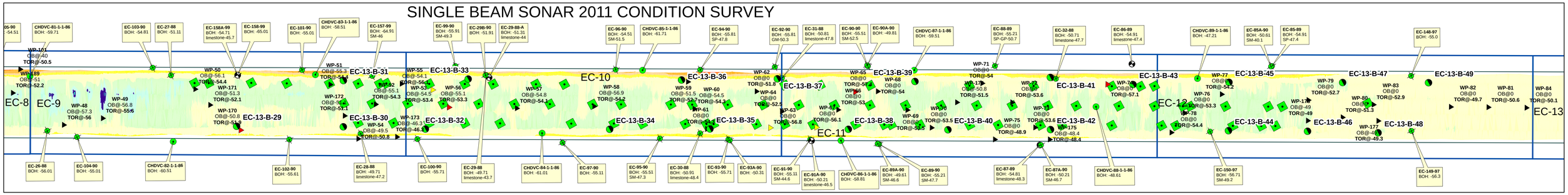
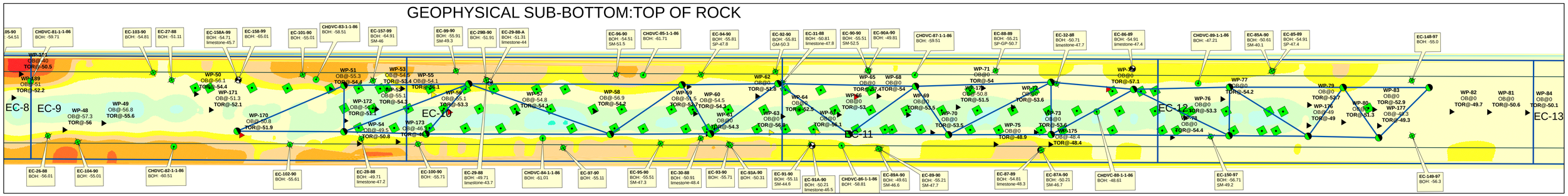
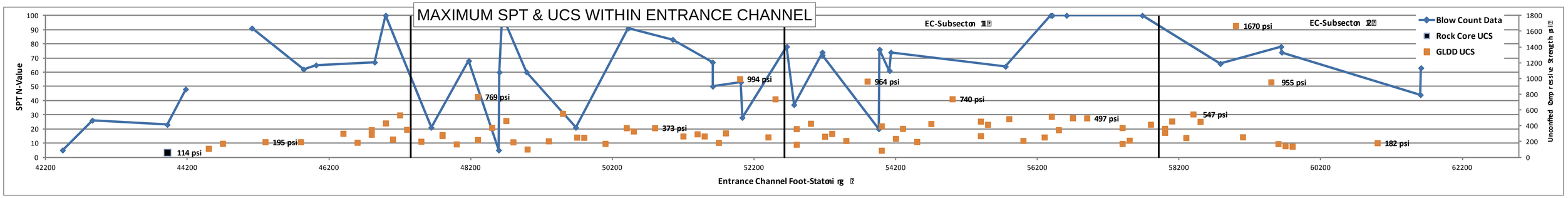
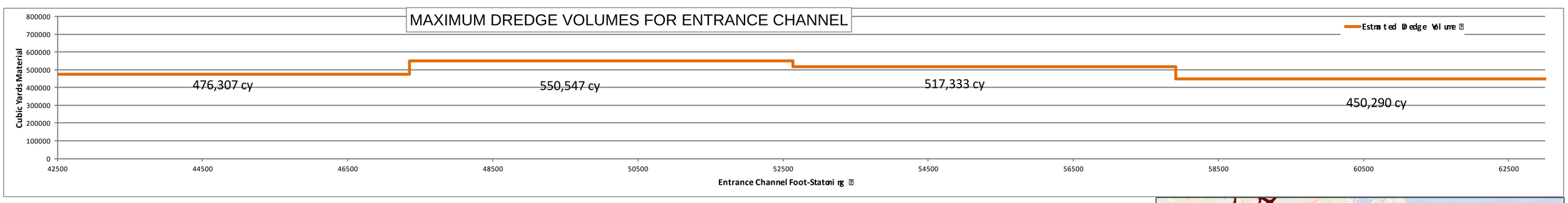








Entrance Channel Rock Core Targeting Overlay

- Priorited Rock Core TGT
- Rock core correlation

Athena 2013 Washprobes

Description

- Refusal within Dredge Prism
- Below -56 MLLW
- No Refusal Encounted
- Poss Rock Encounterd
- Video

NOAA Rock Pinnicles

- Diver Verified 1998

Borings 1986-1999

Boring Type

- Unknown
- SPT
- Rock Core
- Vibracore

Great Lakes Rock Sample

- Scow Grab Sample

OB = Ocean Bottom
TOR = Top of Refusal
BOH = Bottom of Hole (Borings)
UCS = Unconfined Compressive Strength (Rock)

2011 Condition Survey

Bathymetry (MLLW)

25.2 - 30
30 - 34
34 - 38
38 - 40
40 - 44
44 - 46
46 - 48
48 - 52
52 - 54
54 - 56
56 - 58
58 - 60
60 - 65
65 - 70
70 - 75

Geophysical TOR Survey

Elevation (MLLW)

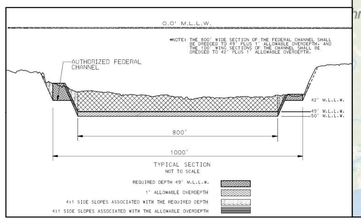
-38 - -34
-40 - -38
-44 - -40
-46 - -44
-48 - -46
-52 - -48
-54 - -52
-56 - -54
-58 - -56
-60 - -58
-65 - -60
-70 - -65
-75 - -70
-77 - -75

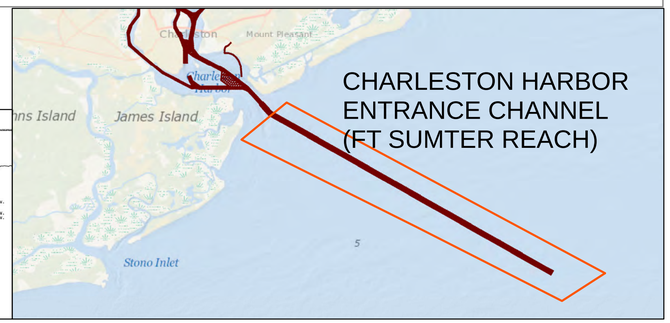
PLATE 8: CHARLESTON HARBOR ENTRANCE CHANNEL COMPOSITE ROCK CORE TARGETING OVERLAY- HISTORICAL BORINGS, WASHPROBES, GEOPHYSICAL & STRENGTH PARAMETERS FOR EC-9 THRU EC-12

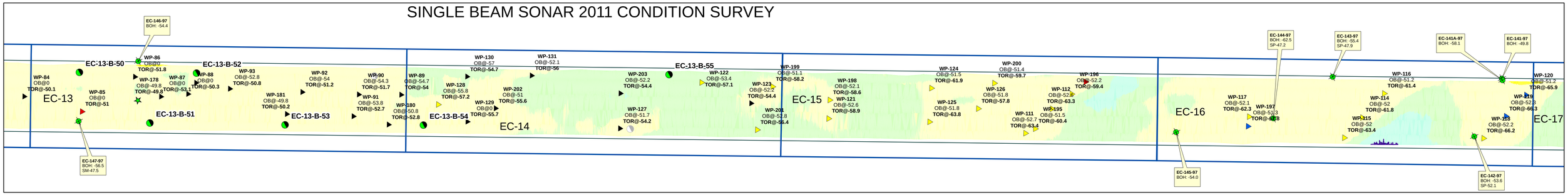
N

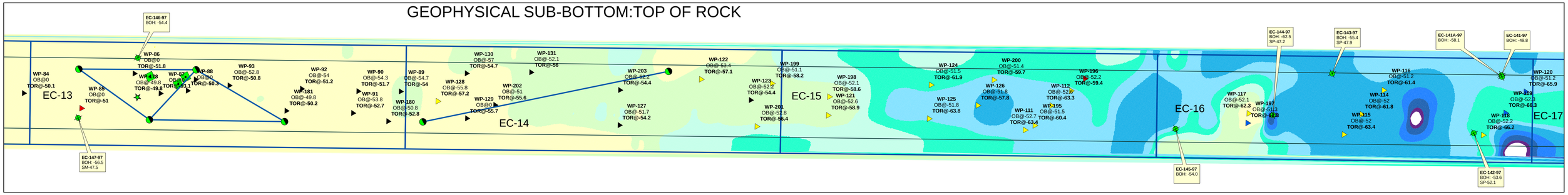
1,000 500 0 1,000 Feet

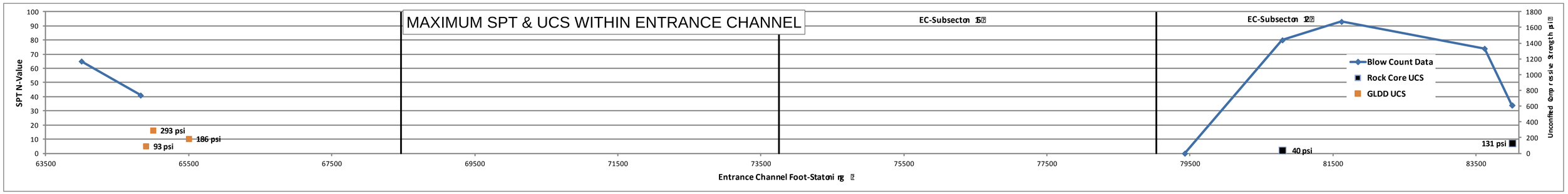
0 0.125 0.25 0.5 0.75 1 Miles

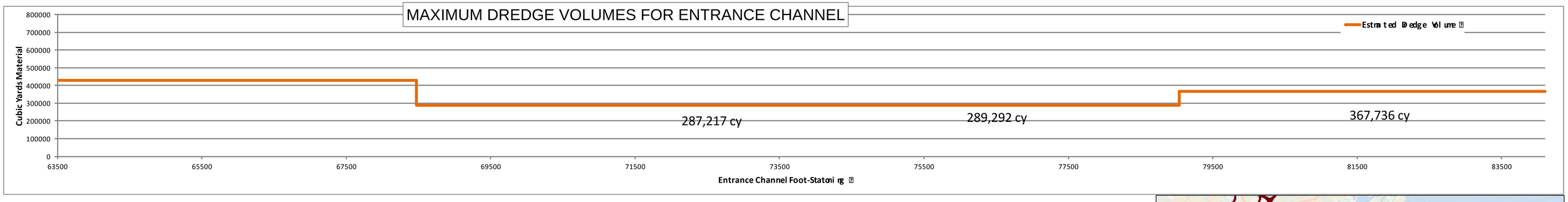












Entrance Channel Rock Core Targeting Overlay

- Prioritized Rock Core TGT
- Rock core correlation

Athena 2013 Washprobes

Description

- Refusal within Dredge Prism
- Below -56 MLLW
- No Refusal Encounted
- Poss Rock Encounterd
- Video

NOAA Rock Pinnicles

- Diver Verified 1998

Borings 1986-1999

Boring Type

- Unknown
- SPT
- Rock Core
- Vibracore

Great Lakes Rock Sample

- Scow Grab Sample

OB = Ocean Bottom
TOR = Top of Refusal
BOH = Bottom of Hole (Borings)
UCS = Unconfined Compressive Strength (Rock)

2011 Condition Survey

Elevation (MLLW)

- 25.2 - 30
- 30 - 34
- 34 - 38
- 38 - 40
- 40 - 44
- 44 - 46
- 46 - 48
- 48 - 52

Geophysical TOR Survey

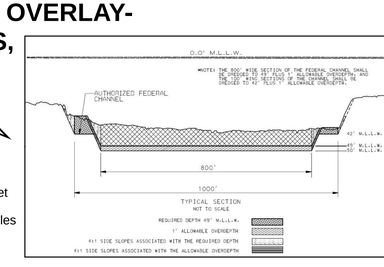
Elevation (MLLW)

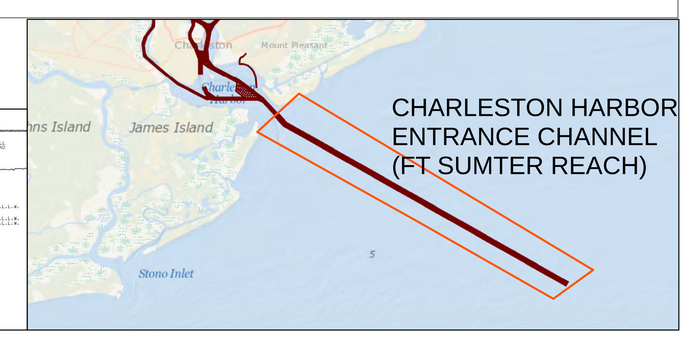
- 52 - 54
- 54 - 56
- 56 - 58
- 58 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- -38 - -34
- -40 - -38
- -44 - -40
- -46 - -44
- -48 - -46
- -52 - -48
- -54 - -52
- -56 - -54
- -58 - -56
- -60 - -58
- -65 - -60
- -70 - -65
- -75 - -70
- -77 - -75

0 500 1,000 2,000 Feet

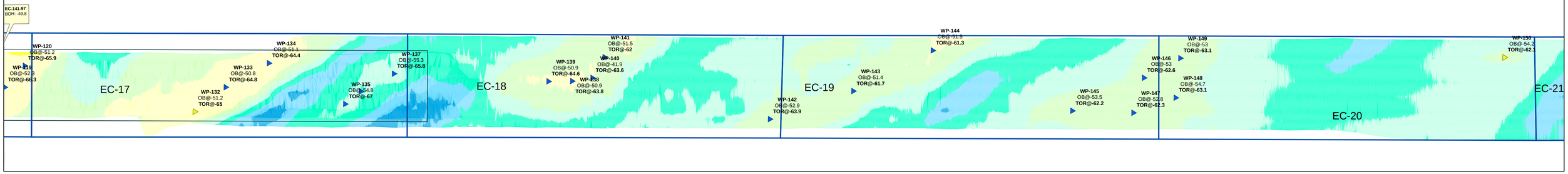
0 0.125 0.25 0.5 0.75 1 Miles

PLATE 9: CHARLESTON HARBOR ENTRANCE CHANNEL COMPOSITE ROCK CORE TARGETING OVERLAY- HISTORICAL BORINGS, WASHPROBES, GEOPHYSICAL & STRENGTH PARAMETERS FOR EC-13 THRU EC-16

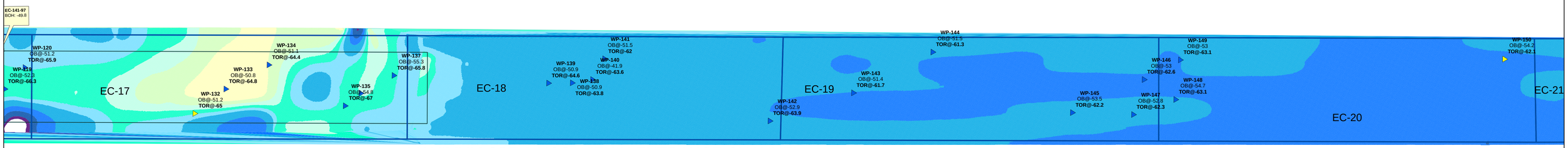




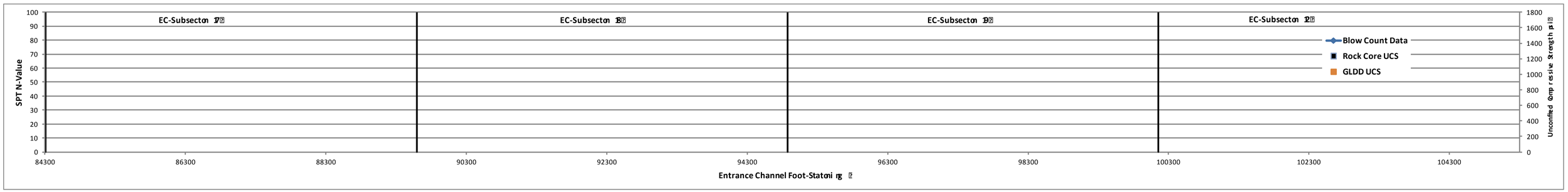
SINGLE BEAM SONAR 2011 CONDITION SURVEY



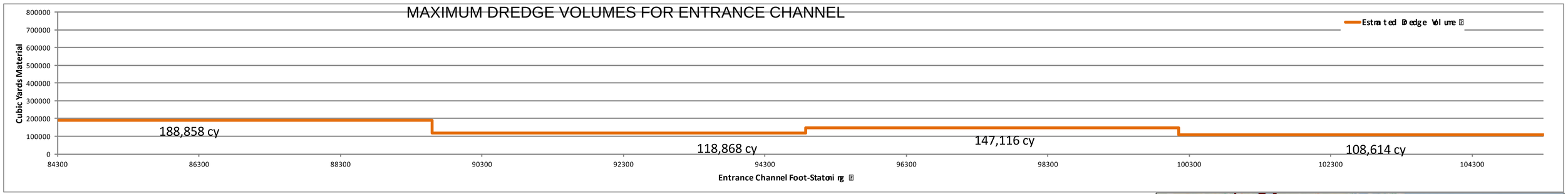
GEOPHYSICAL SUB-BOTTOM:TOP OF ROCK



MAXIMUM SPT & UCS WITHIN ENTRANCE CHANNEL



MAXIMUM DREDGE VOLUMES FOR ENTRANCE CHANNEL



Entrance Channel Rock Core Targeting Overlay

- Priorited Rock Core TGT
- Rock core correlation

Athena 2013 Washprobes Description

- Refusal within Dredge Prism
- Below -56 MLLW
- No Refusal Encounted
- Poss Rock Encounterd
- Video

NOAA Rock Pinnicles

- Diver Verified 1998

Borings 1986-1999 Boring Type

- Unknown
- SPT
- Rock Core
- Vibracore

Great Lakes Rock Sample

- Scow Grab Sample

OB = Ocean Bottom
TOR = Top of Refusal
BOH = Bottom of Hole (Borings)
UCS = Unconfined Compressive Strength (Rock)

2011 Condition Survey Bathymetry (MLLW)

- 25.2 - 30
- 30 - 34
- 34 - 38
- 38 - 40
- 40 - 44
- 44 - 46
- 46 - 48
- 48 - 52
- 52 - 54

Geophysical TOR Survey Elevation (MLLW)

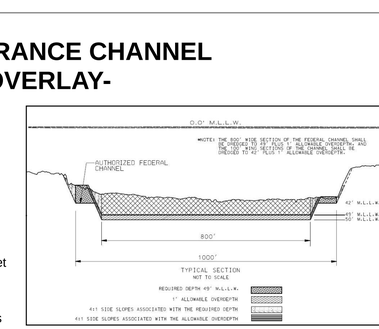
- 54 - 56
- 56 - 58
- 58 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- -38 - -34
- -40 - -38
- -44 - -40
- -46 - -44
- -48 - -46
- -52 - -48
- -54 - -52
- -56 - -54
- -58 - -56
- -60 - -58
- -65 - -60
- -70 - -65
- -75 - -70
- -77 - -75

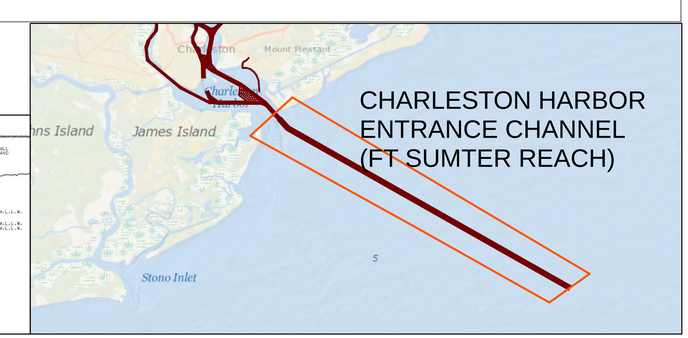
PLATE 10: CHARLESTON HARBOR ENTRANCE CHANNEL COMPOSITE ROCK CORE TARGETING OVERLAY- HISTORICAL BORINGS, WASHPROBES, GEOPHYSICAL & STRENGTH PARAMETERS FOR EC-17 THRU EC-20

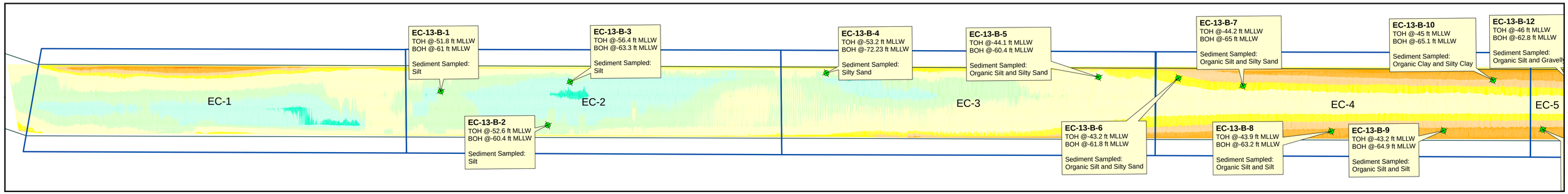
N

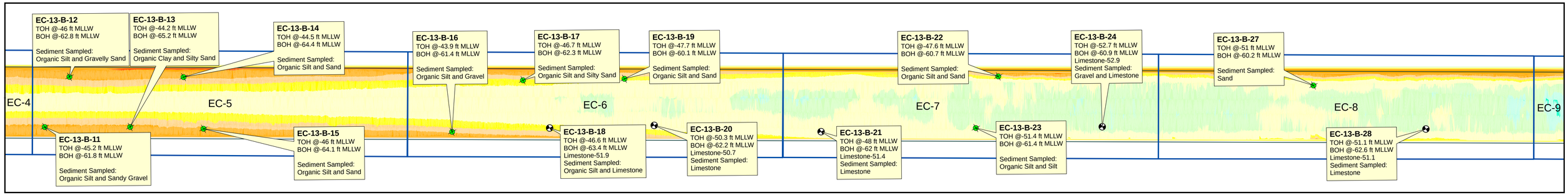
1,000 500 0 1,000 Feet

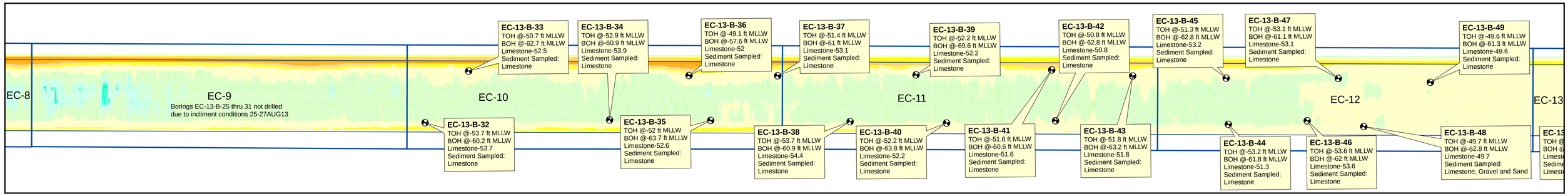
0 0.125 0.25 0.5 0.75 1 Miles

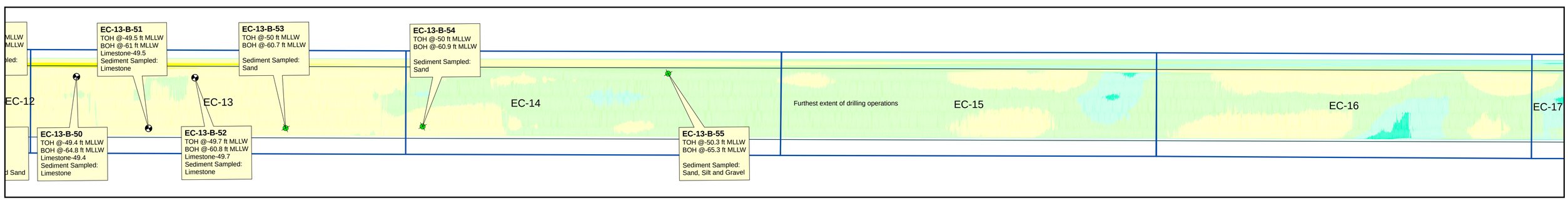












Legend

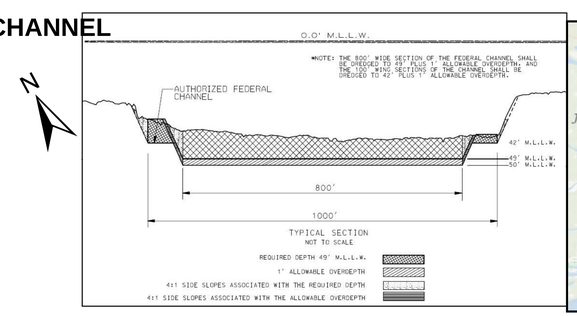
2013 Exploration Boring Type	25JUN13 Condition Survey Bathymetry (MLLW)	
SPT	25.2 - 30	48 - 52
Rock Core	30 - 34	52 - 54
	34 - 38	54 - 56
TOH = Top of Hole	38 - 40	56 - 58
BOH = Bottom of Hole	40 - 44	58 - 60
	44 - 46	60 - 65
	46 - 48	65 - 70
		70 - 75

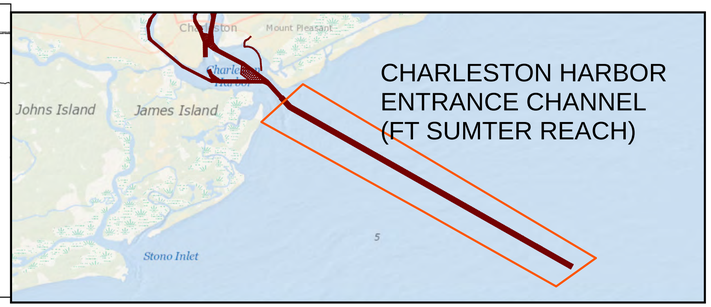
PLATE 11: CHARLESTON HARBOR ENTRANCE CHANNEL 2013 USACE BOREHOLE LOCATION MAP AND DRILLING SUMMARY

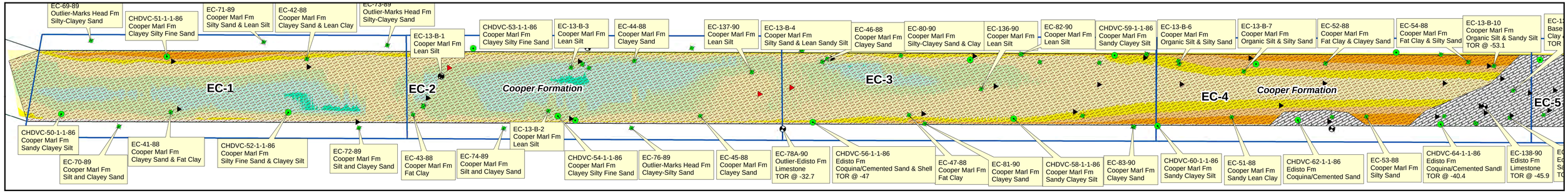
NOTE: BATHYMETRIC SURFACE CONTOURED AND COLOR-CODED BASED UPON SINGLE-BEAM SONAR DATA FROM USACE-SAC CONDITION SURVEY, DATED 25JUN2013.

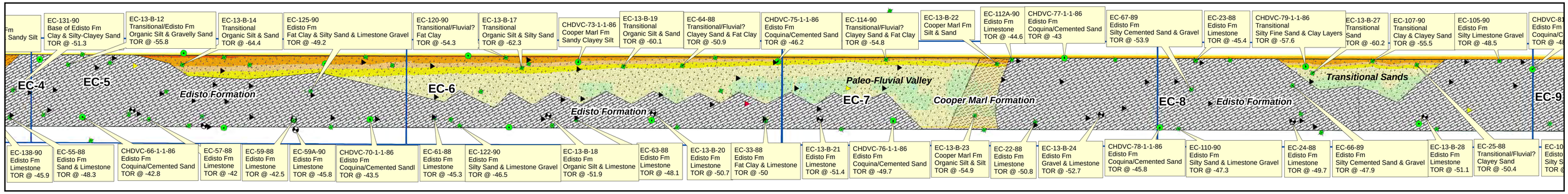
0 500 1,000 2,000 Feet

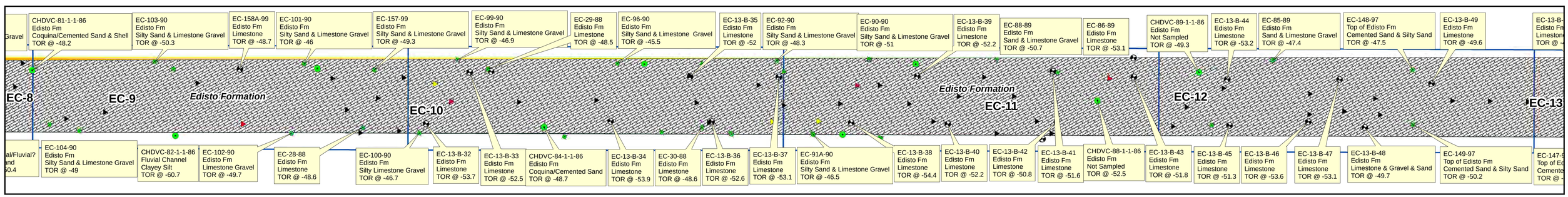
0 0.25 0.5 1 Miles

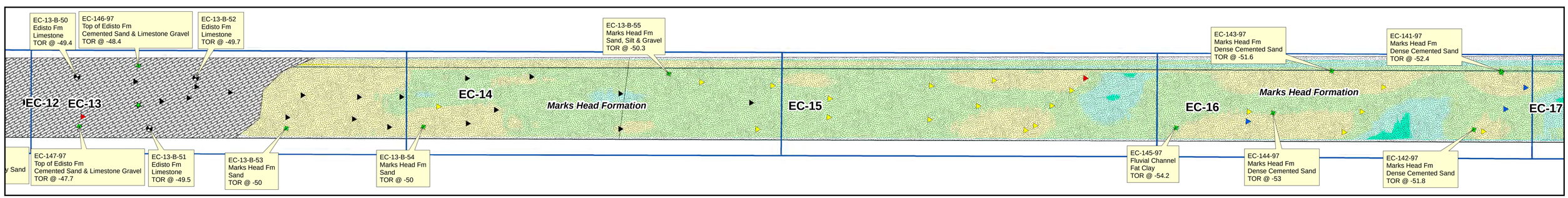












Legend

USACE Borings
- Rock Core
- SPT
- Vibracore

Athena 2013 Washprobes

Description
- Refusal within Dredge Prism
- Below -56 MLLW
- No Refusal Encounted
- Poss Rock Encounterd
- Video

Stratigraphy
- Marks Head Formation
- Edisto Formation
- Transitional Sands
- Cooper Formation

25JUN13 Condition Survey Bathymetry (MLLW)
- 25.2 - 30
- 30 - 34
- 34 - 38
- 38 - 40
- 40 - 44
- 44 - 46
- 46 - 48
- 48 - 52
- 52 - 54
- 54 - 56
- 56 - 58
- 58 - 60
- 60 - 65
- 65 - 70
- 70 - 75

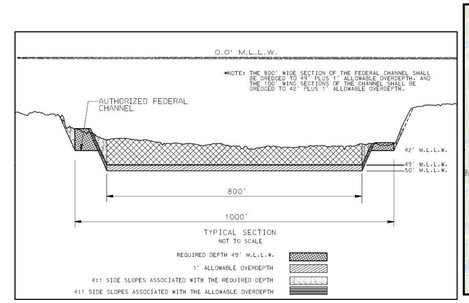
PLATE 12: CHARLESTON HARBOR ENTRANCE CHANNEL GEOLOGIC STRIP MAP AS DELINEATED FROM USACE GEOTECHNICAL BORINGS

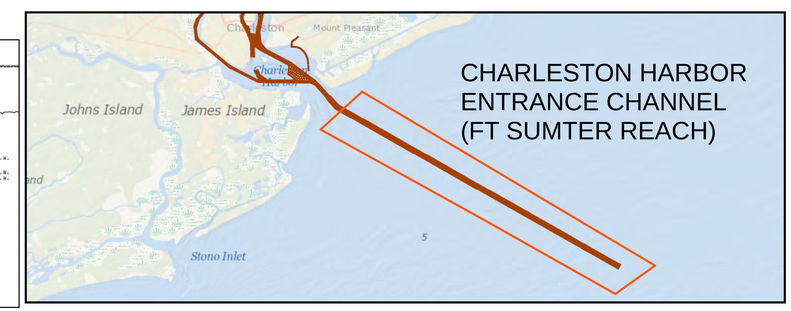
NOTE: BATHYMETRIC SURFACE CONTOURED AND COLOR-CODED BASED UPON SINGLE-BEAM SONAR DATA FROM USACE-SAC CONDITION SURVEY, DATED 25JUN2013.

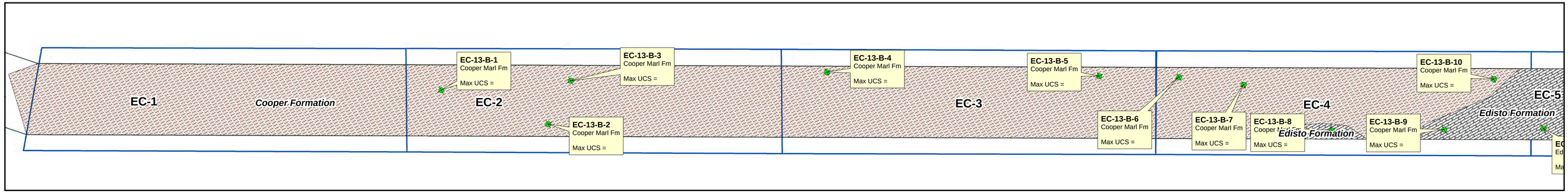
N

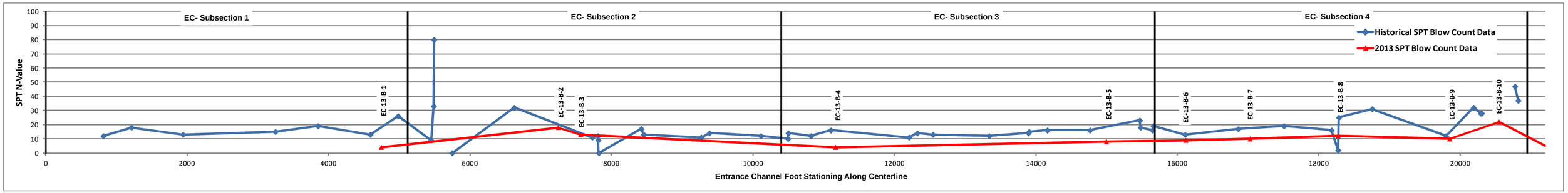
0 500 1,000 2,000 Feet

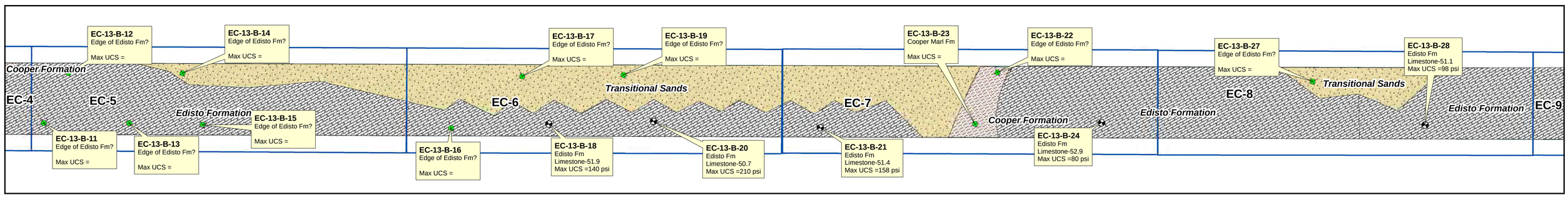
0 0.25 0.5 1 Miles

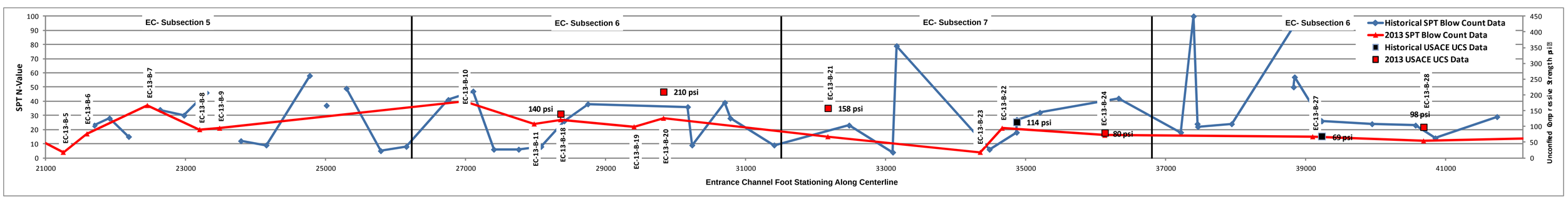












Legend

2013 Exploration Boring Type

- SPT
- Rock Core

Stratigraphy

- Marks Head Formation
- Edisto Formation
- Transitional Sands
- Cooper Formation

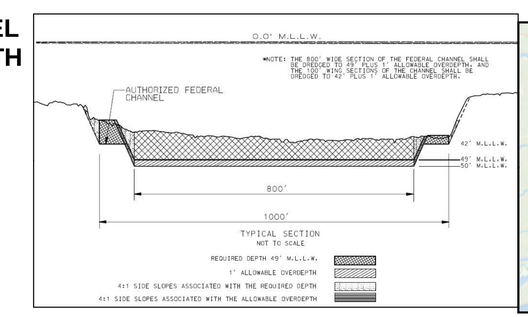
PLATE 14: CHARLESTON HARBOR ENTRANCE CHANNEL SPT N-VALUE & UNCONFINED COMPRESSIVE STRENGTH OF GEOLOGIC STRATA WITHIN SEGMENTS EC-1 THRU EC-8

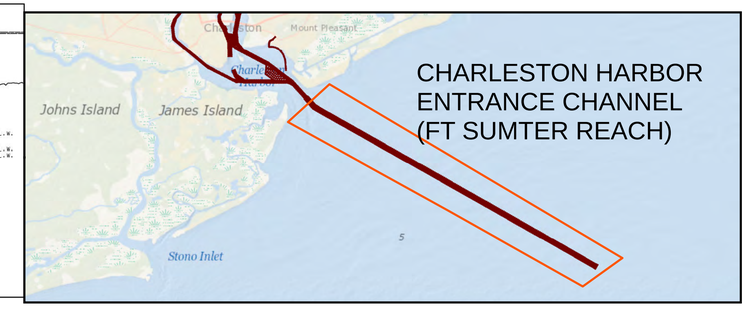
NOTE: BATHYMETRIC SURFACE CONTOURED AND COLOR-CODED BASED UPON SINGLE-BEAM SONAR DATA FROM USACE-SAC CONDITION SURVEY, DATED 25JUN2013.

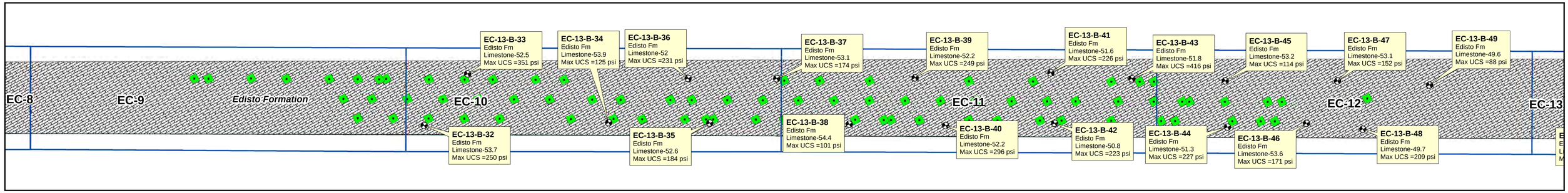
N

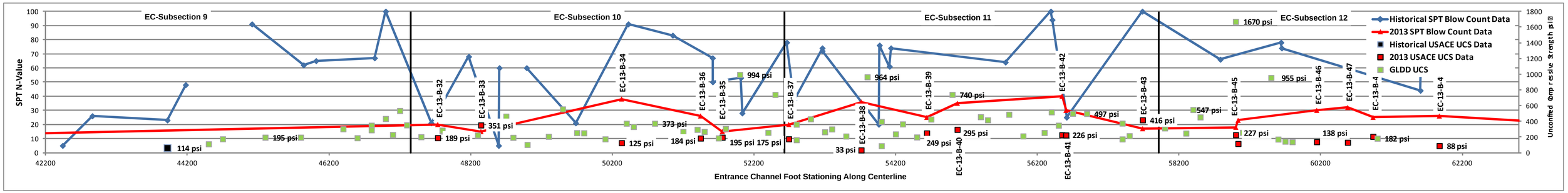
0 500 1,000 2,000 Feet

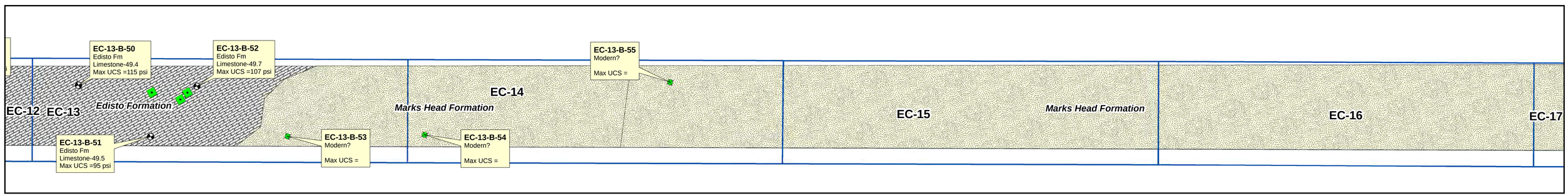
0 0.25 0.5 1 Miles

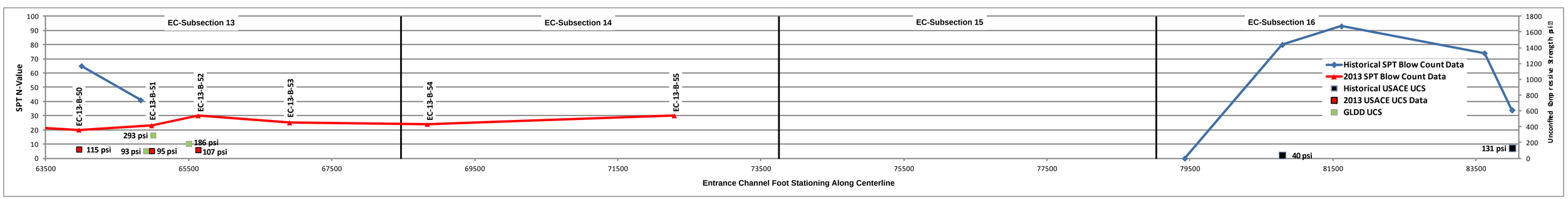












Legend

2013 Exploration

Boring Type

- SPT
- Rock Core

Great Lakes Rock Samples

- Scow Grab Samples

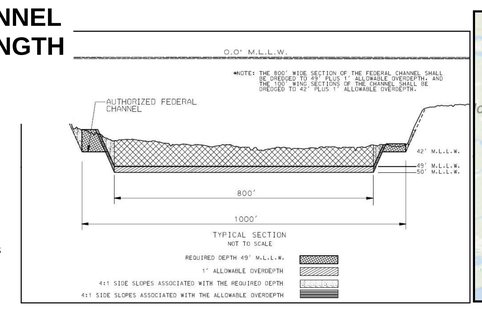
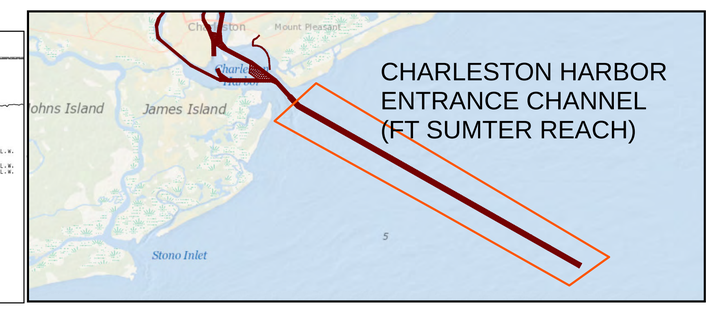
Stratigraphy

- Marks Head Formation
- Edisto Formation
- Transitional Sands
- Cooper Formation

PLATE 14: CHARLESTON HARBOR ENTRANCE CHANNEL SPT N-VALUE & UNCONFINED COMPRESSIVE STRENGTH OF GEOLOGIC STRATA WITHIN SEGMENTS EC-9 THRU EC-16

NOTE: BATHYMETRIC SURFACE CONTOURED AND COLOR-CODED BASED UPON SINGLE-BEAM SONAR DATA FROM USACE-SAC CONDITION SURVEY, DATED 25JUN2013.

N

0 500 1,000 2,000 Feet

0 0.25 0.5 1 Miles