTES

- BAGS FILLED SHOULD BE 5" WIDE, 12" LONG AND 2' HIGH.
- FILTER FABRIC MUST BE SAND COLOR.
- SANDBAGS MUST BE SAND COLOR.

Prepared At the Office of: DIVISION OF HIGHWAYS 123 Airport Dr., Raleigh, NC 27632	
GRAPHIC SCALES FEET	DATE: 11/20/09 Drawing only 1 OF 1





NC 12 – Final roadway shifted 16 ft west

November 12, 2009



December 11, 2009





Coordination between Stakeholders

- **NCDOT – Division 1**
- **FHWA (Funding)**
- **US Fish & Wildlife Service (Pea Island Refuge access)**
- **Dare County Transit (Shuttle service to northern Dare County)**
- **Local & State Emergency Management (Governor's office)**
- **Contractor for road relocation project**





Nov. 2009 Nor'easter - Timeline of Events

- Nov. 12th – Storm damage occurs
- Nov. 13th – NCDOT forces on site working to maintain traffic
- Nov. 16th – NC 12 **closed** to 2-wheel drive vehicles but Maintenance forces kept it open for emergency vehicles and 4-wheel drive vehicles
- Nov. 20th – At 7pm, traffic placed on temporary two paved lanes of NC12 thru the damaged areas – work completed by NCDOT
- Nov. 24th – Bid opening at 2pm for Road Relocation Contract to shift old roadway 16 feet to the west. Awarded to RPC Contracting
- Dec. 11th – Completion of Road Relocation Contract





I-40 Rockslide

- October 25, 2009
- Closed I-40 at Exit 20 in North Carolina and Exit 451 in Tennessee
- The slide is 150 feet high and 200-300 feet wide.
- Debris mainly rocks









Mountain History

- Formed at least 700 million years ago
- Between 400 – 500 feet tall
- Believed to predate the mountains here **BEFORE** the Appalachians
- Formed from an extremely ancient ocean bed





NCDOT Initial Response

- **Began Sunday (10/25/09), 2:00 AM**
- **Within hour, Traffic and Incident Management Engineers on scene closing I-40 and establishing detour (includes coordination with TDOT)**
- **Within 2 hours, Construction Engineers with rockslide experience on scene**
- **Within 10 hours, Geotechnical Engineers on scene**
- **Within 10 hours, Contractor selected and en route**
- **USFS consultation on 10/26/09**





Experts and Specialists

- Division 14 Staff
- NCDOT - Engineering Geologist
- Benjamin Rivers, Geotechnical Engineer, Federal Highway Administration
- Brendan Fisher and Dr. Charles F. "Skip" Watts, Fisher & Strickler Rock Engineering
- Phillips and Jordan, Inc. – Prime Contractor with experience in disaster cleanup
- Subcontractor, Janod, specializes in Rock Stabilization and Rock Remediation







How are we going to fix this?





Plan for Cleanup

Phase 1

- Remove Rocks in Lower and Middle sections
- Blast large boulders

Phase 2

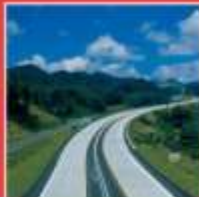
- Removed rocks will be reused to build a ramp for access

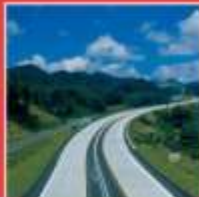


Phase 3

- Stabilize slope by installing over 500 rock anchors

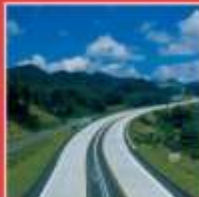








01/07/2010

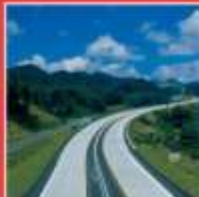


What makes this situation unique?

- Steep mountain on one side
- River on other side
- No access road to top of mountain
- Mostly rocks – not dirt
- Narrow roadway with few wide shoulders
- Requires contractors with specialized skills

12/31/2009







Additional Challenge – Harsh Winter

- Over 25 inches of snow
- Over 17 inches of total precipitation (rain
- Fierce cold, winds make working dangerous
- Some days, equipment is frozen to the ground





Additional Challenge – Additional Rockslide

Additional Sites Identified

- **Second Rockslide on I-40, near original**
- **While the road is closed, experts looked for other potential sites and found 5**
- **Scaling work (chipping rock away) will take place before road opens to traffic**

