

# Muddy Creek Restoration Bridge Project



Presentation to a Joint Hearing of  
the Chatham and Harwich  
Conservation Commissions  
April 9, 2015

With Support From:





39

Church St

Christopher Way

Washburn Way

Blue Heron Landing  
Osprey Ln

Route 28

Williamsburg Ave  
Fredericksburg Ave

Bay Rd

Orleans Rd

Bay Rd

Arbutus Trail

Bee Ln

Church St

Monomoyic Way

Continental Dr

Riverview Dr

Noreast Dr

Potomamecol Rd

Locust Grove Rd  
Nickerson Rd  
Sugar Hill Dr

Monomessary Way

Cemetery Rd

Deer Meadow Ln

Church St  
Harden Ln

Round Cove Rd

Chipping Stone Rd

Lakeview Ave

Joshua Jethro Rd

Trout Pond Ln

North Rd

Chickadee Ln

Duck Marsh Ln

Sachemias Way

Valley Rd

Countryside Dr

Riverview Dr

Park Ave

Training Field Rd

Old Queen Anne Rd

Wading Place Path

Deer Meadow Ln

Old Comers Rd

500 feet

Captain Kendrick Dr

# Existing Conditions

- ❖ Restricted tidal flushing
- ❖ Poor water quality
  - Total Nitrogen TMDL
  - Bacterial TMDL
- ❖ Wetlands impacts
  - Loss of marine wetlands
  - Introduction of invasive species
- ❖ Shellfish Closures
- ❖ Limitations on fish passage
- ❖ Limited public water access



# Restoration Assessment

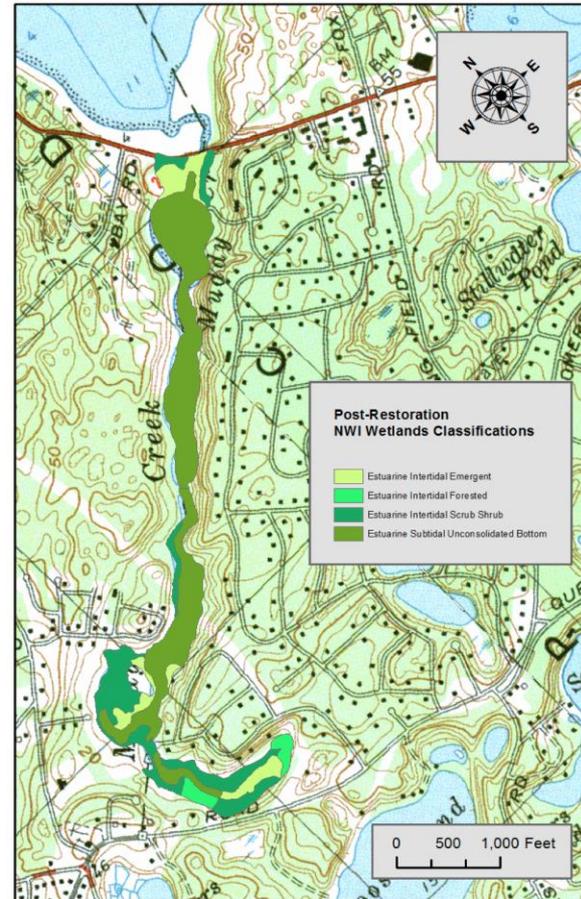
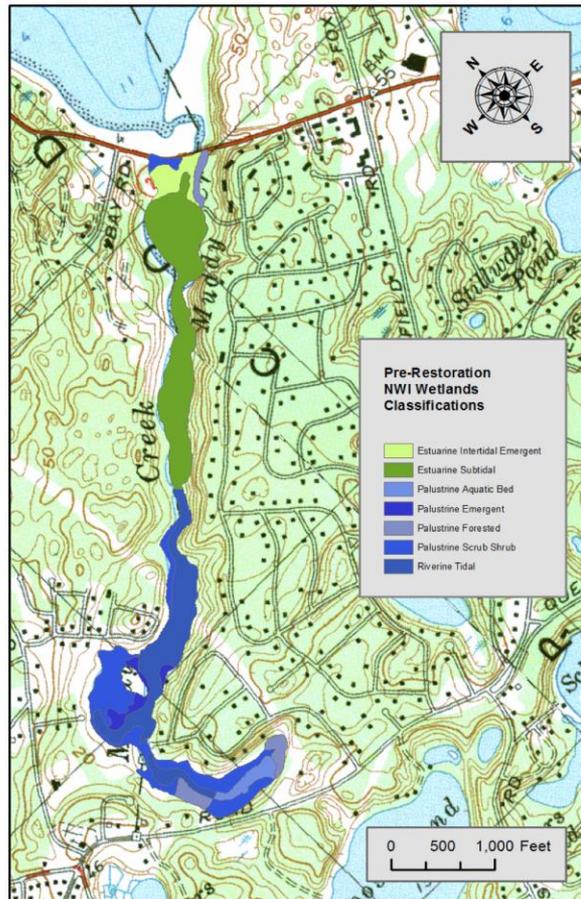
- ❖ Alternatives – Chatham MEP (2003)
- ❖ Priority Project – MassDER Wetland Restoration Program (2008)
- ❖ Hydrodynamic model → optimal opening (2009)
- ❖ Water Quality & Resource Assessments Confirmed Benefits (2010–2012)
- ❖ Design alternatives → single span bridge (2012)
- ❖ Design and permitting (2013–present)

# Restoration Benefits – Wetlands

- ❖ 56 acres of wetlands restored
- ❖ Long-Term Restoration Benefits
  - Increased Salinity and Tidal Range
  - Reduction of Invasive Stands – Improved Biodiversity
  - Expansion of Tidal Mud Flats and Low Marsh Communities
  - New and Expanded Brackish & High Marsh Communities
  - Improved Habitat for several High Priority Species/Populations of migratory waterfowl & other migratory species.



# Pre- and Post Wetlands



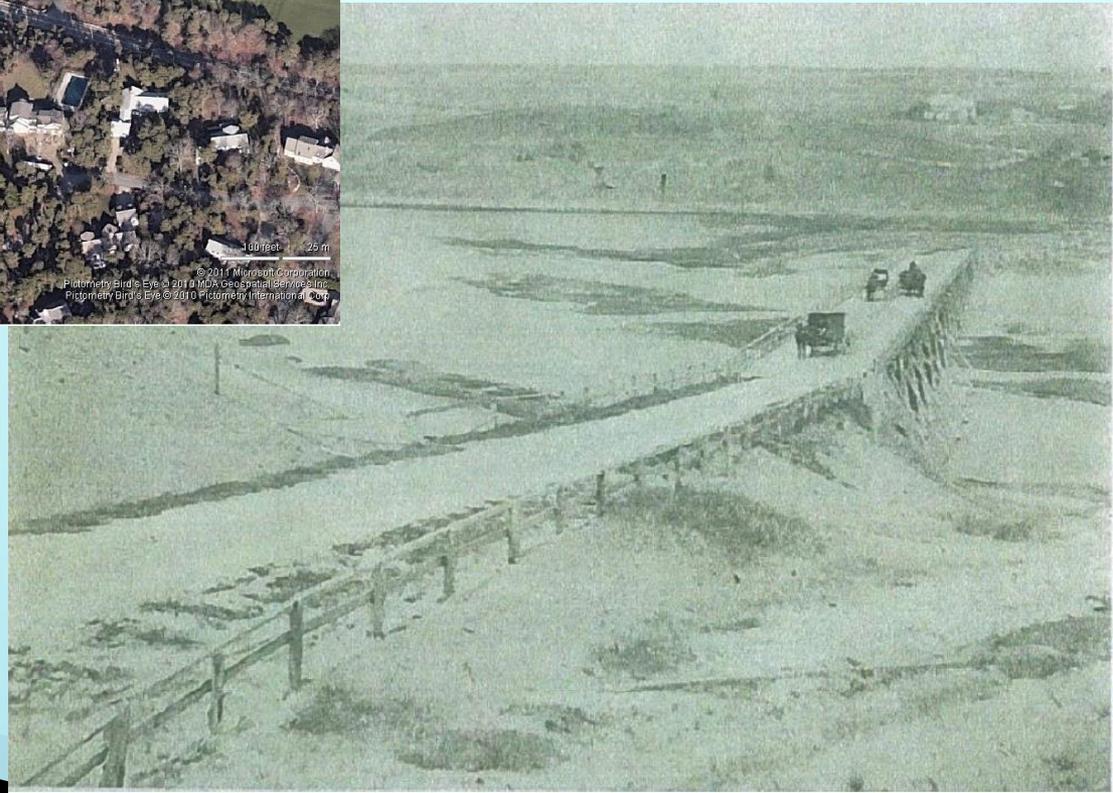
# Restoration Benefits – Fish/Shellfish

## ❖ Long-Term Restoration Benefits

- Larger Channel Opening Will Improve Fish Passage Opportunities for American eel, Alewife, White Perch, Frost Fish and Blue Crab.
- Increased Tidal Exchange Will Improve Water and Habitat Quality
- Improved Shellfish habitat (formerly a robust habitat for quahog (*Mercenaria mercenaria*);

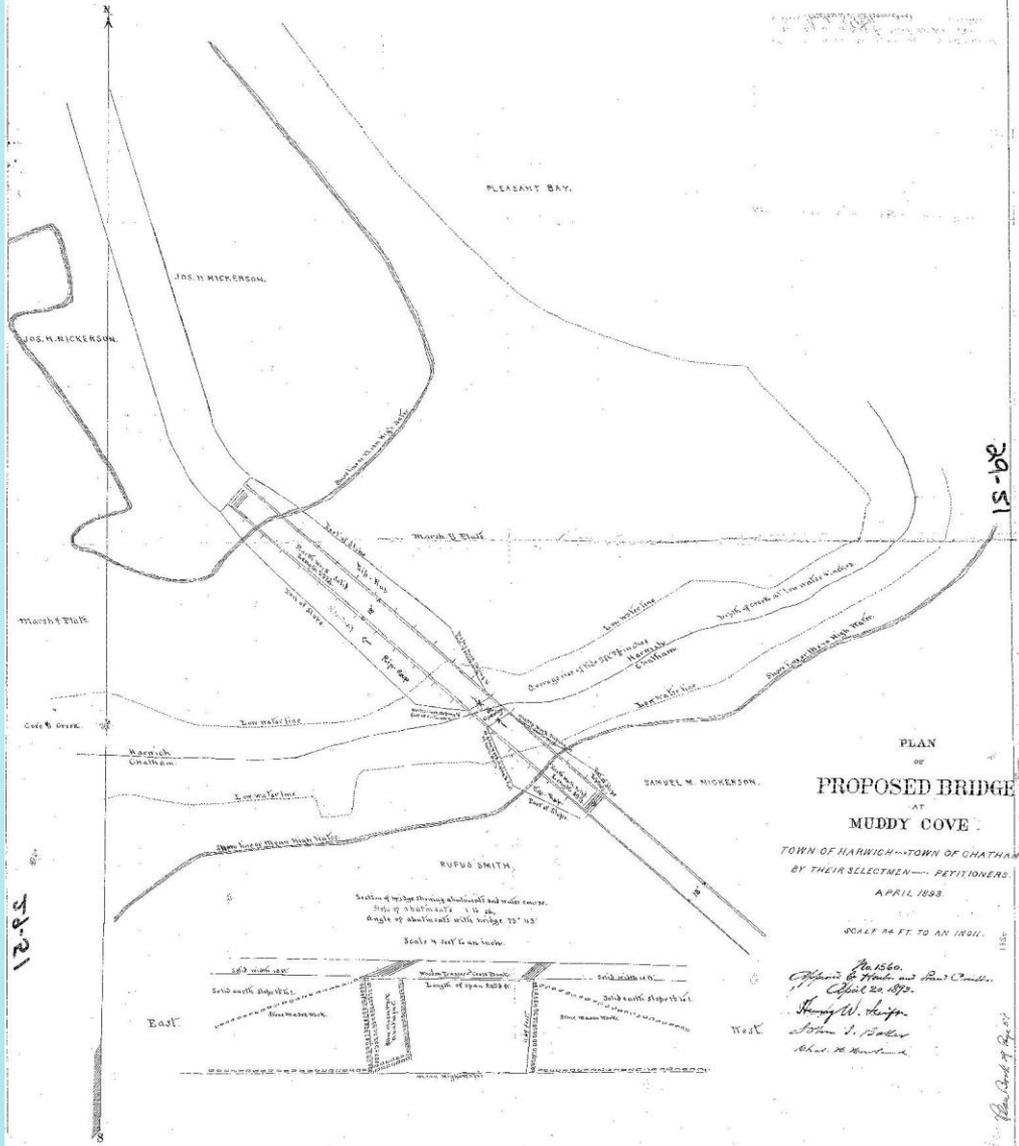


# Project Design



12-21

29-51



PLAN  
OF  
**PROPOSED BRIDGE**  
AT  
**MUDDY COVE**

TOWN OF HARRICH--TOWN OF CHATHAM  
BY THEIR SELECTMEN--PETITIONERS  
APRIL 1893.

SCALE 1/4" = 10' TO AN INCH.

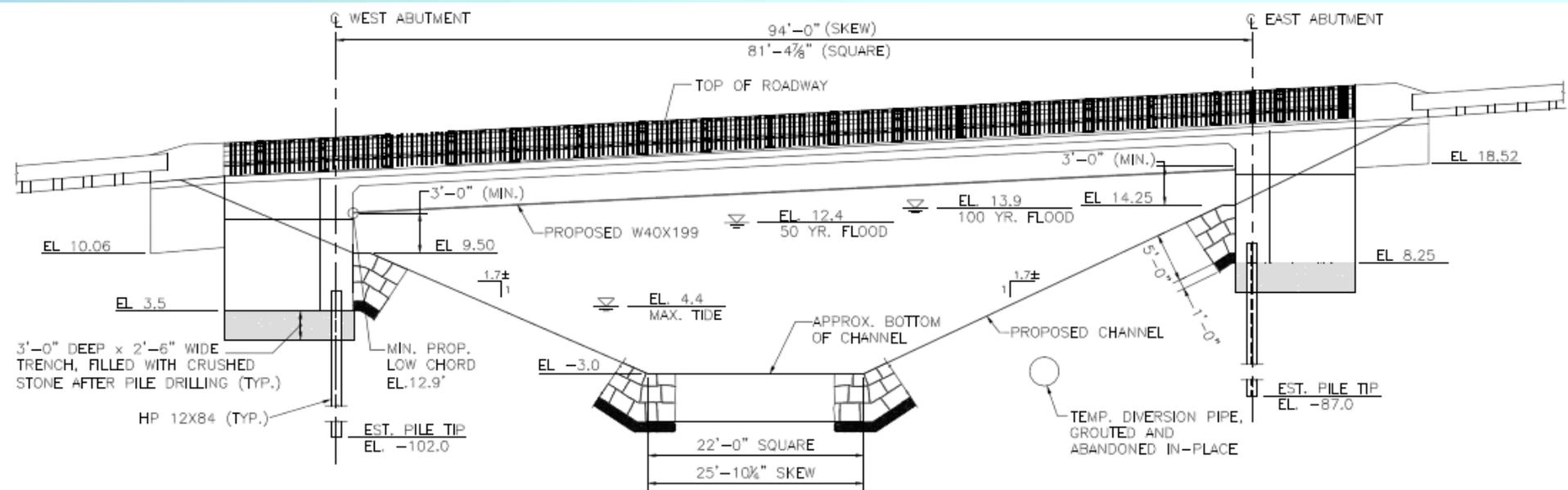
No. 1560.  
Approved by Selectmen and Pet. Comtee.  
April 20 1893.  
Thos. W. Hooper  
John S. Butler  
Chas. M. Bond

15-62

12-21

29-51

# PROPOSED BRIDGE STRUCTURE



SOUTH ELEVATION VIEW - CREEK SIDE

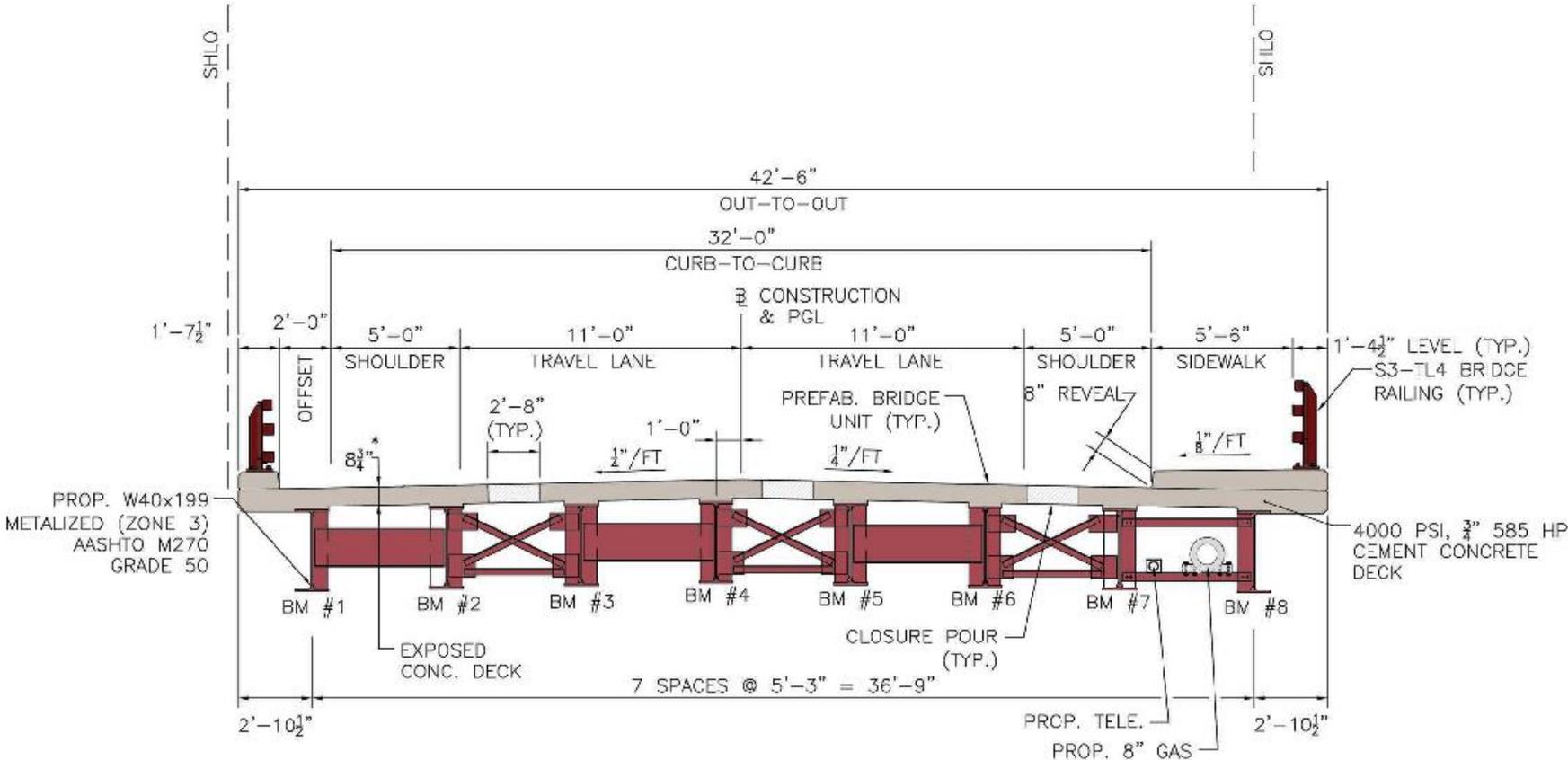
# NORTH ELEVATION VIEW – PLEASANT BAY SIDE



# SOUTH ELEVATION VIEW – CREEK SIDE



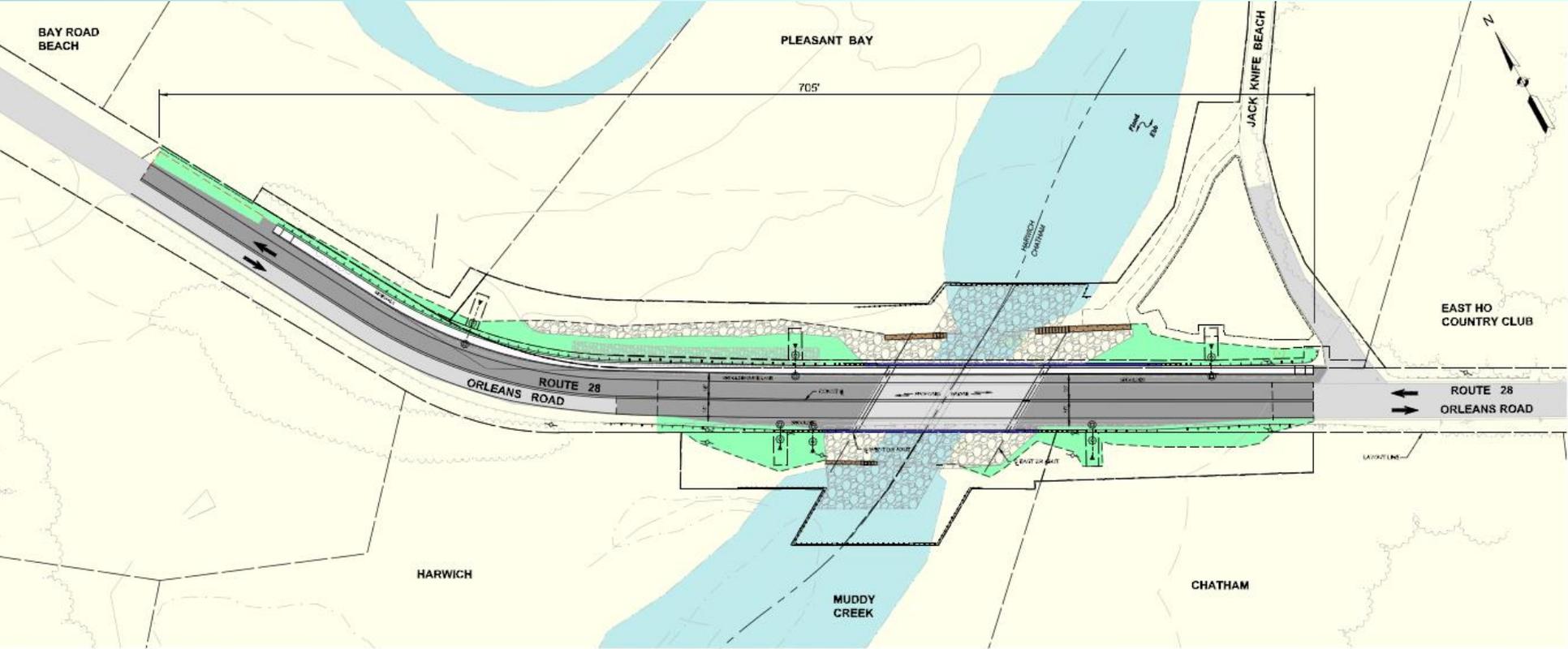
# PROPOSED BRIDGE CROSS SECTION



**BRIDGE CROSS SECTION**

SCALE: 1/4" = 1'-0"

# PROPOSED WORK



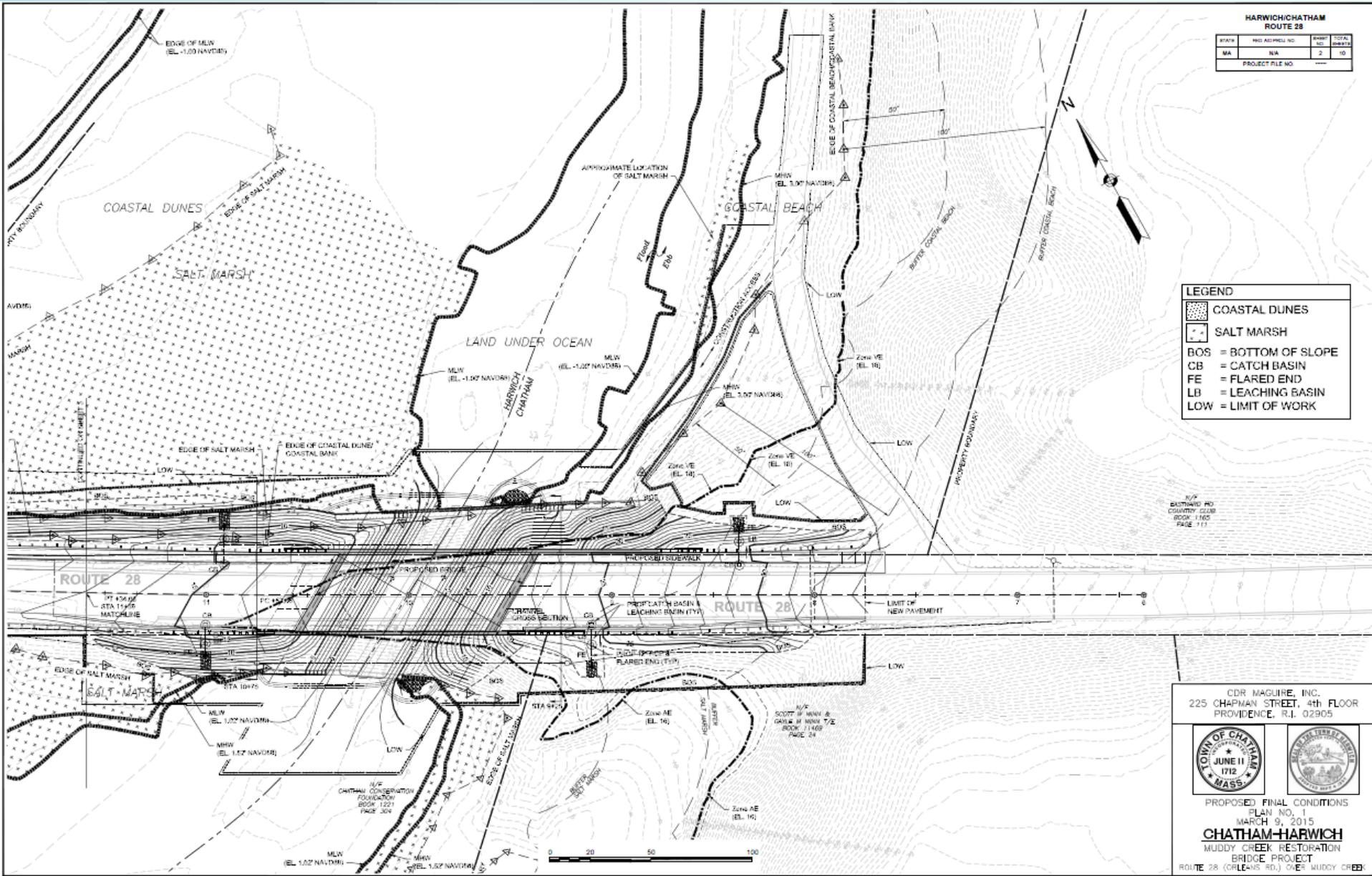
**MUDDY CREEK RESTORATION BRIDGE PROJECT  
ROUTE 28 OVER MUDDY CREEK**

# Natural Resource Impacts within the Limit of Work

| IMPACTS WITHIN LIMIT OF WORK  |            |                   |                   |
|---|------------|-------------------|-------------------|
| RESOURCE AREA   | TOTAL AREA | TEMPORARY IMPACTS | PERMANENT IMPACTS |
| Coastal Beach   | 4,500 sf   | 4,500 sf          | NA                |
| Coastal Dune  | 4,600 sf   | 1,600 sf          | 3,000 sf loss     |
| Salt Marsh  | 5,400 sf   | 3,500 sf          | 1,900 sf loss     |
| Coastal Bank  | 800 lf     | 700 lf            | 100 lf loss       |
| Land Subject to Coastal Storm Flowage   | 60,000 sf  | 60,000 sf         | NA                |
| <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Permanent impacts do not include the temporary impacts incurred during construction identified in the previous columns.</li> <li>2. sf = square feet.</li> <li>3. lf = linear feet.</li> <li>4. NA = not applicable.</li> </ol> |            |                   |                   |

Source: Supplemental NOI Dated 3-25-2015 – Table 2: Current Natural Resource Area Impacts

# Proposed Final Conditions Plan - View 1



**HARWICH/CHATHAM  
ROUTE 28**

| STATE                  | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|------------------------|--------------------|-----------|--------------|
| MA                     | NA                 | 2         | 10           |
| PROJECT FILE NO. _____ |                    |           |              |

**LEGEND**

- COASTAL DUNES
- SALT MARSH
- BOS = BOTTOM OF SLOPE
- CB = CATCH BASIN
- FE = FLARED END
- LB = LEACHING BASIN
- LOW = LIMIT OF WORK

N/P  
BUTNARD RD.  
COUNTY CROSS  
BOOK 1165  
PAGE 111

N/P  
SCOTT ST. HWY. &  
DASH ST. HWY. T/E  
BOOK 1165  
PAGE 24

N/P  
CHATHAM CONSERVATION  
FOUNDATION  
BOOK 1201  
PAGE 304

CDR MACGUIRE, INC.  
225 CHAPMAN STREET, 4th FLOOR  
PROVIDENCE, R.I. 02905

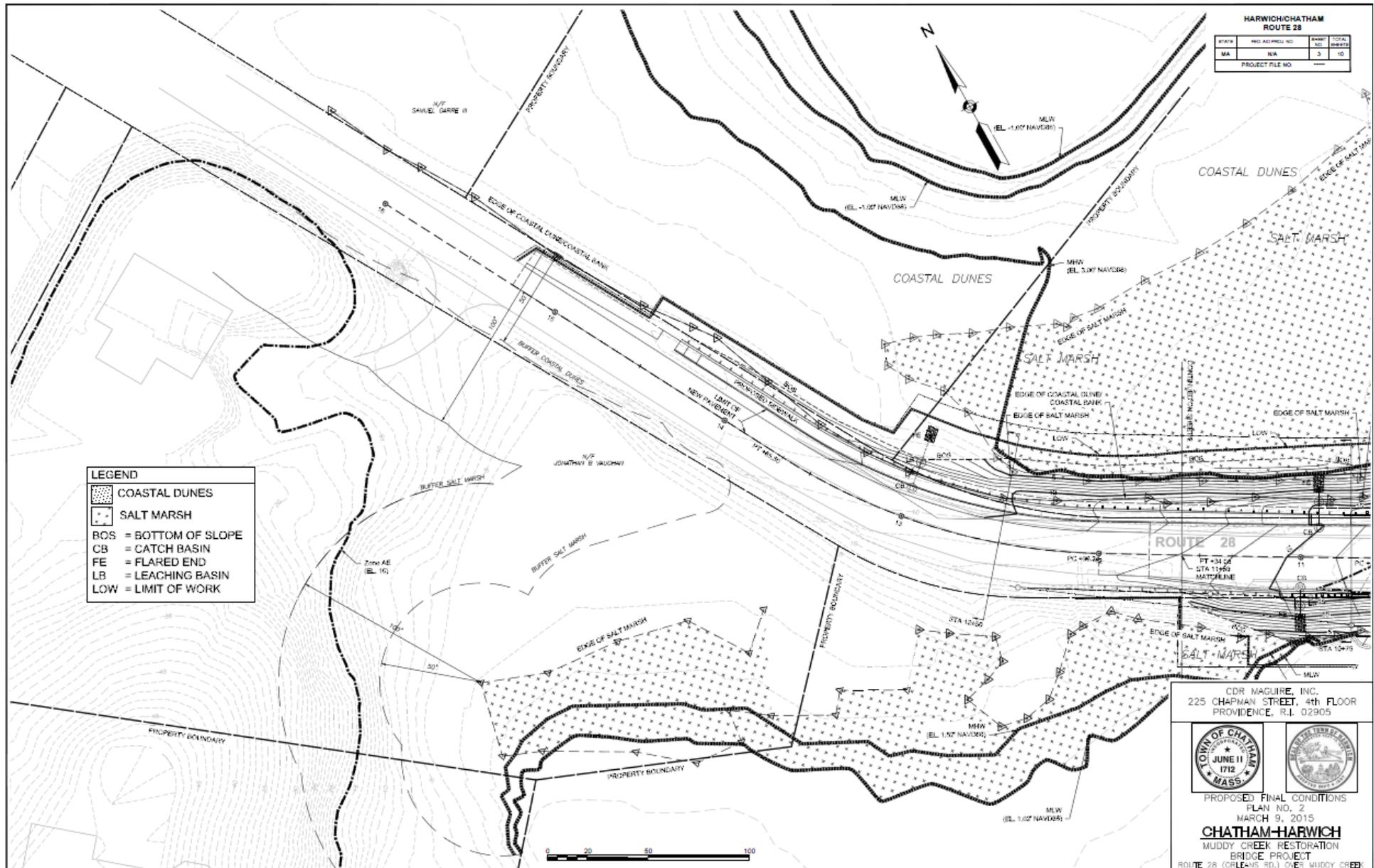


PROPOSED FINAL CONDITIONS  
PLAN NO. 1  
MARCH 9, 2015

**CHATHAM-HARWICH**  
MUDDY CREEK RESTORATION  
BRIDGE PROJECT  
ROUTE 28 (GLEANS RD.) OVER MUDDY CREEK



# Proposed Final Conditions Plan - View 2



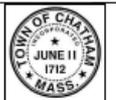
**HARWICH/CHATHAM  
ROUTE 28**

| DATE                   | ISSUE DESCRIPTION | BY | TOTAL SHEETS |
|------------------------|-------------------|----|--------------|
| MA                     | N/A               | 3  | 10           |
| PROJECT FILE NO. _____ |                   |    |              |

**LEGEND**

|  |                       |
|--|-----------------------|
|  | COASTAL DUNES         |
|  | SALT MARSH            |
|  | BOS = BOTTOM OF SLOPE |
|  | CB = CATCH BASIN      |
|  | FE = FLARED END       |
|  | LB = LEACHING BASIN   |
|  | LOW = LIMIT OF WORK   |

CDR MAGUIRE, INC.  
225 CHAPMAN STREET, 4TH FLOOR  
PROVIDENCE, R.I. 02905



PROPOSED FINAL CONDITIONS  
PLAN NO. 2  
MARCH 9, 2015  
**CHATHAM-HARWICH**  
MUDDY CREEK RESTORATION  
BRIDGE PROJECT  
ROUTE 28 (GREENS RD.) OVER MUDDY CREEK

# Rip Rap plan - View 1

HARWICH/CHATHAM  
ROUTE 28

| STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
|-------|--------------------|-----------|--------------|
| MA    | NSA                | 1         | 1            |

PROJECT FILE NO. \_\_\_\_\_

**LEGEND**

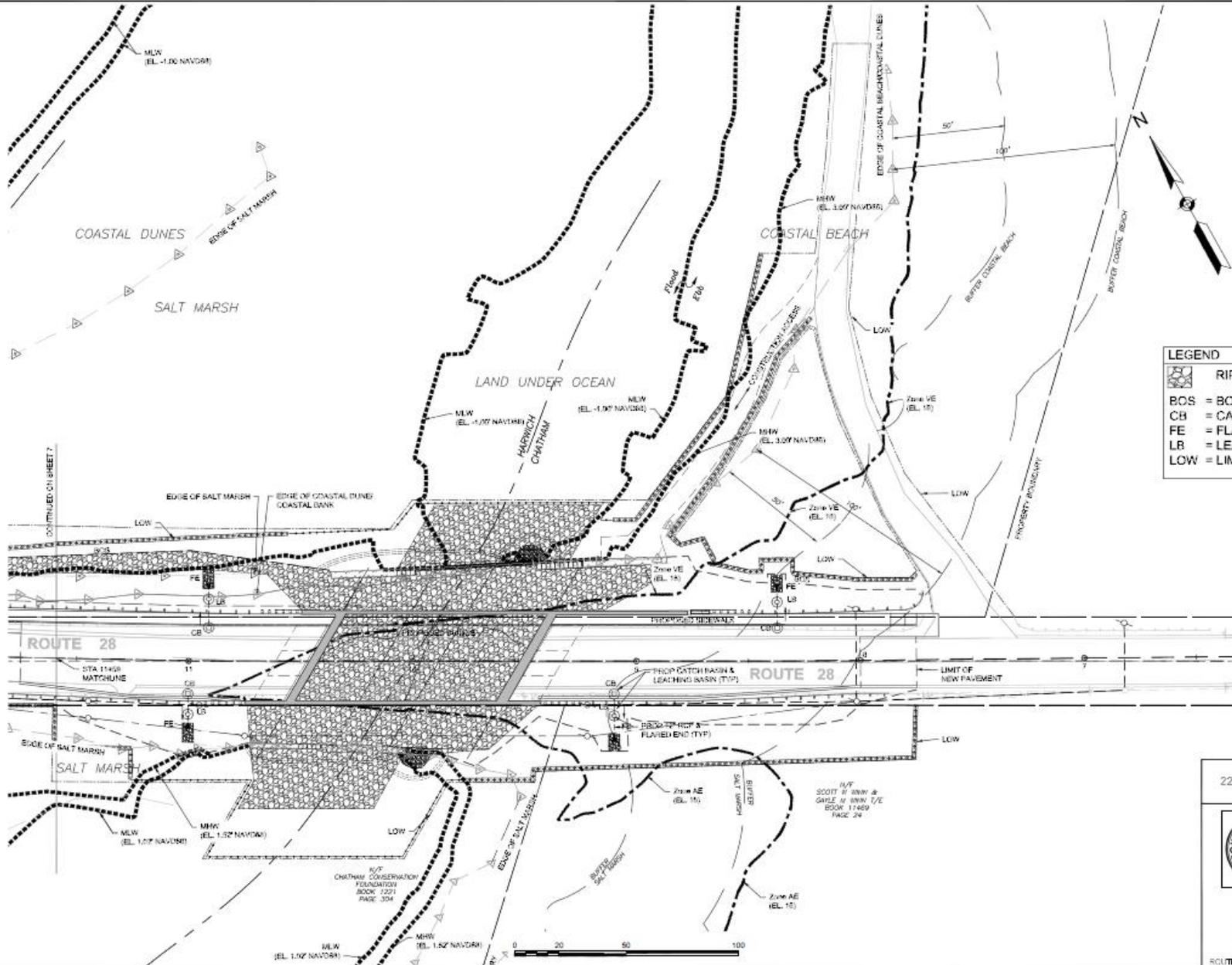
-  RIP RAP
- BOS = BOTTOM OF SLOPE
- CB = CATCH BASIN
- FE = FLARED END
- LB = LEACHING BASIN
- LOW = LIMIT OF WORK

N/E  
EASTMAN &  
COUNTRY CLUB  
BOOK 1783  
PAGE 111

CDR MAGUIRE, INC.  
225 CHAPMAN STREET, 4TH FLOOR  
PROVIDENCE, R.I. 02905



RIPRAP SKETCH PLAN 1  
FEBRUARY 20, 2015  
**CHATHAM-HARWICH**  
MUDDY CREEK RESTORATION  
BRIDGE PROJECT  
ROUTE 28 (ORLEANS RD.) OVER MUDDY CREEK

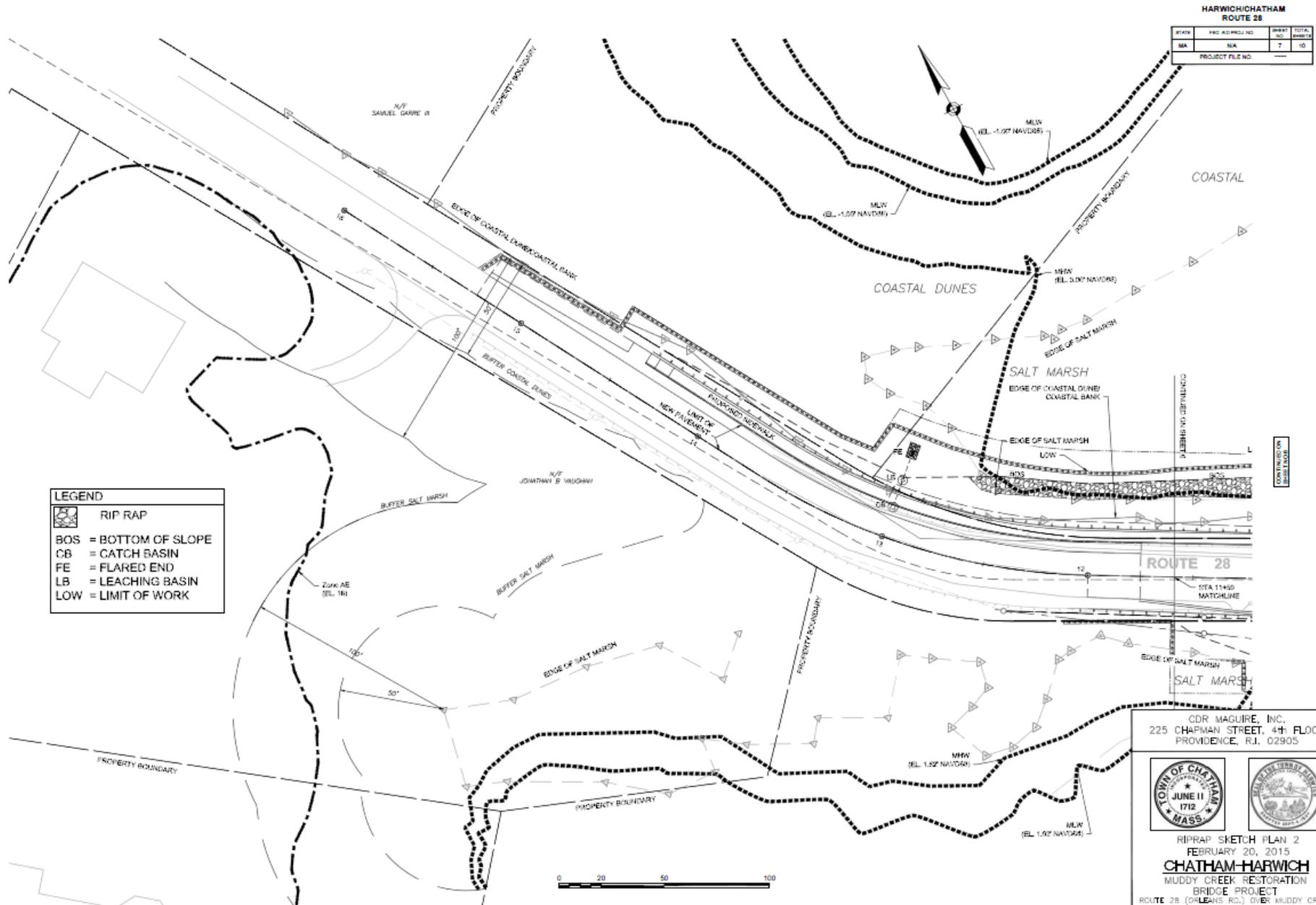


N/E  
SCOTT & BROWN &  
GABLE N/B/W N/E  
BOOK 17489  
PAGE 24

N/E  
CHATHAM CONSERVATION  
FOUNDATION  
BOOK 1221  
PAGE 304

CONTINUED ON SHEET 7

# Rip Rap plan - View 2



# Performance Standards – Land Under Ocean

## ▶ WPA

- Temporary impacts mitigated by BMPs: compost filter tubes, turbidity curtains
- No loss of LUO
- Finfish, shellfish, avian habitat improved

## ▶ Chatham

- No alteration to bottom topography to reduce storm damage prevention
- Water circulation, quality will improve
- NHESP No Take Determination

# Performance Standards – Coastal Dunes

## ▶ WPA

- No alteration to prevent removal of sand via waves
- No increase in storm damage, loss of lateral movement
- No known bird nesting sites disturbed
- Minimize disturbance to vegetative cover
- Sidewalk embankment (turf mat and vegetated cover)
- Finfish, shellfish, avian habitat improved
- NHESP No Take Determination

## ▶ Chatham

- Draw down from storm surge will increase, limiting storm damage

# Performance Standards – Coastal Beach

## ▶ WPA

- Channel will have scour protection to prevent erosion of coastal beach
- Finfish, shellfish, avian habitat improved
- NHESP No Take Determination
- No known bird nesting sites disturbed

## ▶ Chatham

- No permanent impacts to coastal beach

# Performance Standards– Coastal Bank

## ▶ WPA

- Not expected to alter stability of coastal bank (vertical buffer)
- Finfish, shellfish, avian habitat improved
- No known bird nesting sites disturbed

## ▶ Chatham

- NHESP No Take Determination

## ▶ Harwich

- Project does not diminish coastal bank's ability to prevent storm damage

# Performance Standards – Salt Marsh

## ▶ WPA

- Existing 2.7 acres will benefit from improved tidal exchange
- Restoration expected to increase salt marsh resource (<16.6 acres or  $\pm 64,000$  sf)
- Permanent loss of 1,900 sf
- Salt Marsh disturbed during Construction replanted with 2” plugs

# Performance Standards – Land Cont. Shellfish

## ▶ WPA

- Temporary construction impacts in the footprint of the project
- Post project land containing shellfish will be enhanced due to improved water quality and Salt Marsh/wetlands health
- Potential restoration of shellfish habitat inside Muddy Creek

## ▶ Chatham

- Project expected to increase productivity of land containing shellfish

# Performance Standards – Land Under Fish Runs

- ▶ Land Under Fish Runs
  - Temporary bypass pipe will maintain tidal flow
  - In-water activities will observe TOY restrictions
  - Larger opening and improved habitat for anadromous and catadromous fish

# Performance Standards

- ▶ Measures to Protect Buffer Zones
  - Appropriate erosion and sedimentation controls
  - Construction staging on road bed
  - Vegetated areas disturbed during construction will be restored
  - Town variance criteria met for work in buffer zones

# Exemptions and Variances

- ▶ Limited Project Status (310 CMR 10.24)
  - Allows project to be permitted when performance standards are not met
    - Maintenance and improvement of existing roadways
    - Routine maintenance and repair of road structures including culverts,...
- ▶ Project Meets Criteria for Variance for Work in No Disturb Zone for Chatham (4.01(3)(d)) and Harwich (310-4(d)) bylaws

# Questions