Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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U.S. Department of the Interior
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Prepared by:
Aptim Federal Services, LLC
725 US Highway 301 South
Tampa, FL 33619

And

The Water Institute
1110 River Road S.
Suite 200
Baton Rouge, LA 70802

U.S. Department of the Interior
Bureau of Ocean Energy Management
Headquarters, Sterling, VA

BOEM
Bureau of Ocean Energy Management

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Authors and Contributors

Authors
Patrick Bryce, PG
Chris Dvorscak, RPA
Beth Forrest PhD, PG
Rob Hollis, MS
Michael Lowiec, PSM
Mike Miner PhD, PG
Beau Suthard, PG
John Swartz PhD
Alexandra Valente

Contributors
Jeffrey Andrews, CH, PSM
Jeffery Bueche
Patrick Burden, MS
Clayton Dike PhD
Sarah Finkle
Coty Granger
Austin Pierce, MS
Thomas Shahan, MS
Kelli Snyder
Ryan Stiglbauer, MS
Heather Vollmer MS, GISP

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List of Abbreviations and Acronyms

%	percent
AGC	Automatic Gain Control
APTIM	Aptim Federal Services, LLC
ASAP	Atlantic Sand Assessment Project
ASTM	American Society for Testing and Materials
BOEM	Bureau of Ocean Energy Management
cm	centimeter
CRM	Coastal Relief Model
DMA	Dynamic Management Area
DOI	Department of the Interior
EGN	Empirical Gain Normalization
EPIRB	Emergency Position Indicating Radio Beacon
FDAP	Field Data Acquisition Plan
ft	feet
GAMS	GNSS Azimuth Measurement System
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
GSP	Geological Sampling Plan
Hz	hertz
ID/IQ	Indefinite Delivery/Indefinite Quantity
IMU	Inertial Measurement Unit
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
km/hr	kilometer per hour
kn	knot
lb	pound
m	meter(s)
m^3	cubic meter(s)
MBES	Multibeam Echosounder
MMIS	Marine Minerals Information System
MMP	Marine Minerals Program
NCDENR	North Carolina Department of Environment and Natural Resources
nm	nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
nT	nanotesla
OCS	Outer Continental Shelf
ODMDS	Ocean Dredged Material Disposal Site
PMP	Project Management Plan
POS M/V	Position Orientation System for Marine Vessels
POSPac MMS	POSPac Mobile Mapping Suite
PSO	Protected Species Observer
QA/QC	Quality Assurance/Quality Control
QMA	Qualified Marine Archaeologist
RECON	RECON Offshore
SAD SAND	South Atlantic Division Sand Availability and Needs Determination
SBET	smoothed best estimate trajectory
SMA	Seasonal Management Area
TVG	Time Varying Gain
TWI	The Water Institute
UGC	User-Defined Gain Control
UNCW	University of North Carolina Wilmington
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USCS	Unified Soils Classification System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VAC	volts alternating current
VHF	Very High Frequency

Glossary of Geologic Terms

The following is a non-exhaustive glossary of geologic and geomorphic terms used in the report following United States Geological Survey standards.

Coastal compartment: A geographically defined segment of coastline in which sediment gains and losses are estimated for the purpose of calculating sediment budgets.

Coastal plain: The relatively flat, low-lying physiographic province that extends landward of the shoreline to the Piedmont physiographic province along the U.S. Atlantic Margin.

Ephemeral hard-bottom: Rocky areas of the seafloor that are frequently buried and uncovered by sediment.

Fluvial: Refers to rivers and streams.

Geologic framework: Refers to the underlying geologic setting, structure, and lithology (rock/sediment type) in a given area.

Hard-bottom: Rocky areas of seafloor with little to no sediment cover.

Highstand: The uppermost topographic position or elevation on land reached by sea level during a specific period in time.

Longshore transport: The movement of sediment parallel to the shoreline, driven by longshore currents.

Paleochannel: An ancient incision that was cut by a stream or river and filled by younger sediments.

Shoal: A submerged ridge, bank, or bar consisting of or covered by sandy, unconsolidated sediment that stands in relief on the seafloor.

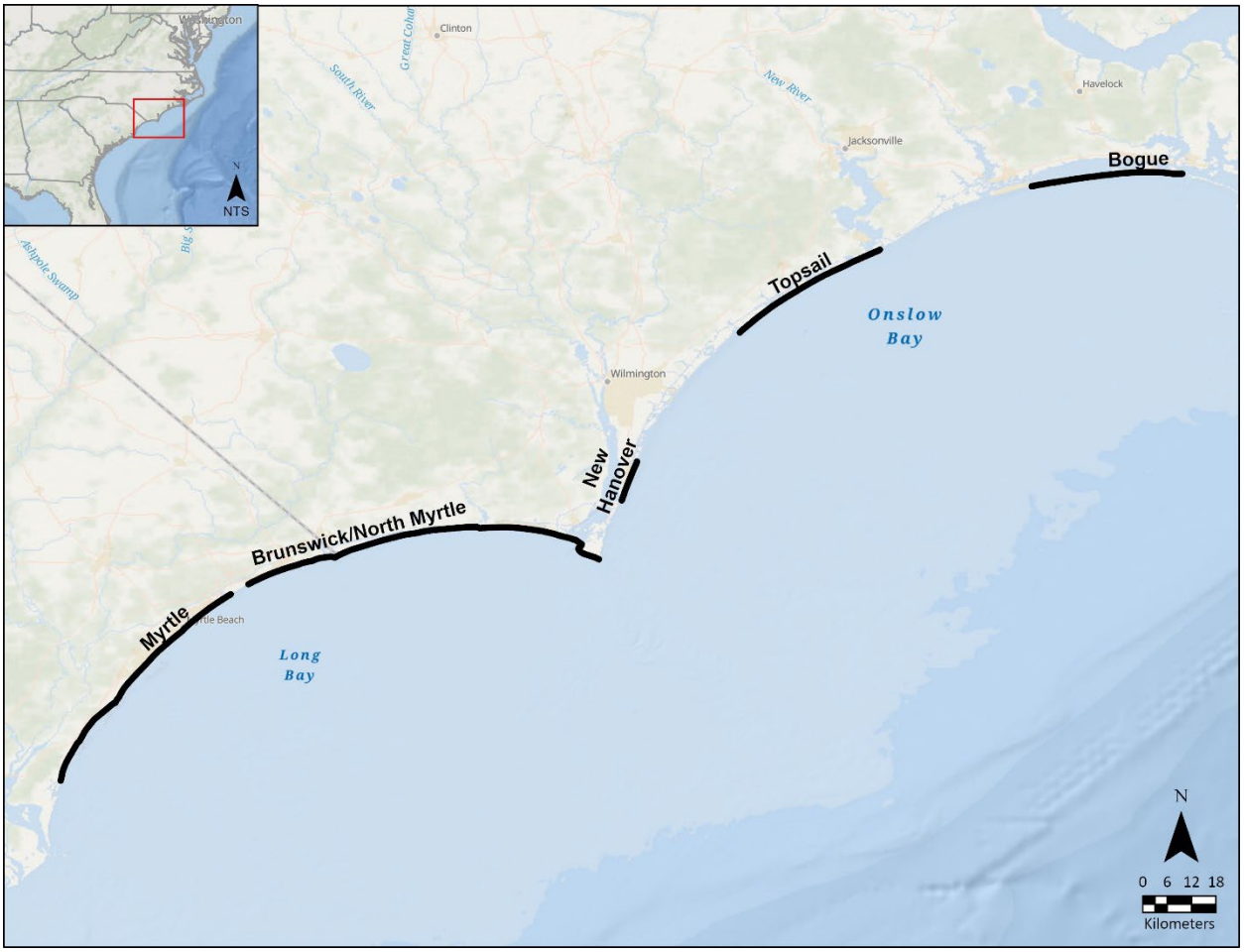
Shoreface: The narrow, shallow part of the inner continental shelf adjacent to shore in which waves regularly agitate the bottom.

Truncation: The eroding or beveling of the top of a geologic unit or landform.

1 Executive Summary

In 2021, the Bureau of Ocean Energy Management (BOEM), Marine Minerals Program (MMP), within the Department of the Interior (DOI) contracted Aptim Federal Services, LLC (APTIM) under an Indefinite Delivery/Indefinite Quantity (ID/IQ) to support the identification, characterization, and delineation of Outer Continental Shelf (OCS) sand to further MMP's development of a National Offshore Sand Inventory, as well as other marine minerals in support of development of a future National Offshore Critical Mineral Inventory. Under this ID/IQ, APTIM is tasked with assisting BOEM in the identification and characterization of sediment resource areas, determining the locations of potential OCS hard/critical minerals, and collecting baseline data to better understand and characterize potential physical, chemical, biological, and cultural impacts from marine mineral extraction. The first Task Order issued under the ID/IQ Contract No. 140M0121D0006 is to conduct geophysical and geological data acquisition and analysis in North Carolina and South Carolina offshore Carteret, Onslow, Pender, New Hanover, Brunswick, and Horry Counties. The study area was subdivided into five discrete regions based on the coastal setting and stakeholder needs. These regions include: (1) Bogue, (2) Topsail, (3) New Hanover, (4) Brunswick/North Myrtle, and (5) Myrtle (Figure 1)

Figure 1: Onslow and Long Bays on the Carolinas coast.



In order to address BOEM's needs as well as those of state and local agencies, APTIM partnered with The Water Institute and approached this Task Order by first conducting a detailed desktop study (Task 1) followed by a series of stakeholder meetings where the proposed survey plan and associated study goals

were presented. The purpose of the stakeholder engagement was to identify data gaps, assess current community sand resource needs, and identify any planned and/or ongoing projects that may lead to overlapping data coverage. Once the results of the desktop study were reviewed and study area plans established, APTIM developed a project-specific Field Data Acquisition Plan (FDAP) outlining the proposed survey plan in each of the investigation areas and how the survey will address each areas strategic questions. Once the data acquisition plan was approved by BOEM, APTIM proceeded to Task 4, and collected 898 line-km (484.88 nm) of geophysical data and 60 vibracores along Onslow and Long Bays. Upon the completion of data collection, APTIM processed, analyzed, and interpreted all geophysical and geological data to determine the potential available sand volume within the region as well as provided data to continue building a geologic framework of the area. A generalized potential sediment resource bearing deposit classification system was defined for each area: surficial sedimentary units (type 1 deposits), discrete subsurface stratigraphic units contained within larger paleovalley or channel systems (type 2 deposits), ancient strata that comprise the substrate for inner continental shelf (type 3 deposit), and coastal lithosomes preserved during shoreline retreat and transgression (type 4 deposit). A scoring system was developed to quantify the relative quality of sand found in the geotechnical sampling effort, incorporating grain size, color, sorting, and other factors to help differentiate high to marginal quality sands found throughout the study area. From the correlation of the geotechnical and geophysical data, APTIM was able to identify, delineate, and quantify numerous potential surficial sand resources along Topsail, New Hanover, Brunswick, and Myrtle ranging from 6,000 cy to 67,508,000 cy (4,587 to 613,569 m^3) and a potential resource in Bogue with some overburden. Additionally, there exist numerous potential sand resources located within preserved paleovalley and paleochannel systems in each region. Several of the larger paleovalley systems were correlated across the study areas within Topsail, New Hanover, and Myrtle. These regional maps can be used to establish fairways for further investigation of the potential resources contained within the valley and channel fill. Additionally, within the Myrtle region, the surficial sand interpretations seaward of the already established U.S. Army Corps of Engineers (USACE) Cane South Borrow Area, indicate that the deposit does extend further offshore. In Topsail, the deposits comprising nearshore USACE borrow areas are not as promising further offshore due to abundant outcropping ancient strata and ephemeral hard-bottom. Within Onslow and Long Bays, high-amplitude acoustic returns at or near the seafloor in both the sidescan sonar and seismic indicate that there is widespread outcropping of underlying ancient strata. These outcropping strata form large areas of ephemeral hard-bottom in some regions, while in others are poorly consolidated and may themselves represent a potential sediment resource.

For Task Order 1, a series of strategic questions were proposed for each of the five regions. These are presented below along with summaries of key findings.

Bogue:

1) *What is the composition, quality, and extent of the potential resource(s)?*

Several types of potential resource deposits were identified in the Bogue region: (1) surficial sedimentary bodies such as isolated shoals and sets of sand ridges, (2) sand-rich packages within larger sub-surface stratigraphic units, and (3) regionally extensive, underlying ancient stratigraphic units that comprise the base of the observable sub-surface geology of the surrounding continental shelf. Type 1 deposits are found sparsely throughout the region, but with highly variable thickness and grain size content ranging from silt to fine sand. The spatial extent of (1) appears hundreds to thousands of feet, but accurate correlation and delineation is limited by sparse data density of the regional-scale survey. Deposits characterized as type (2) are hundreds of feet wide and 5–10-ft (1.5-3 m) thick but are contained within larger paleovalley systems that typically trend across the study area perpendicular to the modern shoreline and vary in width between 1000–6000 ft (304.8-1828.8 m). The composition of type 2 deposits appears to be heterogeneous, with certain packages within the broader valley unit being composed of sand to shelly sand, adjacent to silt and muds. The sand-rich units encountered within the

paleovalleys typically occur close to the modern seafloor. There occurs one type 3 deposit, the largest and most widespread in the region, found across the study area except where incised by a younger paleovalley system. This unit appears to be composed of well-sorted sand, with thicknesses of at least 20 ft (6.1 m). However, it is typically under moderate amounts of overburden (10–30 ft [3-9.1 m]), and so only localized areas of resource (3) may be accessible. However, where exposed, it likely represents the highest quality sediment resource in the Bogue region.

2) What is the origin and evolution of the deposit(s)?

The surficial sand bodies encountered within the region (type 1 deposit) appear to be primarily sourced from reworking of pre-existing deposits, namely paleovalley fill and surrounding ancient stratigraphy that occasionally crops out on the seafloor in the region. Erosion of these deposits allows for redistribution of their mixed sediment composition (sands and silts) into surficial sedimentary deposits (e.g., sand waves, ridges, and shoals) by bottom currents. The paleovalley systems identified within Bogue have a complex internal stratigraphic architecture indicative of numerous cycles of incision and infilling, and the associated potential sand-rich bodies (type 2 deposits were likely formed as the result of fluvial deposition or coastal processes (e.g., tidal inlets). Finally, the deep stratigraphic unit underlying the study area (type 3 deposit is likely of Miocene age, and its sedimentary fabric and depositional architecture may indicate it as a relict coastal deposit).

Topsail:

1) What is the composition, quality, and extent of the potential resource(s)?

Two types of potential sediment resources were identified within Topsail: (1) surficial sedimentary units and (2) discrete sedimentary units located within broader paleovalley systems. Type 1 deposits are found in numerous locations across the study area but with highly variable lateral extent and thickness and is often separated by broad areas of hard-bottom. Where sampled, resource (1) is composed of fine to medium grain sand with minimal silt. Within the study area, only one deposit was identified that meets minimal thickness requirements and was estimated to have a volume of 1,142,000 cy (873,121.65 m^3). This type 2 deposit is constrained to the interior of the broader host paleovalley systems, which extend offshore perpendicular to the modern shoreline. Individual deposits of type (2) range in extent from tens to hundreds of feet, with thicknesses between 5–40 ft (1.52-12.19 m). Sampling of these units found their composition to vary from interbedded silts and sands to medium sand, indicating a high degree of heterogeneity but with promise pending more detailed investigation. The host paleovalleys identified in Topsail should be regarded as fairways with a high likelihood of containing numerous of the individual deposits that themselves represent potential resources.

2) How does sand quality vary across the deposit(s)?

Deposits of type 1 are typically of good to marginal quality, with fine grained sand, trace shell fragments and hash, and occasional limestone fragments. Due to the discontinuous nature of these surficial deposits compared to the scale of the survey and geologic sampling it is difficult to interpret quality variability within a single genetically related deposit. Similarly, while the host paleovalley systems containing type 2 deposits can be correlated across the study area, it is not feasible to directly link each discrete potential resource deposit contained within. Despite this limitation, numerous type 2 deposits were identified and sampled, with composition typically consisting of fine-grained quartz sands, occasional clay pockets, limestone fragments, and trace silts. The interspersed clay and rock fragments are the main limiting factor for more of these deposits being regarded as quality potential sediment resources. Numerous type 2 deposits are high quality with clay and rock fragments rare to absent,

indicating that the heterogeneity observed should be the focus of further investigation to constrain the extent of the highest quality resources within the broader fairways generated in this study.

3) Are there indications of environmentally sensitive areas or cultural sites that may require avoidance within the area?

The results of this survey found several areas of potential benthic habitat in the form of inferred ephemeral hard-bottom that correlate to previously identified hard-bottom areas and habitat. These areas of strong acoustic return in both sidescan sonar and sub-bottom profiler data potentially relate to areas of outcropping ancient, lithified strata at the seafloor. Further delineation and benthic assessments would require a detailed investigation beyond a regional reconnaissance survey. Similarly, several known cultural resources exist in the vicinity of survey regions. However, based on the current reconnaissance-level, geophysical and geological survey data, there is no conclusive evidence of any previously unknown submerged cultural resources along the survey tracklines within the survey regions.

New Hanover:

1) What is the extent and distribution of the potential resource(s)?

The New Hanover region primarily contains two potential sediment resources: (1) surficial sedimentary units and (2) paleovalley deposits. The New Hanover seafloor is predominantly sandy, with isolated hard-bottom patches, and two large conformable type (1) deposits that were identified with potential volume of 1,955,000 to 37,793,000cy (1,494,704.75 to 28,894,821.75 m^3). A single type 1deposit was identified as a continuous sand sheet along the shoreward boundary of the survey area that graded into a more patchy, linear shoal further offshore. Numerous small deposits are observed in the study area but are not able to be regionally correlated. Similarly, this study further characterized the prior unverified plus borrow area (USACE NC M14AC00009 129) and found it to be in parts classified as a type (1) as defined here. There are numerous paleovalleys that potentially contain type 2 deposits, however only two can be regionally correlated across the study area, with no additional geologic data collected to confirm their viability as a potential resource. Occasional localized type 2 deposits that were tested as part of this study found poor to marginal quality sand.

2) What is the origin and evolution of the deposit(s)?

The widespread nature of the type 1deposits indicates a likely combined origin of the surficial sediment, reflecting a combination of longshore transport from further updrift Onslow Bay as well as localized erosion and sourcing of material from the outcropping ancient deposits and paleovalley/paleochannel fill packages observed at the seafloor. Prior investigations observed that sand shoals and sand waves in this region can be active on continuous to annual timescales and concentrate well-sorted sandy deposits over 3-ft (0.91 m) thick. The combined sourcing of relict material together with shelf processes additionally helps understand the distribution of rip-up clasts of antecedent deposits within seemingly modern shelfal sands.

3) Does sand quality vary/follow a pattern that can be identified?

Sand quality of the identified deposits in New Hanover show a large variability, ranging from clean fine to medium-grained surficial sands with rare shells and minimal lithic fragments or clayey sands with large limestone rock fragments, likely from the surrounding Oligocene limestones. The type 1 deposits associated with chaotic/transparent acoustic facies appear to often have a higher sand quality,

but heterogeneity still exists. No spatial pattern to sand quality was identified (e.g., from nearshore to offshore).

Brunswick/North Myrtle:

1) Is there sand of significant thickness (greater than 5 ft) present in this region?

This study identified numerous type 1 deposits across the region, with seven surficial sand units able to be delineated and characterized for further consideration as sand resources. These deposits range from 4–8-ft (1.22-2.44 m) thick, with some potentially thicker depending on local needs and tolerance for fines content. Based on the data from this study, a majority of the identified deposits are small in their extent and thickness, however resources along the south east close to Frying Pan Shoals and to the south west have significant thicknesses and, depending on beach compatibility needs, could be provide an even greater volume than that quantified as part of this study. Additionally, a number of type 2 deposits were observed within the series of paleovalleys and channels that extend across the study region. These type 2 deposits have highly variable lithology, ranging from fine grained sands with reworked coral fragments to relatively clean coarse grain quartzose sandy units. It is likely that the type 2 units and associated host valleys contain additional potential resources greater than 5 ft (1.5 m) in addition to the surficial units quantified by this study, but the reconnaissance survey design precludes full characterization of the discrete sandy deposits.

2) What is the origin and evolution of the deposit(s)?

The Brunswick/North Myrtle area seafloor is relatively muddy, with large areas of outcropping Cretaceous basement rock. Numerous paleovalleys and paleochannels appear to incise these complex strata with highly variable fill architecture. Additionally, the lithology of these valley fills and overlying surficial sediments ranges significantly, reflecting the contribution of fluvial sources, reworking of underlying Cretaceous lithified strata, and coastal processes. The sandy type 1 deposits identified here likely reflect the erosion and reworking by shelf processes of adjacent outcropping paleochannel deposits, which often have a significant quartz sand component. There appears to be a relatively close correlation between the occurrence of thick type 1 deposits and adjacent paleovalley systems. The paleovalley and paleochannel systems themselves (and any potential type 2 deposits) appear to be compound features with multiple overprinting cut and fill cycles and highly variable composition that may be controlled by relative proximity to fluvial sources.

Myrtle

1) Can existing and potential borrow areas be extended further offshore?

This study indicates that some of the existing and potential borrow areas can be extended further into the OCS. Prior work found that many of the previously identified potential borrow areas are likely contained within paleovalley systems, several of which extend further into the Myrtle study area. However, ground truthing of some of these systems found the valleys themselves are often dominated by clay and finely interbedded sands, with a relatively clean surficial sand located above. It does not appear that the Cane North Arcshore and Cane South borrow areas can be extended with confidence across the OCS. However, the USACE Surfside resource does appear to extend into the OCS, following a paleovalley system trending perpendicular to the modern shore.

2) *Are the sand ridges found in the OCS off the coast of Murrell's Inlet a potential resource, and if so, what is the origin of the features and are they actively evolving?*

The Murrell's Inlet sand ridges represent a significant type 1 deposit and portions of them were able to be constrained and quantified as part of this study as a high-potential sand resource. The sand ridges and shoals overlie a large paleovalley that can be mapped across the study area, indicating a potential relationship between the thickest surficial sands and readily erodible sand-rich stratigraphy near the seafloor. Based on the acoustic character and bathymetry of the shoals and comparison to other sand ridges in the Atlantic OCS, it is likely that these systems are mobile on modern timescales and erosion of the surrounding strata continues to provide sediment to the ridge systems.

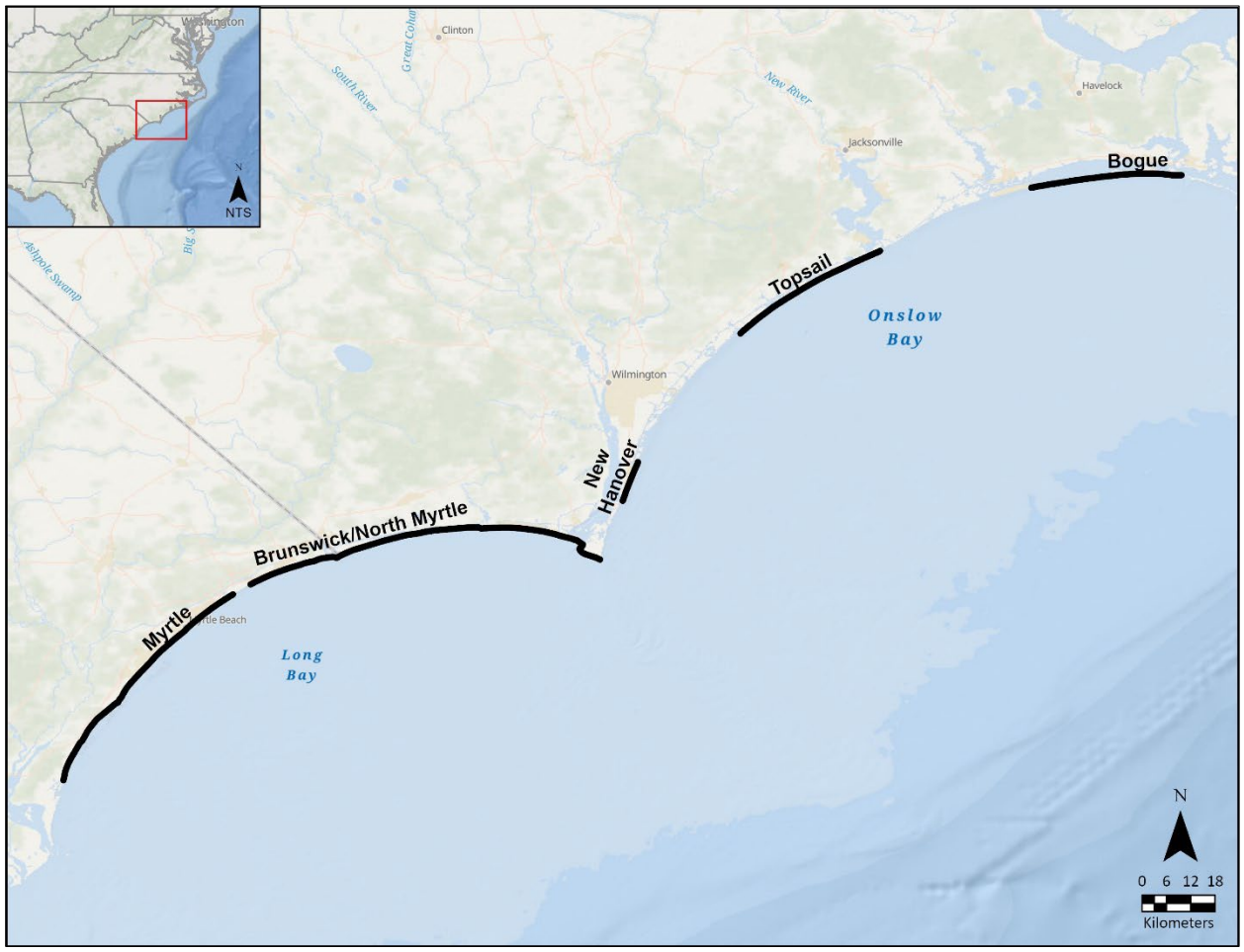
3) Is there sand of significant thickness present off the coast of the cities of Myrtle Beach and North Myrtle Beach in the region from 4 to 8 miles (6.44-12.87 km) offshore, and if so, what is the nature, extent, and quality of the deposit(s)?

This study identified several surficial type 1 deposits as well as numerous potential paleovalley type 2 deposits that have potential for hosting sediment resources. Two surficial type 1 sand bodies were able to be delineated and quantified within this area, with fine to medium grain quartz sands rated as good quality. These deposits are tens of thousands of square yards in extent, located further seaward near the 8-mile (12.87 km) mark. Additionally, this region contains a linear shore perpendicular paleovalley system with high potential for containing type 2 sand-bearing deposits, similar to those that have been found to contain borrow areas closer to the modern shore. While the position and extent of the paleovalleys was able to be regionally correlated, more detailed investigation is required to constrain the character and volume of potential sand resources contained within.

2 Introduction

In 2021, the Bureau of Ocean Energy Management (BOEM), Marine Minerals Program (MMP), within the Department of the Interior (DOI) contracted Aptim Federal Services, LLC (APTIM) under an Indefinite Delivery/Indefinite Quantity (ID/IQ) to support the identification, characterization, and delineation of Outer Continental Shelf (OCS) sand to further MMP's development of a National Offshore Sand Inventory, as well as other marine minerals in support of development of a future National Offshore Critical Mineral Inventory. Under this ID/IQ, APTIM is tasked with assisting BOEM in the identification and characterization of sediment resource areas, determining the locations of potential OCS hard/critical minerals, and collecting baseline data to better understand and characterize potential physical, chemical, biological, and cultural impacts from marine mineral extraction. This will provide BOEM with information on where marine minerals are located, the volume and/or quality that may be available for use and determine measures to minimize impacts from resource exploration or extraction. This will then allow BOEM to evaluate the leasing and development potential of OCS minerals to assist with the assessment of potential environmental impacts and necessary mitigation and minimization measures. The identification of, and access to, potential sand resources along the OCS is critical for the long-term success and cost-effectiveness of many shore-protection, beach-nourishment, coastal- and habitat-restoration projects. The first Task Order issued under the ID/IQ Contract No. 140M0121D0006 was to conduct geophysical and geological data acquisition and analysis in North Carolina and South Carolina. Field collection areas include the OCS areas offshore Carteret, Onslow, Pender, New Hanover, and Brunswick Counties, North Carolina and Horry County, South Carolina. These high-priority areas were selected because in these areas, projected demand for OCS sediment resources outpaces known resources, as identified in the United States Army Corps of Engineers (USACE) South Atlantic Division Sand Availability and Needs Determination Study (SAD SANDS). The current high priority areas include Onslow and Long Bays, as these areas have existing sand deficits and present multiple use and other planning challenges because of potential spatial conflict with future wind farm development. This Task Order focuses on five regions within Onslow and Long Bays: Bogue, Topsail, New Hanover, Brunswick/North Myrtle, and Myrtle (Figure 2).

Figure 2: Task Order 1 investigation areas along the Carolinas coast



In order to address BOEM's needs as well as those of state and local agencies, APTIM partnered with The Water Institute (TWI) and approached this Task Order by first conducting a detailed desktop study (Task 1). During Task 1, APTIM worked closely with BOEM, other federal agencies (United States Geological Survey [USGS], USACE, National Oceanic and Atmospheric Administration [NOAA], etc.), and pertinent state and local stakeholder groups (North Carolina Division of Coastal Management, South Carolina Department of Natural Resources, County and community representatives, etc.) to ensure accurate historical data coverage offshore Carteret, Onslow, Pender, New Hanover, Brunswick, and Horry Counties. The APTIM Team then hosted a remote stakeholder meeting that was broken into two sessions, one focused on North Carolina OCS, and one focused on South Carolina OCS. The purpose of the stakeholder meetings was to identify data gaps, current sand resource needs, and identify any planned and/or ongoing projects that may overlap data coverage (i.e., Carteret County Master Plan Sand Resource and Reserve Project). Once the results of the desktop study were reviewed and study areas and plans were established, APTIM developed a project-specific Field Data Acquisition Plan (FDAP) outlining the proposed survey plan in each of the investigation areas and the goals of each area. Once the data acquisition plan was approved by BOEM, APTIM proceeded to Task 4, and collected 898 line-km (484.88 nm) of geophysical data and 60 vibracores within Onslow and Long Bays. Upon the completion of data collection, APTIM processed, analyzed, and interpreted all geophysical and geological data to determine the potential available sand volume within the bays and develop a better understanding of the geologic framework of the area.

3 Desktop Study and Initial Stratigraphic Framework

3.1 Onslow and Long Bay Pre-Quaternary Geology

The underlying stratigraphy and structural geology of the Onslow and Long Bays region have been well characterized through decades of study and provide important context for understanding the modern physiography and sedimentology of the area. The following section provides a general overview of major pre-Quaternary structural and stratigraphic elements of the region. The Cape Fear arch is a major structural feature underlying the Atlantic Coastal Plain, roughly separating Onslow and Long Bays (Maher, 1971; Figure 3 and Figure 4) The inner continental shelf in this region is underlain by predominantly older strata ranging from the Upper Cretaceous (~90 million years) to the Pliocene (~3 million years), with the oldest material occurring close to the axis of the Cape Fear Arch and younger Pliocene strata near Cape Lookout and along the outer shelf (Figure 4; Riggs and Belknap, 1988; Van de Plassche et al., 2014). Uplift of the Cape Fear Arch has led to the relatively shallow occurrence of these older units, in addition to contributing to relatively lower rates of sea-level rise within the region throughout the Holocene (Van de Plassche, 2014). Importantly, the long-lived nature of this tectonic feature has acted to steer the orientation of the major coastal river systems in the region since at least the Pliocene, and likely plays a role in the distribution of fluvial-related Quaternary units within the continental shelf; although the relative importance of this longer-timescale forcing compared to shorter cycles of beach ridge growth and deflection remains unknown (Soller, 1988; Baldwin et al., 2006). The strata of these older units crop out at the seafloor of the inner continental shelf. These units are highly variable, ranging from carbonates, mixed-carbonate-siliciclastic and siliciclastic systems, thinly to massively bedded, and unconsolidated to fully cemented (Meisburger, 1979; Hoffman, 1991). The variability of these older units leads to a complicated surficial geology of the continental shelf, with adjacent ancient sediments and modern units being reworked to form the modern sediment transport system (Thieler et al., 1995).

Figure 3: Dominant terrestrial bedrock ages of uplifted strata associated with the Cape Fear Arch structural high. Modified from Van de Plassche et al., 2014.

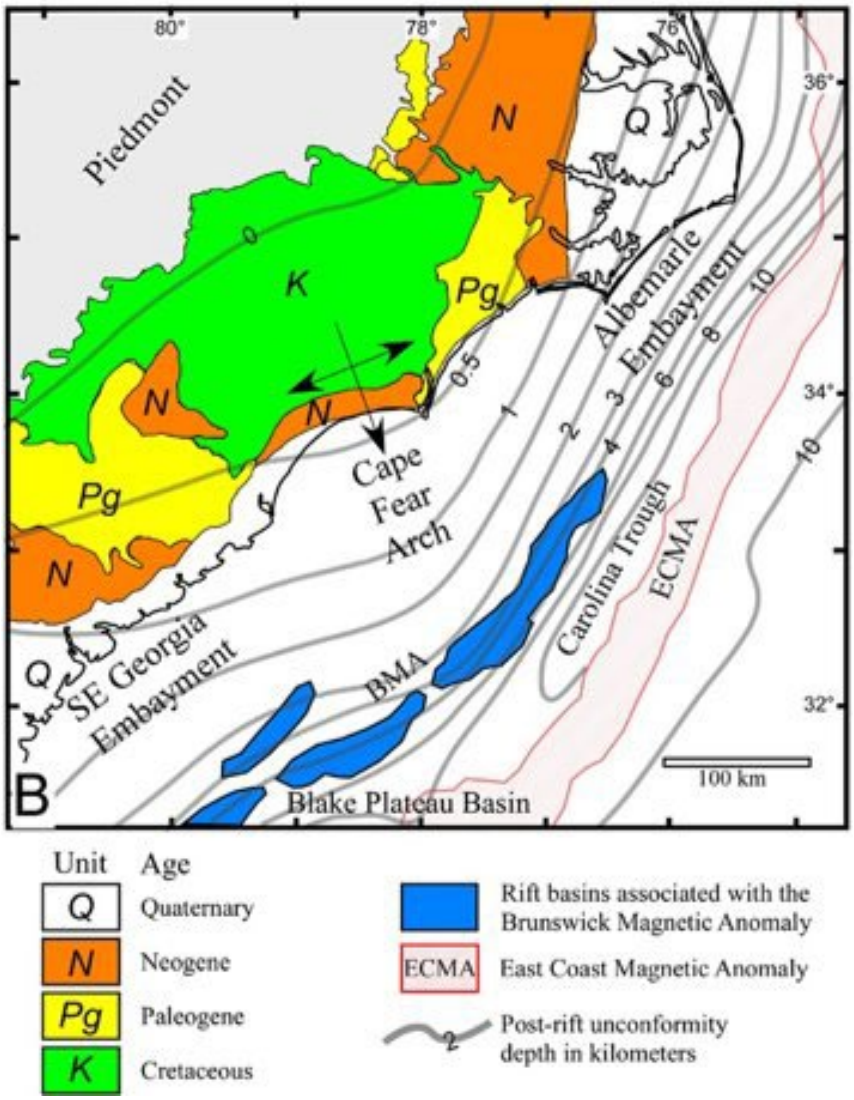
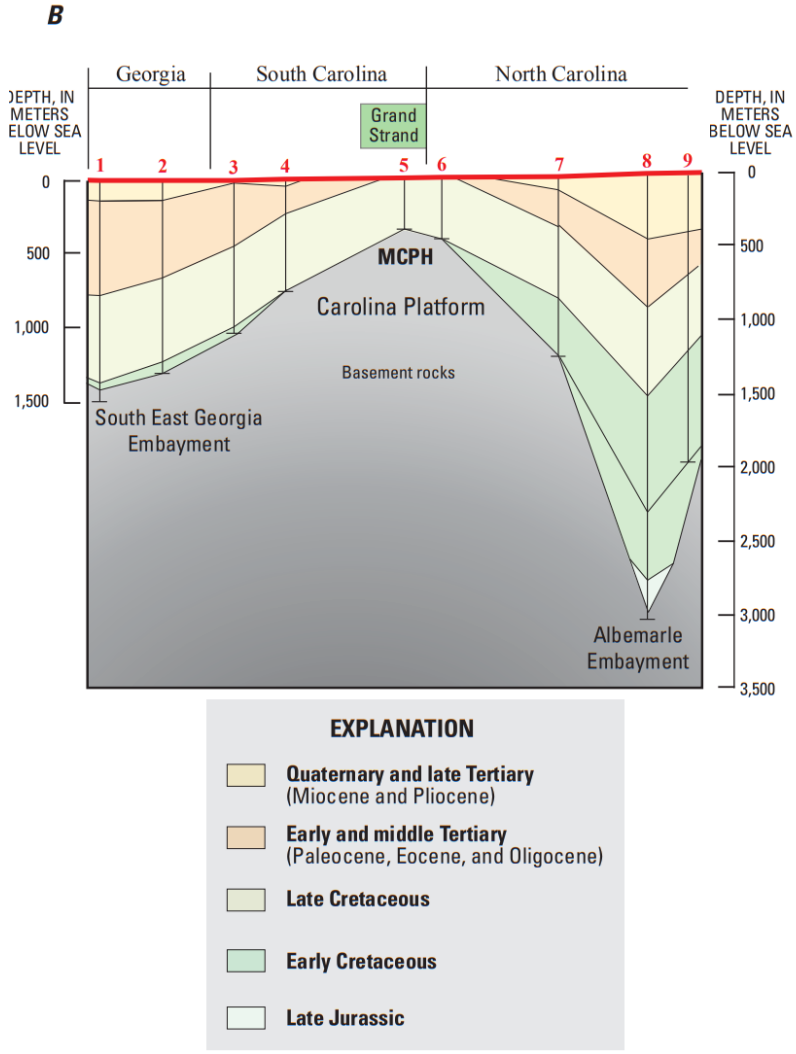


Figure 4: Generalized stratigraphic cross-section along the Atlantic Coastline. Onslow and Long Bays are located between points 5 and 7, separated by the Cape Fear Arch and Mid-Carolina Platform High. Modified from Barnhardt et al. (2009).



The average age of the continental shelf strata within the study area increases from north (Onslow Bay) to south (Long Bay) where it becomes dominated by the Eocene to Upper Cretaceous units, in particular the Eocene Castle Hayne, the Paleocene Black Mingo, and the Cretaceous Pee Dee Formations (Figure 5; Baldwin et al., 2004). Continual uplift of the Cape Fear Arch has led to an absence or reduced volume of Cenozoic sediment within the region as compared to the embayments to the north and south (Georgia and Albemarle; Gohn, 1988). Sea-level cycles have led to continual erosion and reworking of these outcropping older units through subaerial exposure, bioerosion, fluvial incision, and transgressive ravinement, leading to significant variability in physical properties, Quaternary sedimentary cover, and local relief (Baldwin et al., 2004). Initial assessments of potential offshore mineral resources for beach nourishment projects as well as potential phosphate resources found that the Cretaceous-Eocene units within Onslow and Long Bays have highly variable properties, from hard and indurated to unconsolidated sand deposits (Figure 6; Hoffman et al., 1991).

Figure 5: Surficial Geology of the Long Bay inner shelf. Outcropping Tertiary and Cretaceous strata are dissected by Quaternary fluvial channels and valleys. Modified from Barnhardt et al., 2008.

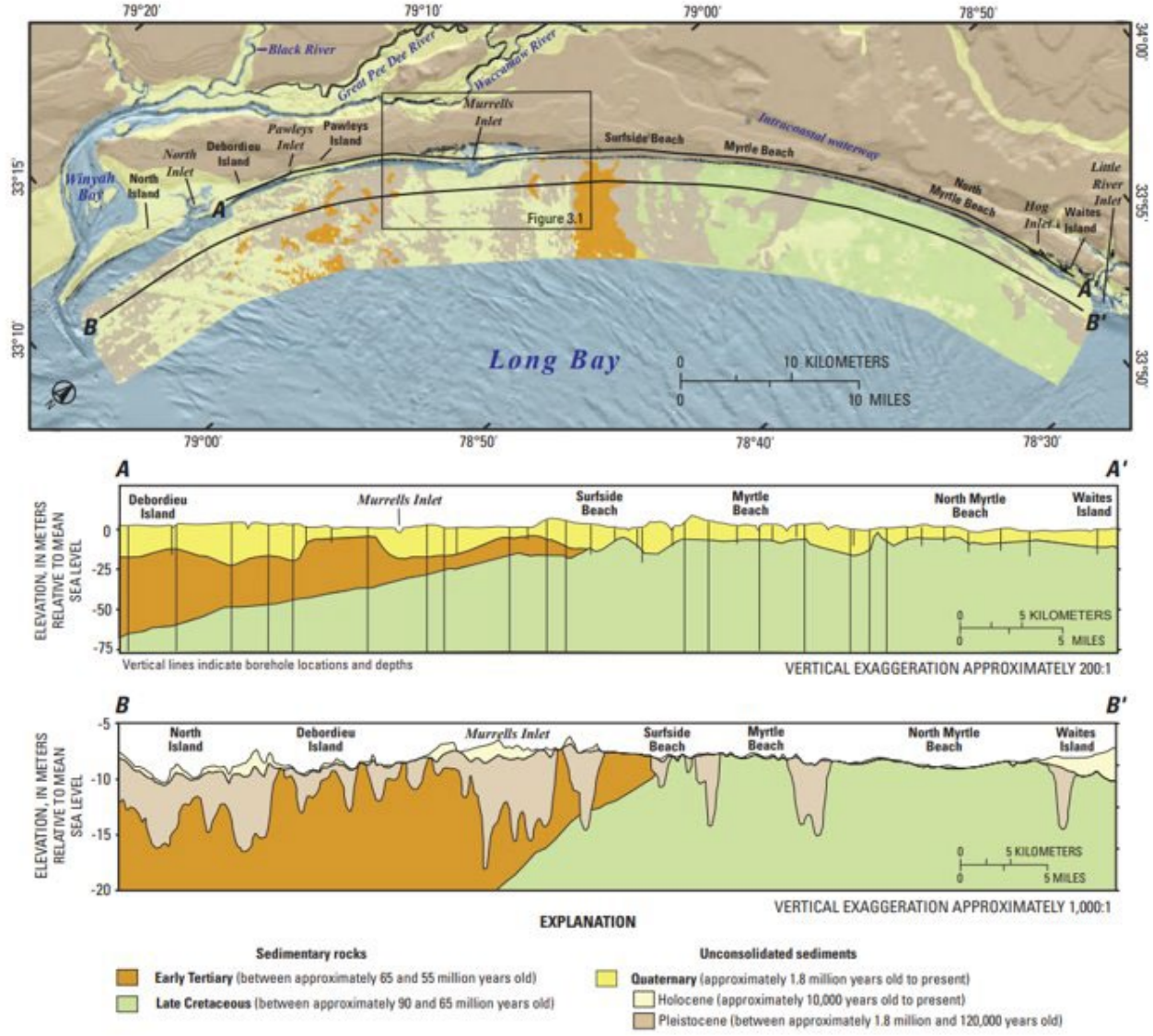
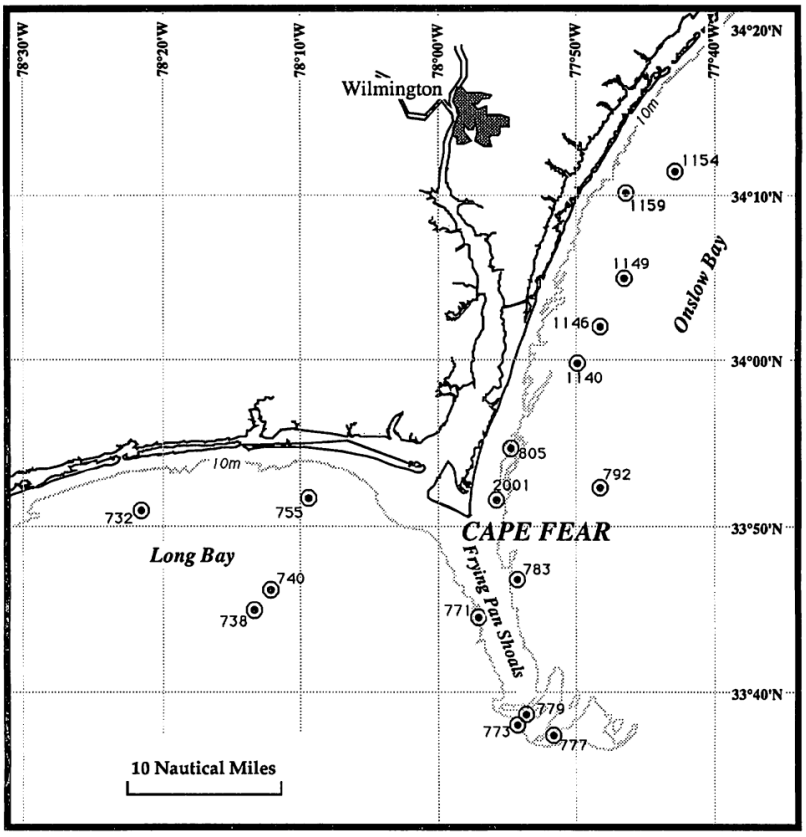


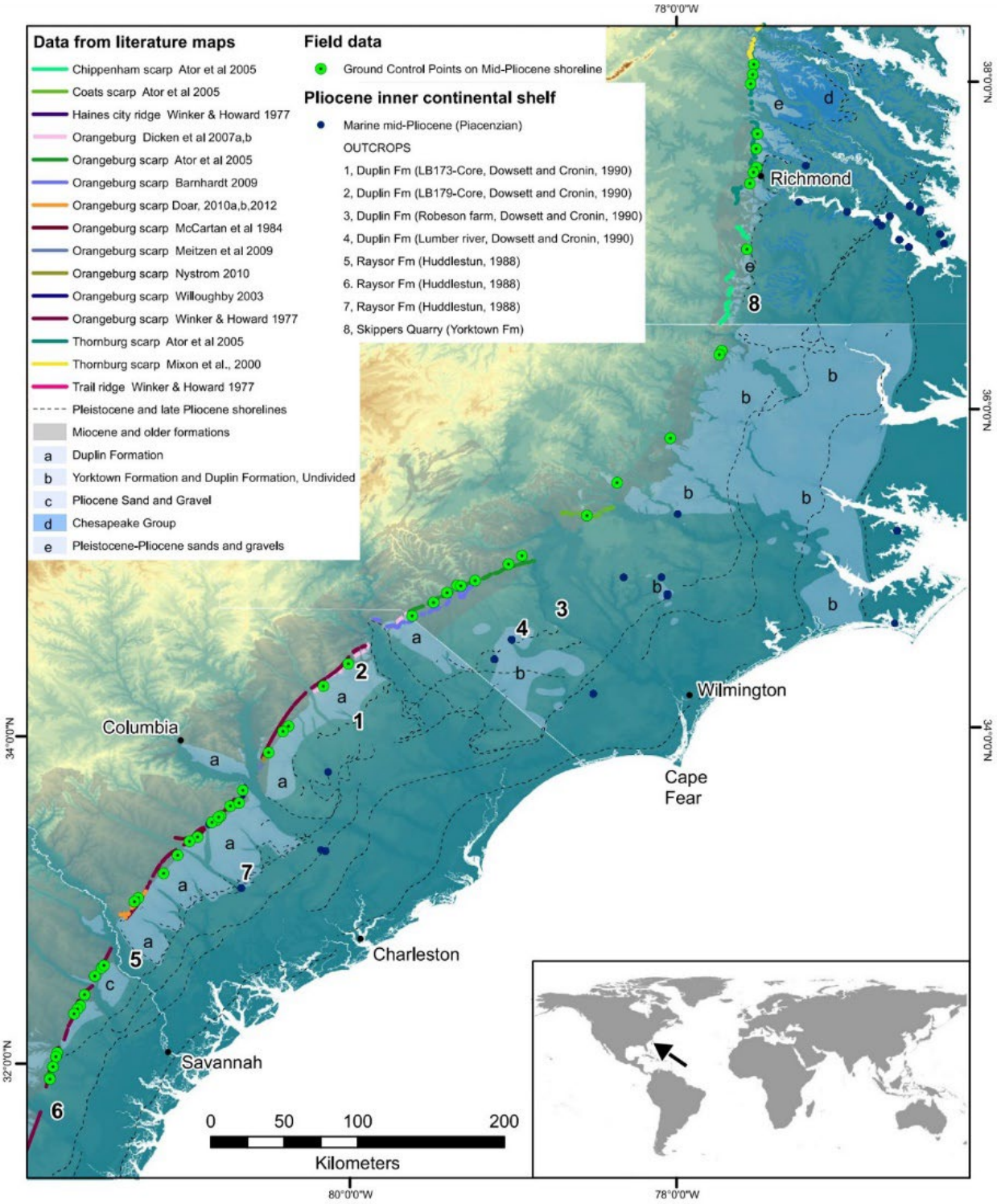
Figure 6: Initial assessments of shelf sediments across Onslow and Long Bays find adjacent units of Holocene to Pliocene sands together with interpreted Oligocene and older. Potential for outcropping Tertiary and Cretaceous deposits to be poorly consolidated and subject to reworking. Modified from Hoffman et al. (1991).



3.2 Quaternary to Present Geology

The modern continental shelf of Onslow and Long Bays is a sediment-starved system (Clearly and Pilkey, 1968; Riggs et al., 1996; Baldwin et al., 2004). Throughout the Quaternary, the main sediment source to this portion of the Atlantic Coastal Plain has been piedmont and coastal plain rivers that currently drain into estuarine systems behind the modern barrier complex (Hayes, 1994). The modern coastal plain of the region contains a series of ridges and terraces formed by the continual seaward growth of the coastal plain throughout the Plio-Pleistocene, interpreted as successive barrier island and strandplain systems deposited during eustatic sea-level highstands (Figure 7; Colquhoun, 1972, Doar and Kendall, 2014; Rovere et al., 2015). These deposits overlie the Upper Cretaceous through Oligocene units that are similarly found offshore.

Figure 7: Seaward growth of the Carolinas shoreline from the Pliocene to modern. Modified from Rovere et al. (2015).



During the falling stage of each eustatic cycle the piedmont and coastal river systems incised through the coastal plain and increasingly exposed inner continental shelf, forming both new channels as well as reoccupying older buried valleys that consisted of relatively weak lithology compared to the surrounding

exposed strata (e.g., Snyder et al., 1994; Baldwin et al., 2004; Long, 2020). At the same time, the previously submerged continental shelf strata become subaerially exposed, leading to complex autogenic drainage formation (e.g., Speed et al., 2022) as well as weathering of the exposed older units and processes such as karst formation (Thieler et al., 1995). The lengthening and incision of the fluvial systems leads to development of broad valleys within which floodplains deposited during falling stage are partially preserved as fluvial terraces. Former shoreline deposits may be stranded on the newly exposed coastal plain (Figure 8). Due to the continual uplift of the Cape Fear Arch combined with general low accommodation across the low-gradient shelf, there is minimal fluvial deposition at this stage outside of the main valley systems. Channels observed within the continental shelf strata of Onslow and Long Bays are at all scales, from the large valley systems associated with the ancestral Pee Dee and Cape Fear Rivers to minor drainage gullies (Figure 9).

Figure 8: Conceptual model of river and coastal response to Quaternary eustatic sea level change. Modified from Barnhardt et al. (2008).

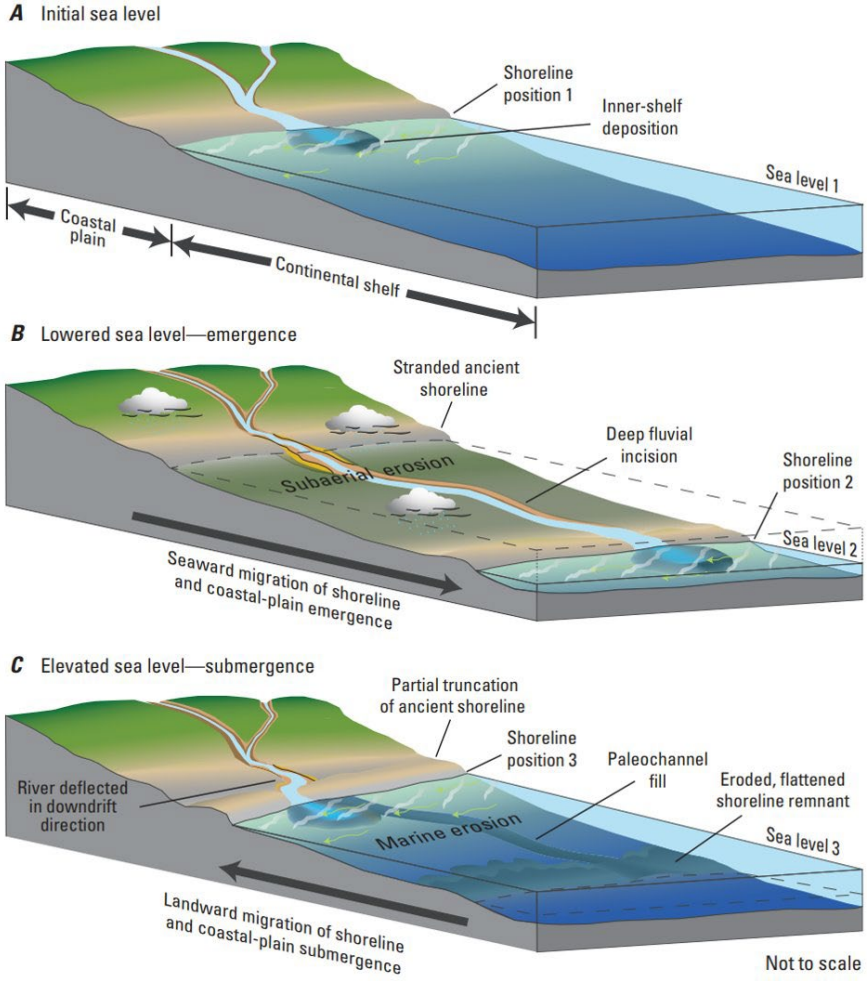
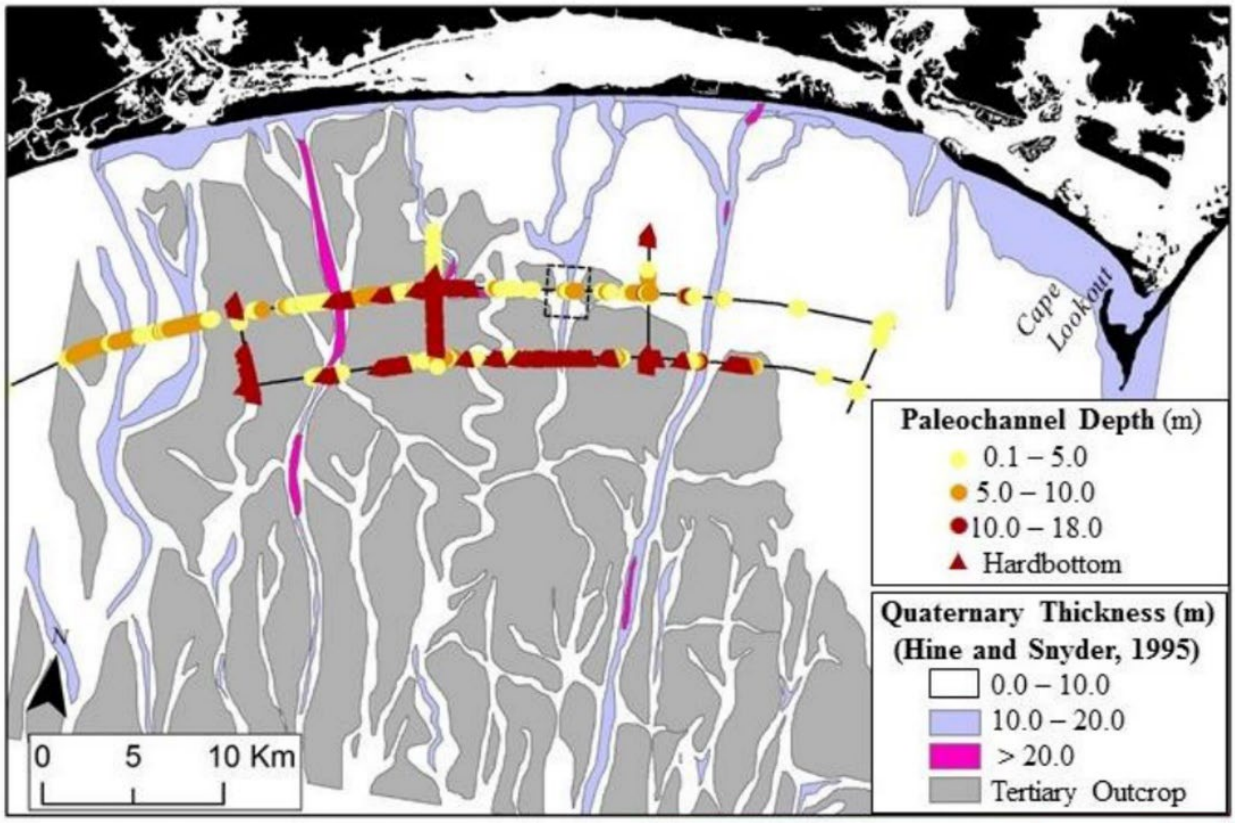
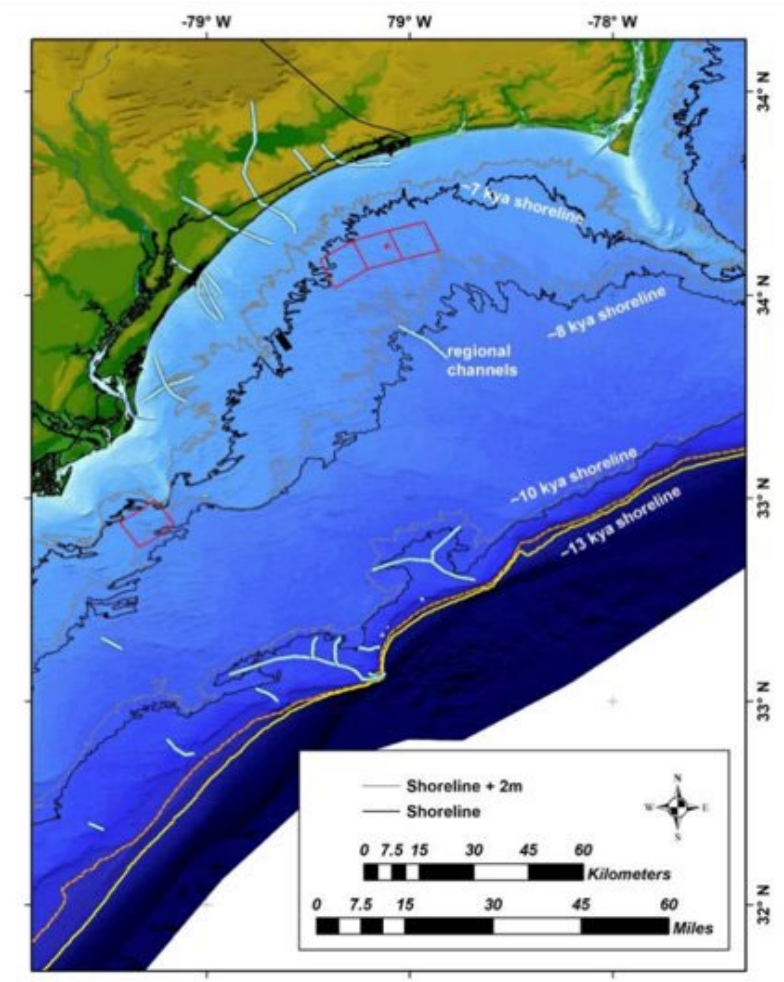


Figure 9: Interpreted patterns of Quaternary drainage topography in Onslow Bay, overlain by measured paleochannel fill thicknesses. Modified from Conery (2019).



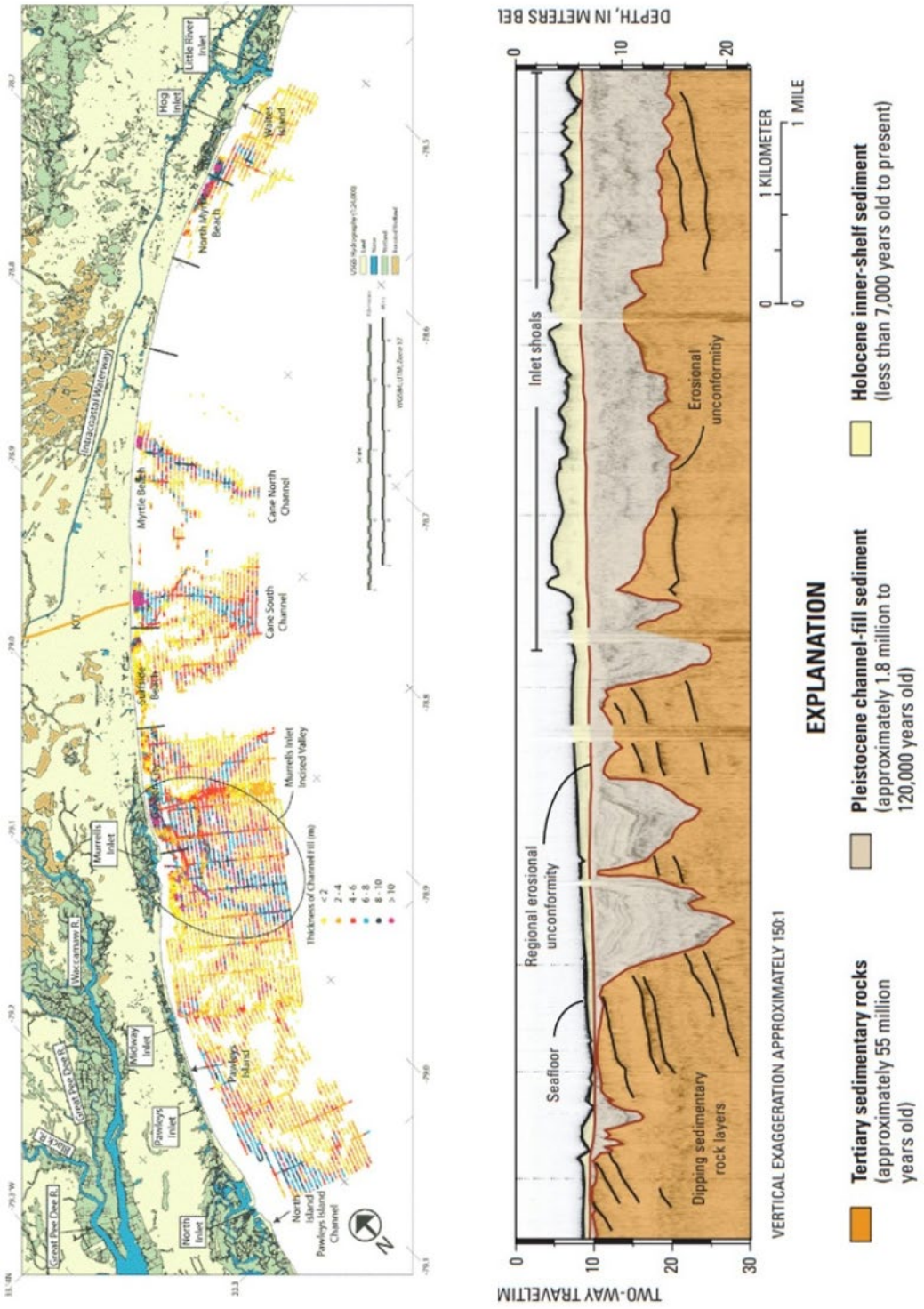
Following the late falling-stage and lowstand of the typical Quaternary eustatic cycle, the subsequent transgression drowned the prior exposed shelf and caused the backstepping of fluvial and coastal systems (Figure 8). Fluvial systems within the previously eroded valleys produced meandering fluvial stratigraphy overlain by muddy overbank deposits that eventually transitioned to estuarine conditions as flooding continued. Tidal inlet deposits may occur locally within the constrictions associated with a previously occupied fluvial channel. Shoreline position migrated landward with locally variable retreat rates that were controlled by variations in resisting lithology, topography, and sediment supply. Reliable markers that can be used to both locate and date the paleo-shoreline remain elusive across the majority of the shelf. Earlier work has attempted to estimate the relative position of the shoreline across the inner continental shelf based on rates of Holocene sea-level rise compared to extant bathymetry (Harris et al., 2018; Figure 10). This methodology assumes that modern bathymetric relief approximates the paleo-elevation of previously exposed land, ignoring important erosional process associated with bay, shoreface, and tidal ravinement during transgression. Transgressive ravinement on the Atlantic shelf was highly efficient at eroding and reworking coastal plain deposits, and there are no examples in the literature of preserved in-situ early Holocene barrier shoreline deposits on the modern mid-Atlantic shelf. Barrier deposits appear to be more commonly eroded during transgression, with material reworked into shelf deposits such as shelf sand shoals or infilling of adjacent paleochannels (e.g., Long et al., 2021).

Figure 10. Approximate Positions of late Quaternary shorelines within Long Bay Inferred by Sea Level Rise Rates, adapted from Harris et al. (2018). White channels represent previously interpreted paleochannel locations from Harris et al. (2018) and references therein.



Paleochannels and paleovalleys formed by fluvial processes during periods of sea-level fall and infilled during subsequent transgression are ubiquitous across Onslow and Long Bays, with highly variable dimensions, morphology, and character of the sedimentary fill (Denny et al., 2003; Baldwin et al., 2004; Thieler et al., 2005). The relative degree of incision associated with these channels and valleys during sea-level fall ranges from imperceptible to >60 ft (18.29 m) and in many cases there may not exist a continuous paleo-relief form across the shelf to the shelf edge (e.g., Talling, 1998; Sylvester, 2012). It is important to note that while referred to as channels or valleys, these are stratigraphic features and usually do not have a bathymetric expression on the seafloor, rather being observed by geophysical and geologic investigations. The fill of these channel features can reflect numerous sea-level cycles and the amalgamation of fluvial, tidal, coastal, and modern shelf processes. Within the overall sediment-starved systems of Onslow and Long Bays, the patterns and thickness of modern (defined as Quaternary or younger) sediment deposits are strongly controlled by the accommodation provided by these paleochannels and valleys (Thieler et al., 2001; Conery, 2019; Long, 2020). Quaternary sediment deposits may reach 20–30-m (65.62-98.43 ft) thick within the largest valleys, while outside these systems transgressive ravinement has removed most relict coastal lithosomes and modern sediment veneers are highly variable in their distribution and properties (Figure 11).

Figure 11: Incised valleys and drainages provide sheltering accommodation for fluvial and coastal lithosomes in the inner shelf. Thicknesses of preserved Quaternary sediment within Tertiary strata closely tied to channel forms. Modified from Barnhardt et al., 2009 and Baldwin et al., 2006.



The larger drainage and valley systems likely contain deposits associated with backstepping fluvial and estuarine systems, and also some degree of coastal and shelf deposits. Prior studies identified that valleys

within Long Bay can contain a more complete record of the linked fluvial-marine system, with an upward progression from fluvial channel fills to back barrier, shoreface, and eventual nearshore marine sedimentation (Baldwin et al., 2006; Figure 12 and Figure 13). Importantly, this indicates that coarser material associated with ancestral barrier and shoreface systems may be preserved relatively close to the modern seafloor, while outside of these accommodation pockets they have been efficiently removed by transgressive ravinement. The potential outcropping of these features at the seafloor have been identified as sediment source to the Onslow and Long Bays' embayments, which receive minimal exogenous sediment input from other sources (Thieler et al., 1995).

Figure 12: Larger compound valley features show reoccupation by multiple fluvial systems and sheltering of subsequent coastal deposits. Numerous recorded cut and fill cycles and preserved beach ridge/back barrier deposits within the valley container while transgressive ravinement has eroded all Quaternary deposits outside the valley. Modified from Baldwin et al. (2006).

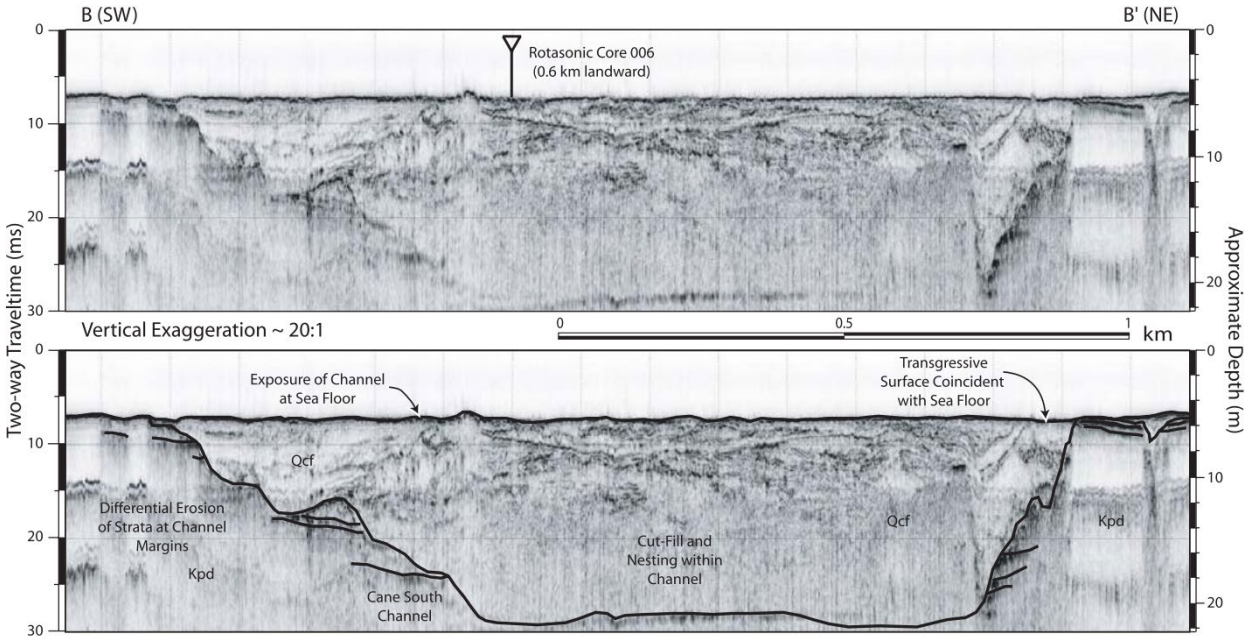
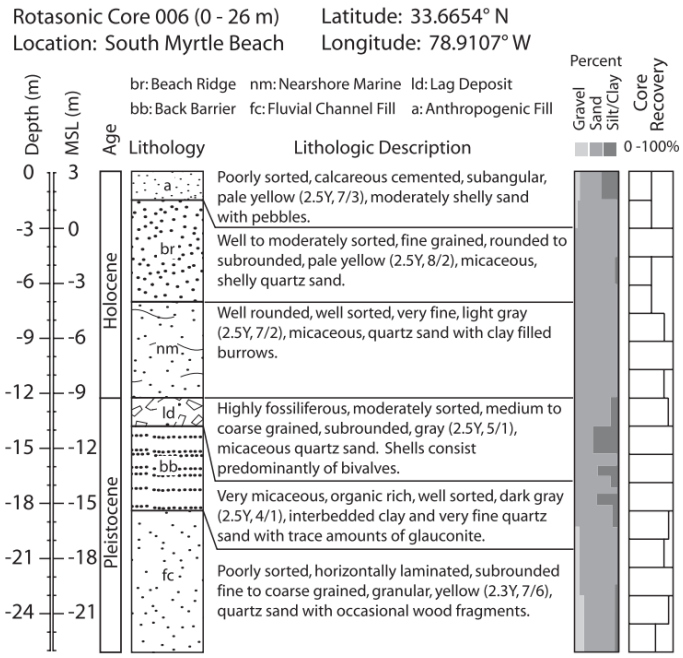


Figure 13: Core log projected along the geophysical line shown in Figure 12. Numerous packages of potential beach ridges, sand-rich fluvial bars, and nearshore sediments are contained within the broader incised valley. Modified from Baldwin et al. (2006).



4 Historic Data Review/Survey Plan Development

For this first Task Order issued under the ID/IQ, APTIM was tasked with conducting geophysical and geological data collection in five regions within Onslow and Long Bays distinguished by geographic and geologic/oceanographic characteristics: Bogue, Topsail, New Hanover, Brunswick/North Myrtle, and Myrtle. During Task 1, a total of 864.2 line-km (466.6 nm) of hydrographic (multibeam bathymetry) and geophysical (chirp sub-bottom, sidescan sonar, and magnetometer) data were allocated to each region and sub-region, based on their needs.

The assessment of each county's needs was conducted by reviewing previous coastal restoration efforts in each of the areas and comparing those against current erosion estimates and beach sand needs. APTIM analyzed the 2020 USACE SAD SAND report to determine current sand resource volumes and future needs of sand resources for each town and region prioritized by BOEM's Task Order 1 Scope of Work. APTIM organized two ranking systems based on unaccounted regional sand needs. These local needs were determined using current and known borrow area volumes and Regional Sediment Management practice volumes. These were then compared to the previously identified USACE 50-year town needs to determine each town's deficit or surplus of sand resources. Previously identified sand resources within each town or jurisdiction were then compared to the USACE 50-year regional sand assessment to determine what percentage of overall regional need each town represents. This ranking was weighted heavier when allocating survey lines and vibracores based on the overall significance of each region's sand resource needs.

Concurrent with the investigation of each individual beach need, APTIM conducted a desktop study to gather existing geophysical, geotechnical, and geologic data available in the Task 1 study area. Historic and critical datasets were reviewed and considered when drafting the geophysical and geologic reconnaissance plan to avoid duplication. Historic datasets from USACE, BOEM, NOAA, USGS, investigation reports,

and APTIM's internal database of data were incorporated into ArcGIS along with identified hazards (wrecks, artificial reefs, protected areas etc.). The North Carolina and South Carolina coastlines have been heavily surveyed and sampled over the years and there are several geophysical and geotechnical datasets and reports available. Although most of these are in state waters, their information is useful for the development of a geologic model for extending potential sand resources across state-federal lines and understanding geologic controls on the distribution of sand resources.

APTIM held virtual stakeholder meetings for North Carolina on April 27, 2022, and for South Carolina on April 28, 2022. Prior to the meetings, APTIM shared an introductory packet with stakeholders that included information on the project and geo PDFs for each of the areas with the results from the desktop study. During the meeting, APTIM gave an introductory presentation that highlighted pertinent project information and historic datasets along with the geologic framework, combined with maps to facilitate the discussion between stakeholders and the project team and review of APTIM's proposed survey plan. During the stakeholder meeting, APTIM and TWI asked participants the following questions: what priority areas to focus on in terms of sand needs? What historical data is missing? Are there any future survey plans that are not known? Are there any avoidance areas that are not known? Any other comments/notes? From these questions APTIM and TWI received additional information in order to adjust the survey plan.

For the evaluation of the proposed survey plan APTIM, TWI, and BOEM reviewed the available historic data as well as county needs to determine an appropriate allocation of geophysical and geologic data for each county. As part of these discussions, overall county needs, multiple use conflicts and stakeholder needs were reviewed along with confirming and providing additional data for the understanding of the geologic framework of Onslow and Long Bays in order to delineate potential deposits for future use. The final allocation of the proposed 864.2 line-km (466.6 nm) of hydrographic (multibeam bathymetry) and geophysical (chirp sub-bottom, sidescan sonar, and magnetometer) data is presented in Table 1. Vibracores were allocated based on the overall state needs, historic data coverage, and to target potential resources identified in the geophysical survey results. Vibracore sites were chosen with the goal of establishing the deposit characteristics and/or to augment the understanding of the geologic framework and evolution of Onslow and Long Bays.

Table 1: Geophysical and geotechnical data allocation per investigation area.

Area	%	Allocated line-km/nm	As-run line-km/nm	Number of vibracores
Bogue	9%	75.8/40.9	79.4/42.9	4
Topsail	29%	252.7/136.4	262/141.5	17
New Hanover	12%	102.9/55.6	128.3/69.3	7
Brunswick/ North Myrtle	26%	228.6/123.4	235.3/127.1	17
Myrtle	24%	204.2/110.3	213.9/115.5	15
Total		**864.2/466.6**	**897.8/484.8**	**60**

A breakdown of each investigation area, as well as findings from the desktop study, stakeholder meetings, and historic data review is provided in the sections below.

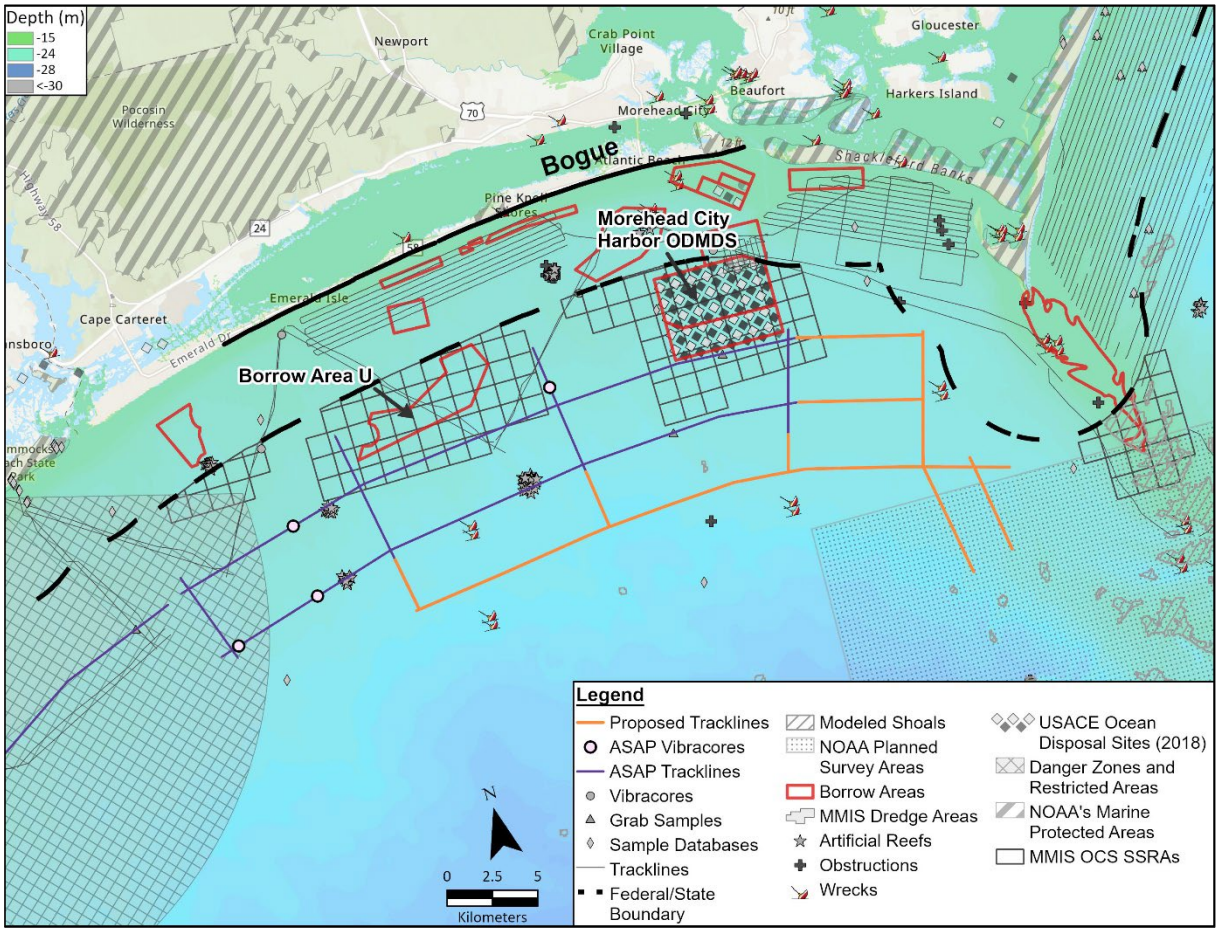
4.1 Bogue

The Bogue region includes the towns of Emerald Isle, Indian Beach/Salter Path, Pine Knoll Shores, and Atlantic Beach/Fort Macon, all of which have current and future sand needs as documented by the USACE SAD SAND study. As part of the desktop study, APTIM identified several datasets within the area that

support the previous results from the BOEM Atlantic Sand Assessment Project (ASAP) that indicated potential sand resources along the central and eastern portion of the Bogue region. There are two identified potential sand sources (Figure 14) that are delineated as part of the USACE SAD SAND report. The eastern resource is the Morehead City Harbor Ocean Dredged Material Disposal Site (ODMDS), which is the Morehead City Harbor Navigation Project disposal area. Current statistics indicate that it has a mean grain size of 1.7 phi (0.31 mm) and a shell content of 13.3%. To the west, there is the Borrow Area U, which is a non-replenishing resource. This is a proven deposit with a potential estimated volume of 818,700 cy (625,941 m^3) and mean grain size of 2.10 phi (0.23 mm). Additional historic geophysical and geotechnical data reported by Meisburger (1979) further confirms that the area is likely to have surficial sands further offshore. Moreover, NOAA planned to collect additional geophysical data offshore Cape Lookout in 2022. APTIM's proposed survey planned to connect the NOAA data to the ASAP data, while still investigating the area further offshore for potential resources (Figure 14). BOEM proposed the following strategic questions for the Bogue region: 1) What is the composition, quality, and extent of the potential resource(s) and 2) what is the origin and evolution of the deposit(s)? The proposed geophysical and geologic survey plans were designed to answer these questions, and they were presented to the stakeholder group for further input.

During the stakeholder meeting held on April 27, 2022, APTIM allowed representatives from the local communities to comment on the tentative line plan. For the Bogue region, stakeholders provided insight into a similar project extending 9 miles (14.4 km) offshore being conducted by Geodynamics for Carteret County. Geodynamics' proposed line plan would likely coincide with APTIM's and TWI's survey plan past the federal state boundary and that some coordination between projects would be possible to minimize data duplication that would require some adjustments to the proposed plan. Additionally, representatives from University of North Carolina Wilmington (UNCW) requested to be allowed access to cores that contained peat, to which BOEM agreed if it were possible to preserve the samples.

Figure 14: Proposed geophysical data for the Bogue region. Plan totals 75.8 km (40.9 nm).



A total of 75.8 km (40.9 nm) of geophysical data were allocated offshore the Bogue region. The line pattern is designed to continue and extend the prior ASAP survey, and shore parallel lines are planned as a multiple of 30 m (98.42 ft). The proposed plan intended to extend the ASAP grid seaward and towards the east in order to better understand the geologic framework and the paleovalley distribution in the area. Results of the desktop survey and ASAP indicate that this region has complex surficial geology where accumulations of sand and other Quaternary sediment is related to accommodation provided by drainage formation and incision into the exposed Pliocene and Miocene ancient strata (Hine and Snyder, 1985). The paleo-drainages in the region trend north-south (shore perpendicular), and so continuing with grid mapping should help constrain their distribution and potential role in sheltering sand resources (Hine and Snyder, 1985; Conery, 2019). Finally, the southernmost proposed survey lines would allow for correlation of the ASAP survey to the planned NOAA hydrographic survey area off of Cape Lookout.

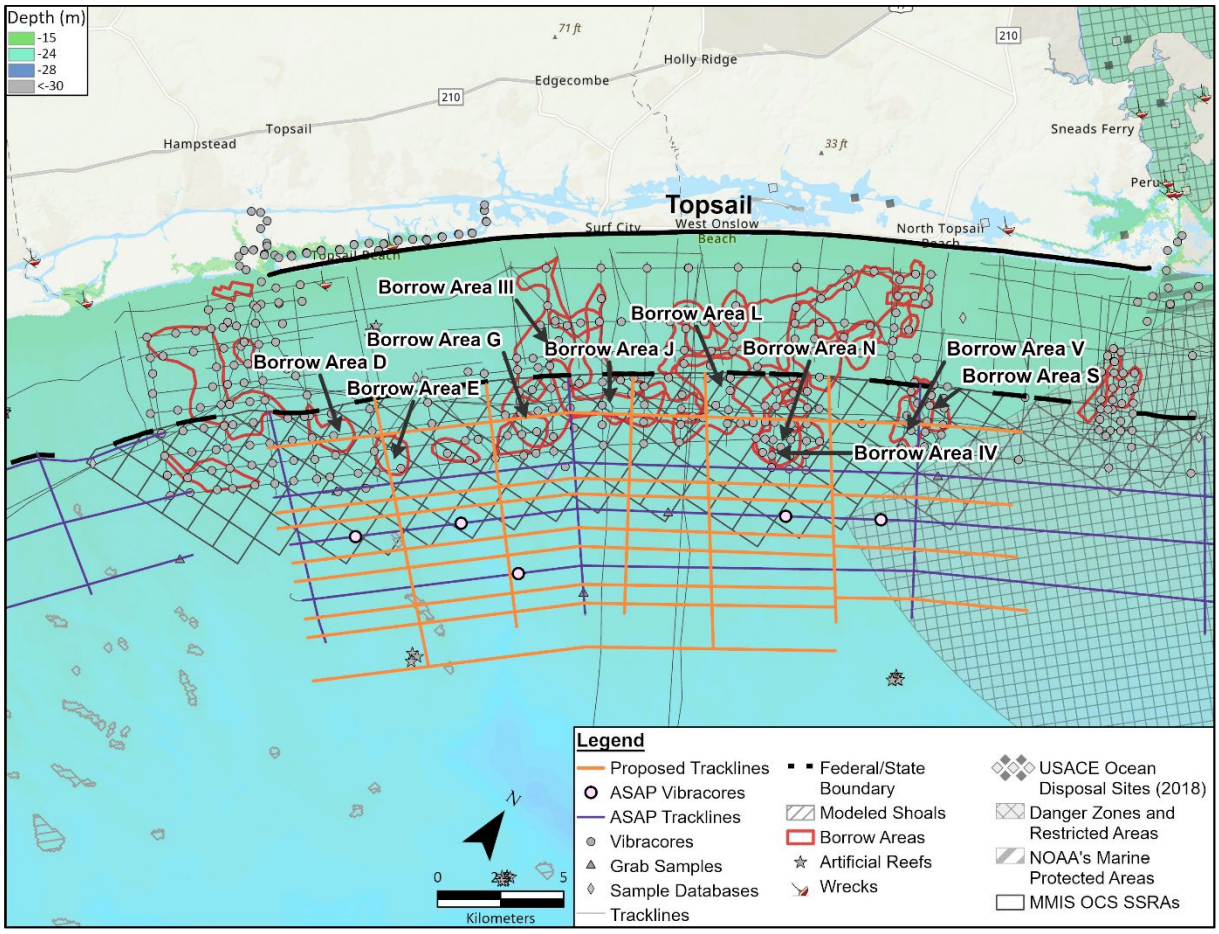
4.2 Topsail

The Topsail region represents sand needs for Topsail Beach, Surf City/North Topsail Beach, and North Topsail Beach (Figure 15). This region is sediment-starved, and discovery of accessible sand resources is challenging because of the presence of extensive exposed ancient strata (ranging from outcropping Oligocene formations to ephemeral hard-bottom formations). ASAP data indicates the potential for sand resources along the south-central portion of the survey area. APTIM and TWI designed this region's survey to determine the extent of potential resources, sand quality distribution, and any indications of

environmentally sensitive areas and/or archaeologically/culturally significant sites. Within federal waters there are several already identified potential, proven, and unverified resources (Borrow Area D, Borrow Area E, Borrow Area J, Borrow Area L, Borrow Area N, Borrow Area S and Borrow Area G, V, IV and III). In this region, locally exposed ancient, lithified strata are covered with discontinuous Quaternary surficial sand and gravel, but the patchy nature indicates surficial sand may not be present in significant volumes (Snyder et al., 1988). The paleo-drainages that dissect the exposed ancient strata have variable fill but provide accommodation to allow for sand accumulation and preservation as found in the ASAP survey. Based on the geologic framework and ASAP data, potential resources could be present in the uppermost section of smaller paleo-drainage channels further offshore. BOEM proposed the following strategic questions for the Topsail region: 1) What is the composition, quality, and extent of the potential resource(s), 2) how does sand quality vary across the deposit(s), and 3) are there indications of environmentally sensitive areas or cultural sites that may require avoidance within the area? The proposed geophysical and geologic survey plans were designed to answer these questions and were presented to the stakeholder group for further input.

During the stakeholder meeting on April 27, 2022, APTIM allowed local representatives to comment on the tentative line plan. For the Topsail region, representatives relayed that beach nourishment would benefit beaches across the entirety of the region and that they would be interested in anything from federal waters. Stakeholders from USACE shared resources related to the dredging of state waters as well as post-construction surveys, however, no activity is expected beyond the federal state boundary. Further, stakeholders from the North Carolina Department of Environment and Natural Resources (NCDENR) revealed that due to the extensive hard-bottom it would be challenging to discount any environmentally sensitive areas or cultural sites in the area, even if not currently known. The stakeholders also requested that tracklines be extended further north in order to assist in the delineation of resources for North Topsail Beach and requested that results from the geotechnical investigation be made available once the survey is complete.

Figure 15: Proposed geophysical tracklines offshore Topsail. Survey plan totals 252.7 line-km (136.4 nm) of geophysical data.



A total of 252.7 km (136.4 nm) of geophysical data were proposed offshore Topsail. The proposed survey plan consists of appraisal fill-in lines to the ASAP data in order to constrain the paleovalley systems and surface deposits in the southern portion of the study area. On the central-north area, additional exploratory fill-in lines were added to determine if any resources were missed within the ASAP grid. Additionally, exploratory lines were placed on the inshore of established USACE Borrow Areas, which are connected by tie-lines that cross the entire survey, in order to determine if these resources can be traced further offshore. An exploratory line offshore was added along the southern area to allow for the characterization of any resources that could extend further offshore.

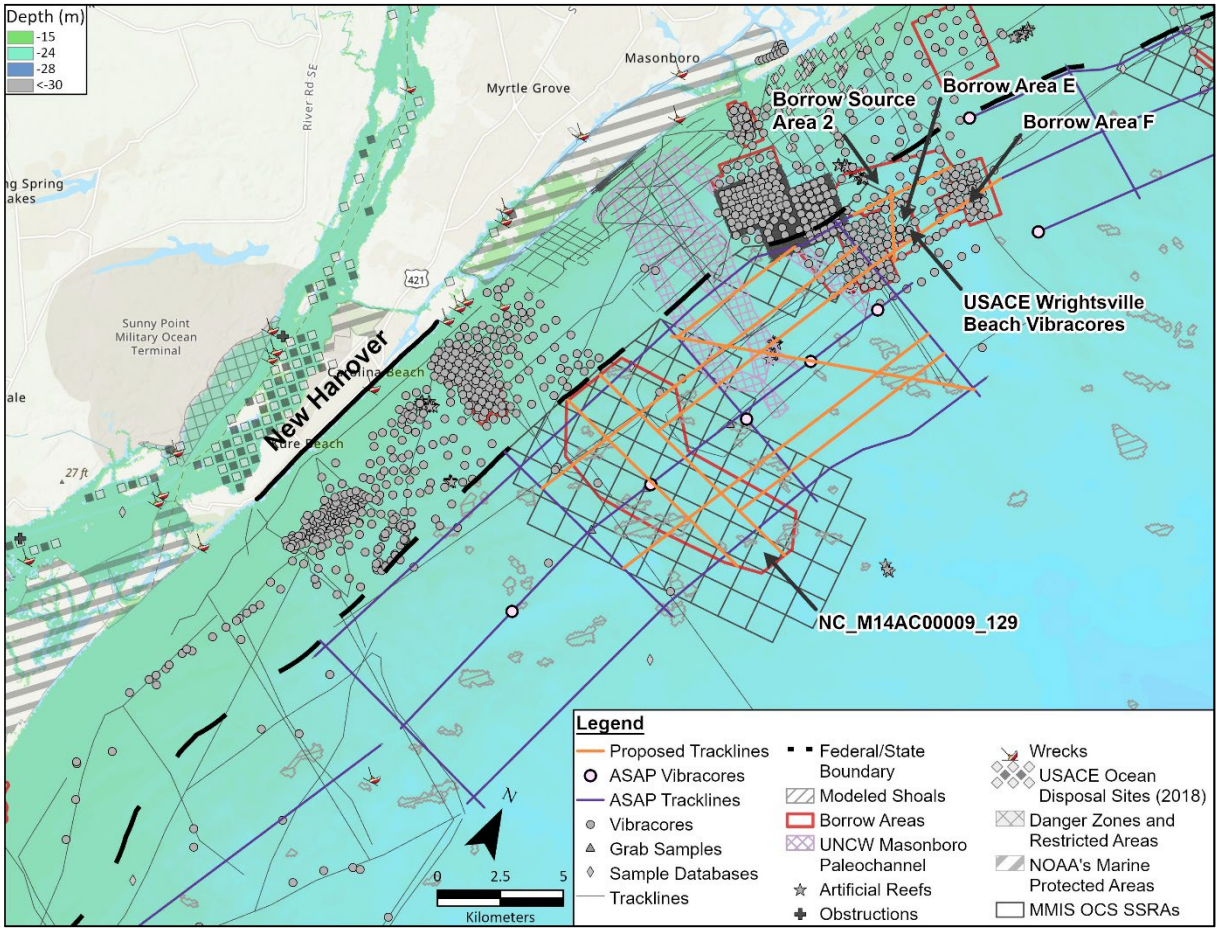
4.3 New Hanover

The New Hanover region represents sand needs for Kure Beach, Carolina Beach, Masonboro Island, and Wrightsville Beach. ASAP results indicated potential sand resources along the northern and central portions of the studied area while bathymetric data and sand resource estimates indicated that the potential deposit may consist of smaller-scale features. At the northern end of New Hanover, USACE has identified an unverified potential resource in federal waters (NC_M14AC00009_129), which APTIM collected additional geophysical and geotechnical data on in order to further characterize the potential deposit. Additionally, APTIM collected fill-in lines to the ASAP data over some of the modeled shoals to characterize the deposit and ground truth the model. The additional geophysical and geotechnical data would also assist in further developing the geologic model for the area (Figure 16). Previous work identified

complex overlapping paleovalleys, channels, and potential preserved shoreface and sand shoal lithosomes across the region (Snyder et al., 1994). Sand resources were identified in the ASAP survey associated with potential shoreface lithosomes preserved in the uppermost sections of the paleovalleys, indicating a potentially important mechanism of accommodation and preservation being linked to patterns of sand resource occurrence (Hoffman et al., 1991; Snyder et al., 1994). These systems extend across state waters well into the federal OCS as mapped by ongoing academic projects (Shannon Klotsko UNCW, personal communication 2022). BOEM proposed the following strategic questions for the New Hanover region: 1) What is the extent and distribution of the potential resource(s), 2) what is the origin and evolution of the deposit(s), and 3) does sand quality vary/follow a pattern that can be identified? The proposed geophysical and geologic survey plans were designed to answer these questions and were presented to the stakeholder group for further input.

During the stakeholder meeting on April 27, 2022, APTIM allowed representatives from the local communities to comment on the tentative line. In the discussion, representatives from UNCW stated that they collected geophysical data offshore Masonboro Island that correlates with some of the proposed lines and some of the proposed data could likely be reallocated in order not to duplicate efforts. Representatives from USACE requested that additional data be collected in federal waters within the unverified plus area and extending to the north to characterize the potential and proven resources offshore Wrightsville beach.

Figure 16: Proposed geophysical tracklines offshore New Hanover. Survey plan totals 102.9 line-km (55.6 nm) of geophysical data.



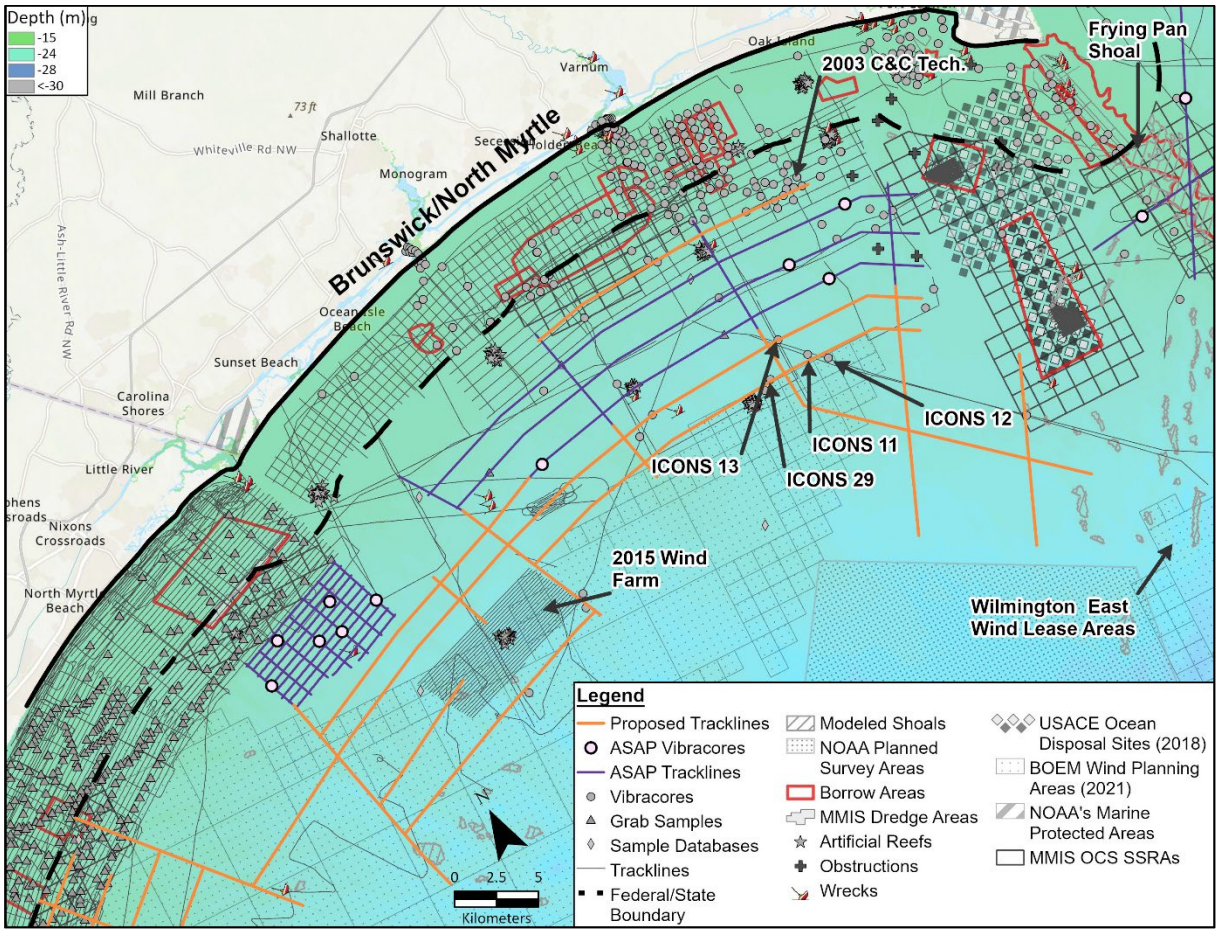
A total of 102.9 km (55.6 nm) of geophysical data were proposed offshore New Hanover. The proposed plan was designed to constrain potential resources within the northern portion of the ASAP lines and collect additional data over the unverified, proven, and potential resources. Review of the geophysical and geotechnical ASAP data indicated that the northern area has the highest potential for sand resources. APTIM's proposed survey plan sought to further constrain this area through near-appraisal level sampling and optimizing placement relative to UNCW's geophysical data. A tie-line was proposed within the northern area to sample the modeled shoals identified in the northeast corner of the area. Based on stakeholder feedback, the proposed line plan was extended further north, connecting the ASAP New Hanover survey area lines with the Wrightsville Beach study area. This allowed for the characterization of USACE Offshore Borrow Source Area 2 Borrow Area E and F, as well as correlating the existing USACE Wrightsville Beach vibracores with seismic data in order to further constrain the deposit. Additionally, per stakeholder requests, Borrow Area NC_M14AC00009_129 was further sampled in order to better constrain its properties.

4.4 Brunswick/North Myrtle

The Brunswick/North Myrtle Region represents sand needs for North Myrtle Beach, Waites Island, Ocean Isle, Holden Beach, and Oak Island. ASAP data indicated little sand present in the 4.8 to 12.8 km (3- to 8-mile) offshore region and other data suggest sand may be present in appreciable thickness in the 16 to 21 km (10- to 13-mile) region offshore of Waites Island. There are several identified borrow areas that are proven and unverified, the majority of which are in federal waters. USACE was planning to collect 102 vibracores offshore Holden Beach within mostly state waters. APTIM's plan avoided duplicating efforts and re-sampling the same area. Moreover, there are several disposal sites and shoals (Frying Pan Shoals) at the easternmost portion of the coastline. Due to the known sedimentological properties of Frying Pan Shoals, as well as likely regulatory issues associated with marine minerals on the shoal, APTIM decided against collecting any geophysical or geotechnical data in its vicinity. The proposed survey plan aimed at identifying the presence of sand deposits of significant thicknesses (>1.5 m [5 ft]), as well as the deposit's nature, extent, and quality beyond the 12.8 km (8-mile) region. By collecting wider spaced lines and extending the mapped area, APTIM was able to tie-in the geophysical data collected in 2015 as part of the wind farm dataset and have the necessary coverage for ground-truthing (Figure 17). BOEM proposed the following strategic questions for the Brunswick/North Myrtle region: 1) Is there sand of significant thickness (greater than 5 ft [1.5 m]) present in this region, and 2) what is the origin and evolution of the deposit(s)? The proposed geophysical and geologic survey plans were designed to answer these questions and were presented to the stakeholder group for further input.

During the stakeholder meeting on April 27, 2022, APTIM allowed representatives from the local communities to comment on the tentative line plan. For the Brunswick/North Myrtle beach region, representatives from USACE concurred that sand was found in nearshore regions, but known existing volumes are limited, therefore looking beyond the 3-mile (4.83 km) limit to renourish Holden beach will be essential. It was also noted that the USACE is actively executing a study offshore Holden Beach and offered that during their ongoing work they encountered quality issues with some of the historic geophysical data and have identified potential conflicts between existing seismic data interpretations and subsequent vibracore ground truth results. USACE suggested additional data collection in the 3–6 nm (5.55- 11.11 km) zone may be warranted.

Figure 17: Proposed geophysical tracklines offshore Brunswick/North Myrtle. Survey plan totals 228.6 line-km (123.4 nm) of geophysical data.



A total of 228.6 km (123.4 nm) of geophysical data were proposed offshore Brunswick/North Myrtle. In response to stakeholder comments, APTIM and TWI planned to collect a shore parallel line in the nearshore portion of the ASAP grid. This line aimed at correlating and connecting previously collected USACE vibracores (C&C Technology 2003 Vibracores) with geophysical data and determining if there are any potential resources nearshore. On the offshore portion of the study area, APTIM increased the extent of the ASAP data coverage while also correlating the Meisburger 1979 ICONS core 11, 12, 13 and 29, which indicate the presence of sand in the area. The three lines that were collected west of Frying Pan Shoals aimed at characterizing the area between the ASAP data and the Wilmington East Wind Lease Areas and assessing if there are any resources that could be made inaccessible once the wind farm and auxiliary structures are placed. The western region also has subsurface structural complexity with folding of underlying Cretaceous units (Baldwin et al., 2004), potentially related to the presence of the Cape Fear Arch (Van de Plasche et al., 2014). This structural framework may have played a role in the routing of paleo-drainages observed in prior studies and subsequent accommodation generation for preservation of sand resources. In order to assist in the understanding of the geologic framework of the area and further delineate and constrain these complex features, APTIM and TWI chose to extend the study area further

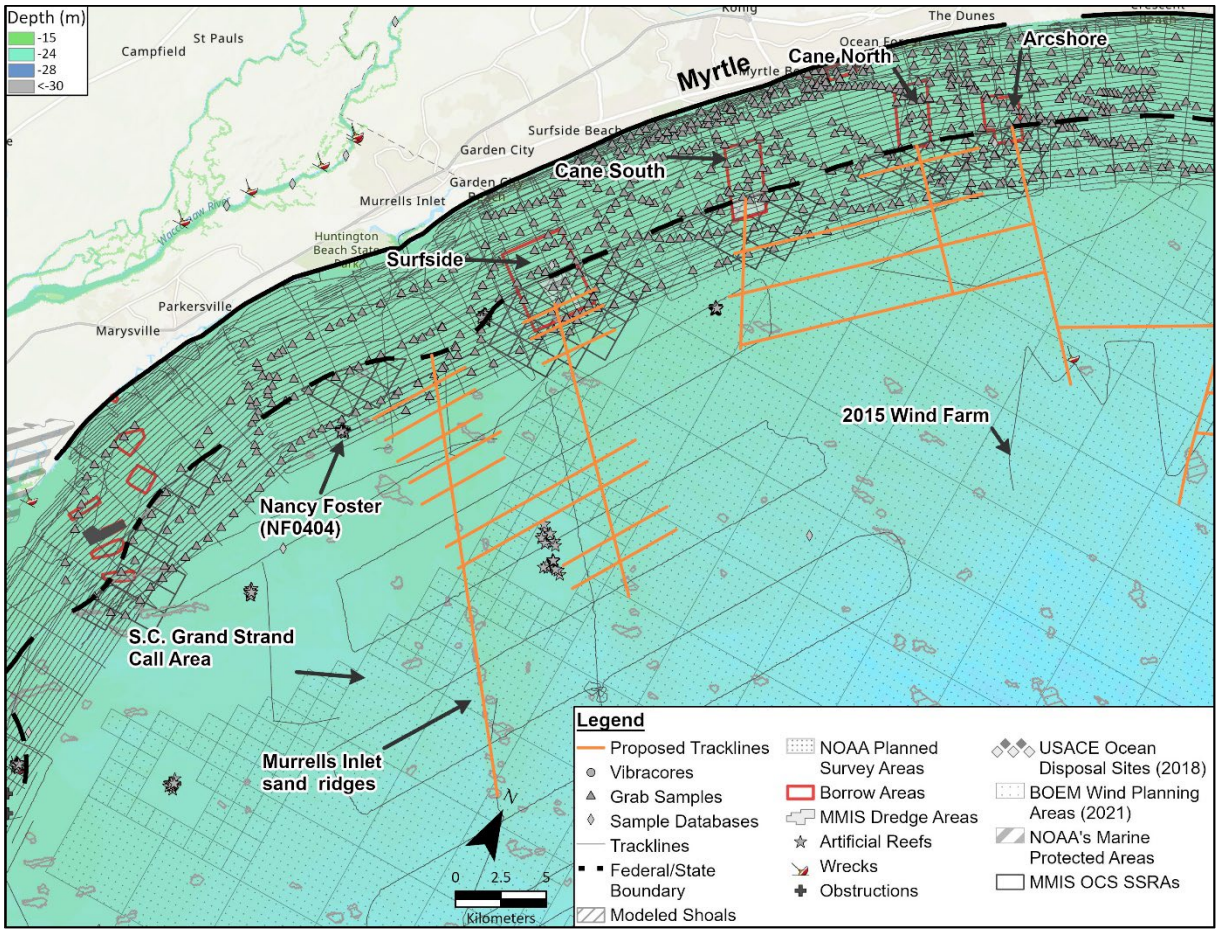
offshore and tie-in the new geophysical data to the 2015 wind farm data, targeting specific features that are likely to be sand bearing.

4.5 Myrtle

The Myrtle region represents sand needs for Pawleys Island, Litchfield Beach, South Garden City/Huntington Beach, Garden City/Surfside Beach, the City of Myrtle Beach, Arcadian Shores, and North Myrtle Beach. This region contains the Grand Strand Call Area for future wind farm development, where advanced exploration and identification of sand resources are required. Due to the high data coverage in the nearshore, APTIM's efforts focused beyond the 11.2 km (7-mile) region, while still tying in historic data with new data in order to better understand the geologic framework and processes along the coastline. Numerous paleovalleys were observed in state waters across this region, with highly variable channel fill and evidence for reoccupation and tidal reworking (Baldwin et al., 2006). The uppermost sediments within these valleys were occasionally found to be modern or Holocene well sorted sand, and there was found to be a spatial relationship between the valley position and the presence of surficial sand shoals in state waters (Baldwin et al., 2006). APTIM's plan extends the study area further offshore to determine if there are any existing and potential borrow areas, if the Murrells Inlet sand ridges can be a potential resource, and if there are any sand deposits of significant thicknesses (> 1.5 m [5 ft]) offshore Myrtle Beach and what is their extent and potential quality. Additionally, the proposed plan covers some of the Grand Strand Call Area in order to assist with the determination of areas to avoid during the installation of the cable system and turbine placements (Figure 18). BOEM proposed the following strategic questions for the Myrtle region: 1) can existing and potential borrow areas be extended further offshore, 2) Are the sand ridges found in the OCS off the coast of Murrell's Inlet a potential resource, and if so, what is the origin of the features and are they actively evolving, and 3) Is there sand of significant thickness present off the coast of the cities of Myrtle Beach and North Myrtle Beach in the region from 4 to 8 miles(6.4-12.9 km) offshore, and if so, what is the nature, extent, and quality of the deposit(s)? The proposed geophysical and geologic survey plans were designed to answer these questions and were presented to the stakeholder group for further input.

During the stakeholder meeting on April 28, 2022, APTIM allowed representatives from the local communities to comment on the tentative line plan. For the Myrtle region in South Carolina, there were very few concerns or comments voiced by local stakeholders. The main concern centered around the ability of the project to incorporate the existence of known live bottom and preserving the habitat during the data collection phase. APTIM acknowledged that preserving the habitat is paramount and they will avoid bottom sampling within the area of concern.

Figure 18: Proposed geophysical tracklines offshore Myrtle. Survey plan totals 204.2 line-km (110.3 nm) of geophysical data.



A total of 204.2 km (110.3 nm) of geophysical data were allocated to the Myrtle study area. The proposed line plan intended to satisfy a multitude of project goals within the area. The easternmost nearshore lines aimed at potentially extending the USACE Cane North and Arcshore borrow area and further constraining the deposit beyond the federal state boundary. The eastern shore perpendicular and offshore shore parallel lines are intended to provide information on the geologic framework further offshore and tie-in the 2015 Wind Farm data to the nearshore resources. The central nearshore lines aimed at characterizing the existing USACE borrow areas (Surfside and Cane South) and determining if these resources extend further offshore. The western lines were designed based on the Nancy Foster (NF0404) data set and were intended to constrain the paleovalley system identified in the area and confirm the existing understanding of the geologic framework and where potential resources could be deposited. The offshore portion of the westernmost shore perpendicular tie line aims at characterizing the series of identified modeled shoals that have yet to be confirmed and their origin is unknown.

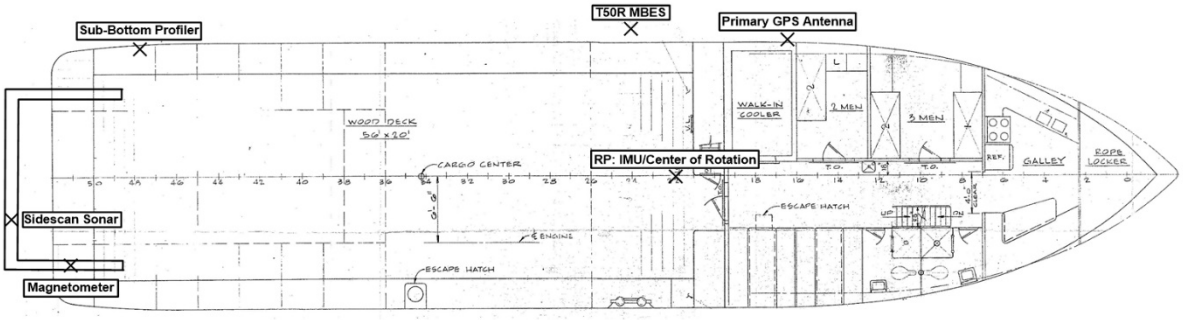
5 Geophysical and Geotechnical Data Collection Methodology

5.1 Geophysical Survey Operations and Geotechnical Site Selection

5.1.1 Systems and Equipment

Between May 15, 2022 and June 16, 2022 APTIM collected a total of 898 line-km (484.9nm) of geophysical data in Onslow and Long Bays utilizing the following systems and equipment according to the diagram presented in Figure 19 and included in Appendix D

Figure 19: R/V James K. Goodwin vessel diagram



5.1.1.1 Geophysical Survey Vessel Characteristics

For the geophysical data collection efforts, APTIM used the R/V James K. Goodwin, a United States Coast Guard (USCG) inspected and certified vessel for Phase 1 of this project. The R/V James K. Goodwin is a 33.5 m (110 ft) steel hulled vessel, acquired with the sole purpose of geophysical, geotechnical, and biological surveys. It comes equipped with twin 1692 Detroit diesel main engines, twin 471 Detroit diesel generators (40 Amp), one 18,000-pound (lb) capacity deck winch, a 10 cm (4 inch) down pole with variable mounting brackets, and a 10-ton capacity hydraulic A-frame. The R/V James K. Goodwin are equipped with crew and client quarters as well as a full galley with two heads including showers. As a USCG inspected vessel, the R/V James K. Goodwin safety features include fire extinguishers, life vests/survival suits, 50-man life raft, first aid kits, radar, Very High Frequency (VHF) radios, and an Emergency Position Indicating Radio Beacon (EPIRB) with Global Positioning System (GPS) and more. These safety features and the level of experience and expertise from the captain and crew allows the R/V

James K. Goodwin to operate safely and efficiently, providing proficient geophysical and geotechnical support throughout project operations.

5.1.1.2 Navigation System

APTIM utilized Hypack Inc.'s Hypack 2020 software for geophysical data collection and Hypack Inc's Hysweep system for multibeam data collection. Hypack and Hysweep are state-of-the-art navigation and hydrographic surveying systems. Vessel positioning and navigation were provided by the Applanix Position Orientation System for Marine Vessels (POS M/V; see Section 5.1.1.3 below). The POS M/V is a highly accurate positioning device that combines Global Navigation Satellite Systems (GNSS) data with acceleration data from the Inertial Measure Unit (IMU), as well as heading to provide a complete position solution. Navigation, motion reference unit, magnetometer, and all depth sounder systems were interfaced with an onboard computer, and the data integrated in real time. The locations of the tow points on the vessel for each towed instrument in relation to the POS M/V system and the length of cable between the tow point and each towed instrument were measured and entered into Hypack. The real time position of each towed instrument was calculated using the aforementioned values and a catenary factor specific to each system's towing attitude and displayed in real time through Hypack and monitored by APTIM scientists. Online screen graphic displays include the pre-plotted survey lines, the updated boat track across the survey area, adjustable left/right indicator, as well as other positioning information such as boat speed and line bearing. The digital data was merged with positioning data, video displayed and recorded to each of the individual acquisition computers. Hysweep was operating concurrently to Hypack and provides a visual display of the multibeam bathymetric data being collected as well as attitude corrections, so that APTIM scientists were able to visualize the data in real time for proper data quality. Each acquisition system parsed the corrected navigation string from Hypack to the incoming data; therefore, all raw data is layback corrected.

5.1.1.3 Motion Reference Unit

An Applanix POS M/V IMU system was utilized to collect attitude, heading, position and velocity data for survey operations. The POS M/V data was logged at 25 Hz for post processing using POSPac Mobile Mapping Suite (POSPac MMS). The Applanix POS M/V family is an inertially aided motion unit that provides highly accurate attitude corrections. The POS M/V works by combining GNSS data with IMU angular rate and acceleration and GNSS Azimuth Measurement System (GAMS). GAMS calibration was required to calculate the misalignment of the inertial navigator to the heading produced from GAMS. Calibration was performed through careful physical measurement of system components and aggressive maneuvering of the survey vessel to reduce the dynamic heading alignment below one (1) degree (approximately) and subsequently calculate the misalignment with the GAMS heading. Motion data were embedded within the Hypack MBES files. POS M/V data groups were logged at 25 Hz for post-processing using Applanix POSPac MMS software.

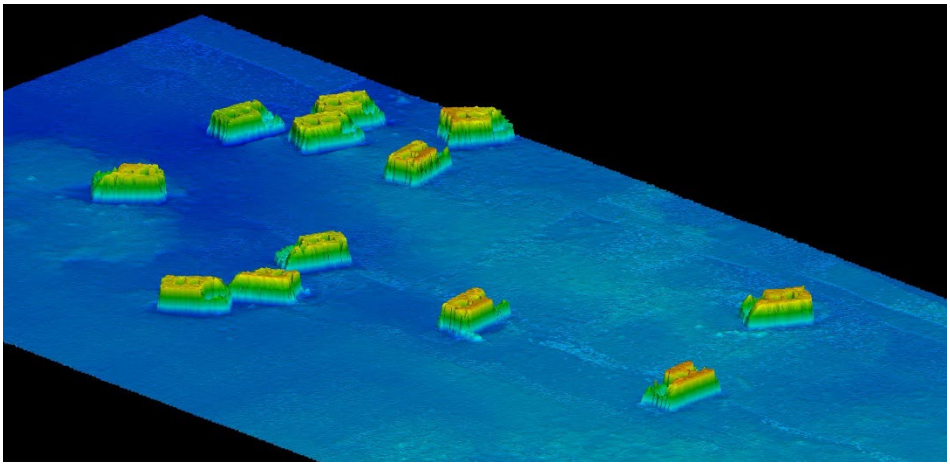
5.1.1.4 Multibeam Bathymetry Instrumentation

APTIM collected Multibeam Echosounder (MBES) data following International Hydrographic Organization S-44 Standards Order 1b. APTIM utilized a Reson Seabat T-50 system multibeam

echosounder pole mounted on the side of the vessel for multibeam bathymetry data collection. The Reson T50 is an all-in-one, fully flexible survey system designed for fast mobilization. It has a frequency range of 190 to 420 kilohertz (kHz) that can be adjusted to allow for optimal swath performance and reduce survey time in various conditions. The T-50 operated at 400kHz providing a specified sounding footprint of 0.5º x 1.0º. Horizontal and vertical offsets from the multibeam transmitter and receiver were measured to the navigation antennas and IMU and applied in Hypack/Hysweep and Applanix POSView. Multibeam soundings and real time sound velocity measurements at the sonar head were recorded directly to Hysweep acquisition software.

Prior to the start of bathymetric data collection, a patch test was required to precisely measure system misalignments in relation to the vessel's reference frame. Patch tests were conducted each time the pole mount was adjusted, retrieved for port calls, deployed, and as necessary for quality assurance and quality control (QA/QC) procedures. Patch tests were performed prior to data collection in each region. Patch tests were performed over sloping grounds and/or submerged objects or artificial reefs. An artificial reef site was used in the New Hanover region as shown in Figure 20.

Figure 20: Patch test bathymetry from New Hanover artificial reef site.



Patch test biases were calculated for latency, roll, pitch, and yaw. In brief, a patch test is performed by collecting survey lines perpendicular to a slope (or object) on the seafloor in a specific reciprocal pattern to account for latency, pitch, and yaw biases. Additional survey lines are collected over flat bottom to account for roll bias. The collected patch test data were loaded into Hysweep editor and processed using the Patch Test utility. Patch test trials were averaged and embedded within all processed sonar files. Patch test bias values varied between survey vessels as presented in Table 2 below. The patch test performed in the Bogue region was removed from the average applied due to the surface sound velocity error. Patch test values were consistent throughout the survey and varied within acceptable limits.

Table 2: MBES Patch Test Results.

Region	Date	Roll	Pitch	Yaw	Latency
Bogue	5/24/2022	0.18	-3.67	1.00	0.00
Topsail	5/30/2022	-0.12	-3.75	0.50	0.00
Brunswick/North Myrtle	6/6/2022	-0.27	-3.71	0.33	0.00
Myrtle	6/14/2022	-0.07	-3.25	-0.50	0.00
Used	N/A	-0.15	-3.57	0.17	0.00

Sound velocity profiles were collected using a Valeport Swift sound velocity profiler using an Ocean Science under-way system. Sound velocity casts were taken several times daily and embedded into Hypack HSX files and stored for later analysis.

5.1.1.5 Magnetometer Instrumentation

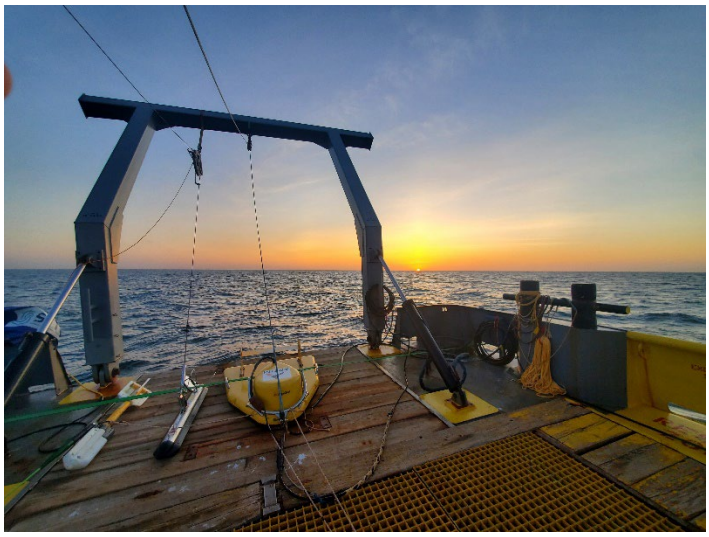
A Geometrics G-882 Digital Cesium Marine Magnetometer was used to perform an investigation of magnetic anomalies and to establish the presence and location of any potential underwater wrecks, cultural resources, or submerged hazards. The Geometrics G-882 magnetometer runs on 110 volts alternating current (VAC) and is capable of detecting and aiding the identification of any ferrous, ferric, or other objects that might have a distinct magnetic signature. This particular magnetometer is highly sensitive and is capable of identifying targets with less than 1 gamma. Factory set scale and sensitivity settings were used for data collection (0.004 nT/πHz rms [nT = nanotesla or gamma]; typically, 0.02 nT peak to peak at a 0.1 second sample rate or 0.002 nT at 1 second sample rate). Sample frequency is factory-set at up to 10 samples per second. The magnetometer was towed at an altitude no greater than 6 m (19.7 ft) above the seafloor (per BOEM guidelines) and far enough from the vessel to minimize boat interference. Navigation and horizontal positioning for the magnetometer were provided by the Applanix POS M/V Oceanmaster via HYPACK utilizing the Hypack towfish layback correction. The magnetometer was recorded in the native .raw Hypack file format.

In order to meet BOEM's requirement of towing the magnetometer within 6 m (19.7 ft) from the seafloor, APTIM towed the magnetometer in tandem with the sidescan sonar system to better adjust and maintain appropriate altitudes above the seafloor. When water depths become shallow enough and significant boat interference was observed in the data, APTIM modified the towing configuration so that the magnetometer was towed independently from the sidescan sonar towfish.

5.1.1.6 Sidescan Sonar Instrumentation

An EdgeTech 4200 sidescan sonar system was used to collect sidescan sonar data in the investigation area. The 4200 uses full-spectrum chirp technology to deliver wide-band, high-energy pulses coupled with high resolution signal to noise ratio echo data. The portable sidescan package includes a laptop computer running the Discover® acquisition software and a 300/600 kHz dual frequency towfish running in high-definition mode. At 300 kHz the maximum range scale is 230 m (754 ft), and at 600 kHz the maximum range scale is 120 m (393 ft). The sensor was towed from a marine grade oceanographic winch to allow for easy, real-time adjustments for changes in the seafloor to maintain an altitude that is 10 to 20% of the range of the instrument per BOEM guidelines. The sidescan sonar system was monitored and adjusted, in real-time to use the optimal settings for environmental, oceanographic, and geologic conditions in order to maximize data quality and coverage to ensure that the data being collected resolve features at a 0.5 m (1.6 ft) resolution. Navigation and horizontal positioning for the sidescan sonar system was provided by the POS M/V system via Hypack utilizing the Hypack towfish layback correction. Sidescan sonar data was collected and recorded in the system's native .jsf format.

5.1.1.7 Sub-Bottom Profiler Instrumentation



Chirp sub-bottom data were collected using an EdgeTech 3200 sub-bottom profiler system with a 512i towfish to conduct the high-resolution subsurface mapping within the upper 10 m (33 ft). This instrumentation generates cross-sectional images of the seabed capable of resolving bed separation resolutions of 0.06 m (0.2 ft) to 0.10 m (0.3 ft) depending on selected pulse/ping rate. The X-STAR Full Spectrum Sonar is a versatile wideband FM sub-bottom profiler that collects digital normal incidence reflection data over many frequency ranges. This instrumentation generates cross-sectional images of the seabed. The X-STAR SB-512i transmits an FM pulse that is linearly swept over a full spectrum frequency range (also called a "chirp pulse"). The tapered waveform spectrum results in images that have virtually constant resolution with depth. The sub-bottom profiler was operated at a frequency of 0.7-12 kHz, 40 percent power, and with a ping rate of 8 Hz during data collection. In the majority of conditions this provides an estimated stratigraphic bed resolution of 10–30 cm (11.81 inches). The data was collected and recorded in the systems native, EdgeTech .jsf and standard exchange format (SEG-Y) format. APTIM scientists monitored the data continuously in order to ensure the highest quality data is being collected. Additionally, APTIM adjusted the survey speed to provide optimal data collection and maintain a speed around 4 knots. Navigation and horizontal positioning for the sub-bottom system were provided by the POS M/V system via Hypack utilizing the Hypack towfish layback correction.

5.1.2 Geophysical Data Processing Methodology and Initial Interpretation

The results of the geophysical survey (sub-bottom profiler, sidescan sonar, magnetometer) were processed and evaluated to develop the proposed geotechnical sampling plan. Initial geophysical interpretations were made to identify stratigraphic and geomorphic features of interest that have the potential for hosting sedimentary resources and to add to the regional geologic framework. Each proposed geotechnical sample site was cleared for archaeological and sensitive benthic habitat resource assessments. A brief summary of the findings of each assessment is included below and for each study area.

5.1.2.1 Multibeam Bathymetry

The bathymetry data collected were processed using Hypack Hysweep MBMax 64-bit editor. Applanix's POSPac MMS was used for post-processing of attitude and position data. All data was reviewed for errant soundings with the swath limited to 55 degrees on port and starboard to ensure sounding quality. Post-processed attitude and position data were exported from POSPac MMS as a smoothed best estimate trajectory (SBET) file and applied within Hypack's MBMAX64. Post-processed ellipsoidal heights were utilized for tidal corrections using MBMAX64's real time kinematic tide correction function using GEOID18. A surface sound velocity error was found in the Bogue region of the survey area. Sound velocity adjustments were made where needed using the Hypack sound velocity adjustment tool and applied to the soundings where needed. All data was saved as Hypack .HS2X files. The xyz data was sorted at 5 ft (1.5 m) to create raster elevation files in the format of .tif. The sorted xyz files were loaded into ArcGIS Pro and the Topo to Raster tool was used to create gridded 10-ft (3.05 m) cell raster elevation data (presented in

Appendix A Maps 2a-2e). These data were saved as .tif files. Two-foot (0.61 m) contours were created from the elevation .tif files using the contour tool in ArcGIS Pro. Data is provided as ASCII XYZ including TPU values, gridded raster surfaces, and imported into a geodatabase provided in digital Appendix B. Raw and edited Hypack files are provided in Appendix O and sound velocity profiles are provided in digital Appendix E.

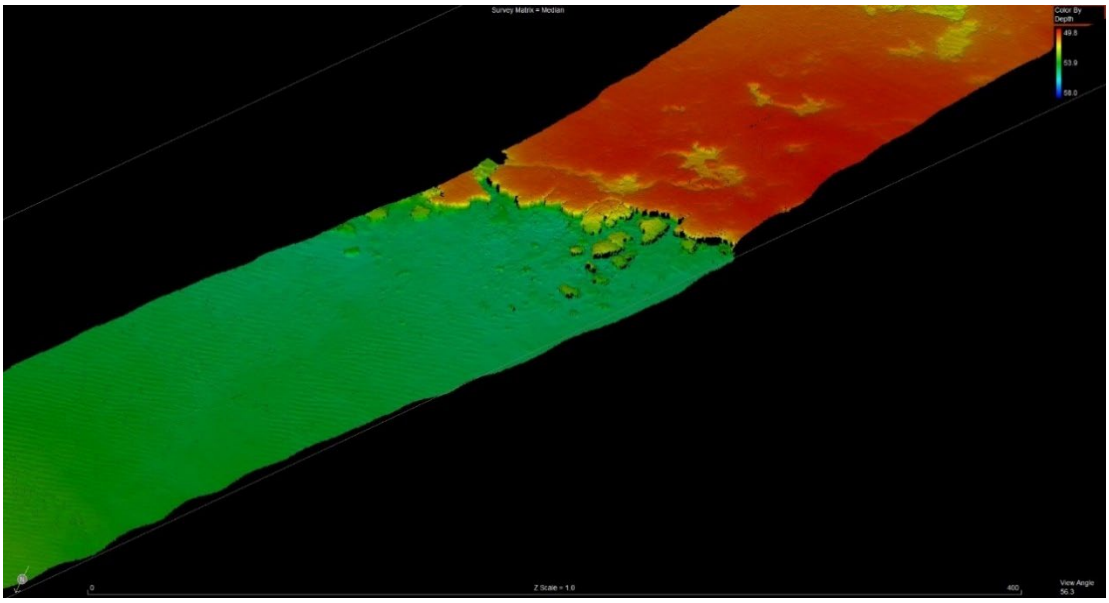
Multibeam data were processed by APTIM staff and exported for the creation of contours as well as raster grids. Data was analyzed for TPU, TVU, and THU to ensure that all data met International Hydrographic Organization 1b criteria using Hypack's TPU editor as well as manual calculations of uncertainty thresholds. All data remained within order 1b standards. ASCII files and gridded results are presented with the Marine Minerals Information System (MMIS) geodatabase (Digital Appendix B). In addition to TPU analysis, vertical comparisons were performed between crossing lines and presented by region in Table 3 below. Raster grids were used to perform the calculations across the entire swath of soundings. Cross statistics were calculated by inversing the difference between raster cell depths at each intersection point. A cell size of 10 ft (3.05 m) was used to create all raster surfaces. The difference between the two raster surfaces were presented as a surface where statistics could be calculated on a regional basis using the Raster Calculator tool within GIS. Post-processed ellipsoidal heights are negatively affected by long baselines from the vessel to the Continuously Operating Reference Stations used for the final solution and would contribute to the vertical discrepancies present. Other contributing factors include dynamic draft, sea condition, and the presence of strong and varying thermoclines.

Table 3: Crossing Line Statistics.

Region	Min ft/m	Max ft/m	Mean ft/m	Std. Dev. ft/m
Bogue	-0.433/-0.132	0.698/0.213	-0.010/-0.003	0.245/0.075
Topsail	-0.509/-0.155	0.462/0.141	0.051/0.016	0.147/0.045
New Hanover	-1.479/-0.451	0.575/0.175	-0.066/-0.02	0.217/0.067
Brunswick	-0.569/-0.173	0.536/0.163	-0.052/0.016	0.183/0.057
Myrtle	-0.557/-0.170	0.704/0.215	0.046/0.014	0.178/0.054
Topsail	-0.509/-0.155	0.462/0.141	0.051/0.016	0.147/0.045

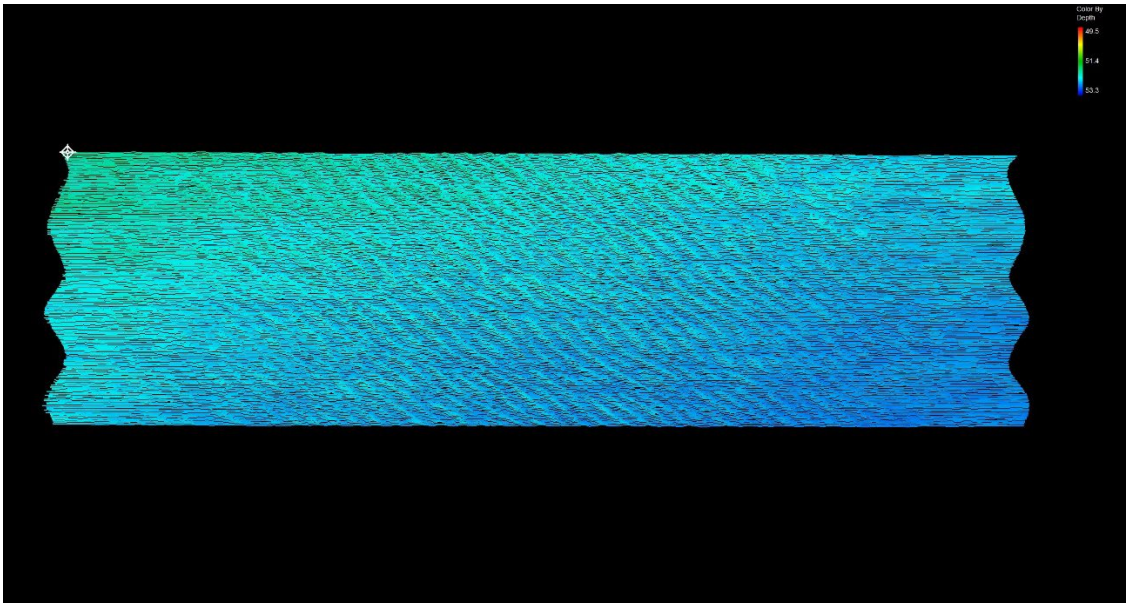
The T-50 MBES soundings were compared with side scan sonar data for feature verification and positioning. MBES soundings were able to capture depth and relief of the sea floor with high resolution to capture both potential ephemeral hard-bottom features, sand ripples/waves, and other targets. An example of a high resolution MBES color model matrix at half foot cell size capturing a distinct escarpment adjacent to sand waves is presented in Figure 21 below.

Figure 21: MBES imaged escarpment and sand waves.



In addition to color model matrices, Hysweep MBMax has multiple viewing options including individual sounding sweeps. This allows the user to identify errant soundings as well as bottom features. An example of MBMAX sweep window showing sand waves in *color wiggle* display is shown below in Figure 22.

Figure 22: MBES Sweep window showing sand waves.



5.1.2.2 Magnetometer

Magnetic field data were processed using Chesapeake Technologies, Inc. SonarWiz 7 software. The Hypack raw files were imported into two (2) separate SonarWiz projects to account for the two separate coordinate systems for the multiple regions, located offshore North Carolina (NAD83 North Carolina State Plane) and South Carolina (NAD83 South Carolina State Plane). Those data were then corrected for

navigation and/or sensor errors. Errant magnetic field readings were smoothed with manual corrections such as de-spiking to improve signal quality and coherence. Additionally, edits to the towfish layback may occur to more accurately reflect towfish position based off of known objects with ferromagnetic mass, if necessary. Raw and residual magnetic fields were then interpolated and analyzed to mark the most accurate representation of magnetic anomalies along each survey trackline. When marking anomalies, attributes such as amplitude, duration, and magnetic signature were measured and determined. All the magnetic anomalies and their associated attributes were then exported from SonarWiz and plotted in Esri's ArcGIS Pro for further analyses. All anomalies were examined in conjunction with other geophysical data products. The collective datasets were evaluated holistically while considering their spatial distribution and proximity to one another or other known features (e.g., sidescan sonar contacts, sub-bottom features of interest, or artificial reefs) to aid in interpretation and the determination of the source of anomalies, their potential relationship to their surroundings, and/or their potential archaeological significance. While reconnaissance-level survey investigations produce valuable data products, it is recommended that a close-order survey using a tighter line-spacing interval be conducted to better refine the magnetic field and the anomalies present within the survey areas. Maps with identified magnetic anomalies are presented in Appendix A Maps 4a-4e and provided digitally in Appendix B.

5.1.2.3 Sidescan Sonar

Sidescan sonar data were processed using Chesapeake Technologies, Inc. SonarWiz 7 software. The raw sidescan sonar data were imported into two (2) SonarWiz 7 projects, one (1) for the survey tracklines in North Carolina and one (1) for the survey tracklines in South Carolina data processing. The two projects were necessary due to the two different coordinate systems (NAD83 North Carolina State Plane and NAD83 South Carolina State Plane). Once those data were imported, they were bottom tracked to remove the water column (nadir) recorded. Bottom tracking was achieved by applying an automated bottom tracking routine that determined the first return signal in the data and provided an accurate baseline representation of the seafloor that eliminated the water column from the data. In some cases, manual bottom tracking was necessary when the automated bottom tracking could not accurately determine the first return in the sidescan sonar record. For these cases, the processor manually determined the first return in the data.

An empirical gain normalization table was built including all of the sidescan sonar data files. Once the table was built, it was applied to all of the sidescan sonar data. Empirical Gain Normalization (EGN) is a new gain function that works extremely well in most situations and can be considered a replacement for Beam Angle Correction. EGN is a function that sums and averages up all of the sonar amplitudes in all pings in a set of sonar files by altitude and range. The amplitude values are summed and averaged by transducer (port and starboard) to produce two tables. A given sonar amplitude sample is placed in a grid location based on the geometry of the ping. On the x-axis of the grid is range, and on the y-axis of the grid is altitude. The resulting table is used to work out the beam pattern of a sonar by empirically looking at millions of samples of data.

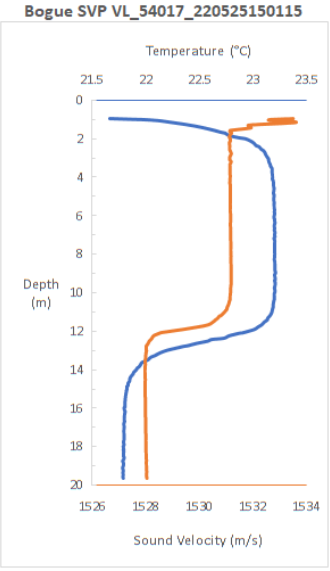
Due to the sea state and water quality conditions (thermocline) observed in portions of the survey area, a small percentage of the sidescan sonar lines contain reduced data quality, resulting in noise and striping. To try and aid in rectifying the noisy data, the Nadir Filter setting, and a De-Stripe Filter setting were utilized on those files with reduced data quality. The Nadir Filter is a special version of the Automatic Gain Control (AGC) filter that runs only along the nadir stripe. It is designed to reduce the difference between the nadir pixel values and the values immediately outside the nadir. The De-Stripe Filter can be used to reduce the effects of a 'pitching' sonar that is characterized by a stripy pattern perpendicular to the direction of travel. This setting processes each ping by comparing the current ping brightness to a filtered version of the sonar file that has smoothed out the stripes.

After processing each line, the data were inspected and interpreted for areas of potential seafloor hazards, geomorphic features, as well as other features of interest. Each potential area of interest on a line was digitized or highlighted and a shapefile was created for that particular bottom type. While APTIM geologists utilized the backscatter intensity, distribution, and texture to make best professional interpretations regarding the interpretation of features. Further ground-truthing is recommended for confirmation of acoustic interpretation.

The widely spaced survey lines collected throughout the survey area covering the different regions were collected with the EdgeTech 4200 towfish, which provided a limited image of the seafloor. The maximum range of the system was 240 m (787 ft) on each side, or 460 m (1,508 ft) swath, which was insufficient to allow for full seafloor coverage or interpretation between lines given the reconnaissance-level line spacing of the survey. Therefore, the digitized features were "isolated" to individual lines but provide a general location and description of areas/features of interest. Interpreted maps with digitized features delineated from the sidescan sonar data can be found in Appendix A Maps 3a–3e. Identified sidescan sonar targets with magnetometer anomalies can be found in Appendix A Maps 4a–4e. The sidescan sonar targets are also included within a contact report in order to highlight specific imagery, size characteristics, and location information of specific targets and can be found in Appendix F.

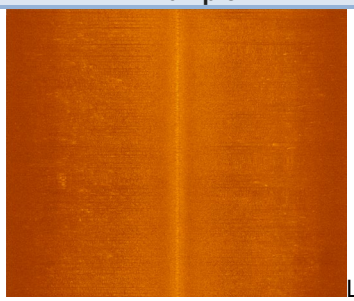
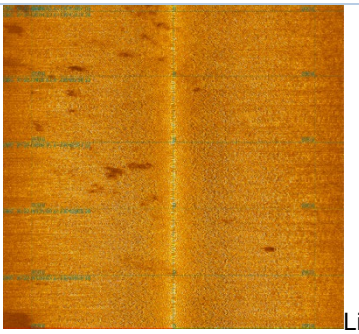
Throughout the geophysical data collection phase, a significant thermocline was observed, specifically in the Bogue, Topsail, and Myrtle Regions. APTIM made several attempts to increase the data quality and mitigate the negative effects of the thermocline to the data by placing the towfish below the thermocline, however the drastic changes in both temperature and sound velocity in the water column proved to be a challenge in some areas. As an example, Bogue SVP VL_54017_220525150115 (Figure 23) recorded a drastic thermocline in both seawater temperatures and sound velocity. This profile recorded a steep change in both water temperature and sound velocity between 11 and 12 m (36 to 39 ft), decreasing from 23.2° C to 21.8° C (74° F to 71° F) and from 1531 m/s to 1528 m/s (5023 ft/s to 5013 ft/s), respectively. The observed thermocline ranged between 6 and 12 m (20–40 ft) above the seafloor, and by placing the towfish below the point where the temperature and sound velocity changed, would cause the towfish to not be compliant with BOEM towing specifications that require the system to be towed at an altitude equal to 10–20 percent the range of the sidescan. The EdgeTech 4200's range in the low frequency is 230 m (754.59 ft), and therefore the towing altitude would be 23 to 46 m (75 to 150 ft), while the high frequency range is 120 m (393.7 ft), with a towing altitude of 12 to 24 m (40–79 ft). APTIM made every attempt possible to balance both the negative impacts of the thermocline while also ensuring that the sidescan sonar data was collected within the required specifications, however, in some instances, the quality of the data was impacted by either the thermocline or proximity of the system to the seafloor.

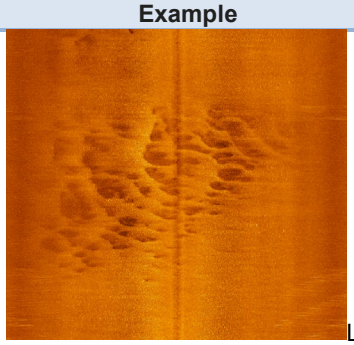
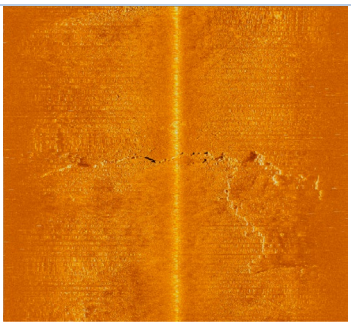
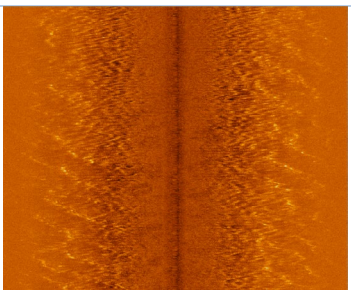
Figure 23: Bogue SVP VL_54017_220525150115



Based on the sidescan sonar interpretations, 56 contacts or targets were identified throughout the survey area. As displayed in Appendix F, contacts and targets include unknown features, schools of fish and dolphins, nearby vessel wakes, fishing associated features (trawl marks), and artificial reefs. The sidescan sonar data identified four different bottom texture types that have been digitized sands, sand ripples, patch sand, and hard-bottom, which are displayed in Table 4 below. Table 4 also includes an example of the effects the thermocline induces in the sidescan sonar data.

Table 4: Sidescan Sonar Textures.
Sidescan sonar examples are from the low frequency (300 kHz) data collected and depict a 460 m swath.

Bottom Feature/Description	Example
Sand High-intensity backscatter features indicative of medium to coarse sediments that appear to be continuous or cover a majority of the digitized area with definitive boundaries.	 Line 146
Sand Ripples High-intensity backscatter features indicative of medium to coarse sediments with visible waves that appear to be continuous or cover a majority of the digitized area with definitive boundaries	 Line 102.003

Bottom Feature/Description	Example
Patch Sand High-intensity backscatter features indicative of medium to coarse sediments that do not appear to be continuous or appear to be sparsely distributed throughout the digitized area.	 Line 151
Hard-bottom High confidence areas or rock outcrops on the seafloor that appear to be continuous or cover a majority of the digitized area with definitive boundaries. High confidence is based on these features having definitive boundaries, having a signature indicative of very coarse material, and exhibiting a rugged surface.	 Line 144.01
Thermocline Acoustic interference in the form of worm-shaped high intensity reflectors observed in the outer extents of the data swath.	 Line 105

5.1.2.4 Sub-Bottom Profiler

Post-collection processing of the envelope sub-bottom data was completed using Chesapeake Technology, Inc.'s SonarWiz 7 software. This software allows the user to apply specific gains and settings in order to produce enhanced sub-bottom imagery that were interpreted and digitized for specific stratigraphic facies relevant to the project goals.

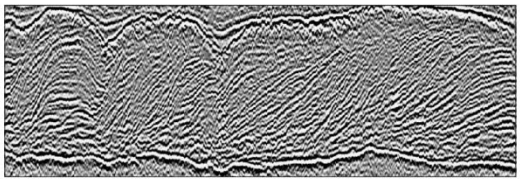
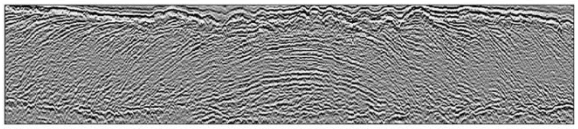
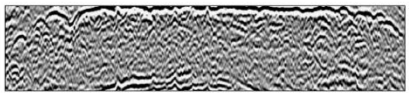
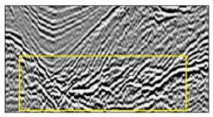
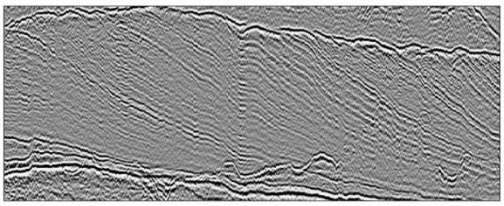
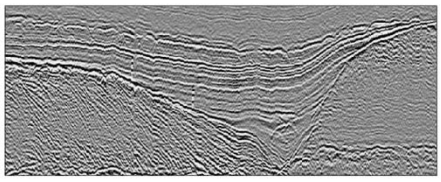
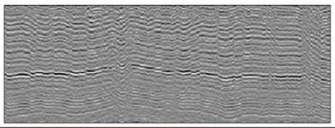
The first data processing step was to calculate the approximate depth of the reflector below the sound source by converting the two-way travel time (the time in milliseconds that it takes for the "chirp pulse" to leave the source, hit the reflector and return to the source) to feet by utilizing an approximate value for the speed of sound through both the water and underlying geology. For this survey, a detailed hydrographic and geologic sound velocity structure was not available, so APTIM geophysicists used an estimated sound velocity of 1.6 meters per millisecond (m/ms) (5.2 feet per millisecond (ft/ms) to convert two-way travel time to feet. This estimate of the composite sound velocity is based on several assumptions including the speed of sound through water that is typically 1.5 m/ms (4.9/ft/ms) as well as on the speed of sound through the sediment that can vary from 1.6 m/ms (5.2 ft/ms) for unconsolidated sediment to >1.7 m/ms (5.6 ft/ms) for limestone. APTIM then processed the imagery to reduce noise effects (commonly due to the vessel, sea state, or other natural and anthropogenic phenomenon) and enhance stratigraphy. This was done using the processing features available in SonarWiz; Automatic Gain Control (AGC), swell filter, and a User-Defined

Gain Control (UGC). The SonarWiz AGC is similar to the Discover-SB® AGC feature, where the data are normalized in order to remove the extreme high and low returns, while enhancing the contrast of the middle returns. In order to appropriately apply the swell filter and UGC functions, the sub-bottom data were bottom-tracked to produce an accurate baseline representation of the seafloor. Once this was done, through a process of automatic bottom tracking (based on the high-amplitude signal associated with the seafloor) and manual digitization, the swell filter and UGC were applied to the data. The swell filter is based on a ping averaging function that removes vertical changes in the data due to towfish movement caused by the sea state. The swell filter was increased or decreased depending on the period and frequency of the sea surface wave conditions, however, special care was taken during this phase to not remove, or smooth over geologic features that are masked by the sea state noise. The final step was to apply the UGC. The SonarWiz UGC feature allows the user to define amplitude gains based on either the depth below the source, or the depth below the seafloor. For this survey, the UGC was adjusted so that the gain would increase with depth below the imaged seafloor (and not the source), mimicking a Time Varying Gain (TVG). The user was able to remove the noise within the water column, increase the contrast within the stratigraphy, and increase the amplitude of the stratigraphy with depth, accounting for some of the signal attenuation normally associated with sound penetration over time. A blank water column function was also applied to eliminate any features such as schools of fish under the chirp system that produce reflected artifacts within the water column.

Bottom tracked chirp sub-bottom profile lines were opened in SonarWiz to digitally display the recorded subsurface stratigraphy. Using the software's Sonar File Manager, color-coded vibracore descriptions were added directly to the chirp sub-bottom profiles following the color scheme outlined below. Using the color-coded vibracore descriptions as a guide, the chirp sub-bottom stratigraphy was interpreted and the stratigraphic reflector that best correlated to the bottom of the sand layer was digitized within SonarWiz to create a color-coded boundary. These boundaries appear on the subsequent chirp sub-bottom imagery to allow for an easy, visual reference for the boundary representing the bottom of the sand unit. In areas with lacking geotechnical data, the digitization was conducted utilizing the intersection feature within SonarWiz and cross-referencing lines to trace what is the bottom of sand unit. Additionally historic vibracores were also color-coded and plotted onto the seismic data to assist with the delineation of the sand unit when necessary. This boundary was used within SonarWiz to compute the thickness of the available sand by calculating the distance between the digitized seafloor and the bottom of sand digitized unit.

Additionally, interpretation of processed sub-bottom profiler data was used to identify significant seismic reflection horizons that serve as the boundaries for different seismic facies packages even in the absence of supporting vibracore analysis. Horizons can represent unconformities such as the basal scour surface of an incising fluvial channel, the gradational change in lithology arising from environmental change such as estuarine flooding, or more detailed internal stratigraphic architecture such as the presence of clinoforms, lap surfaces, or other geometric signatures that can be used to hypothesize depositional environment and help predict lithologic composition without additional geologic ground truth (Reijenstein et al., 2011; Figure 24). These principles were used to interpret the processed sub-bottom profiler data to help develop regional conceptual models, such as the spatial extent of paleovalleys and mapping the occurrence of shallow basement stratigraphy.

Figure 24. Example classification scheme for sub-bottom profiler data based on seismic geometry and acoustic facies. Modified from Reijenstein et al. (2011).

2-D Seismic Facies	Reflection Character / Sedimentologic Interpretation
	**Convex-up lateral accretion surfaces. High-amplitude inclined seismic facies** Point-bar lateral accretion surfaces as seen in a dip-view cross section; Convex-up geometry with downdip increase in slope: 0.49° to 0.62° (point-bar tops) and 0.48° to 3.74° (basal point bar).
	**Convex-up bidirectional downlap; High-amplitude inclined seismic facies** Point-bar lateral accretion surfaces as seen in a strike-view cross section
	**Low-amplitude chaotic seismic facies** Reworked point-bar top deposits
	**High-amplitude channel lag seismic facies** Basal coarse-grained channel lag
	**Concave-up clinoforms; Low-amplitude inclined seismic facies** Clinoform deltaic mouth bar deposits; Concave-up geometry with downdip decrease in slope: 1.76° to 2.04° (clinoform tops) and 0.37° to 0.91° (basal section)
	**High-amplitude, confined, laterally continuous reflections; Seismic terminations onlap against valley walls** Early transgressive estuarine muddy facies
	**Low-amplitude (transparent), laterally continuous seismic facies** Open marine muddy facies

Moreover, as part of the seismic data interpretation process, APTIM plotted the sidescan interpretations onto the seismic project to assist in the delineation of additional features. The ubiquitous presence of hard-bottom in Onslow and Long Bays has been previously documented, and it is most commonly interpreted as a surface feature. However, by corroborating the seismic with the sidescan data, it is possible to trace the surficial exposed unit throughout the investigation areas.

5.1.2.4.1 Seismic Feature Delineation and Interpretation

The delineation and interpretation of the consolidated sediments, and paleochannels in each of the study areas were conducted by utilizing both the vibracores as well as interpretations from the sidescan sonar data. Most of the sub-surface features identified in these areas are large paleochannels and outcropping ancient, lithified strata bounded by either chaotic/semi-transparent acoustic facies or laminated variable

amplitude seismic facies. Throughout the study area, features indicative of outcropping strata, which lacked surficial expression, corroborating sidescan sonar data, and/or full acoustic impedance were digitized as consolidated sediments. This unit is a layer that is causing some acoustic blocking, however, is variable in its properties and "level" of acoustic impedance and seismic signal attenuation. Seismic data interpretations are included as a digital web project (Appendix I). SonarWiz projects for North Carolina and South Carolina are included in the digital Appendix J. Raw segys are submitted in Appendix O and processed segys are in Appendix K and exported ascii files are also in Appendix K.

5.1.2.5 Marine Archaeological Assessment

Prior to the collection of vibracores, APTIM's Qualified Marine Archaeologist (QMA) evaluated the collected geophysical data, in conjunction with information gathered as part of the literature review, desktop study, and background research, to ensure that no potential submerged cultural resources were located within each proposed core location's clearance buffer (a circular buffer with a 328 ft [100 m] radius). APTIM, together with RECON Offshore (RECON), produced an archaeological vibracore clearance letter report that clears all proposed core locations from an archaeological perspective that was submitted to BOEM for review as part of the Geological Sampling Plan (GSP).

The report included maps with as-run tracklines, proposed vibracore sites and their clearance buffers, magnetic anomalies, sidescan sonar contacts, sidescan mosaics, and bathymetric contours. Chirp sub-bottom profile images were also provided for each core location to ensure that no potentially significant paleo landforms or subsurface features of archaeological interest would be adversely impacted during coring operations. The report also included a table with all identified magnetometer anomalies and their characteristics, such as amplitude, duration, and magnetic signature, associated features identified from the sidescan sonar or chirp sub-bottom data, and an anomaly interpretation/assessment. Additionally, a sidescan sonar contact report was provided as part of the report including a description of the contact size, characteristics, attributes, interpretation, and assessment. A summary table with avoidance requirements and mitigation measures following the Environmental Protection Compliance Plan was also included.

5.1.2.6 Sensitive Benthic Habitat Resources Assessment

An analysis of sensitive benthic habitats was conducted by APTIM as part of the geophysical data processing. The results of the habitat assessment consist of maps showing identified features (with labels), habitat boundaries, avoidance buffers, proposed vibracore locations, and bathymetric contours submitted as part of the GSP. More detailed results are provided in each study area data review section below.

5.1.2.7 Bogue

Between May 24 and May 25, 2022, APTIM collected 79.4 line-km (43.8 nm) in the Bogue region. Preliminary interpretation of the geophysical data identified several paleochannels and a series of larger compound paleovalley features (sensu Baldwin et al., 2006) distributed across the survey region, and a large regional unit composed of inclined dipping strata that underlies the eastern and western portions of the Bogue survey. Earlier geologic interpretations of the region (Hine and Snyder, 1985; Conery, 2019) indicated the presence of numerous fluvial incisions and associated infilling potentially from the Quaternary to present, which likely correlate to the channel and valley systems observed in the 2022 survey. Additionally, interpretations of the ASAP survey found that the eastern Bogue region contained thicker surficial sands of unknown origin and extent. The large, regional unit of inclined strata is potentially Miocene in age (Riggs et al., 2018), and could correlate to units that outcrop at the seafloor further to the south. This proposed Miocene unit could contain beach-quality sand as observed in earlier work (e.g. Snyder et al., 1988), representing a high-priority geotechnical sampling target along with the shallower Quaternary and Modern channel/valley infill packages and surficial features (Figure 25). Geotechnical sites

were chosen to test several observed seismic facies associated with the above stratigraphic units, in particular chaotic/transparent seismic facies found in several surficial sedimentary bodies, and inclined dipping strata often associated with fluvial channel migration/infill processes (Figure 26; Table 5).

An analysis of the geophysical data collected from the Bogue region reveals that the main avoidance areas exist on the nearshore lines, in the southern section of the survey. In this area there are several artificial reefs and shipwrecks that were avoided. These locations were assigned a 500 ft (152 m) avoidance buffer to ensure that potential vibracore locations do not encroach within the exclusion zone.

Figure 25: Example stratigraphic architecture from the Bogue Region showing a paleovalley system incising into an inferred Miocene unit of steeply inclined dipping stratigraphy.

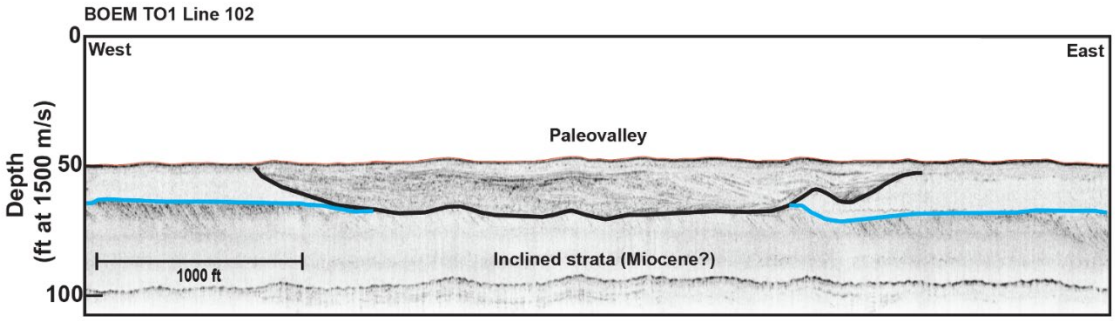
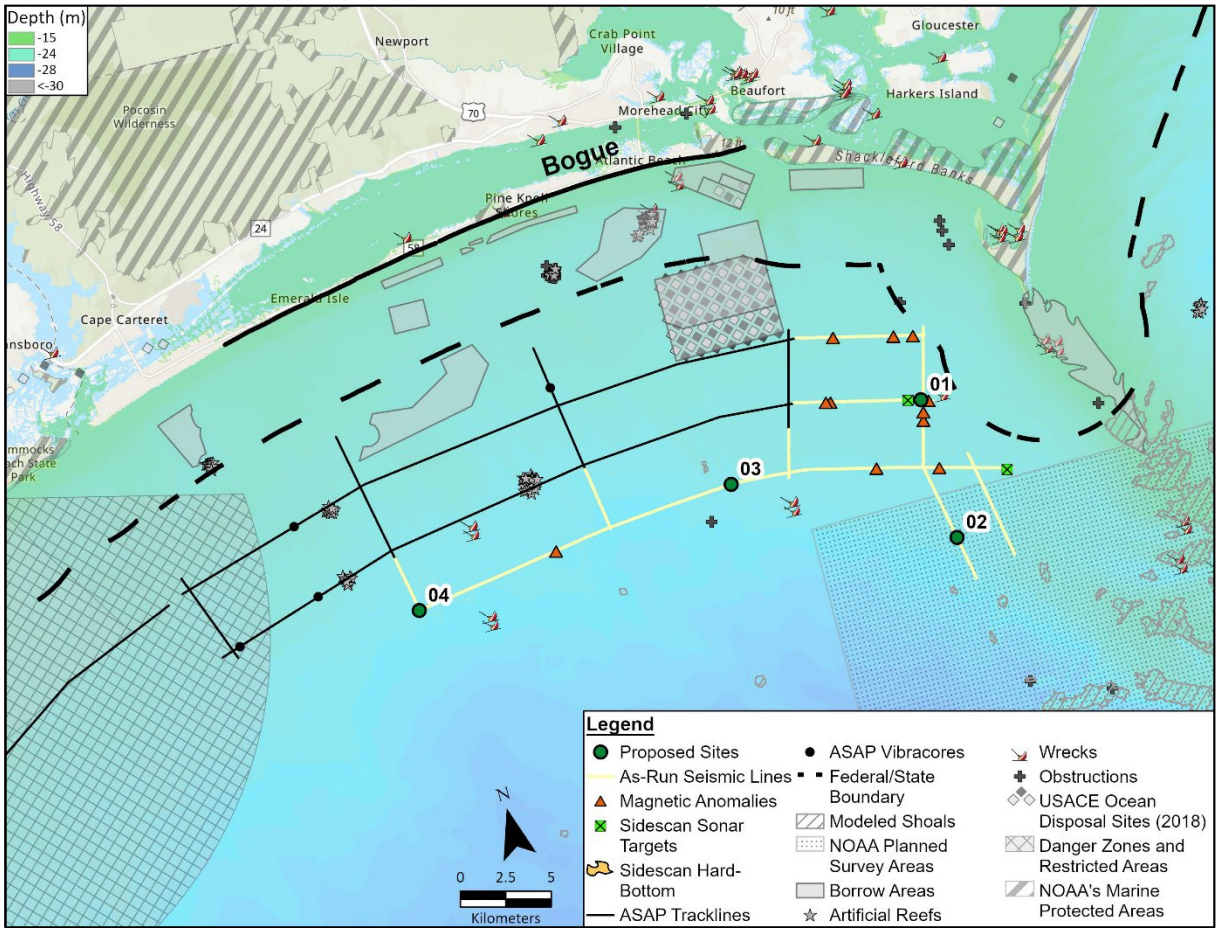


Figure 26: Proposed geologic sites offshore Bogue. Survey plan totals four vibracores.



A total of four vibracores were collected offshore the Bogue region. The proposed plan aimed at characterizing the local geology and further identifying the composition of the surficial sedimentary units and large paleovalleys and paleochannels extending offshore (Table 3).

Table 5: Bogue Region Vibracores Final ID and Target Units.

Vibracore Number	Final as-built name	Target sediment/layer
1	BOEMVC-2022-NC-01	Surficial sediment unit (10–15-ft [3.05-4.57 m] thick), seismic facies variable from chaotic to laminated
2	BOEMVC-2022-NC-02	Potential paleovalley unit (20-ft [6.1 m] thick) with minimal overburden, several layered seismic facies ranging from transparent to chaotic
3	BOEMVC-2022-NC-03	Potential paleovalley unit (40-ft [12.2 m] thick), seismic facies grade from laminated to transparent to high angle reflectors at base of channel form
4	BOEMVC-2022-NC-04	Potential paleovalley (20-ft [6.1 m] thick) incising into lower variable amplitude steeply inclined reflector package. Paleovalley fill seismic facies are variable transparent and concave up dipping reflectors

5.1.2.8 Topsail

Between May 30 and June 2, 2022, APTIM collected 262 line-km (141 nm) of geophysical data within the Topsail region. Initial interpretation of the geophysical data indicated that there are several large paleovalley and paleochannel systems extending offshore perpendicular to the modern coastline, similar to those observed in the earlier ASAP survey (Conery, 2019). These systems incise across outcropping Oligocene strata, which can form ephemeral hard-bottom on the inner continental shelf in addition to being potential resources themselves when poorly consolidated (Meisburger, 1979). Existing borrow areas are broadly distributed across the Topsail area, separated by areas of ephemeral hard-bottom, and some areas have proven challenging due to lithologic variability within sedimentary bodies. Preliminary geophysical interpretations indicated that the depth of incision associated with the paleovalley systems is variable, but in general increases further seaward. The sedimentary fill of these systems is similarly variable in both thickness and acoustic facies, with some systems exhibiting deep incisions filled with variable amplitude, laminated strata (Figure 27), while others have a more complex internal architecture recording several cut and fill episodes and reflect either more dynamic infilling processes or the time-transgressive overprinting of numerous regression and transgression cycles (Figure 28). There are also numerous smaller surficial sediment units, paleochannels, and more enigmatic depositional elements that do not appear to be able to be correlated across the existing survey lines, but nevertheless may represent potential sediment resource units.

Figure 27: Example of proposed paleovalley in the Topsail region showing continuous, laminated fill architecture.

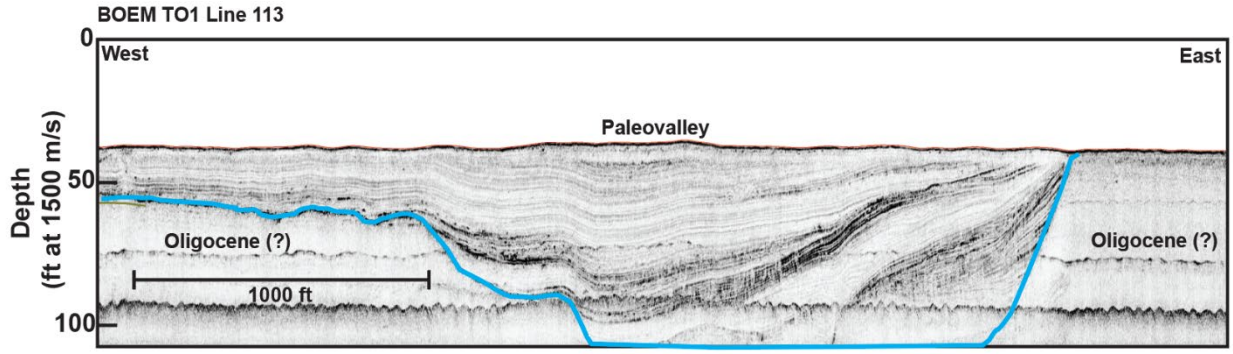
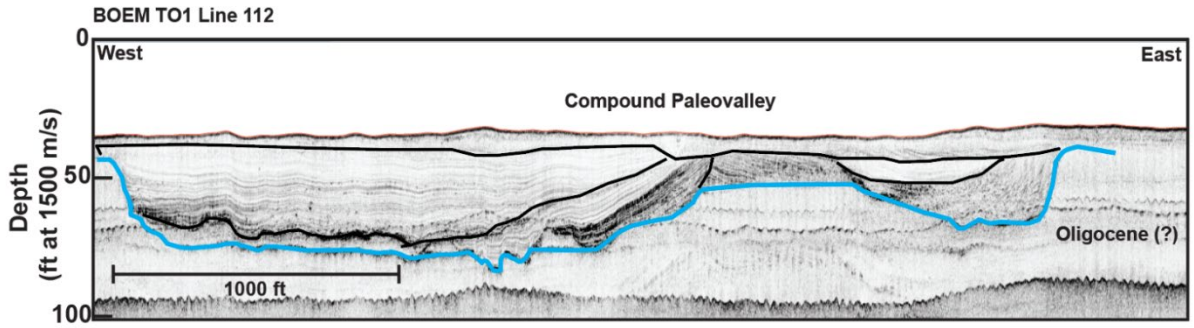


Figure 28: Example of proposed compound paleovalley in the Topsail region showing several cut and fill cycles.



In the Topsail region, the majority of potential ephemeral hard-bottom observed in and delineated from the sidescan sonar data occur in the northern portion of the survey area and strike NNE. The hard-bottom areas were delineated based on the high-intensity speckled acoustic returns observed in the sidescan sonar data. The hard-bottom areas are linear in nature, parallel to the coast, and terminate towards the middle section of the study region. The single artificial reef recorded in this area is found along the southern most seaward transect. A buffer of 500 ft (152 m) was applied to the hard-bottom and artificial reef sites to ensure that the proposed vibracore locations did not fall within the avoidance area.

The proposed survey plan consists of 17 vibracores intended to further identify and characterize borrow areas in the Topsail region while also providing additional information on the geologic framework and help constrain the depositional history of the complex regional geology (Figure 29; Table 6). The proposed plan is intended to sample a variety of high-potential sediment resource bearing units and further evaluate the variability of identified linked depositional units, such as paleovalleys, that have been interpreted to be continuous across the inner continental shelf and potentially are the host systems for previously identified and exploited sediment borrow areas.

Figure 29: Proposed geologic sites offshore Topsail. Survey plan totals 17 vibracores.

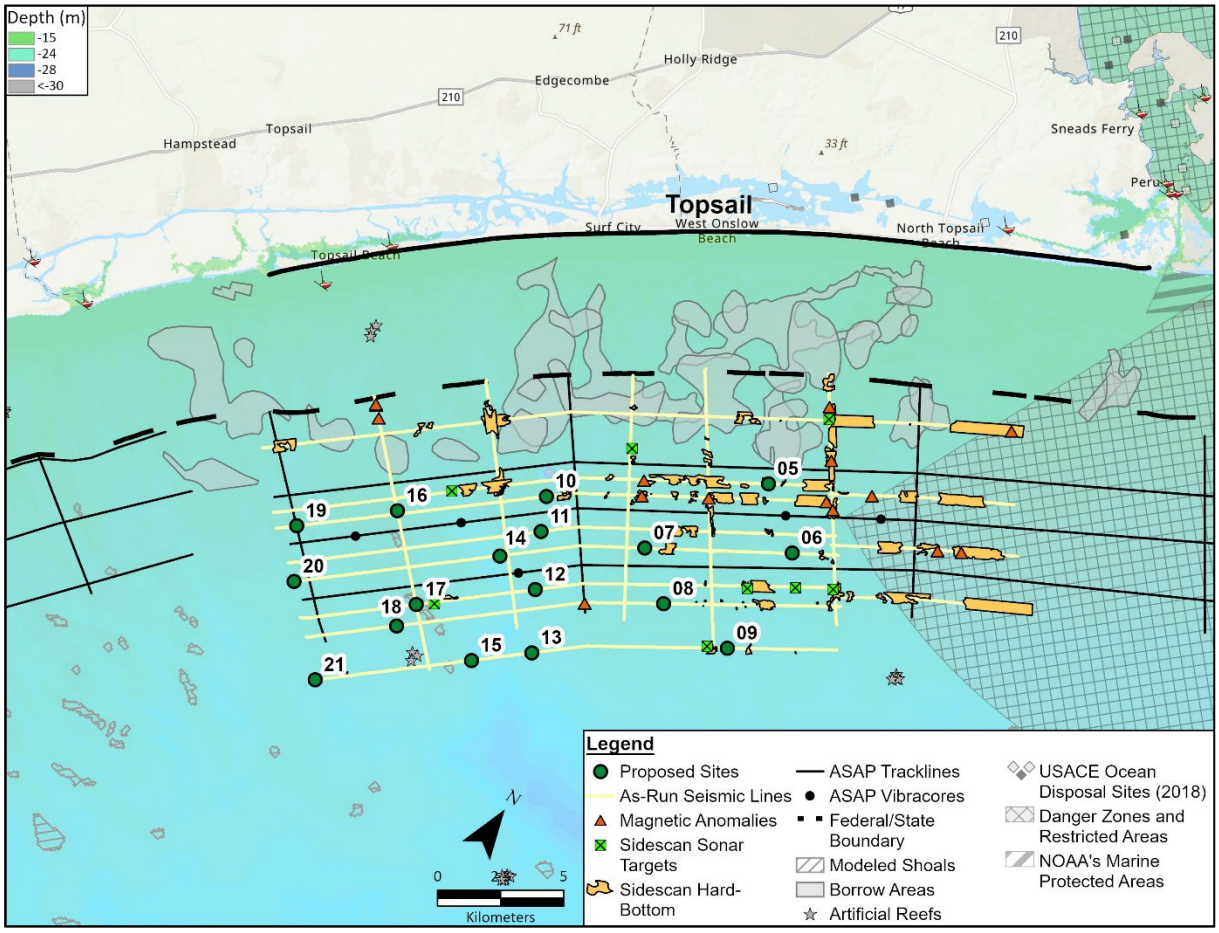


Table 6: Topsail Region Vibracores Final ID and Target Units.

Vibracore Number	Final as-built name	Target sediment/layer
5	BOEMVC-2022-NC-05	Potential paleovalley unit (20–30-ft [6.1-9.1 m] thick) with minimal overburden, several compound incisions and associated infilling observed, seismic facies variable from chaotic to steeply inclined dipping concave reflectors
6	BOEMVC-2022-NC-06	Potential paleovalley unit (20-ft [6.1 m] thick) with minimal overburden, well defined basal unconformity and broad, low-medium angle dipping reflectors grading into sub-parallel laminated reflectors
7	BOEMVC-2022-NC-09	Potential paleovalley/paleochannel unit (20–80-ft [6.1-24.38 m] thick) with minimal overburden, high amplitude reflector on top of chaotic facies, with draping dipping reflector wings dipping away from central chaotic facies grading into laminated paleovalley fill
8	BOEMVC-2022-NC-08	Potential paleochannel unit (15–2-ft [4.57-6.1 m] thick) on top of high amplitude reflector that is regionally conformable, multiple internal units observed
9	BOEMVC-2022-NC-07	Potential paleochannel unit (20-ft [6.1 m] thick) with chaotic seismic facies on top of high amplitude regionally conformable reflector
10	BOEMVC-2022-NC-13	Potential paleovalley unit (20–30-ft 6.1- 9.1 m] thick) with upper semi-transparent seismic facies and chaotic lower package. Unit is located downdip of previously delineated borrow area interpreted to be within a shore-perpendicular paleovalley feature
11	BOEMVC-2022-NC-12	Potential paleovalley unit (20-ft [6.1 m] thick) with minimal overburden, multiple packages of variable amplitude dipping reflectors
12	BOEMVC-2022-NC-11	Potential upper section of paleovalley unit (bottom not observed) with steeply inclined dipping reflectors and internal unconformities with sub-parallel laminated valley fill below
13	BOEMVC-2022-NC-10	Package (20-ft [6.1 m] thick) of inclined dipping reflectors that onlap on high amplitude basal surface, low angle reflectors steepen laterally and grade into semi-transparent chaotic unit
14	BOEMVC-2022-NC-14	Potential paleovalley unit (20–30-ft [6.1-9.1 m] thick) with multiple packages with acoustic facies ranging from inclined dipping reflectors to low amplitude “mottled” or “speckled” textures
15	BOEMVC-2022-NC-16	Local surficial sediment unit (10-ft [3.05 m] thick) in deepest bathymetry of survey region, surficial unit constrained by underlying shallow concave reflector in sag-like configuration
16	BOEMVC-2022-NC-15	Modeled shoal feature, surficial sediment unit (10–15-ft [3.05-4.57 m] thick), transparent facies overlying variable amplitude laminated acoustic facies
17	BOEMVC-2022-NC-17	Modeled shoal feature, surficial sediment unit (10-ft [3.05 m] thick), chaotic facies overlying variable amplitude laminated acoustic facies
18	BOEMVC-2022-NC-18	Potential upper section of paleovalley unit (20–80-ft [6.1-24.4 m] thick), variable acoustic facies of transparent to medium amplitude moderate dip reflectors grading into variable amplitude semi-parallel fill package. Potentially several internal unconformities, bottom of paleovalley not fully observed
19	BOEMVC-2022-NC-21	Potential paleovalley unit (20-ft [6.1 m] thick), seismic facies grade from laminated to transparent to high angle reflectors at base of channel form
20	BOEMVC-2022-NC-20	Potential paleovalley unit (40-ft [12.2 m] thick), steeply inclined low amplitude dipping reflectors grade into variable amplitude conformable concave fill facies, broader channel form not fully defined
21	BOEMVC-2022-NC-19	Package (20–30-ft [6.1-9.1 m] thick) of shallow dipping high amplitude reflectors constrained by basal unconformity

5.1.2.9 New Hanover

Between May June 2 and June 4, 2022, APTIM collected 107.2 line-km (57.8 nm) of geophysical data in the New Hanover area. This region spans from the northern end of Smith Island to Masonboro Inlet. Previous work in the region (Conery, 2021; Ammerman, 2022) had identified several paleovalley and paleochannel features extending across the inner shelf perpendicular to the modern shoreline, as well as a large number of variable-scale surficial sedimentary units. Prior investigations also noted the widespread occurrence of ephemeral hard-bottom and ancient strata occurring at or near the seafloor related to outcropping Oligocene strata of mixed lithologies, from poorly consolidated sandy units to karstified limestone (Meisburger, 1979; Snyder, 1995). Several modeled shoals are present in the region, with unknown extent and sedimentary character. Preliminary interpretation of the geophysical data indicates the presence of significantly more surficial sedimentary units, or shoals, than previously identified or predicted. Existing geologic data indicated that these shoals consist of a mix of fine to coarse grain sands and shell hashes. The surficial sediment units range in thickness from 2–3 ft (0.61-0.91 m) to 10–15 ft (3.05-4.57 m), and unconformably overlie the Oligocene strata as well as the Quaternary paleovalley systems (Figure 30). Paleovalleys and paleochannel units are present as both localized features and systems conformable across the study area. Previous efforts mapped several valley systems offshore of Wrightsville Beach (Snyder, 1995; Klotsko, 2022) that do appear to extend further offshore into the present study area, but the majority of the upper stratigraphy appears to be composed of either outcropping Oligocene strata or surficial sedimentary units. Potential paleovalley systems imaged in the study area have variable preserved incisional depth and associated fill, ranging from low amplitude inclined dipping reflectors to high amplitude concave channel fill (Figure 31). The proposed geotechnical survey was designed to further constrain the prior paleovalley systems and assess their potential as sediment resource areas, to classify the identified surficial sediment units and understand their potential origin, and to continue developing the relationship between potential sediment borrow areas and the underlying geologic framework. A total of seven vibracores were proposed for offshore New Hanover (Figure 32 and Table 7).

Figure 30: Example surficial sedimentary units overlying Oligocene units with dipping strata. Note the discontinuous nature of the surficial units separated by outcropping Oligocene beds.

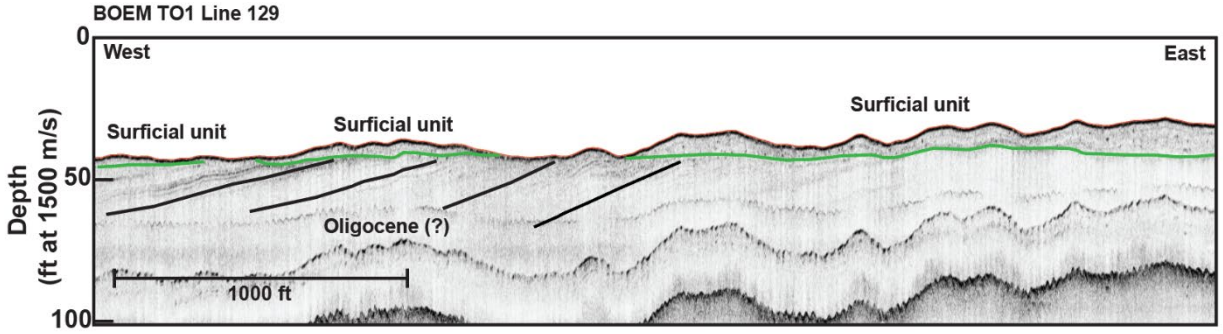
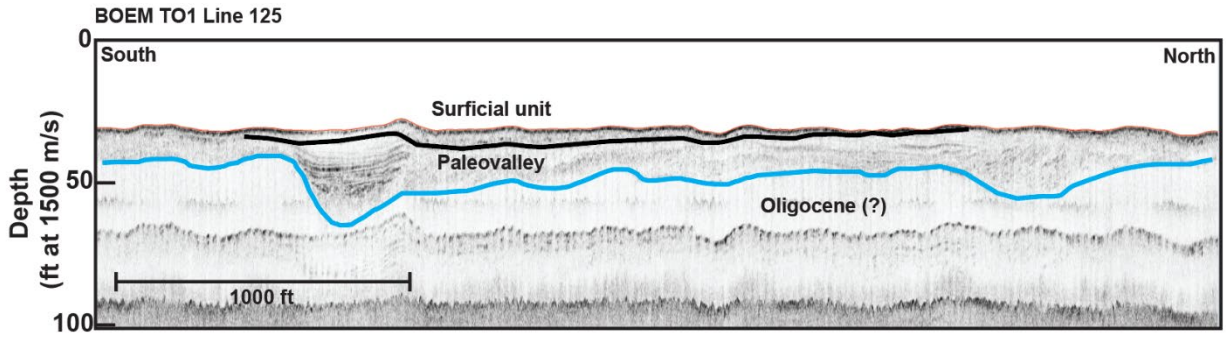


Figure 31: Example paleovalley from the New Hanover region showing the variable acoustic facies within the valley fill and the existence of surficial sediment units overlying the core of the valley.



The New Hanover region includes several small hard-bottom areas identified on the basis of side-scan sonar interpretation that occur linearly, paralleling the coastline, along the northern section of the survey area. The region also contains a documented shipwreck on the north end as well as an artificial reef landward of the middle section of the survey. A 500 ft (152.4 m) avoidance buffer was applied to each of these locations to ensure that the potential vibracore locations did not fall within the exclusion zone.

Figure 32: Proposed geologic sites offshore New Hanover. Survey plan totals 7 vibracores.

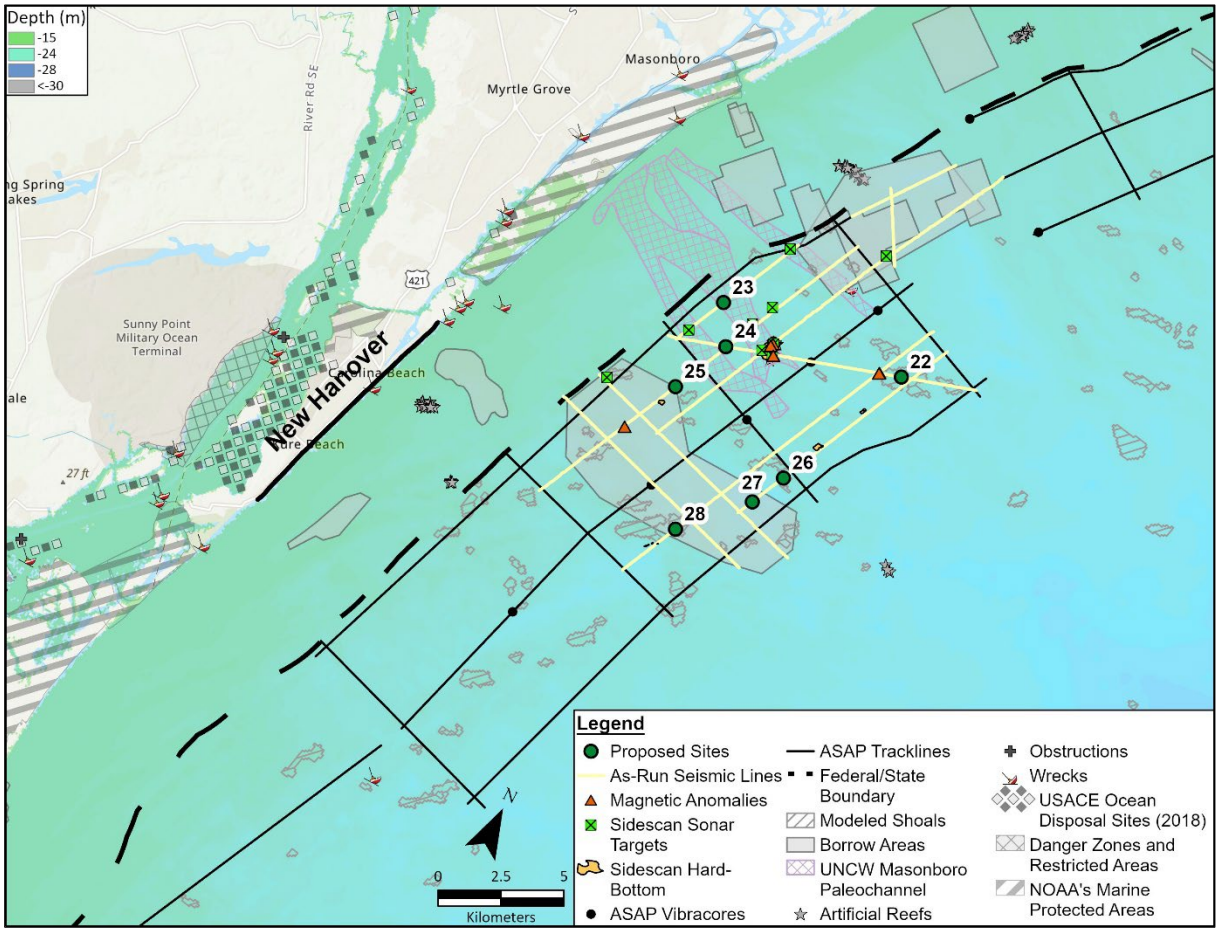


Table 7: New Hanover Region Vibracores Final ID and Target Units

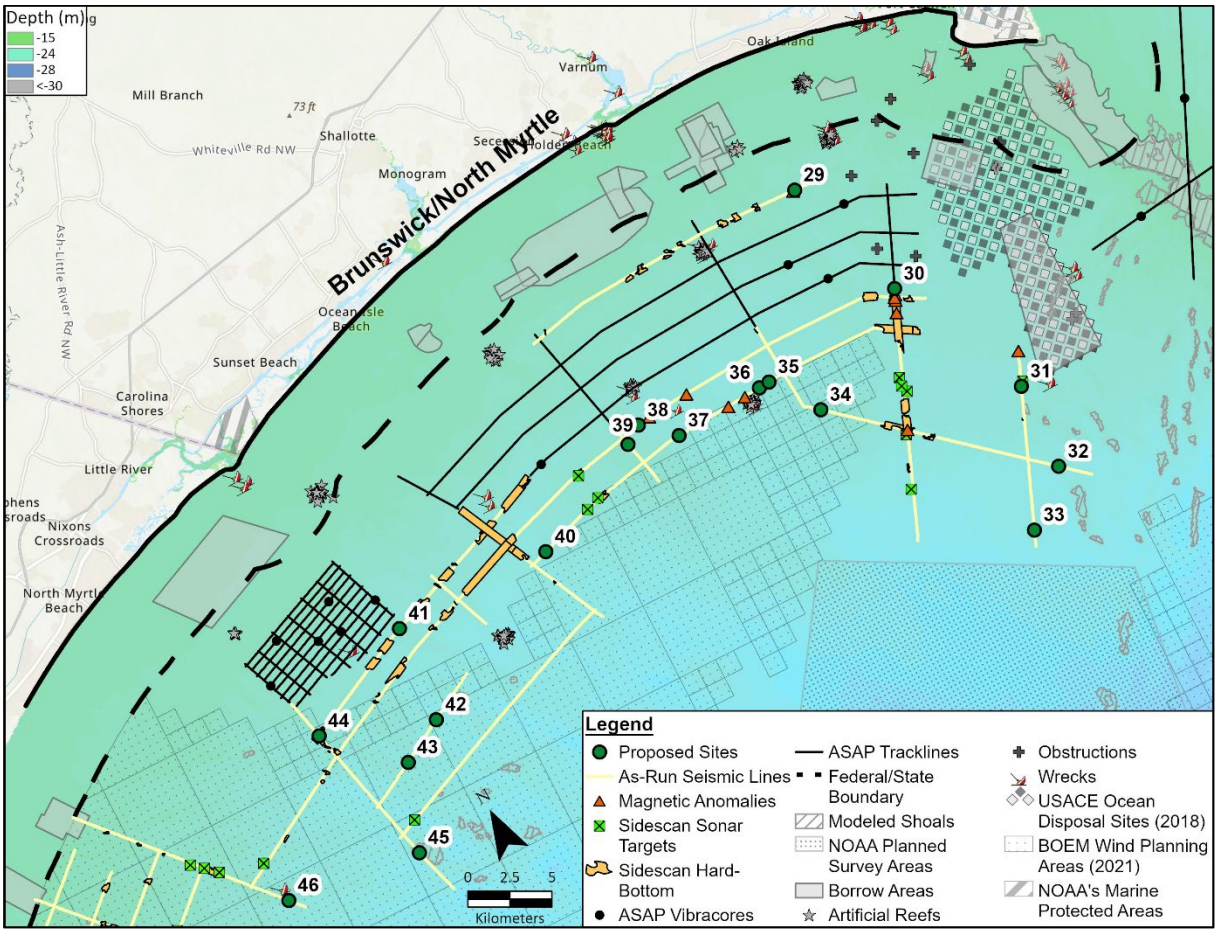
Vibracore Number	Final as-built name	Target sediment/layer
22	BOEMVC-2022-NC-22	Modeled shoal feature, surficial sediment unit (10-ft [3.05 m] thick), mottled/chaotic facies overlying medium-high amplitude basal unconformity and potential Oligocene strata below
23	BOEMVC-2022-NC-23	Surficial sedimentary unit (10-ft [3.05 m] thick) occupying an erosional "sag", transparent to chaotic seismic facies overlying a high amplitude basal unconformity with a concave geometry, potential Oligocene dipping strata below
24	BOEMVC-2022-NC-24	Test of three major units including a surficial sedimentary unit (5–10-ft [1.52-3.05 m] thick) composed of chaotic seismic facies and intermittent high amplitude basal reflector, medium amplitude laminated and chaotic unit, and basal transparent acoustic unit
25	BOEMVC-2022-NC-25	Upper section of potential paleovalley fill and overlying surficial sedimentary unit (10-ft [3.05 m] thick). Package of dipping reflectors (10-ft thick) downlapping on laminated unit below
26	BOEMVC-2022-NC-26	Modeled shoal feature, surficial sediment unit (10-ft [3.05 m] thick), with multiple thin packages including transparent and chaotic acoustic facies on top of medium-amplitude basal reflector. Underlying strata are shallow dipping medium amplitude (potentially Oligocene)
27	BOEMVC-2022-NC-27	Dipping reflector unit outcropping on seafloor (potentially Oligocene) with relatively flat seafloor, potential small chaotic unit overlying low bathymetry sags across area
28	BOEMVC-2022-NC-28	Test of unverified plus borrow area, highly variable seismic facies with potential surficial sedimentary unit

5.1.2.10 Brunswick/North Myrtle

Between June 7 and June 10, 2022, APTIM collected 235.3 line-km (127 nm) of geophysical data in the Brunswick/North Myrtle region. Initial interpretation indicated numerous paleovalley systems with highly heterogeneous acoustic facies and depositional architecture, along with several surficial sediment units. Overall, however, the shelf is dominated by relatively thin surficial sands overlying shallow ancient, lithified strata that crops out across the study area, forming large patches of ephemeral hard-bottom. This shallow ancient, lithified strata has been interpreted to be Tertiary and Upper Cretaceous units uplifting with the Cape Fear Arch (Colquhon and Muthig, 1991; Hoffman et al., 1991). The variable lithology of these strata has likely played a role either as a source of erodible material to the shelf as well as forming preferential pathways for fluvial incision and continual reoccupation, together with the tectonic steering of the Cape Fear Arch itself (Hoffman et al., 1991). The preliminary interpretations of paleovalleys in the region indicate a high degree of variability in width, depth of incision, and associated fill that the proposed geotechnical campaign aims to further constrain. A total of 17 vibracores are proposed for offshore Brunswick/North Myrtle region Figure 33 and Table 8).

The Brunswick/North Myrtle region contains varying potential outcropping ancient, lithified strata that occurs in three areas: along the shipping route in the east, along the most nearshore line, and further west towards the end of the survey region. In addition, there are six artificial reef locations and nine shipwreck sites that were avoided. The vibracore locations selected in this area did not fall within the 500 ft (152 m) avoidance buffer applied to each of the hard-bottom, artificial reef, and shipwreck site.

Figure 33: Proposed geologic sites offshore Brunswick/North Myrtle. Survey plan totals 17 vibracores.



A total of 17 vibracores were collected offshore Brunswick/North Myrtle. The proposed survey plan aims to identify borrow areas within the Brunswick/North Myrtle region, confirm previous assumptions on potential deposits and findings from the historic data review, and understanding of the geologic framework.

Table 8: Brunswick/North Myrtle Region Vibracores Final ID and Target Units

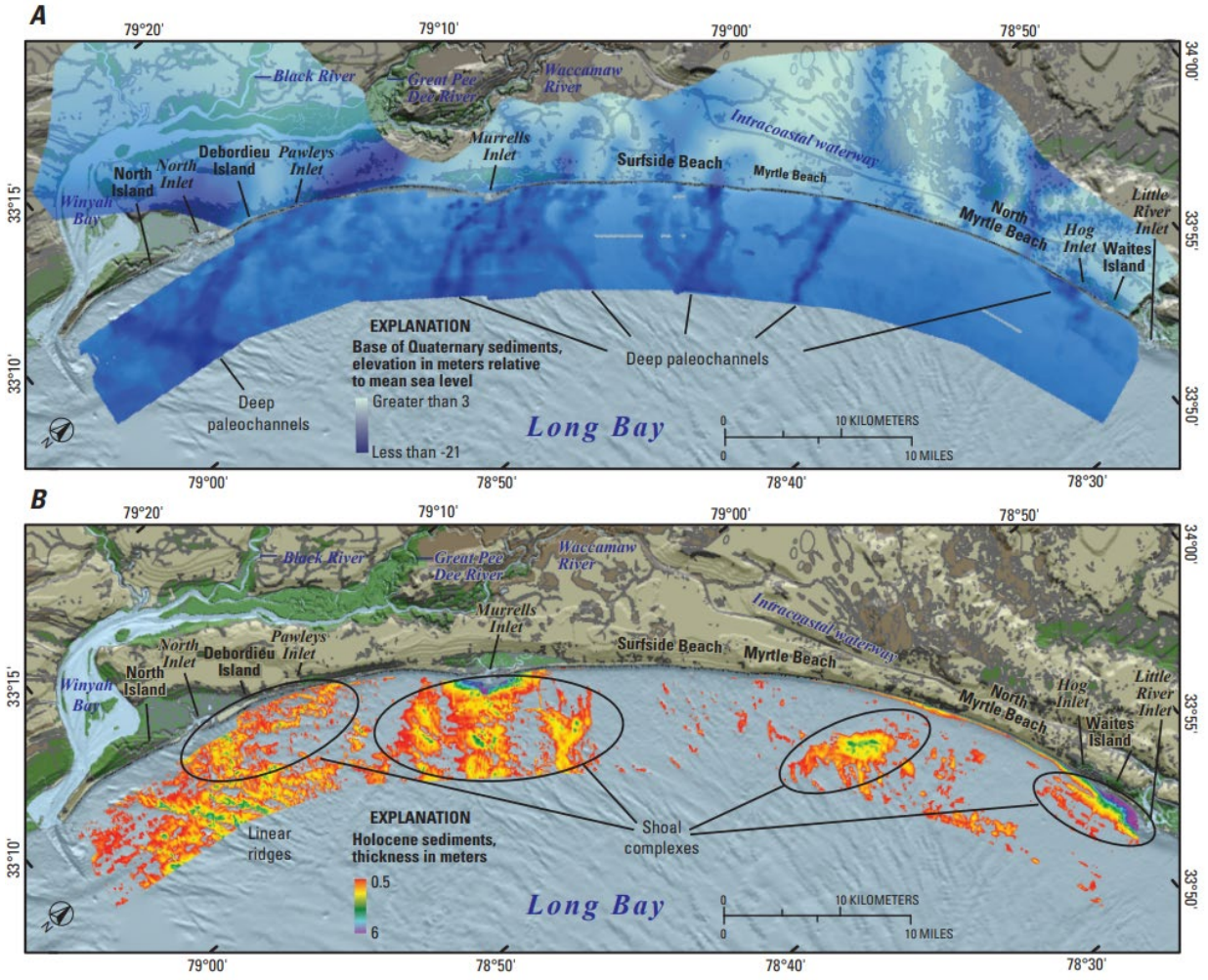
Vibracore Number	Final as-built name	Target sediment/layer
29	BOEMVC-2022-NC33	Potential paleovalley fill and overlying surficial sedimentary unit (5-ft thick). Potential paleovalley fill consists of a transparent package (15-ft [1.52-4.57 m] thick), with medium-amplitude basal unconformity
30	BOEMVC-2022-NC32	Potential paleovalley fill and overlying semi-transparent surficial sedimentary unit (10-ft [3.05 m] thick). Potential paleovalley fill consists of a chaotic package (5-ft [1.52 m] thick), with underlying transparent package below
31	BOEMVC-2022-NC-31	Potential paleovalley fill and overlying surficial sedimentary unit (5-ft [1.52 m] thick). Targeting three unverified contacts and packages. Proximal to ODMDS location
32	BOEMVC-2022-NC-30	Surficial sediment unit (10-ft [3.05 m] thick), mottled/chaotic facies overlying medium-high amplitude basal unconformity and unverified package below
33	BOEMVC-2022-NC-29	Surficial sediment unit (10-ft [3.05 m] thick), mottled/chaotic facies overlying semi-transparent to dipping reflector package (10-ft [3.05 m] thick), overlying medium-high amplitude basal reflector
34	BOEMVC-2022-NC-34	Potential paleovalley fill and overlying surficial sedimentary unit (10-ft [3.05 m] thick). Potential paleovalley fill consists of a semi-transparent to dipping reflector package (15-ft [4.57 m] thick), with medium-amplitude basal unconformity
35	BOEMVC-2022-NC-35	Potential paleovalley fill, with minimal to no overburden, consisting of transparent and steeply dipping reflectors (15-ft [4.57 m] thick), with strong-amplitude basal unconformity
36	BOEMVC-2022-NC-36	Potential paleovalley fill, with minimal to no overburden, consisting of multiple dipping reflector packages (+30-ft [9.1] thick)
37	BOEMVC-2022-NC-37	Potential paleovalley fill, with minimal to no overburden, consisting of transparent and low amplitude hazy fill (22-ft [6.7 m] thick), with faint-amplitude basal unconformity
38	BOEMVC-2022-NC-38	Potential paleovalley fill, with minimal to no overburden, consisting of transparent and low amplitude hazy fill (18-ft [5.5 m] thick), with strong-amplitude basal unconformity
39	BOEMVC-2022-NC-39	Surficial sediment unit (10-ft [3.05 m] thick), semi-transparent to dipping reflector facies overlying medium-high amplitude basal unconformity and unverified package below
40	BOEMVC-2022-NC-40	Potential paleovalley fill, with minimal to no overburden, consisting of transparent and low amplitude hazy fill (10-ft [3.05 m] thick), with strong-amplitude basal unconformity
41	BOEMVC-2022-SC-41	Surficial sediment unit (10-ft [3.05 m] thick), an upper mottled/chaotic to semi-transparent package, overlying high amplitude basal reflector
42	BOEMVC-2022-SC-43	Potential paleovalley fill and overlying semi-transparent, surficial sedimentary unit (8-ft [2.4 m] thick). Potential paleovalley fill consists of semi-transparent reflector package (6-ft [1.8 m] thick), overlying chaotic package and strong-amplitude reflector
43	BOEMVC-2022-SC-44	Potential paleovalley fill and overlying semi-transparent to mottled, surficial sedimentary unit (5-ft [1.52 m] thick). Potential paleovalley fill consists of gently dipping to semi-transparent package (10-ft [3.05 m] thick), overlying strong-amplitude basal unconformity
44	BOEMVC-2022-SC-42	Potential paleovalley fill and overlying semi-transparent to mottled, surficial sedimentary unit (8-ft [2.4 m] thick). Potential paleovalley fill consists of gently dipping or prograding reflector package (10-ft [3.05 m] thick), overlying strong-amplitude basal unconformity
45	BOEMVC-2022-SC-45	Modeled Shoal, surficial sediment unit (10-ft [3.05 m] thick), mottled to semi-transparent package, overlying unconfirmed laminated package. Targeting Wind Energy Area.

5.1.2.11 Myrtle

Between June 11 and June 13, 2022, APTIM collected 213.9 line-km (115.4 nm) of geophysical data in the Myrtle region. Interpretation of the geophysical data in this area show that there are several large paleochannels that extend offshore and stay consistent with the sediment type and stratigraphy of the North Carolina study areas. The composition of the sediment in this area appears to be mud/silt dominated, in contrast to the semi-coarse sands commonly seen in the northern transects.

The Myrtle region has been relatively well-studied compared to other regions of Onslow and Long Bays, leading to an extensive existing framework to build from. The antecedent strata in the region are expected to be composed of Tertiary units that have variable structure, relief, and lithology but commonly outcrop on the seafloor leading to widely distributed ephemeral hard-bottom areas (e.g. Denny et al., 1997) interspersed with incisional paleovalleys and channel systems eroding into the host continental shelf strata (e.g. Barnhardt, 2009). Paleovalley systems in the Myrtle region are expected to vary from single incisional events filled in during subsequent transgression to long lived, larger valley systems with a history of reoccupation and potential preservation of a variety of lithosomes ranging from fluvial to estuarine to coastal (Baldwin et al., 2006). Additionally, numerous shoal complexes have been observed in the region from Murrell's Inlet to North Myrtle Beach, with some potential relationship between their occurrence and the underlying position of paleovalley systems with sandy infill (Figure 34; Baldwin et al., 2006).

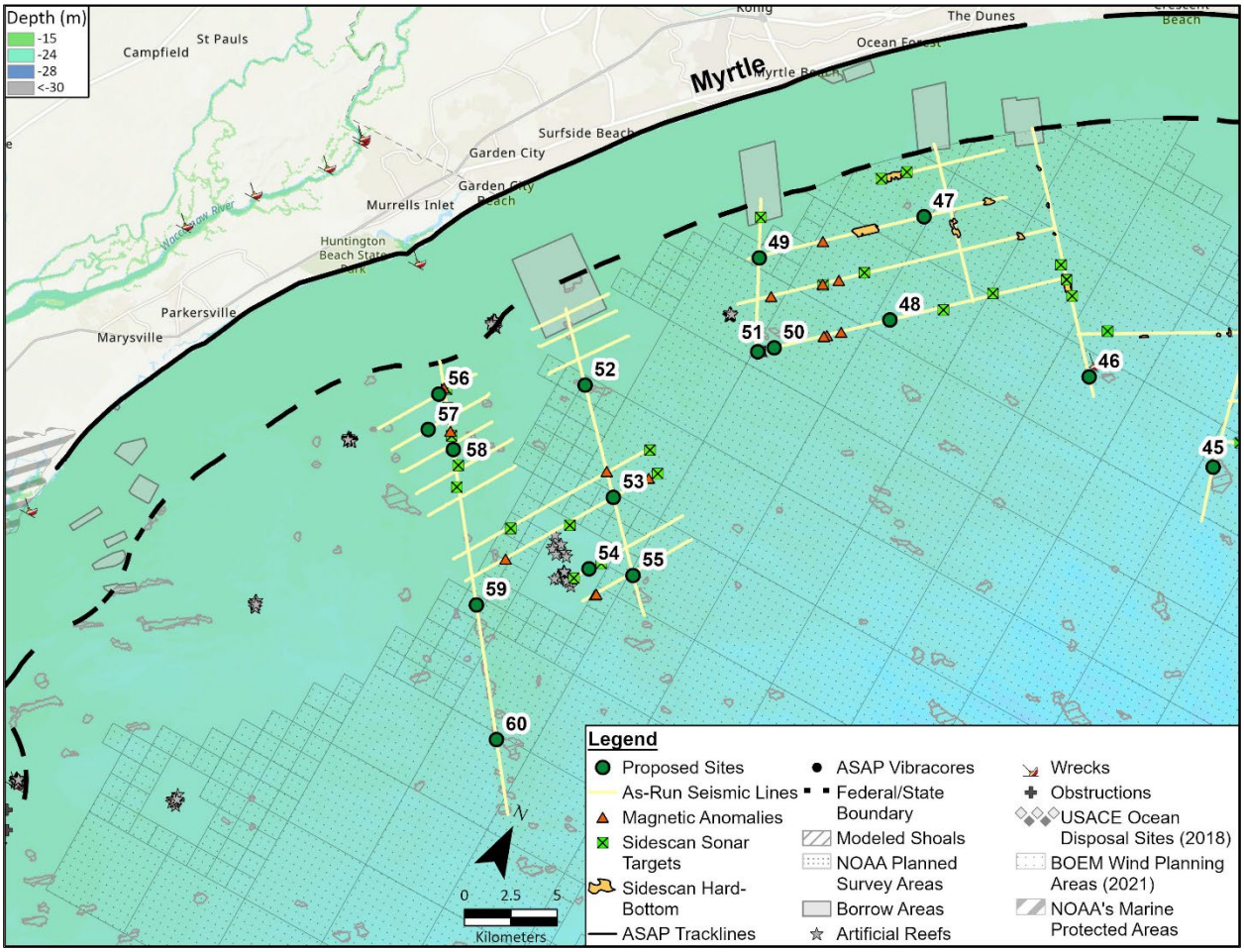
Figure 34. Map of deep paleochannels and shoal complexes within Long Bay. Modified from Baldwin et al. (2006)



Interpretation of initial geophysical data confirms the presence of paleovalley systems likely equivalent to those observed closer to the modern coastline, with several systems able to be correlated across the study area. The extent, depth of incision, and infill acoustic facies appear highly variable, again similar to others observed in Long Bay. The proposed vibracore sites are designed to test the occurrence and distribution of sand rich deposits within the paleovalley systems, the extent and thickness of shoals within the study area, and the relationship between the two types of depositional systems. A total of 15 vibracores collected offshore Myrtle region (Figure 35 and Table 6).

Sensitive benthic habitats in the Myrtle region appears to be divided into the northern and southern survey areas (see Appendix A, Map 3e). In the northern region, observed outcropping ancient strata and ephemeral hard-bottom is sparse, but occurs locally. In the southern transects there are several artificial reefs that were avoided. The vibracore locations were selected outside of the 500 ft (152 m) avoidance buffer surrounding these benthic habitats.

Figure 35: Proposed geologic sites offshore Myrtle. Survey plan totals 15 vibracores



A total of 15 vibracores were collected in the Myrtle study area. The proposed plan intends to satisfy a multitude of project goals within the area as previously discussed in Section 4.5.

Table 9: Myrtle Region Vibracores Final ID and Target Units

Vibracore Number	Final as-built name	Target sediment/layer
46	BOEMVC-2022-SC-46	Potential paleovalley fill and associated surficial sedimentary unit, base of paleovalley appears controlled by position of basement (high amplitude sub-parallel reflectors). Potential to hit top of basement
47	BOEMVC-2022-SC-47	Surficial sediment unit (5-ft [1.52 m] thick) overlying edge of paleovalley, high amplitude reflectors fanning into laminated aggradational fill of deep incision
48	BOEMVC-2022-SC-48	Potential paleochannel with chaotic and transparent acoustic facies overlying wedge-shaped high-amplitude package downlapping onto basement
49	BOEMVC-2022-SC-49	Potential paleovalley fill, irregular sub-parallel laminations, and mottled texture
50	BOEMVC-2022-SC-50	Surficial sedimentary unit overlying potential paleovalley fill, multiple packages each 5–7-ft (1.52-2.13 m) thick ranging from mottled acoustic facies to parallel medium amplitude reflectors
51	BOEMVC-2022-SC-51	Laminated upper unit and laterally continuous lower transparent unit overlying steeply inclined dipping reflectors that may be basement
52	BOEMVC-2022-SC-52	Test of shoals located near USACE surfside borrow area. 10–15-ft transparent unit with potential sub-zonations overlying sub-parallel medium amplitude package
60	BOEMVC-2022-SC-53	Surficial sediment unit (15-ft [4.57 m] thick) with mottled texture overlying potential paleovalley fill
59	BOEMVC-2022-SC-54	Surficial sediment unit with mottled and chaotic texture overlying small sag and associated sediment lens
54	BOEMVC-2022-SC-55	Potential paleochannel fill (20-ft [6.1 m] thick), acoustically transparent, located within highly variable dipping reflector package
55	BOEMVC-2022-SC-56	Surficial sediment unit (5–10-ft [3.05 m] thick) with chaotic and thinly bedded acoustic facies, overlying low-amplitude semi-parallel laminated facies
53	BOEMVC-2022-SC-57	Surficial sediment unit (5-ft [1.52 m] thick) with transparent acoustic facies, basal unconformity separating layered concave up paleovalley fill package (60-ft [18.29 m] thick)
58	BOEMVC-2022-SC-58	Surficial sediment unit (5–10-ft [3.05 m] thick) with mottled texture overlying potential paleovalley fill and potential rise in basement contact
57	BOEMVC-2022-SC-59	Potential paleovalley fill (20-ft [6.1 m] thick) with upper transparent package overlying steeply inclined dipping clinoforms
56	BOEMVC-2022-SC-60	Laterally continuous mottled acoustic facies unit (10 ft [3.05 m] thick) overlying laminated paleovalley fill

5.2 Geotechnical Data Collection

Prior to data collection, proposed geotechnical sample sites were assessed and cleared for archaeological and sensitive benthic habitat resources (Section 5.1.2.5 and 5.1.2.6). During geotechnical sampling operations, a qualified geologist monitored the acquired information in real time to maximize data quality and make any necessary adjustments to the sampling methodology, if needed. Additionally, the geologist onboard ensured that the collected data were compatible with the historical data identified in the area as part of the Task 1 desktop study.

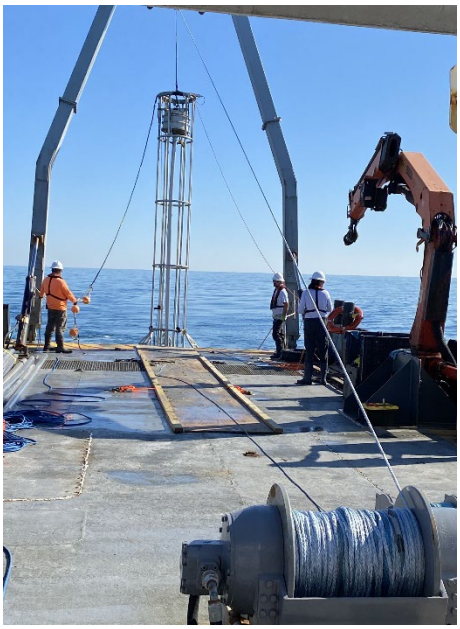
5.2.1 Systems and Equipment

Between October 10 and October 25, 2022, APTIM collected 60 vibracores utilizing the following vessel and equipment.

5.2.1.1 Geologic Survey Vessel Characteristics

APTIM used the R/V Rachel K Goodwin, a USCG inspected and certified vessel, for the geologic survey. The R/V Rachel K Goodwin is a 33.5 m (110 ft) steel hulled vessel, outfitted with the sole purpose of geophysical, geotechnical, and biological surveys. It comes equipped with a 27 ft (8.23 m) A-Frame, twin 1692 Detroit diesel main engines, twin 471 Detroit diesel generators (40 Amp), one 18,000 lb capacity deck winch, a 4 inch (10.16 cm) down pole with variable mounting brackets, and a 10-ton capacity 17 ft (5.18 m) hydraulic a-frame. The R/V Rachel K Goodwin is equipped with crew and client quarters as well as a full galley with two heads including showers. As a USCG inspected vessel, the R/V Rachel K Goodwin safety features include fire extinguishers, life vests/survival suits, 50-man life raft, first aid kits, radar, VHF radios, and an EPIRB. These safety features and the level of experience and expertise from the captain and crew allows the R/V Rachel K Goodwin to operate safely and efficiently, providing proficient geotechnical support throughout project operations.

5.2.1.2 Vibracore System Characteristics



APTIM utilized the SEAS VC-700 Vibracoring System, configured to collect undisturbed sediment cores up to 6 m (20 ft) in length. The VC-700 is a single core electric vibracoring system operational to depths of 1,000 m (3,281 ft). The electric vibracore is the most versatile of vibracore systems, with the ability to retrieve deep core samples with no pressure constraints as found with pneumatic vibracores. The self-contained, free-standing electronically operated vibracore unit contains a VC-700 vibrator head (4.4 kilowatts) configured to 415 VAC or 220 VAC 3-phase power, allowing for a user to operate the vibracorer at fluctuating vibration frequencies to penetrate through otherwise unyielding strata. A 210 m (688 ft) long 4-core Hydrofirm sea cable provides power to the drive unit of the vibracore from the surface control system, located on vessel.

The vibracore unit was winch and A-Frame deployed and retrieved from the R/V Rachel K Goodwin. The vibracorer's light weight modular construction allowed for a safe and efficient deployment and retrieval to and from the survey vessel. The vessel "live boated" at all geologic sample locations to reduce and mitigate any potential bottom disturbance.

As part of the geotechnical operations APTIM utilized an underwater camera with lights installed on the vibracore frame to allow for the operator to determine/adjust the proper vibrating frequency to preserve the integrity of the sample as well as have the ability to know exactly what is happening with the vibracore sample. APTIM also utilized a penetrometer, which provided information on the rate/speed of penetration. When recovery was less than 80% of the expected penetration, the liner was removed, a new liner inserted, and a second and third attempt performed (as necessary). During geotechnical field operations, if upon

completion of the second attempt, the refusal penetration was similar to the first attempt and was corroborated by collected seismic data (getting refusal at specific horizons), the third attempt was waived, and the site was considered complete. Upon collection of the vibracores and removal of the vibracore barrel, APTIM geologists measured, marked, and cut the liner of each vibracore into 1.52 m (5 ft) sections to prepare the cores for transport. The vibracores were then transported to APTIM's accredited geotechnical laboratory in Boca Raton, Florida, where they were processed according to the ASTM standards.

APTIM utilized an Odom Hydrographic Systems, Inc.'s E20, a single frequency portable hydrographic echo sounder operating at 200 kHz for bathymetric data collection during the vibracore collection. The final top of vibracore elevations were derived from MBES data collected during the geophysical phase of the project. This allowed APTIM to represent the top of vibracore elevation more accurately by applying post-processed tide correction at each vibracore location. Trimble Differential Global Positioning System receivers were used to provide real time navigation to the helm and record vibracore sample site locations during the geological sampling survey. All vibracore activities abided by the proper ASTM and USACE standards (ASTM D4823-95 [2019]).

5.3 Geological Interpretation Methodology

5.3.1 Geotechnical Data Sampling and Processing

Upon collection of the vibracores and removal of the vibracore tube, APTIM geologists measured, marked, and cut each vibracore into 1.52 m (5 ft) sections to prepare the vibracores for transportation. Each vibracore section was then labeled onboard the vessel. After geotechnical survey operations were completed, all vibracore sections were transported to APTIM's accredited geotechnical laboratory in Boca Raton, Florida. APTIM geologists split each vibracore lengthwise and logged them in detail by describing sedimentary properties by layer in terms of layer thickness, wet Munsell color, texture (grain size), composition and presence of clay, silt, gravel, or any other identifying features. The vibracores were logged in accordance with the American Society for Testing and Materials (ASTM) Standard Materials Designation D2488-17e1 for the description and identification of soils using the visual-manual procedure. Wet Munsell colors were determined from the methodology described in the Munsell Soil Color Book, as recommended by the Florida Department of Environmental Protection's Offshore Sand Search Guidelines. Logging was consistent with USACE ENG Form 1836.

Sediment subsamples were extracted from the vibracore sample halves at irregular intervals based on distinct stratigraphic layers and sediment quality (strata with apparent high fines content were typically avoided) in the sediment sequence. The subsample collection depths were noted on the logs, and the subsamples were stored in labeled plastic bags. The archived (un-sampled) halves and sampled halves of the vibracore sections were then placed in labelled plastic sleeves and stored at APTIM to be available for additional review and sampling as needed. Archive vibracore halves were wrapped with plastic wrap prior to placement in the plastic sleeves, to reduce shifting of the sediments during storage and future transfer. The vibracore log descriptions were entered into the gINT software program.

The split vibracores were photographed in 0.6 m (2.0 ft) intervals using an Olympus Stylus TG-3 16 megapixel digital camera that was mounted on a frame directly above the vibracores. The photographs were taken using the normal image compression mode (shooting at "Normal" quality) using full spectrum overhead lighting and an 18 percent gray background, which provides a known reference color and is the

standard reference value against which all camera light meters are calibrated. Photographs included the project name, vibracore name, depth interval, and scale. Photograph procedures were determined from the methodology described in the Florida Department of Environmental Protection's Offshore Sand Search Guidelines. The photographs were downloaded from the camera as .jpgs, formatted for consistency, and then exported into the finalized .pdf format. Vibracore photographs, logs, curves, carbonate and torvane results are presented in Appendix G (both attached to the report and digital), digital penetrometer logs are presented in Appendix H and geotechnical field notes are presented in Appendix N.

5.3.1.1 Mechanical Sieve Analysis

The sediment subsamples were analyzed to determine color and grain size distribution. During sieve analysis, the wet, dry, and washed Munsell colors were noted. Dry and washed Munsell colors were determined from the methodology described in the Munsell Soil Color Book, as recommended by the Florida Department of Environmental Protection's Offshore Sand Search Guidelines. Grain size was determined through sieve analysis in accordance with ASTM Standard Materials Designation D6913/D6913M-17 for particle size analysis of soils. This method covers the quantitative determination of the distribution of sand particles. Sediment finer than the No. 200 sieve (3.75 phi) was analyzed following ASTM Standard Materials Designation D1140-17. Mechanical sieving was accomplished using calibrated sieves with a gradation of half phi intervals. Additional sieves representing key ASTM sediment classification boundaries were included to meet appropriate Florida Department of Environmental Protection requirements (FDEP, 2010). Weights retained on each sieve were recorded cumulatively. The sieve stack used for mechanical analysis is provided in Table 10. Grain size results were entered into the gINT® software program, which computes the mean and median grain size, sorting, and fines (silt/clay) percentages for each sample using the moment method. Grain size results are displayed on the granulometric reports, grain size distribution curves, and logs (Appendix G). Final gINT projects are also submitted in Appendix M.

Table 10: Granulometric Analysis Mesh Sizes by USCS Classification based on the ASTM D2487/2488 standards

Table 10 presents the classifications for gravel, B presents the classification for Sands and C the classification for Fines.

A1: Coarse Gravel

Sieve Number	Sieve Size (phi)	Sieve Size (mm)
3/4	-4.25	19.03

A2: Fine Gravel

Sieve Number	Sieve Size (phi)	Sieve Size (mm)
5/8	-4.00	16.00
7/16	-3.50	11.20
5/16	-3.00	8.00
3 ½	-2.50	5.60
4	-2.25	4.75

B1: Coarse Sand

Sieve Number	Sieve Size (phi)	Sieve Size (mm)
5	-2.00	4.00
7	-1.50	2.80
10	-1.00	2.00

B2: Medium Sand

Sieve Number	Sieve Size (phi)	Sieve Size (mm)
14	-0.50	1.40
18	0.00	1.00
25	0.50	0.71
35	1.00	0.50

B3: Fine Sand

Sieve Number	Sieve Size (phi)	Sieve Size (mm)
45	1.50	0.36
60	2.00	0.25
80	2.50	0.18
120	3.00	0.13
170	3.50	0.09
200	3.75	0.08

C1: Silty/Clay

Sieve Number	Sieve Size (phi)	Sieve Size (mm)
230	4.00	0.06

5.3.1.2 Composition/Carbonate Analysis

Carbonate content was determined by percent weight using the acid leaching methodology described by Twenhofel and Tyler (1941), and the testing procedures outlined within CPE-HAT-09. Results were entered into the gINT software program and displayed on the granulometric reports and grain size distribution curves.

5.3.1.3 Field Vane Shear Tests

Field vane shear tests were conducted during vibracore logging in accordance with ASTM Standard Test Methods of Laboratory Miniature Vane Shear Test for Saturated Fine-Grained Clayey Soil (D4648/D4648M-16). These tests were used to characterize the clay material.

5.3.2 Surficial Sand Delineation and Quantification

As part of the project scope, APTIM was tasked with evaluating the collected seismic data to delineate any potential sand resources present in Onslow and Long Bays that could be further mapped and used for future restoration efforts. In order to accomplish this assessment, APTIM correlated the geotechnical and seismic data to develop a sediment resource thickness surface that would then be clipped according to bathymetric expressions observed in the NOAA Coastal Relief Model (CRM). The methodology used for the resource delineation and quantification are presented in the sections below.

5.3.2.1 Seismic and Geotechnical Data Correlation

To meet the various project goals, APTIM developed a project specific color-coding scheme for the layers within each vibracore. The scheme is based on a point deduction system, where specific characteristics such as mean grain size, shell content or color cause a layer to lose points. The final score then determines what color the layer should be classified as. A sampled layer would start with a score according to its fine percentage (based on percent passing the #200 or 3.75 phi sieve) outlined in Table 11. From the initial score, points were deducted based on mean grain size (mm), layer qualifiers, the descriptive terms, and color.

Table 11: Vibracore sample point allocation based on fine content

% Fine[1]	Points
<5%	10
5–10%	9
10–15%	8
15–20%	7
20–25%	6
>25%	5

[1]*based on the percent passing the #200 sieve.*

For each layer from which a sample was collected and analyzed, points were deducted from the initial score based on properties that would typically make the layer non-beach compatible and/or negatively affect the overall vibracore composite (Table 12). The number of points deducted was based primarily on how far the sediment within a layer deviates from a conservative assumption of the characteristics of beach compatible sediment. Samples that are either too coarse-grained or too fine-grained based on their mean grain size (mm) had points deducted. Points were also deducted based on the sand layer qualifiers such as Silty, Shelly, or Clayey, which indicate that a sample is 35 to 50 percent of that material. Additionally, the components of each layer were reviewed for little (10 to 20 percent) or some (20 to 35 percent) non beach compatible components (shell, rock fragments, clay, silt, wood etc.). If a layer was partially lithified or lithified, it also had points deducted. Lastly, wet Munsell color values were also reviewed for potential beach compatibility. Darker colors are typically considered less beach compatible, so they had more points deducted than lighter colors.

Table 12: Sample point deductions based on properties, qualities, and color

Mean (mm)	Points
0.51mm>	-1
0.21–.50	0
<0.20 mm	-1

Qualifier	Points
Shelly/Shell	-3
Clayey/Silty	-2
Clayey Shell Hash	-2

Percentage non-beach compatible components	Points
Trace (0–10%)	0
Little (10–20%)	-0.5
Some (20–35%)	-1
Lithified/partially lithified	-5

Munsell Value (wet)	Points
6–8	0
5	-0.5
2.5–4	-1

A color was then assigned to the interpreted layer based on the final score according to Table 13, where layers that are potentially more beach compatible are classified as green, while clays are color coded as red and less compatible sand layers are color coded as yellows and oranges.

Table 13: Final vibracore sample point system and color-coding scheme

Color	Total points
Dark Green	9.1–10
Green	8.1–9
Light Green	7.1–8
Yellow	5.1–7
Orange	3.1–5
Red	2.1–3
Dark Red	<2

Unsampled layers, which likely did not meet sand needs were color coded according to Table 14 where the layer descriptor, qualifiers and Unified Soils Classification System (USCS) were used to determine the final points allocated to the layer.

Table 14: Unsampled vibracore point allocations

Color	Total points
Clay	1
Clayey Sand	3
Clayey Shell Hash	2
Clayey Silt	1
GM	3
Gravely Sand	3
GW	3
Sand	5
Sandy Clay	2
SC	4
Shell	3
Shell Hash	3
Shelly Clay	2
Shelly Sand	3
Silty Clay	1
Silty Sand	2
SW	4

5.3.2.2 Surficial Sand Delineation

With the assistance of the plotted vibracores, APTIM was able to evaluate the available surficial sands in each of the studied areas and generate an isopach for each analyzed area in order to identify future potential sand resources that are greater than 3-ft (0.91 m) thick. Using the seafloor and the reflector representing non-beach-compatible material (i.e., high silt, clay, or rock content) boundary, the thickness of the sediment unit was calculated and exported in order to develop an isopach (sediment thickness) of each of the five study areas. X/Y/Thickness files were imported into Golden Software Inc.'s Surfer software program and adjustments were made to the digitization whenever discrepancies occurred, such as obvious differences in thicknesses between adjacent/intersecting lines or consecutive files (roll overs). A final thicknesses file was exported for each area in Surfer and smoothed into an isopach surface within ArcGIS in order to remove any anomalies that occurred due to the line spacing and gridding interpolation. Due to the wide line spacing, surfaces in Bogue, Topsail, New Hanover Brunswick, and Myrtle were generated using a grid node spacing of 500. All generated surfaces were then smoothed in ArcGIS Pro using the Focal Statistics geoprocessing tool using a circle neighborhood with three cells (radius and unit type) computing the mean statistic. From the generated sand surfaces, APTIM then used the NOAA CRM surface to assist in identifying regional patterns and to delineate a polygon around the collected data that would exclude any potential erroneous areas that were generated from the gridding tool interpolating between areas without any data coverage. The sand isopach surface was then clipped to the generated polygon to eliminate any artifacts that would interfere with the interpretation and review of the data. Maps depicting the sediment thickness in feet can be found in Appendix A Map 6a–6e. It is worth mentioning again that the isopach surface created in ArcGIS is only a reconnaissance level model since it is interpolating between the widely spaced reconnaissance lines and therefore is not expected to be completely accurate.

Upon analysis of the data, it became evident that due to the widely spaced as-run lines a conservative sand resource delineation approach would be the best method to provide a comprehensive and accurate coverage of the area. In order to accurately digitize subsurface reflectors, the geologist relies heavily on computed

intersections between perpendicular chirp sub-bottom lines to confirm the vertical location of actual geologic reflectors. With the large spaces between collected survey lines from the reconnaissance phase, there are fewer survey line intersections, reducing the amount of data available to "tie" geologic features together. This, in turn, reduces the overall accuracy of, and confidence in the generated surfaces due to the interpolation between lines. While the data are sufficient to make general qualitative geologic interpretations supporting the identification and mapping of potential beach-compatible sand resources, it is not at a sufficient spatial resolution (between lines) to allow for a detailed accounting and mapping of geologic data between survey lines.

Also, given the limited number of vibracores sampling the subsurface material, the interpretation of the overall sediment type and quality is highly dependent upon the chirp sub-bottom acoustic response. Therefore, most of the digitization excluded areas where the subsurface stratigraphy had a signal that was not indicative of clean sands. It is possible however, that some of these areas could prove to be sand when sampled. Further geophysical and geologic sampling would refine these stratigraphic interpretations and thickness estimates.

Granulometric curves and reports, descriptive logs, and photographs of vibracore data were used to compile sediment characteristics and vibracore composite statistics in the study areas that had surficial sands greater than 3ft (0.91 m) and 5ft (1.52m) per the scope of work. The Bogue region did not have any significant surficial sand resources that were greater than 3ft (0.91 m), therefore the analysis presented in the sections below do not include any surface sand deposit conclusions from the Bogue region. Additionally, within the New Hanover region, two potential resources were identified that do not have any geotechnical information. These potential resources were not included in this report; however they can be seen in Appendix A Map 7c and are included as potential Sand Resources as part of the MMIS deliverables (Appendix B).

6 Integrated Geophysical and Geologic Interpretation

The integrated geophysical and geological datasets were interpreted in order to address each region's specific strategic questions as well as identify and characterize any potential surficial or sub-surface sediment resource deposits that may be suitable for future coastal restoration efforts. Additionally, these data were used to provide a geologic framework for portions of the region to assist in future determinations of potential sediment resources and to provide a better understanding of the evolution of Onslow and Long Bays. Maps depicting results from the geophysical data interpretation are submitted in Appendix A. Below are results of the overall regional surficial sand resource quantification conducted across Onslow and Long Bays as well as specific results and interpretations for each of the five identified study areas.

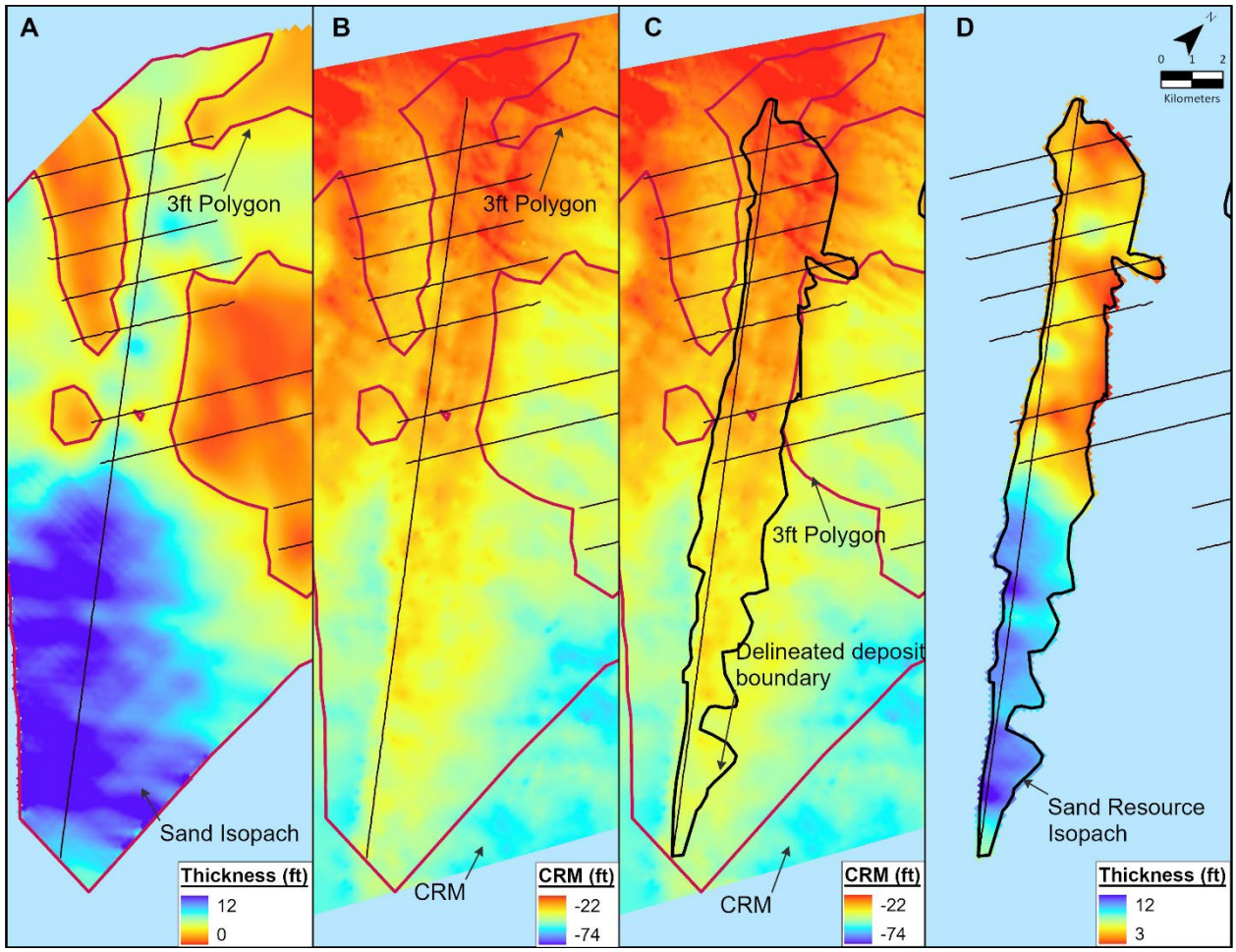
6.1 Surficial Sand Resource Quantification

Based on the surface sand delineations created by correlating the seismic and vibracore data, APTIM was able to identify potential deposits that are greater than 3-ft (0.91 m) thickness within the investigation areas. In order to meet the project needs, APTIM first clipped the thickness surface discussed in the section above to exclude everything thinner than 3-ft (0.91 m) thick. The remaining data boundary was then converted to a polygon within ArcGIS Pro to assist in correlating the various datasets. APTIM then utilized the NOAA CRM for the study area to identify depositional patterns that likely correlated with the surficial sand polygon created from the isopach data. As part of this review, APTIM used patterns of topographic highs observed within the CRM model and generated isopachs to best identify the boundaries of the shoals.

Within ArcGIS Pro, a polygon representing the areas that had a sand isopach thicknesses greater than 3ft (0.91m) was generated using the Raster to Polygon (Figure 36, Panel A). This tool allowed APTIM to corelate the potential resource boundaries of the interpreted areas to the CRM model (Figure 36 Panel B).

By comparing the 3 ft (0.91 m) polygon to the CRM, APTIM was able to better understand how the observed sand isopach thicknesses correlates to the bathymetric highs seen in the CRM and use the collected geophysical and geologic data to better understand the shallower areas seen in the CRM surface. Additionally, this visual surface comparison allows for the identification of areas outside the surveyed area where the sand surface shows artifacts of the largely spaced lines and the gridding tool interpolating between data points. From comparing the surfaces and the 3 ft (0.91 m) polygon, APTIM was able to delineate a deposit boundary that would best represent the sand resource identified in the seismic data (Figure 36 Panel C). The sand isopach surface was then clipped to each of the individual identified boundaries and a final sand resource isopach was generated (Figure 36 Panel D). This surface was then used for subsequent calculations of potential resource volumes. It is important to note that there are some caveats to this assessment. In instances where the seismic data indicated a thickness greater than 3 ft (0.91 m) and/or a vibracore indicated the presence of sand, but the CRM data did not indicate any significant bathymetric shoal or observable trend, and/or the deposit did not have a current vibracore sample, deposits were not included as part of the final resource volumes presented as part of this report. Moreover, due to the correlation between the different datasets in order to determine the boundaries of the deposit, some of final sand thickness isopachs might include sand thicknesses less than 3 ft (0.91 m). Additional data coverage and further analysis of the depositional patterns within the CRM model would be required in order to resolve these areas, however that was not included as part of the scope of work.

Figure 36: Surficial Sand Resource delineation methodology for observed surficial sedimentary unit within the Myrtle study area



By visually correlating the CRM data, the clipped surface, as well as geophysical data coverage, APTIM was able to identify 14 potential deposits in Onslow and Long Bays (Table 15 and Appendix A Map7a–7e), however no surficial deposits were identified within the Bogue region that met the necessary requirements. Volumes and composite statistics were calculated for each of the potential deposits identified. It is important to note that these are based on reconnaissance data and require additional data coverage in order to more accurately delineate the deposit and correlate it to the bathymetric data.

Composite mean grain size and percent silt content were computed for each vibracore within each of the study areas by calculating the weighted average (sample weighted by effective lengths of the sampled layer above the elevation of base of suitable material). The final product of this calculation was a composite vibracore sample with weights for each phi interval. The composite statistics for each study area were compiled by averaging the weighted results for all cores within the vertical and lateral limits of the study areas. It should be noted that the final composite values for each study area are only an estimate based on very limited, widely spaced geologic samples, and that additional vibracores should be taken during a secondary offshore design-level investigation in order to more confidently determine the beach-compatibility of the preliminary borrow areas. These areas are presented in Appendix A Map 7a-7e.

Volumes for each of the potential deposits were calculated by utilizing the Surface Volume tool within ArcGIS Pro. Due to the variability in the thickness grid created after removing the areas that do not correlate to bathymetric shoals in the CRM surface, the volume of potential sediment in the deposit was calculated above a 3 ft (0.91 m) plane to ensure that only the volume that could be dredged are included in the final calculations. The same method was used along identified resources in study areas where strategic questions required significant volumes greater than 5ft (1.52 m). These volumes and areas are also reported in Table 15 and are differentiated in the Deposit ID column by appending 5ft (1.52 m) to the deposit designation. Areas reported in the table below are the regions of space between the specified plane height of 3ft (0.91 m) (or 5ft [1.52 m]) and the portions of the surface that are above the plane that had corroborating geotechnical information and therefore do not represent all the identified CRM polygon areas included in the MMIS deliverable.

Table 15: Area and first order volume breakdown of surficial sand for each study area

Study Area	Deposit ID	Vibracores	Isopach Area (acre/km^2)	Volume (cy/m^3)	Grain Size (mm/phi)	% Silt	Sorting (mm/phi)
Topsail	Topsail_01	BOEMVC-2022-NC-11, NC-BOEM-2015-VC25	700/2.83	1,142,000/ 873,121	0.21/ 2.25	0.69	3.56/ -1.83
New Hanover	NH_01	BOEMVC-2022-NC-22	500/2.02	1,955,000/ 1,494,704	0.25/ 2.0	0.95	2.29/ -1.20
New Hanover	NH_02	BOEMVC-2022-NC-26, BOEMVC-2022-NC-25, BOEMVC-2022-NC-28, BOEMVC-2022-NC-27, NC-BOEM-2015-VC13	9,500/38.45	37,793,000/ 28,894,822	0.24/ 2.06	0.92	3.39/ -1.76
Brunswick/ N. Myrtle	BNM_01	BOEMVC-2022-NC-30	30/0.12	6,000/4,587	0.47/ 1.09	0.96	3.94/ -1.98
Brunswick/ N. Myrtle	BNM_02	BOEMVC-2022-NC-29,	1,200/4.86	4,980,000/3, 807,483	0.28 1.84	1.06	2.85/ -1.51
Brunswick/ N. Myrtle	BNM_02 (5ft)	BOEMVC-2022-NC-29,	800/3.24	1,522,000/1, 163,652	0.28/ 1.84	1.06	2.85/ -1/51
Brunswick/ N. Myrtle	BNM_05	BOEMVC-2022-SC-44	180/0.73	808,000/617 ,760	0.26/ 1.94	0.68	1.92/ -0.92
Brunswick/ N. Myrtle	BNM_06	BOEMVC-2022-SC-42	100/0.40	50,000/38,2 28	0.35/ 1.51	0.96	1.42/ -0.51

Study Area	Deposit ID	Vibracores	Isopach Area (acre/km^2)	Volume (cy/m^3)	Grain Size (mm/phi)	% Silt	Sorting (mm/phi)
Brunswick/ N. Myrtle	BNM_07	BOEMVC-2022-SC-45	200/0.81	1,091,000/834,129	0.26/ 1.94	0.69	1.72/ -0.78
Myrtle	Myrtle_01	BOEMVC-2022-SC-46	160/0.65	336,000/256,890	0.28/ 1.84	1.05	2.13/ -1.09
Myrtle	Myrtle_01 (5ft)	BOEMVC-2022-SC-46	700/2.83	1,504,000/1,149,891	0.28/ 1.84	1.05	2.13/ -1.09
Myrtle	Myrtle_02	BOEMVC-2022-SC-48	180/0.73	159,000/121,564	0.26/ 1.94	0.75	2.54/ -1.34
Myrtle	Myrtle_02 (5ft)	BOEMVC-2022-SC-48	65/0.26	219,000/167,438	0.26/ 1.94	0.75	2.54/ -1.34
Myrtle	Myrtle_03	BOEMVC-2022-SC-50	1,900/7.69	5,803,000/4,436,712	0.33/ 1.60	0.98	3.40/ -1.77
Myrtle	Myrtle_04	BOEMVC-2022-SC-56	700/2.83	1,010,000/772,200	0.32/ 1.64	0.97	1.27/ -0.34
Myrtle	Myrtle_04 (5ft)	BOEMVC-2022-SC-56	2,90011.74	6,266,000/4,790,700	0.32/ 1.64	0.97	1.27/ -0.34
Myrtle	Myrtle_05	BOEMVC-2022-SC-52	300/1.21	319,000/243,893	0.34/ 1.56	0.76	2.49/ -1.32
Myrtle	Myrtle_05 (5ft)	BOEMVC-2022-SC-52	11,200/45.32	67,508,000/ 51,613,569	0.34/ 1.56	0.76	2.49/ -1.32
Myrtle	Myrtle_06	BOEMVC-2022-SC-60 BOEMVC-2022-SC-58 BOEMVC-2022-SC-54 BOEMVC-2022-SC-53	7,000/28.33	36,690,000/ 28,515,518	0.25/ 2.0	0.82	2.12/ -1.08
Myrtle	Myrtle_06 (5ft)	BOEMVC-2022-SC-60 BOEMVC-2022-SC-58 BOEMVC-2022-SC-54 BOEMVC-2022-SC-53	7,000/28.33	67,508,000/ 51,613,569	0.25/ 2.0	0.82	2.12/ -1.08

The provided areas of likely beach compatible resources consist of a conservative estimate of beach compatibility and constitute gross volumes of potentially available resources.

6.2 Regional Interpretation and Discussion

Major results and discussion of the integrated geophysical and geological results for each five study areas (Bogue, Topsail, New Hanover, North Myrtle, and Myrtle) across Onslow and Long Bays are presented below. The goal of each section is to address the strategic questions and provide all necessary details of potential sediment resources as well as identified limiting factors (e.g., magnetometer anomalies or avoidance areas). This report provides an overview of all identified and interpreted magnetometer/sidescan sonar anomalies and contacts that may provide input for avoidance area delineations. Sidescan sonar data is interpreted to identify the presence and characteristics of surficial sedimentary deposits as well as their potential geomorphic interpretation. Sub-bottom profiler data and geologic ground truth are used to map subsurface stratigraphic features of interest (e.g., paleochannels) that may host potential sediment resources as well as provide additional geologic framework interpretation for each region. Regional strategic questions and indications of future directions are also provided.

6.2.1 Bogue

The Bogue region, located offshore Carteret County, North Carolina, contains 11 magnetic anomalies in total. These anomalies consist of six monopolar, three dipolar, and two multicomponent anomalies. Their

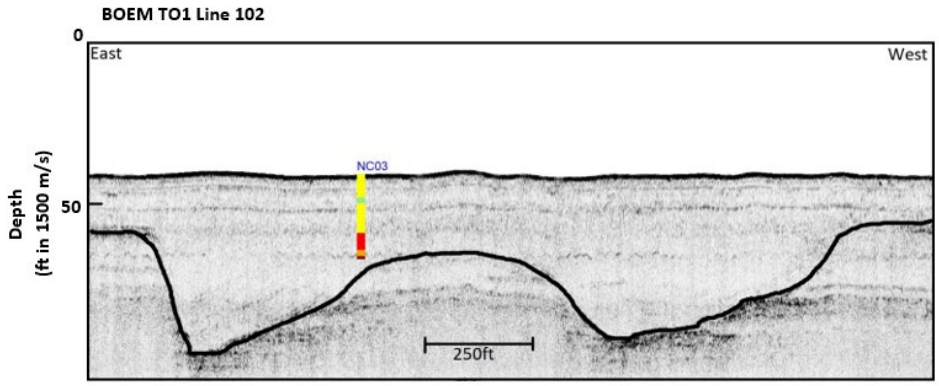
amplitudes range from 5 to 364.9 nT, durations from 36.9 to 169.5 ft (11.25-51.66 m), and none of the anomalies were interpreted to be potentially associated with any sidescan sonar contacts or known features. All of the anomalies within the Bogue region are described as unknown/modern debris.

The sidescan sonar data indicates that the surface is very fine-grained sediments (i.e., muds, indicated by low-intensity backscatter) with fine to coarse grained sediments (i.e., sands, indicated by medium to high-intensity backscatter). Sidescan sonar data within the region characterizes the seafloor as having a mostly muddy bottom (low-intensity backscatter) with some areas of sandy bottom consisting of sand waves. The sand waves are located towards the western edge of the region and are oriented in a generally north to south trend. Only two sidescan sonar contacts were identified within the Bogue region and represent unknown features, likely potential debris.

Seismic data within the Bogue region verify the existence of several paleochannels in the southwestern segment of the survey area (Figure 37). Seismic line BOEM_SBP_20220525_Line_102 outlines the extent of a large paleochannel in the south-eastern section of the Bogue survey area. Ground-truthing using BOEM-VC-2022-NC-03 reveals that both sands and clays were deposited within a paleovalley, which are traceable throughout the profile, indicating that there is the potential for sands within the infill of some paleovalley systems.

Figure 37: Seismic line BOEM_SBP_20220525_Line_102 with color coded vibracore BOEMVC-2022-NC03 and delineated paleochannel

Seismic line BOEM_SBP_20220525_Line_102 with a delineated paleochannel in black. Ground truthing using BOEM-VC-2022-NC03 revealed fine sands and clay likely infill these large paleochannel systems in the southeastern section of the Bogue survey area.

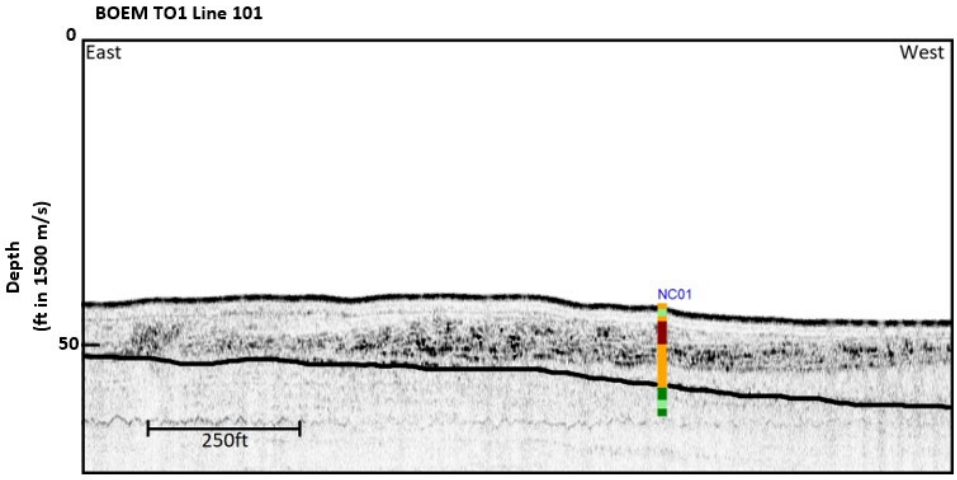


Potential beach-compatible sands within the Bogue region appear to be within paleochannel systems and likely with some overburden, which require additional data coverage in order to accurately establish their boundaries and composition. From the geotechnical data, it is evident that most of the surface sands are fine grained with a larger silt content. From the correlation of the seismic data and vibracores, APTIM was able to identify a small potential deposit at depth around BOEMVC-2022-NC01 (Figure 38), with roughly 10 ft (3.05 m) of very fine sand overburden. This potential deposit was sampled by the lower part of BOEMVC-2022-NC01 and appears to be sands with little shell fragments and shell hash and associated with the upper portion of inclined heterogeneous strata overlying the erosional base of the paleochannel. As can be seen in Figure 38 vibracore BOEMVC-2022-NC01 likely did not sample the potential deposit in its entirety and the seismic data does not have the necessary resolution at depth to fully resolve the deeper stratigraphic architecture, potentially due to the sandy nature of the stratigraphic unit. Therefore, only the top of the potential sand unit was digitized, and additional data would be required to further resolve the bottom of the sand unit and further characterize the deposit.

Surface sand delineations within the Bogue region do not indicate the presence of any significant sediment resources that are thicker than 3ft (0.91 m) across the study area. Analysis of the collected geotechnical and seismic data indicates a thin surficial unit throughout the region with variable beach compatibility properties. As previously mentioned, potential sand resources in the Bogue region are constrained within the paleochannel systems and require additional geophysical and geotechnical data coverage to further constrain the boundaries of the deposit and evaluate the extent and quality of the resources.

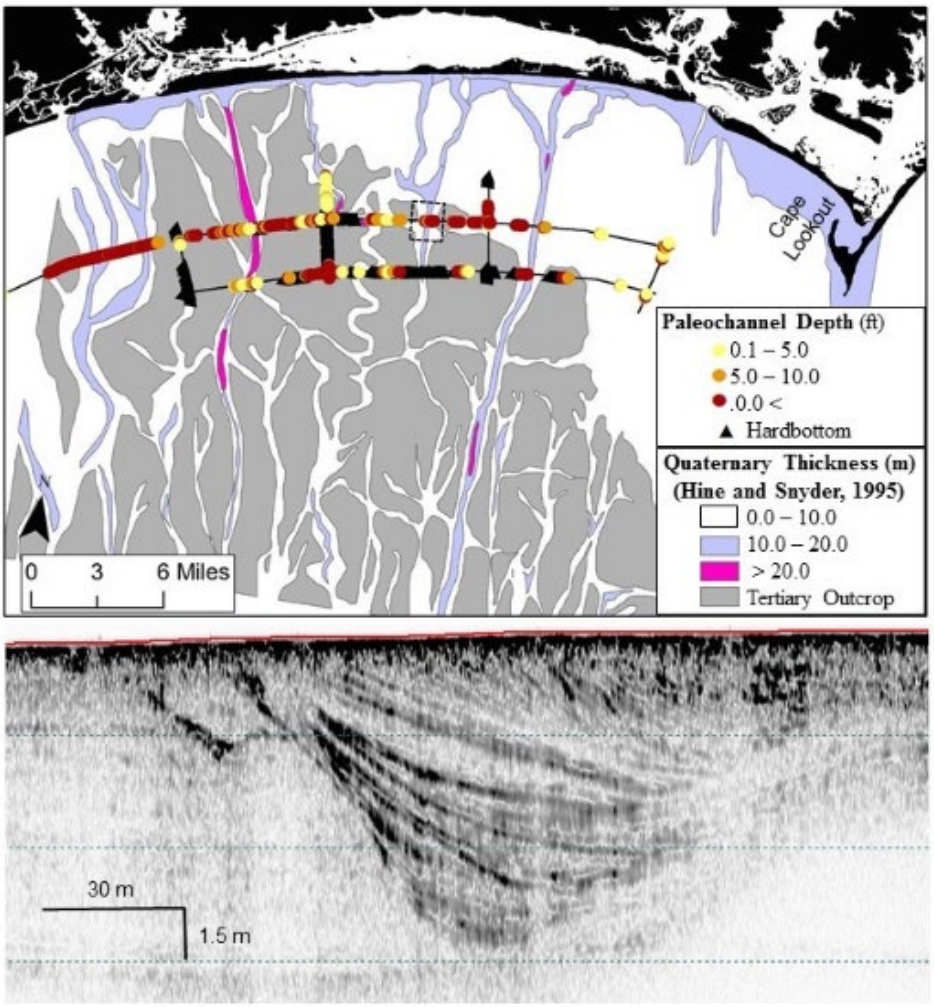
Figure 38: Seismic line BOEM_SBP_20220524_Line_101 with color coded vibracore BOEMVC-2022-NC01

Seismic sub-bottom line with BOEMVC-2022-NC-01 color coded according to the schema developed project (see section 5.3.2.1 for color classification information). The black line plotted onto the profile is highlighting the reflector that best correlates with the top of the likely beach compatible sand deposit in the eastern region of the Bogue survey area. Due to the depth and resolution of the dataset, the bottom of the beach compatible unit was not digitized and will require additional data coverage to delineate the deposit.



The Bogue region is bounded to the east by Cape Lookout with the modern shoreline trending east-west. Prior work has noted the presence of a patchy, thin sandy unit across much of the shelf (e.g., Hine and Snyder, 1985) interspersed with outcropping hardgrounds composed of Tertiary strata (Freeman et al., 2012), in agreement with the findings of this study. Numerous incisional channel forms and paleovalleys have been identified across the region, eroding the underlying Tertiary units by up to 60 ft (18.29 m) (Figure 39) and infilled by Quaternary sediments deposited under fluvial and estuarine conditions across a likely wide time-range, rather than a single continuous sequence (Hine and Snyder, 1985). Where surficial sediments are present, they are typically 2–5-ft (0.61-1.52 m) thick but can reach up to 10–15 ft (3.05-4.57 m) in localized areas towards the east of the region.

Figure 39. Interpretations of ASAP survey combined with previous conceptual paleovalley pathways, modified from compilation in Conery, 2019. Bottom sub-bottom profiler panel shows example character of paleochannel and subsequent infill from ASAP survey data



Three types of potential sediment resource bearing deposits were identified in the study area: type (1) deposits consisting of surficial sand units (see examples above), type (2) deposits of discrete sandy units located within larger paleovalley systems, and type (3) deposits of older basement rocks that may be poorly consolidated despite their age (e.g., Tertiary units). Paleovalley systems potentially containing type (2) deposits were observed across the Bogue region, varying in incisional depth and associated fill thickness between 20–60 ft (6.1-18.29 m) (Hine and Snyder, 1985). Some systems appear to have been filled by relatively uniform aggradational laminated strata that is likely reflective of estuarine conditions and has little probability of hosting sediment resources (Figure 40), while others contain chaotic-mottled acoustic facies and/or dipping reflectors within the full unit that may indicate higher proportions of fluvial or tidal deposition and have a higher likelihood of containing sand bearing resource deposits (Figure 41). Geotechnical results of core BOEMVC-2022-NC-04 located within such a valley indicate deposits of fine-medium grain quartz sands with trace shells and silts that have been classified as good to marginal quality sands in association with these acoustic facies.

Figure 40. Example sub-bottom profiler data across a Bogue paleovalley showing incisional base and aggradational fill. Steeply inclined dipping reflectors on left of paleovalley may indicate sand potential

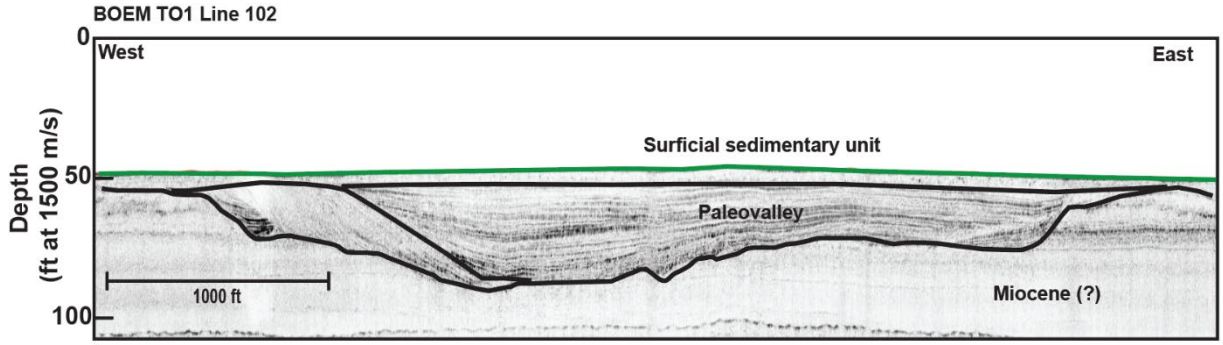
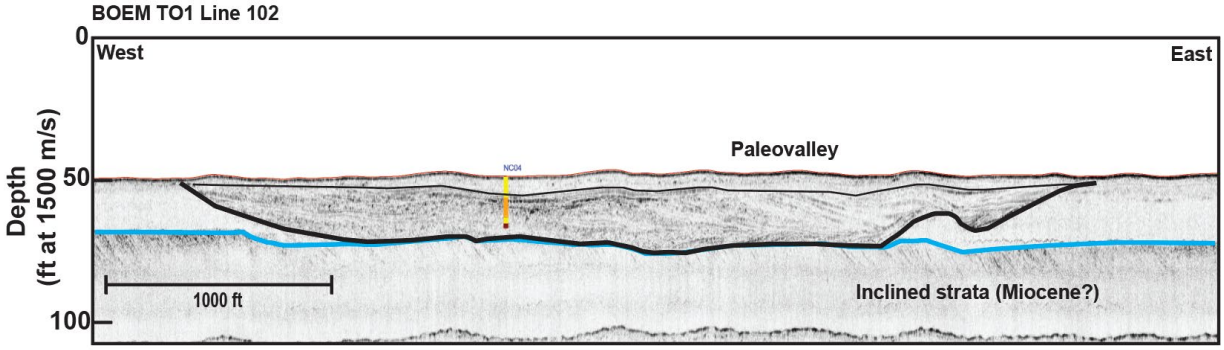


Figure 41. Example sub-bottom profiler data across a Bogue paleovalley with chaotic facies and dipping reflectors. Inclined strata located below paleovalley (top in blue) are potential sand-rich deposits



Numerous paleovalleys are observed adjacent to each other across Bogue, in line with previous interpretations of the region's shelf as being highly dissected by numerous sea-level cycles with minimal shelfal deposition to provide "fresh" substrate for the next regressive and incisional episode (e.g., Hine and Snyder, 1985). This likely leads to highly time-transgressive units occurring at similar depths below the seafloor, such as adjacent deposits dating from the mid-Holocene to Pleistocene or older (Conery, 2019). Additionally, individual valleys may represent zones of relative weakness compared to the surrounding Miocene and Pliocene rock and sediments and thus be preferentially reoccupied by subsequent fluvial systems, potentially acting to rework estuarine and fluvial units. The observed variability of paleovalley incisional depth and fill facies make accurate interpretation of valleys as genetically-related regional features challenging in Bogue, particularly at the reconnaissance level survey scale conducted here. Rather, the relatively widely distributed nature of such features should provide numerous potential targets for future detailed investigations to allow for more accurate delineation and linking across the shelf.

A deeper ancient stratigraphic unit is also observed across almost the entirety of the study area, except where paleovalleys have either fully eroded it or mask its imaging, which can occur within 10–20 ft (3.05-6.1 m) of the modern seafloor (Figure 41). While Tertiary, in particular Miocene, units are widespread in this area the internal architecture of this unit differs significantly. The upper bounding surface is regionally conformable, and it is composed of steeply inclined dipping reflectors and maintains a thickness of at least 20–40 ft (6.1-12.19 m) thick across the area. The bottom of the unit is not observed within this dataset, as explained above. The steep clinoform architecture combined with earlier sampling of potentially the same unit finding well-sorted, fine grained quartz sand with high beach compatibility may indicate this deposit

as a preserved coastal landform from the Tertiary (Snyder et al., 1988). This unit is classified as a potential type (3) deposit that should be the focus of future investigation to further delineate its extent and identify areas of Bogue where the basement structure allows for minimal overburden and thus sampling access.

Bogue Regional Strategic Questions

1) What is the composition, quality, and extent of the potential resource(s)?

Several types of potential resource deposits were identified in the Bogue region: (1) surficial sedimentary bodies such as isolated shoals and sets of sand ridges, (2) sand-rich packages within larger sub-surface stratigraphic units, and (3) regionally extensive, underlying ancient stratigraphic units that comprise the base of the observable sub-surface geology of the surrounding continental shelf. Deposit type (1) is found sparsely throughout the region, but with highly variable thickness and grain size content ranging from silt to fine sand. The spatial extent of type 1 deposits appears hundreds to thousands of feet, but accurate correlation and delineation is limited by sparce data density of the regional-scale survey. Deposits characterized as type 2 are hundreds of feet wide and 5–10-ft (1.52-3.05 m) thick but are contained within larger paleovalley systems that typically trend across the study area perpendicular to the modern shoreline and vary in width between 1000–6000 ft (304.8-1828.8 m). The composition of type 2 deposits appears to be heterogeneous, with certain packages within the broader valley unit being composed of sand to shelly sand, adjacent to silt and muds. The sand-rich units encountered within the paleovalleys typically occur close to the modern seafloor. The single type 3 deposit is the largest and most widespread in the region, occurring across the study area except where incised by a younger paleovalley system. This unit appears to be composed of well-sorted sand, with thicknesses of at least 20 ft (6.1 m). However, it is typically under moderate amounts of overburden (10–30 ft [3.05-9.14 m]), and so only localized areas of resource (3) may be accessible. Where exposed, however, it likely represents the highest quality sediment resource in the Bogue region.

2) What is the origin and evolution of the deposit(s)?

The surficial sand bodies encountered within the region (type 1 deposits) appear to be primarily sourced from reworking of pre-existing deposits, namely paleovalley fill and surrounding ancient stratigraphy that occasionally crops out on the seafloor in the region. Erosion of these deposits allows for redistribution of their mixed sediment composition (sands and silts) into surficial sedimentary deposits (e.g., sand waves, ridges, and shoals) by bottom currents. The paleovalley systems identified within Bogue have a complex internal stratigraphic architecture indicative of numerous cycles of incision and infilling, and the associated potential sand-rich bodies (type 2 deposit) were likely deposited as the result of fluvial deposition or coastal processes (e.g., tidal inlets). Finally, the deep stratigraphic unit underlying the study area (type 3 deposit) is likely of Miocene age, and its sedimentary fabric and depositional architecture may indicate it as a relict coastal deposit.

Bogue Future Directions:

- Deeper framework geologic units identified in the region have potential to hold viable sediment resources. Future work could be targeted to identify the extent of this deeper type 3 deposit and identify areas where overburden is minimal to expand the viability of the deposit.
- Several paleochannel/paleovalley systems with sand-rich stratigraphy are identified within the region that appear to be oriented perpendicular to the current shoreline. Existing regional data does

not provide sufficient line density to map the full extent and heterogeneity of these systems, which have a high-potential to host sediment resources within the OCS.

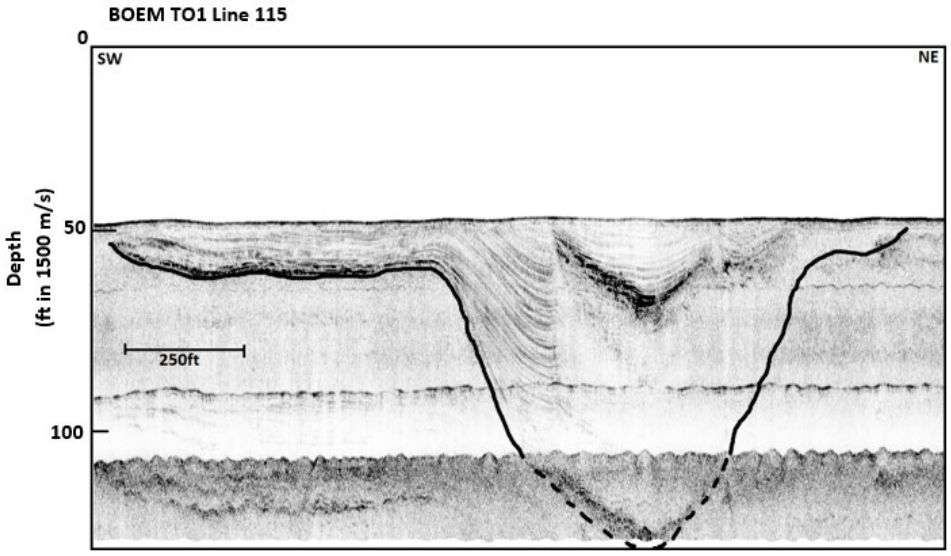
6.2.2 Topsail

The Topsail region, located offshore Onslow and Pender Counties, North Carolina, contains 15 magnetic anomalies. These anomalies consist of ten monopolar and five dipolar anomalies. Their amplitudes range from 6.3 to 180.7 nT, durations range from 15.2 to 82.3 ft (4.63-25.09 m), and none of the anomalies were interpreted to be potentially associated with any sidescan sonar contacts or known features. All of the anomalies within the Topsail Region are described as unknown/modern debris.

Sidescan sonar data characterizes the seafloor as being mostly dominated by sand and exposed hard-bottom. However, the offshore central portion of the region is mostly dominated by low-intensity backscatter sediments (i.e., muds, silts, clays). The sand and sand ripple areas are oriented in a shore-perpendicular trend (NW/SE). The hard-bottom observed within the region are primarily located in the northeastern extent of the Topsail region with isolated pockets of hard-bottom located in the southwest nearshore extent of the Topsail region. A total of nine sidescan sonar contacts were identified within the Topsail region and represent unknown features.

Seismic data interpretations in Topsail region show five distinct paleovalley systems are present in the area, with incision and associated fill reaching thicknesses greater than 60 ft (18.29 m) (Figure 42). These acoustic facies in these systems are consistent and appear to indicate that paleovalleys in the Topsail area were initially filled with finely laminated units of likely mud and silt, with some potential coarser grained deposition in sags, or lows, left by erosion of the valley fill. Other valley systems show a variable compound architecture indicative of numerous cut and fill episodes.

Figure 42 Seismic line BOEM_SBP_20220530_Line_115 with delineated paleochannel
Seismic line BOEM_SBP_20220530_Line_115 with a delineated paleochannel (black). The exact base is not fully resolved in imaging due to depth and loss of acoustic signal. The acoustic signal in these systems appears to reveal mixed sediment infill, indicative of a paleochannel comprised of laminated clays that has been truncated and infilled with sandy sediment.



The seismic data in the Topsail region shows that there are significant ancient, lithified strata occurring at or near the seafloor throughout the area, as identified by the strong acoustic return that limits deeper

imaging. Along the northern section of the study area, the observed lithified stratigraphic unit appears to be either close to the surface, or at the surface (exposed), which can be corroborated by the sidescan sonar hard-bottom delineations (Figure 43). Additionally, it is evident that the potential ancient, lithified strata exposed at the seafloor can be traced further down the seismic profile (beyond the ensonification capabilities of the seismic system) or and is locally incised by paleochannels. Interpretation from the correlation of the seismic and vibracore data within the Topsail area indicates that there is likely a thin surficial sand unit above the lithified strata layers described above.

Figure 43 Seismic line BOEM_SBP_20220525_Line_123 delineating consolidated sediments within the Topsail survey area

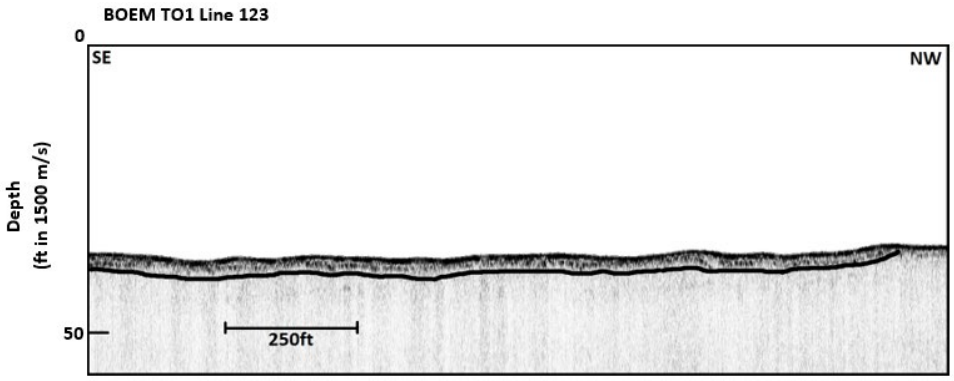
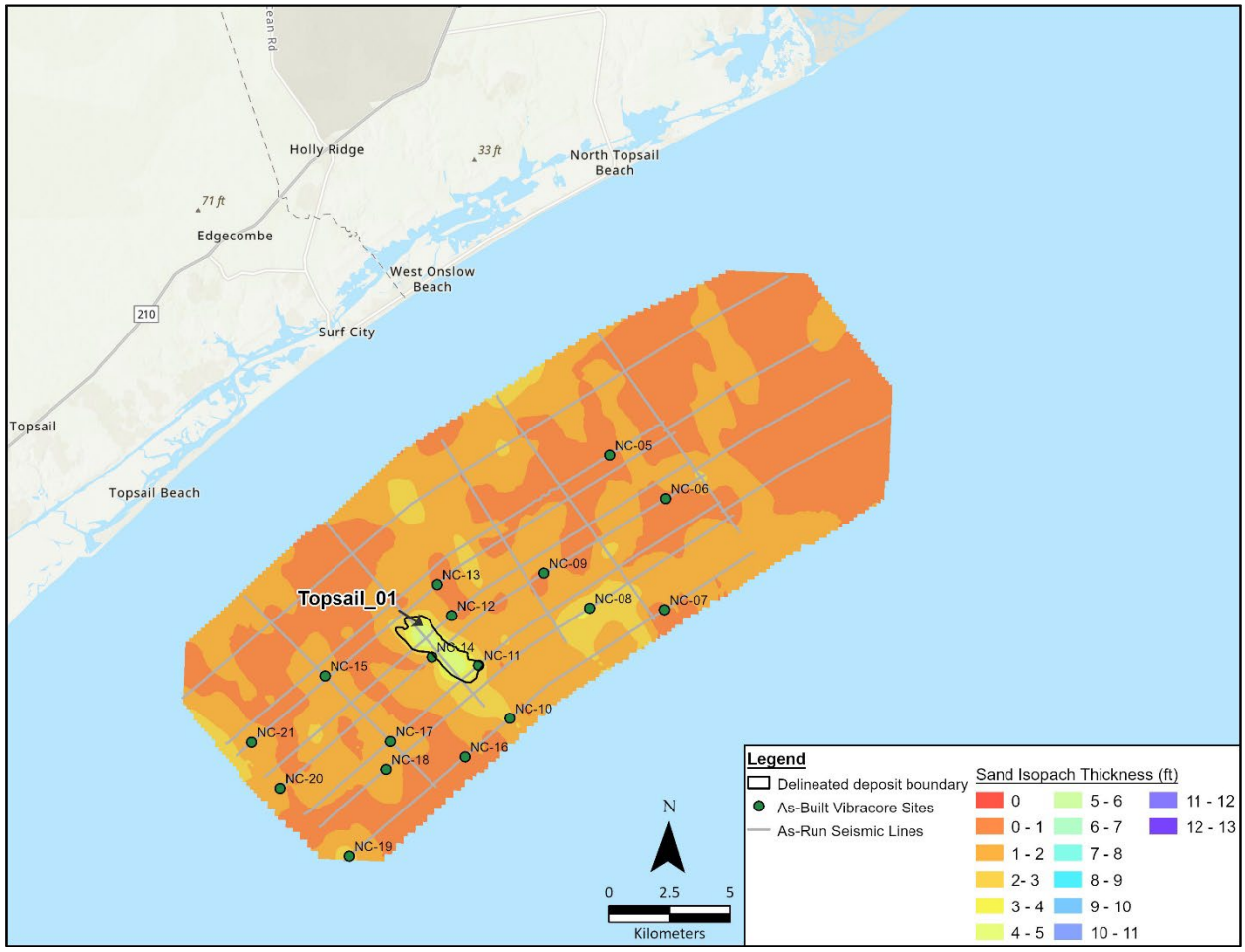


Figure 44: Identified potential sand resources delineated in the Topsail study area



Surficial sand interpretation along the Topsail region yielded one potential sand deposit (Figure 44 Topsail_1) with a potential volume of 1,142,000 cy (873,122 m^3) above the 3 ft (0.91 m) plane with a composite of 0.21 mm (0.01 inch) and percent silt content of 3.56%. Review of the seismic data also indicates that along line BOEM_SBP_20220530_Line_114, vibracore BOEMVC-2022-NC-08 there is a 2.6-ft (0.79 m) thick surficial sand unit that could extend further offshore. This feature was not included as part of the surficial sand delineation process since it did not appear to meet the minimum thickness requirements and the CRM did not show any significant bathymetric highs. Additional geophysical and geotechnical data are required to constrain this potential deposit and further evaluate if it is a viable resource in terms of extent, volume, and geotechnical properties.

Previous investigations of the Topsail region have proposed that the majority of identified sand borrow areas are associated with paleovalley/paleochannel systems that are oriented perpendicular to the modern shoreline (Figure 45; USACE, 2020). These systems extend below the modern coast and are often separated from each other laterally by wide areas of shallow basement rock. The linkage between borrow areas and paleovalley occurrence makes understanding how distribution and extent of these systems are similar further offshore critical to predicting resource occurrence. In the Topsail study area five discrete, regionally conformable paleovalley systems were identified and delineated within the regional survey (Figure 46). Each of these systems has the potential to host type 2 deposits, some of which were sampled and confirmed as containing sand resources by this study's vibracore campaign. The paleovalleys identified in this study area appear relatively evenly spaced every ~5 km (2.7 nm) (Figure 46).

Figure 45. Map of Identified Sediment Borrow Areas, paleovalleys, and intervening shallow basement rock. Adapted from USACE, 2020

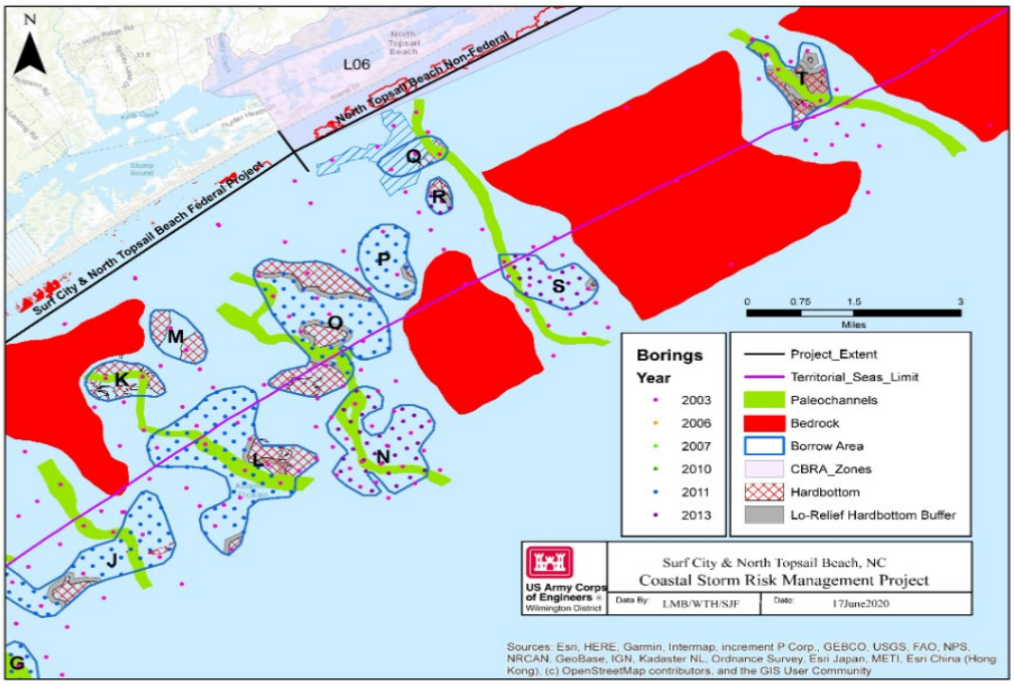
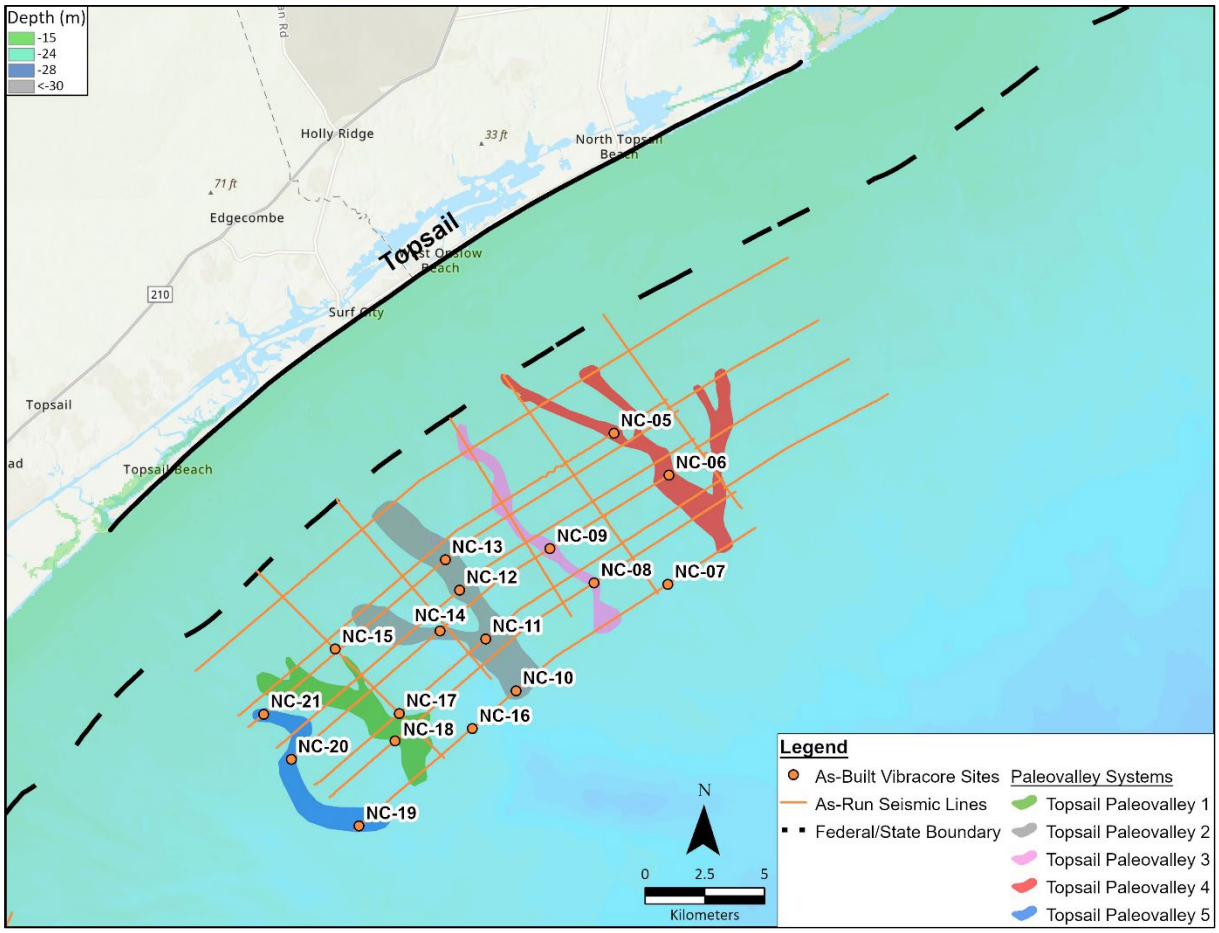


Figure 46. Topsail paleovalley systems identified by this study. The intervening shelf between each system is composed of Oligocene basement rock and sediments



Topsail Valley 2 is characterized by a broad basal erosional unconformity overlaid by a variety of acoustic facies including inclined dipping clinoforms, sub-parallel aggradational laminae, and smaller packages of acoustically transparent units (Figure 47). The uppermost units of the paleovalley fill are often truncated by transgressive ravinement, occasionally with a thin veneer of modern shelf sand. The overall valley width is 1000–6000 ft (304.8-1828.8 m), with incisional depths of 25–50 ft (6.1-15.24 m). It appears to widen significantly with increasing distance seaward, but maintains a compound cut-and-fill architecture (Figure 48). It is incisional into the surrounding Oligocene basement strata, and bounded on either side by outcropping Oligocene units, and the depth of incision appears to increase seaward and down-dip.

Figure 47. Example sub-bottom profiler data across upper reach of Topsail Valley 2. Note the variable cut and fill pattern within the valley, and minimal overburden across the valley and adjacent Oligocene basement

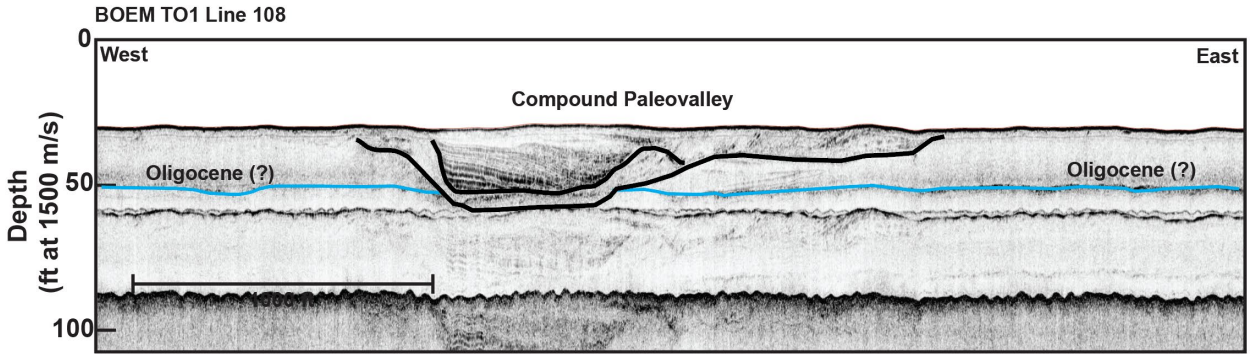
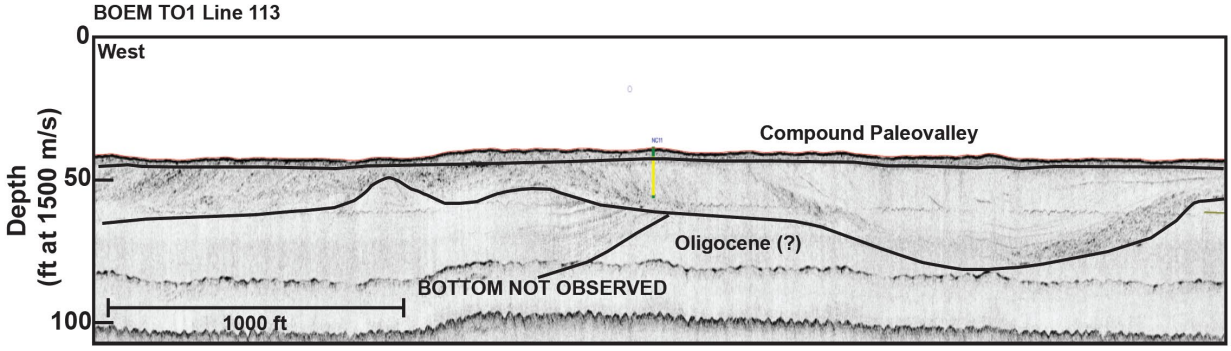


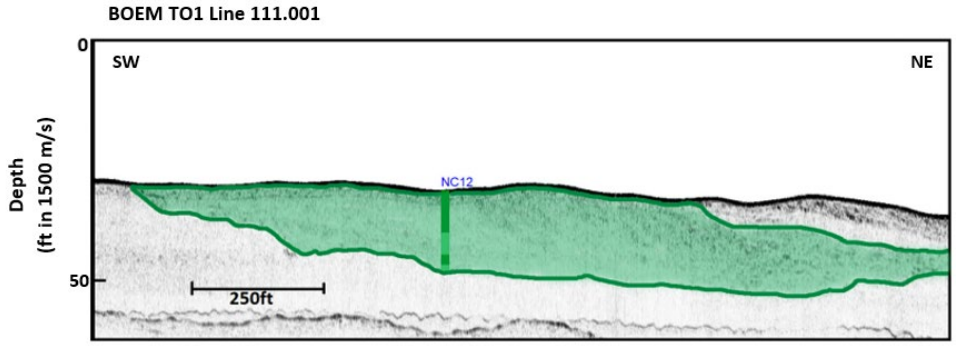
Figure 48. Example sub-bottom profiler data across lower reach of Topsail Valley 2. Note the variable cut and fill pattern within the valley, with numerous inclined dipping clinoform packages. Valley fill units are truncated by transgressive ravinement and capped with a modern shelf sand



Close to historic vibracore NC-BOEM-2015-VC25, there is a potential sand resource deposited above a paleochannel system that could likely be correlated to the paleochannel observed to the east with some sandier infill. This channel sand deposit, sampled by BOEMVC-2022-NC-10, BOEMVC-2022-NC-11, BOEMVC-2022-NC-12 (Figure 49), and BOEMVC-2022-NC-13, crosses the entire western portion of the central study area. The channel overburden appears to be variable in its properties and thickness, typically silt to silty-sand with areas both nearshore and offshore exhibiting thicknesses between 10–12 ft (3.05-3.66 m) and the middle portion of the channel having little to no overburden. From the delineations and observable stratigraphic architecture in the seismic data, it is evident that both these deposits are highly variable and would require additional data coverage to further constrain the sand deposit and its boundaries.

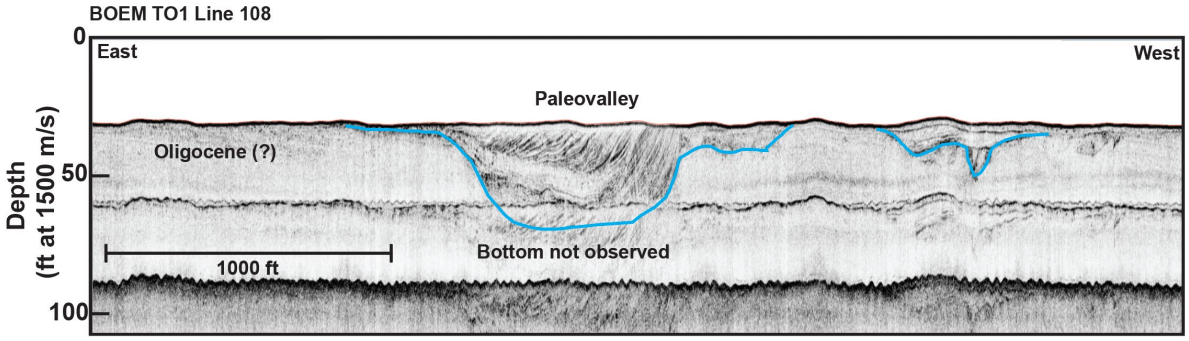
Figure 49: Seismic line BOEM_SBP_20220531_Line_111.001 with color coded vibracore BOEMVC-2022-NC12

Seismic sub-bottom line with BOEMVC-2022-NC12 color coded according to the schema developed project (see section 5.3.2.1 for color classification information) with the sandier portion/wedge of the paleochannel highlighted in green.



Topsail Valley 3 is characterized by a basal erosional unconformity overlaid by transparent and chaotic acoustic units as well as very steeply inclined dipping clinoforms that display a lateral migration architecture (Figure 50). The uppermost units of the paleovalley fill are truncated by transgressive ravinement. The overall valley width is 1000–3000 ft (304.8-914.4 m), with incisional depths of 10–30 ft (3.05-9.14 m). It appears to maintain a relatively constant width with increasing distance seaward. It is incisional into the surrounding Oligocene basement strata and bounded on either side by outcropping Oligocene units.

Figure 50. Example sub-bottom profiler data across the upper reach of Topsail Valley 3



Topsail Valley 4 is characterized by a broad basal erosional unconformity overlaid by highly varied acoustic facies ranging from transparent to chaotic packages and inclined dipping clinoforms (Figure 51). The uppermost units of the paleovalley fill are often truncated by transgressive ravinement, occasionally with a thin veneer of modern shelf sand. The overall valley width is 1000–3000 ft (304.8-914.4 m), with incisional depths of 10-50ft (3.05-15.24 m). It appears to widen with increasing distance seaward, but maintains a compound cut-and-fill architecture (Figure 52). It is incisional into the surrounding Oligocene basement strata and bounded on either side by outcropping Oligocene units. Interestingly, the relative preserved incisional depth appears to decrease seaward, with the amount of preserved valley fill also decreasing (Figure 53). The seismic facies of the paleovalley at its seaward most extent is primarily chaotic and medium-amplitude inclined dipping beds outcropping at the seafloor. This may be the result of either actual decreased original incision seaward, or more effective erosion of the paleovalley seaward, or some combination of the two. The composition of Topsail Valley 4 was tested by BOEMVC-2022-NC-05 and BOEMVC-2022-NC-06, with the paleovalley fill composed of fine grained quartzose sand of good to

marginal quality, indicating a high potential for type (2) deposits to form sediment resources within the fairway defined by Topsail Valley 4.

Figure 51. Example sub-bottom profiler data across the upper reach of Topsail Valley 4. Note the relatively shallow and wide valley form bounded by outcropping Oligocene basement, and the truncation of compound valley fill at the seafloor

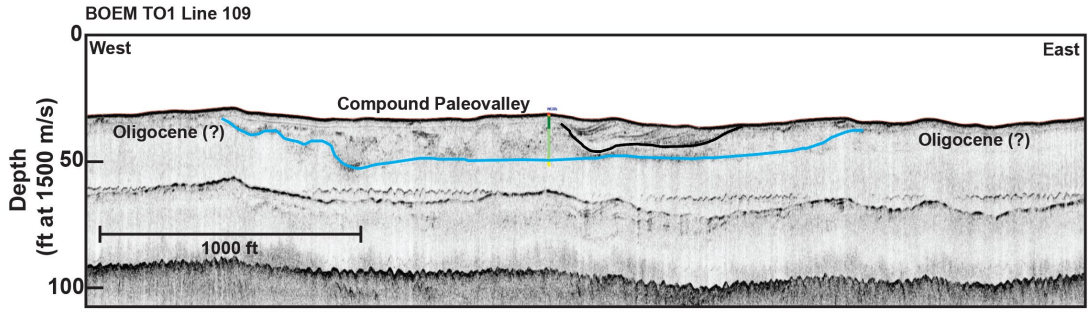


Figure 52. Example sub-bottom profiler data across the middle reach of Topsail Valley 4. Note the widening valley form and variable acoustic facies of the valley fill, including inclined dipping clinoforms

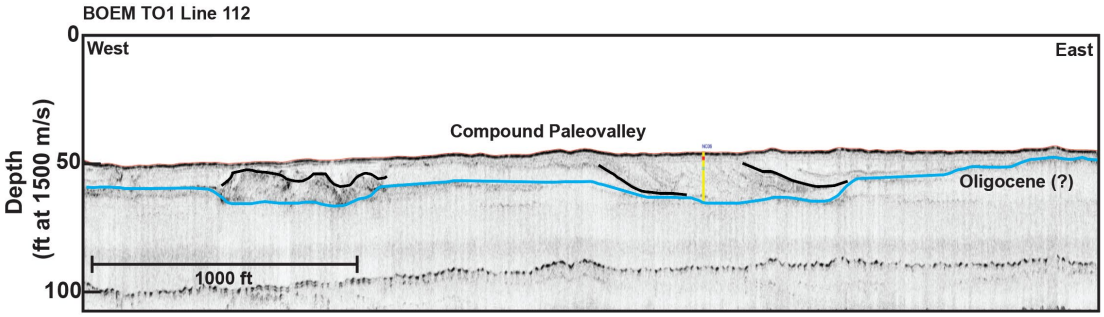
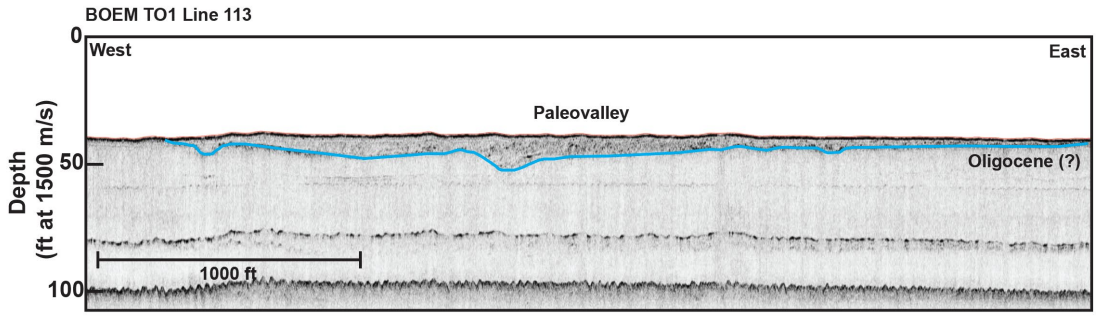


Figure 53. Example sub-bottom profiler data across the lower reach of Topsail Valley 4



Topsail Regional Strategic Questions

1) What is the composition, quality, and extent of the potential resource(s)?

Two types of potential sediment resources were identified within Topsail: (1) surficial sedimentary units and (2) discrete sedimentary units located within broader paleovalley systems. Resource type (1) is found in numerous locations across the study area but with highly variable lateral extent and thickness

and is often separated by broad areas of hard-bottom. Where sampled, these type 1 deposits are composed of fine to medium grain sand with minimal silt. Within the study area, only one deposit was identified that meets minimal thickness requirements and was estimated to have a volume of 1,142,000 cy (873,121.65 m^3) type 2 deposit is constrained to the interior of the broader host paleovalley systems, which extend offshore perpendicular to the modern shoreline. Individual type 2 deposits range in extent from tens to hundreds of feet, with thicknesses between 5-40 ft (1.52-12.19 m). Sampling of these units found their composition to vary from interbedded silts and sands to medium sand, indicating a high degree of heterogeneity but with promise pending more detailed investigation. The host paleovalleys identified in Topsail should be regarded as fairways with a high likelihood of containing numerous of the individual deposits that themselves represent potential resources.

2) How does sand quality vary across the deposit(s)?

Type 1 deposits are typically of good to marginal quality, with fine grained sand, trace shell fragments and hash, and occasional limestone fragments. Due to the discontinuous nature of these surficial deposits compared to the scale of the survey and geologic sampling it is difficult to interpret quality variability within a single genetically related deposit. Similarly, while the host paleovalley systems containing type 2 deposits can be correlated across the study area, it is not feasible to directly link each discrete potential resource deposit contained within. Despite this limitation, numerous type 2 deposits were identified and sampled, with composition typically consisting of fine-grained quartz sands, occasional clay pockets, limestone fragments, and trace silts. The interspersed clay and rock fragments are the main limiting factor for more of these deposits being regarded as quality potential sediment resources. Numerous type 2 deposits are high quality with clay and rock fragments rare to absent, indicating that the heterogeneity observed should be the focus of further investigation to constrain the extent of the highest quality resources within the broader fairways generated in this study.

3) Are there indications of environmentally sensitive areas or cultural sites that may require avoidance within the area?

The results of this survey found several areas of potential benthic habitat in the form of inferred ephemeral hard-bottom that correlate to previously identified hard-bottom areas and habitat. These areas of strong acoustic return in both sidescan sonar and sub-bottom profiler data potentially relate to areas of outcropping ancient, lithified strata at the seafloor. Further delineation and benthic assessments would require a detailed investigation beyond a regional reconnaissance survey. Similarly, several known cultural resources exist in the vicinity of survey regions. However, based on the current reconnaissance-level, geophysical and geological survey data, there is no conclusive evidence of any previously unknown submerged cultural resources along the survey tracklines within the survey regions.

Topsail Future Directions:

- The identified paleovalley systems appear to trend perpendicular to the modern shoreline and the largest systems exhibit a tributary pattern. The fill of each system is highly heterogeneous, but initial results show promising sand-rich lithosomes contained within each of the paleovalleys. Future work capturing higher data density across specific valley systems can help constrain the volume and lithology of potential resources.

6.2.3 New Hanover

The New Hanover region, located offshore New Hanover County, North Carolina, contains six magnetic anomalies. These anomalies consist of four monopolar and two multicomponent anomalies. Their amplitudes range from 10.8 to 7939.8 nT, durations range from 41.4 to 552 ft (12.62-168.25 m), and two of the anomalies are associated with nearby sidescan sonar contacts (Mag_0027:Contact_0014 and Mag_0030:Contact_0013). Mag_0027, Mag_0028, and Mag_0030, and their associated sidescan contacts, are representative of the manmade fish haven, North Carolina Artificial Reef AR-372, located within the survey area. The remaining three anomalies are described as unknown/modern debris.

Sidescan sonar interpretations in the area characterize the seafloor as being mostly sandy with isolated pockets of exposed ancient strata. A continuous sand sheet is observed nearshore and becomes patchy and more linear as it extends offshore. Exposed hard-bottom and a 220 ft (67.06 m) barge, associated with North Carolina Artificial Reef AR-327, were observed on Line 131 and Line 127. A total of ten sidescan sonar contacts were identified within the New Hanover Region and represent an artificial reef, fishing trawler marks, schools of fish, and one unknown linear feature (potential cable, chain, or pipeline).

Seismic data within the region indicate the presence of several paleochannels in the northern area of the survey and are comprised of acoustically semitransparent facies truncated by laminated variable amplitude faces, suggesting similarities between the paleovalley systems here and those in the Topsail region; however more data are required to verify any potential correlation between the two regions. (Figure 54 and Figure 55). Surface exposed hard-bottom in the New Hanover area is minimal, however there is evidence of consolidated deposits in the southern area, underlaying the delineated sand shoals.

Figure 54 Seismic line BOEM_SBP_20220602_Line_119

Seismic sub-bottom line BOEM_SBP_20220602_Line_119 delineates a paleochannel system that possibly extends into the New Hanover region. The system is comprised of acoustically semi-transparent facies truncated by laminated variable amplitude facies.

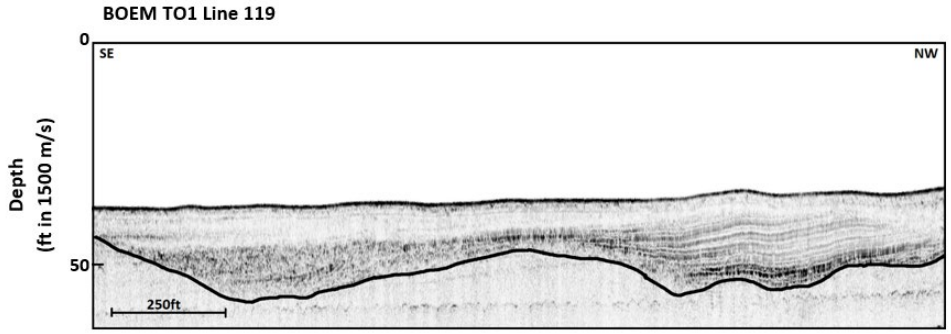
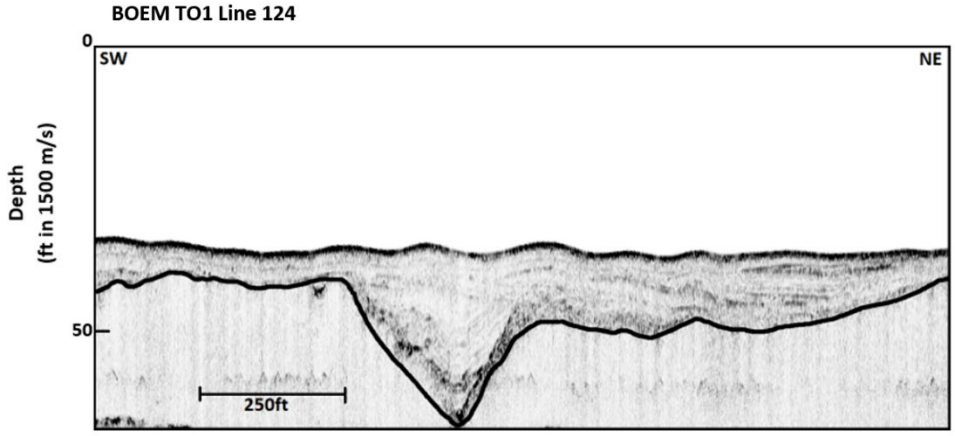


Figure 55 Seismic line BOEM_SBP_20220602_Line_124
Seismic sub-bottom line BOEM_SBP_20220602_Line_124 delineates a paleochannel system that possibly extends from the Topsail region. The system is comprised of acoustically transparent facies truncated by laminated variable amplitude facies.



Geophysical and geological data interpretation in the New Hanover region corroborated the information found during the desktop study and has validated the presence of several shoals within the area (Figure 56). Along the northern portion of the study area, there are several smaller sand shoals that, depending on the size of the project, could be a usable resource for the region. Two potential resources were identified by analyzing the seismic data, however, do not have any corroborating geotechnical data. The outline of these potential resources was determined following the same methods as outlined in Section 6.1 and are included in the MMIS digital deliverable as a reference for future investigations. NH_P_01 further offshore coincides with Modeled Shoal SedAreaID 5408 and has an estimated area of 150 acres (0.61 km^2). NH_P_02 is closer to shore and encompasses Modeled Shoal SedAreaID 5409 and 5404 and has an estimated area of 485 acres (1.96 km^2). Within the New Hanover study area, two surficial sand units were delineated that had corroborating geotechnical data and had the minimum thickness requirements. The resource identified in this study as NH_01 shares similar extent to the Modeled Shoal SedAreaID 5407 and was identified as having a potential area and volume of 9,500 acres (38.45 km^2) and 37,793,000 cy (28,894,822 m^3) with a silt content of 2.29% and mean grain size of 0.25mm (2phi). The USACE Unverified Plus Borrow Area NC_M14AC00009_129, delineated at NH_02 was also determined to be a significant resource with a potential volume of 39,726,000 cy (30,372,706 m^3), with a mean grain size of 0.24mm (2.05phi) and silt content of 3.39%. This potential deposit, originally outlined based on the ASAP data, is likely more variable in its accumulation and composition due to the presence of potential consolidated sediments within the area (Figure 57). Moreover, based on the acoustic signal observed within the potential borrow area, it is likely that the overall composition on the deposit is not homogeneous in nature and would require additional data in order to properly assess the total volume available that would meet native beach requirements.

Figure 56: Identified potential sand resources delineated in the New Hanover study area

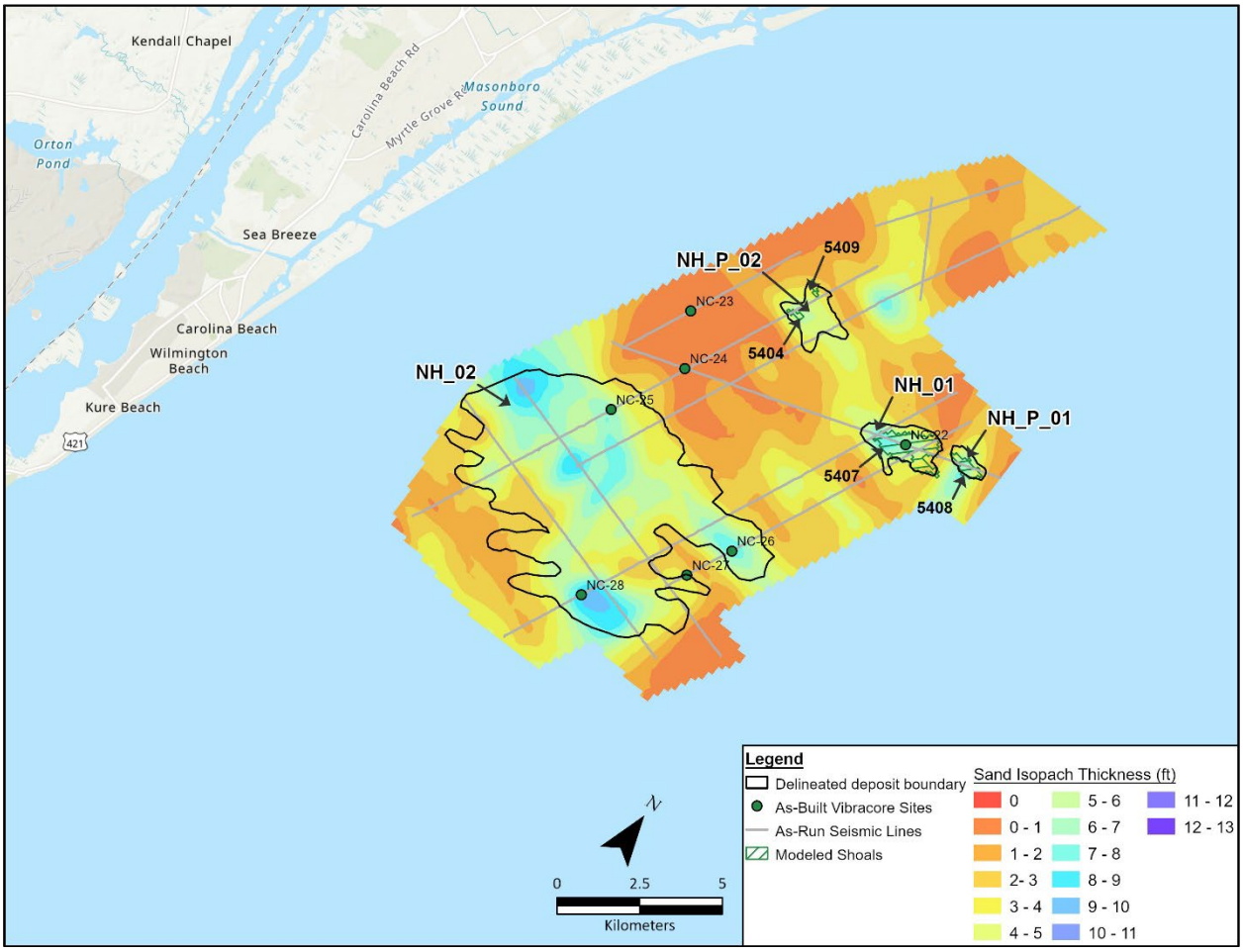


Figure 57: Seismic line BOEM_SBP_20220603_Line_128
The on the profile indicates the reflector that best correlates with the edge of the bottom of the shoal boundary and the blue line highlights the consolidated sediment that is evident throughout the study area.

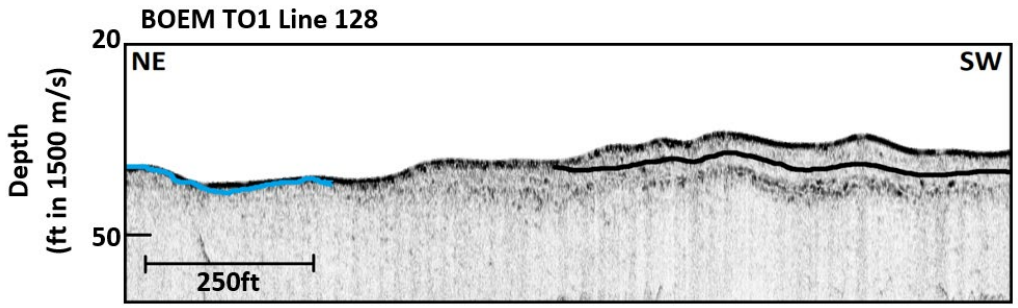
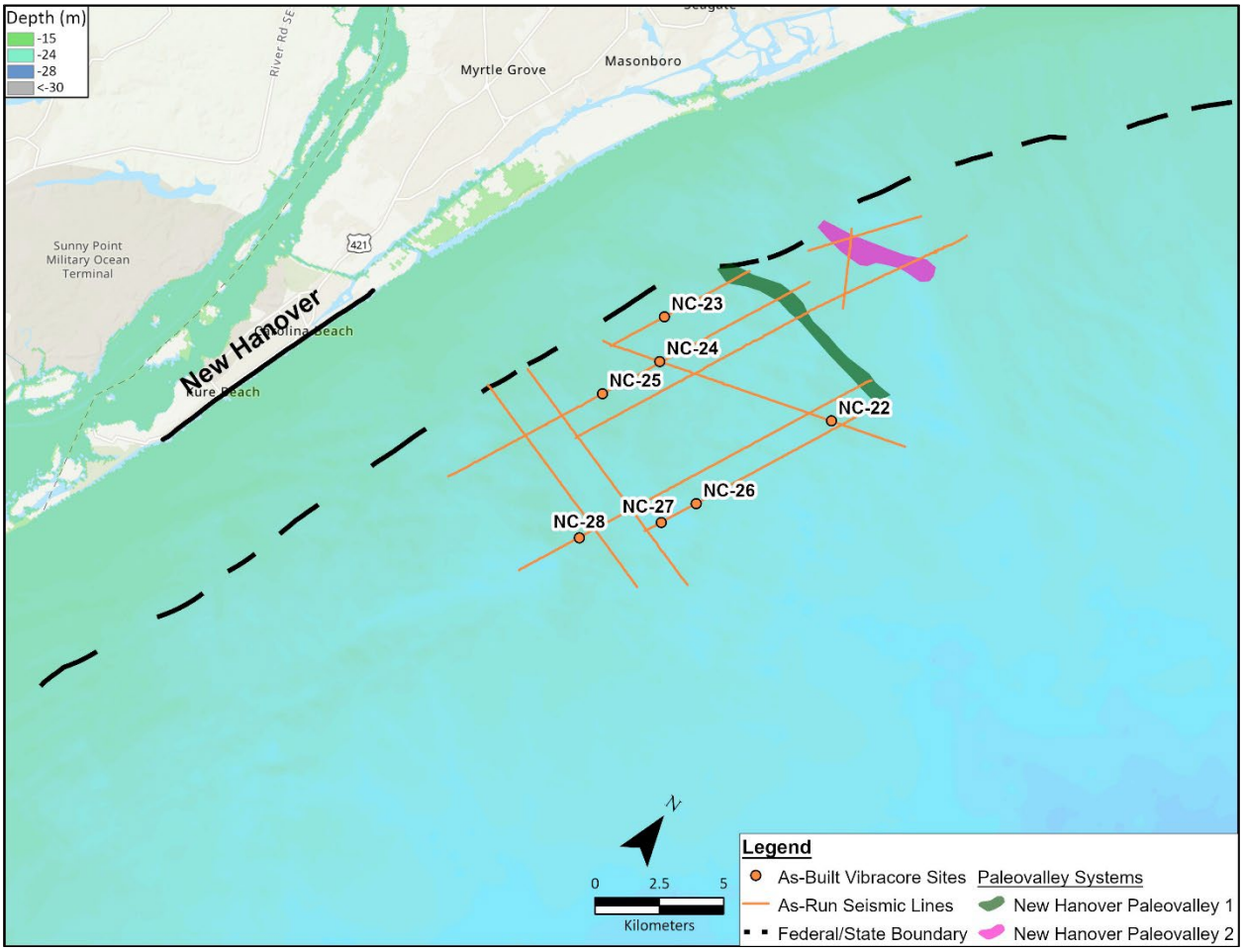


Figure 58: New Hanover paleovalley systems identified by this study



New Hanover Regional Strategic Questions:

1) What is the extent and distribution of the potential resource(s)?

The New Hanover region primarily contains two potential sediment resources: (1) surficial sedimentary units and (2) paleovalley deposits. The New Hanover seafloor is predominantly sandy, with isolated hard-bottom patches, and two large conformable type (1) deposits that were identified with potential volume of 1,955,000 to 37,793,000 cy (1,494,704.75 to 28,894,821.75 m^3). One type (1) deposit was identified as a continuous sand sheet along the shoreward boundary of the survey area that graded into a more patchy, linear shoal further offshore. Numerous small deposits are observed in the study area but are not able to be regionally correlated. Similarly, this study further characterized the prior unverified plus borrow area (USACE NC M14AC00009 129) and found it to be in parts classified as a type (1) as defined here. There are numerous paleovalleys that potentially contain type 2 deposits, however only two can be regionally correlated across the study area, with no additional geologic data collected to confirm their viability as a potential resource. Occasional localized type 2 deposits that were tested as part of this study found poor to marginal quality sand.

2) What is the origin and evolution of the deposit(s)?

The widespread nature of the type 1 deposits indicates a likely combined origin of the surficial sediment, reflecting a combination of longshore transport from further updrift Onslow Bay as well as localized erosion and sourcing of material from the outcropping ancient deposits and paleovalley/paleochannel fill packages observed at the seafloor. Prior investigations observed that sand shoals and sand waves in this region can be active on continuous to annual timescales and concentrate well-sorted sandy deposits over 3–ft (0.91 m) thick. The combined sourcing of relict material together with shelf processes additionally helps understand the distribution of rip-up clasts of antecedent deposits within seemingly modern shelfal sands.

3) Does sand quality vary/follow a pattern that can be identified?

Sand quality of the identified deposits in New Hanover show a large variability, ranging from clean fine to medium-grained surficial sands with rare shells and minimal lithic fragments or clayey sands with large limestone rock fragments, likely from the surrounding Oligocene limestones. The type (1) deposits associated with chaotic/transparent acoustic facies appear to often have a higher sand quality, but heterogeneity still exists. No spatial pattern to sand quality was identified (e.g., from nearshore to offshore).

New Hanover Future Directions:

- The regional surficial unit that locally thickens to provide potential sand resource targets likely represents a combination of littoral transport combined with local sources. The patterns of thickening and thinning do not at a first order appear to relate to underlying antecedent topography, indicating a likely dominance of modern hydrographic conditions controlling the depositional patterns. Future work could investigate and constrain the provenance of these surficial sands and the time-scales required to accumulate resource-level thicknesses in the area.

6.2.4 Brunswick/North Myrtle

The Brunswick/North Myrtle region, located offshore Brunswick County, North Carolina and Horry County, South Carolina, contains 11 magnetic anomalies. These anomalies consist of four monopolar and seven dipolar anomalies. Their amplitudes range from 8.5 to 127.6 nT, durations range from 27.5 to 93.1 ft (8.38-28.38 m), and one anomaly (Mag_0043) was representative of a nearby fish haven within the survey area, North Carolina Artificial Reef AR-445. The remaining anomalies within the Brunswick/North Myrtle Region are described as unknown/modern debris.

Sidescan data within the region characterizes the seafloor as having a mostly muddy bottom with two areas of exposed ephemeral hard-bottom, one on the west side of the Wilmington Ship Channel and the other on the nearshore areas off Ocean Isle Beach. A total of 12 sidescan sonar contacts were identified within the Brunswick/N. Myrtle Region and represent a school of fish, anchor scouring, boat wakes, schools of fish, and unknown features.

In Brunswick and North Myrtle, the underlying framework ancient strata is found nearly at the seafloor in the nearshore and eastern section of the survey area, while along the south area, these older geologic units are at depth with roughly 21 ft (6.4 m) of modern to Pleistocene overburden (Figure 59). These outcropping ancient strata may also represent ephemeral hard-bottom if exposed at the seafloor, but the degree of exposure is likely variable at different timescales and at finer spatial scales than captured in this survey. The acoustic signature, recovered core bit samples, and lack of full core penetration suggests significant consolidation, induration, or lithification of some underlying units in this region. These units appear to

continue into the Myrtle study area where several seismic facies and reflectors have similar acoustic signals and characteristics (Figure 59, Figure 60 and Figure 61).

Figure 59 Seismic line BOEM_SBP_20220610_Line_146
Seismic line BOEM_SBP_20220610_Line_146 delineating potential consolidated sediments at depth in the southern section of the Brunswick survey area with roughly 21 ft (6.4 m) of overburden.

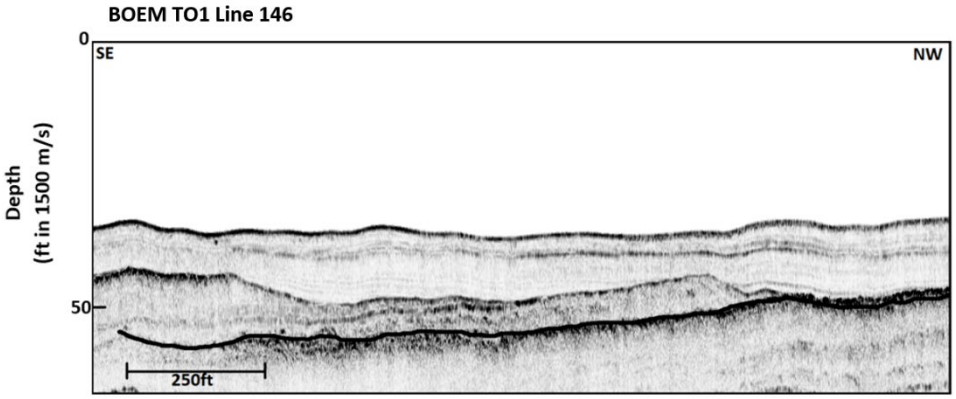


Figure 60 Seismic line BOEM_SBP_20220610_Line_136
Seismic line BOEM_SBP_20220610_Line_136 delineating consolidated sediments at depth in the North Myrtle survey area. Similar acoustically transparent facies overtop the consolidated sediment reflector exists in the Brunswick, North Myrtle, and Myrtle survey areas.

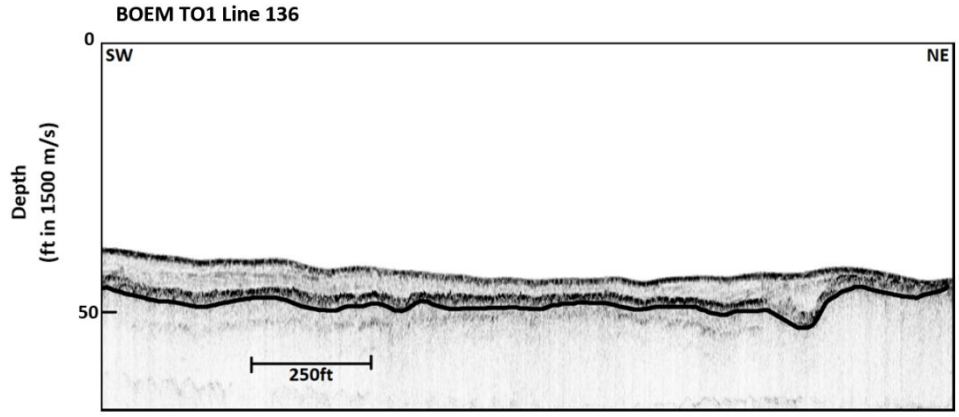
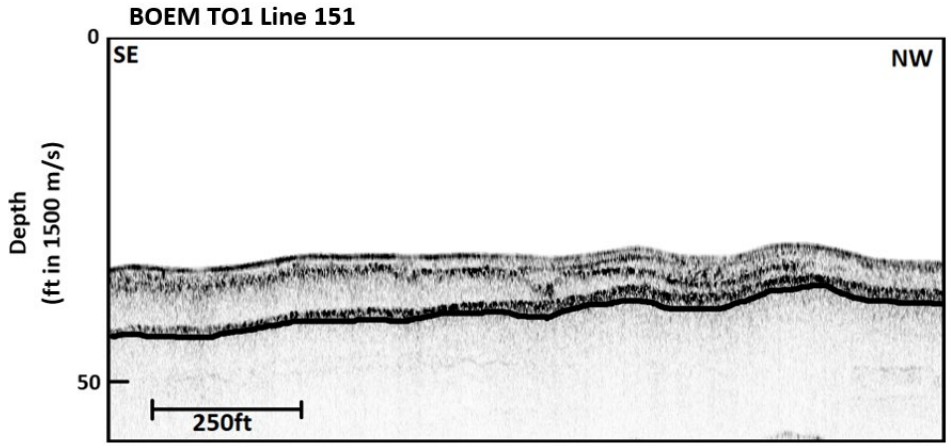


Figure 61 Seismic line BOEM_SBP_20220611_Line_151
Seismic line BOEM_SBP_20220611_Line_151 delineates consolidated sediments extending at depth in the Myrtle survey area with an acoustically semi-transparent layer overtop, as seen in the Brunswick and North Myrtle areas.



Surface sand delineations within the Brunswick North Myrtle region indicate the presence of a thin surface sand unit above the potential consolidated sediment reflector. Several of the identified surficial sand bodies along the inshore portion of the survey area (Figure 62, BNM-03 and BNM-04) are located above paleochannel systems and have a volume of 34,000 and 11,000 cy (25,995-8,410 m^3) respectfully, above a 3ft (0.91 m) plane. From the geophysical and geotechnical data collected, these resources do not appear to be greater than 5ft (1.52 m) and would require additional geophysical and geotechnical data to further constrain their area and volume. Additionally, two similar potential resources were identified with vibracores and geophysical data along BOEMVC-2022-SC-41 and BOEMVC-2022-SC-43; however, due to the limited geophysical data along the channel and the apparent narrow nature of the deposit, these resources were not delineated as potential resources due to the limitations of the gridding system and computational processes utilized.

The surficial unit identified further offshore on the western side of the study area (Figure 62, BNM-05) corroborates the Modeled Shoal feature identified by MMIS sampled by BOEMVC-2022-SC45 (Figure 63). Based on the collected data, BNM-05 has a potential volume of 808,000 cy (617,760 m^3) above the 3 ft (0.91 m) plane and of 50,000 cy (38,228 m^3) above a 5 ft (1.5 m) plane. Moreover, based on the CRM data, this deposit is likely larger than the footprint identified during this study and could be an even greater resource. The three lines, designed to sample the area between the BOEM Wind Lease Areas, Frying Pan Shoals and the Brunswick investigation area, indicate the presence of surficial sands that are variable in their depositional pattern, however, with additional data could be developed into a potential resource. The two resources delineated from this investigation indicate that BNM_01 and BNM_02 have an estimated volume of 6,000 and 4,980,000 cy (4,587-3,807,483 m^3) respectfully above a 3ft (0.91 m) plane and BNM_02 has an estimated volume of 1,522,000cy (1,163,652 m^3) above a 5ft (1.52 m) plane. Review of the CRM together with the reconnaissance seismic data indicate that, with additional geophysical and geotechnical data as well assessment of native beach needs, the beach compatible portion of the deposit could be evaluated to have a larger footprint and volume than identified as part of this study.

Figure 62: Identified potential sand resources delineated in the Brunswick/N. Myrtle study area

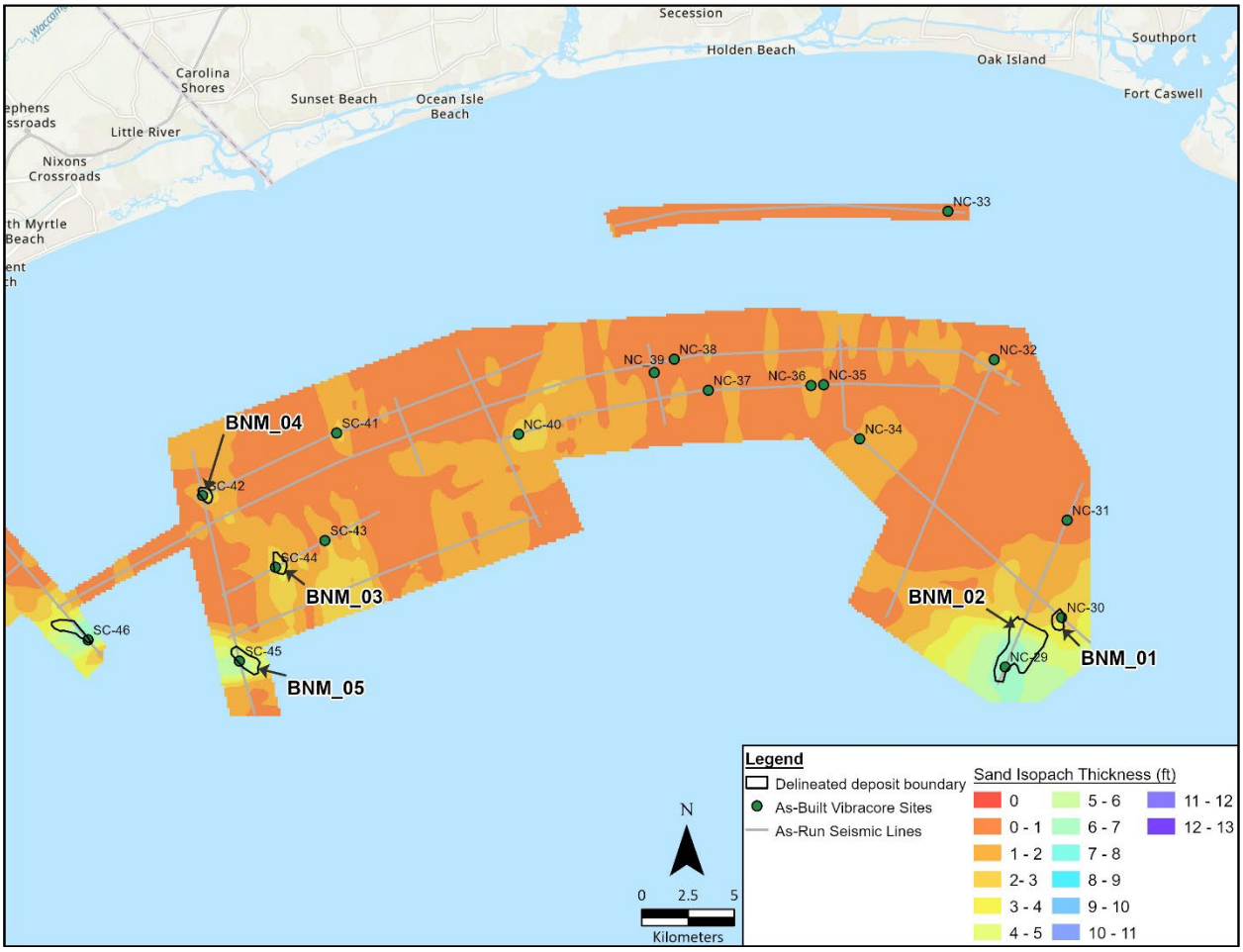
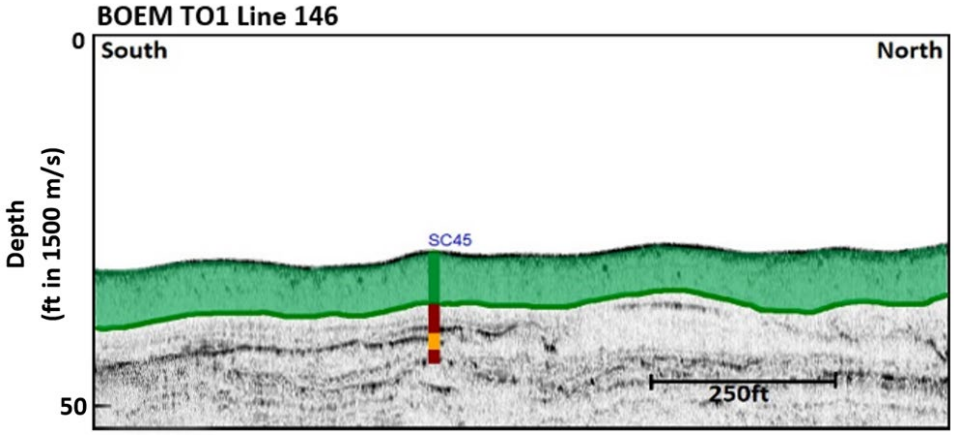


Figure 63: Seismic line BOEM_SBP_20220610_Line_146 with color coded vibracore BOEMVC-2022-SC-45

Seismic sub-bottom line with BOEMVC-2022-SC-45 color coded according to the schema developed for this project (see section 5.3.2.1 for color classification information). The green line on the profile indicates the reflector that best correlates with the bottom of the sand boundary and the highlighted area represents the deposited sand overlaying the paleochannel.



Brunswick/North Myrtle Strategic Questions:

1) Is there sand of significant thickness (greater than 5ft [1.52 m]) present in this region?

This study identified numerous type 1 deposits across the region, with seven surficial sand units able to be delineated and characterized for further consideration as sand resources. These deposits range from 4-8 ft (1.22-2.44 m) thick, with some potentially thicker depending on local needs and tolerance for fines content. Based on the data from this study, a majority of the identified deposits are small in their extent and thickness, however resources along the south east close to Frying Pan Shoals and to the south west have significant thicknesses and, depending on beach compatibility needs, could be provide an even greater volume than that identified as part of this study. Additionally, a number of type 2 deposits were observed within the series of paleovalleys and channels that extend across the study region. These type 2 deposits have highly variable lithology, ranging from fine grained sands with reworked coral fragments to relatively clean coarse grain quartzose sandy units. It is likely that the type 2 units and associated host valleys contain additional potential resources greater than 5 ft (1.5 m) in addition to the surficial units quantified by this study, but the reconnaissance survey design precludes full characterization of the discrete sandy deposits.

2) What is the origin and evolution of the deposit(s)?

The Brunswick/North Myrtle area seafloor is relatively muddy, with large areas of outcropping Cretaceous strata. Numerous paleovalleys and paleochannels appear to incise these complex strata with highly variable fill architecture. Additionally, the lithology of these valley fills and overlying surficial sediments ranges significantly, reflecting the contribution of fluvial sources, reworking of underlying Cretaceous lithified strata, and coastal processes. The sandy type 1 deposits identified here likely reflect the erosion and reworking by shelf processes of adjacent outcropping paleochannel deposits, which often have a significant quartz sand component. There appears to be a relatively close correlation between the occurrence of thick type 1 deposits and adjacent paleovalley systems. The paleovalley and paleochannel systems themselves (and any potential type 2 deposits) appear to be compound features with multiple overprinting cut and fill cycles and highly variable composition that may be controlled by relative proximity to fluvial sources.

Brunswick / North Myrtle Future Directions

- The underlying structure of the Cretaceous lithified stratigraphy is a primary control on the available accommodation and preservation of more modern sediments (e.g. Pleistocene-Holocene). In some cases, this relief may be the result of antecedent structural trends in the original depositional unit, where in others it is due to an amalgamated erosional surface from compound valley incision and/or subaerial exposure. The reconnaissance survey identified several areas of surficial sand with thicknesses above 5 ft corresponding to lows in the underlying ancient strata, which do not always show an associated bathymetric high. Future investigations could provide additional control of how continuous these identified sand trends are away from existing sub-bottom imaging stratigraphic control, which will help both identify additional potential resources and better constrain the relationship between depositional patterns and underlying framework geology. The identified surficial sand resources are likely under-estimations in overall spatial extent and volume, due to the limited number of reconnaissance lines and lack of a strong relationship between observed bathymetry and underlying sand thicknesses.
- Several identified sandy type 1 deposits occurred in close proximity to compound valley systems of unknown age and formational fluvial basin. Limited core penetration of these indurated deposits indicated that these valley systems may host localized sand bodies that could be potential resources with additional data constraints as well as potential original source material to the surficial deposits through transgressive ravinement and ongoing shelfal processes. Future studies could use

additional geophysical data collection to constrain the offshore extent of these valley systems and what trends exist in the preservation of potential sandy lithosomes. Existing cores indicate that many of these systems are likely to be dominated by fine-grained laminated sediments, so targeting areas near identified surficial sands may help differentiate those systems that may host more sand-rich material if the observed relationship is truly genetic.

6.2.5 Myrtle

The Myrtle region, located offshore Horry and Georgetown Counties, South Carolina, contains 15 magnetic anomalies. These anomalies consist of ten monopolar, four dipolar, and one multicomponent anomaly. Their amplitudes range from 6.2 to 45.4 nT, durations range from 45.7 to 431.9 ft (13.93-131.64 m), and one of the anomalies is associated with a nearby sidescan sonar contact (Mag_0047: Contact_0043). Contact_0043 was described as unknown debris, while all the magnetic anomalies within the Myrtle Region are described as unknown/modern debris.

The Myrtle Region is generally characterized as having a mostly sandy bottom with some isolated patches of exposed hard-bottom located off Myrtle Beach and Arcadian Shores. A total of 23 sidescan sonar contacts were identified in the Myrtle Region and represent unknown features (likely potential debris), schools of fish, nearby vessel wakes, and one unknown linear feature (potential cable, chain, or pipeline).

A thin layer of surficial sediment overlying the near surface ancient strata is common throughout the North Myrtle and Myrtle study regions. Large paleochannels identified in the southern portion of both North Myrtle and the Myrtle were ground truthed using BOEM-VC-2022-SC-57 allowing for identification of the laminated variable amplitude facies, providing a traceable reflector of the acoustically transparent facies. These paleochannels were revealed to contain a thin layer of sand bounded by laminated clays, reaching thicknesses of greater than 40 ft (12.19 m)(Figure 64 and Figure 65).

Figure 64 Seismic line BOEM_SBP_20220609_Line_139

Seismic line BOEM_SBP_20220609_Line_139 with a delineated paleochannel revealing a similar acoustic structure as that of Figure 65. A paleochannel with acoustically transparent facies truncated and infilled with laminated variable amplitude facies.

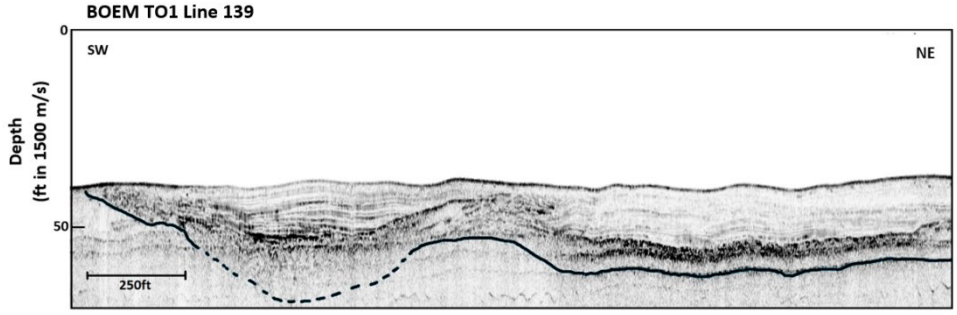
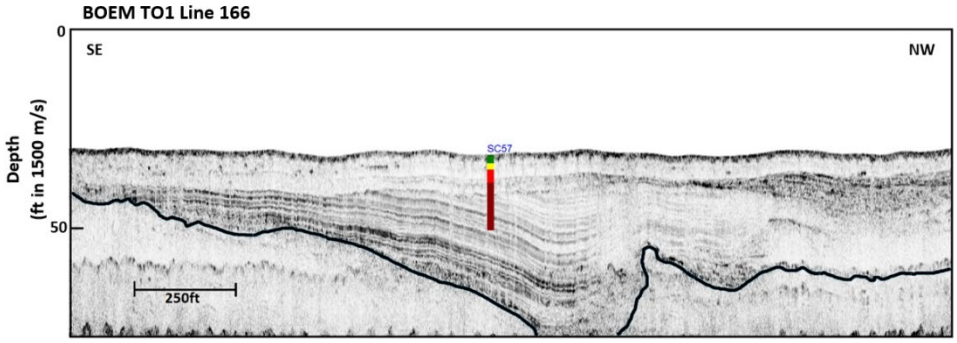
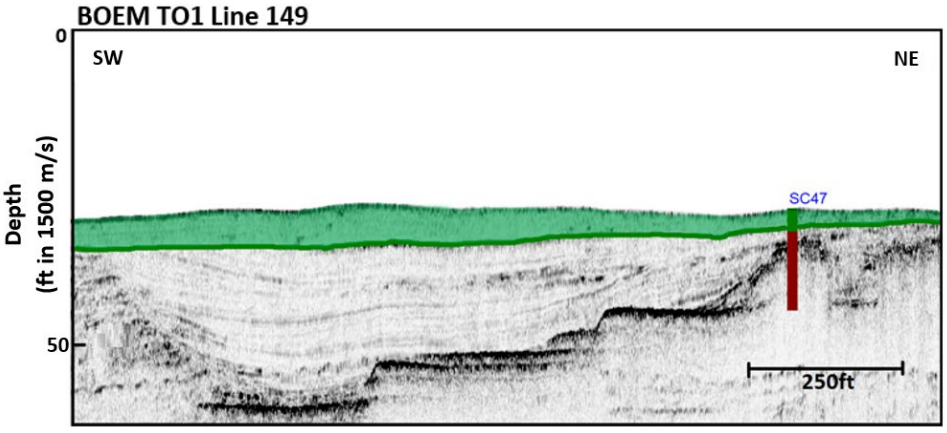


Figure 65 Seismic line BOEM_SBP_20220612_Line_166
Seismic line BOEM_SBP_20220612_Line_166 with a delineated paleochannel mirroring an acoustic structure similar to that of Figure 64. Ground truthing using BOEM-VC-2022-SC-57 allowed identification of the laminated variable amplitude facies and provided a traceable reflector for the acoustically transparent facies.



In the Myrtle region, surface sands delineations indicate the presence of several small, isolated deposits in the northern region, and several shoal systems in the southern region (Figure 67). Along the northern region, most of the resources are along the top of paleochannel systems and are smaller, likely localized deposits (Figure 66).

Figure 66: Seismic line BOEM_SBP_20220611_Line_149 with color coded vibracore BOEMVC-2022-SC-47
Seismic sub-bottom line with BOEMVC-2022-SC-47 color coded according to the schema developed for this project (see section 5.3.2.1 for color classification information). The green line on the profile indicates the reflector that best correlates with the bottom of the sand boundary and the highlighted area represents the deposited sand overlaying the paleochannel.



The geophysical data along Cane South and Cane North do not indicate that the potential resource extends further offshore, however, the historic geotechnical data collected within those proven resources would assist in further constraining the resource since it would provide additional information on the properties of the area as well as targeted composition information. Offshore Myrtle Beach, APTIM identified three potential resources (Figure 67, Myrtle_01, Myrtle_02 and Myrtle_03). From the review of the CRM and sand isopach surfaces, it appears these deposits are likely associated with the shore perpendicular shoals (explained below). Of these identified resources only Myrtle_01 and Myrtle_02 have resources greater than 5ft (1.52 m) 336,000 and 159,000cy [256,890-121,564 m^3] respectfully. The larger deposits identified within this study area are offshore Garden City Beach/Surfside Borrow Area and Murrells Inlet.

Geophysical data collected extending from the Surfside USACE resource indicate that the resource could potentially be present further offshore (Myrtle_05) and have a potential volume of 6,266,000 cy (4,790,700 m^3) and 319,000 (243,893 m^3) above a 3ft and 5ft (0.91 m and 1.52 m) plane respectfully. Further offshore, Myrle_04 from the CRM data, appears to be associated with a of the shore perpendicular ridges that are observed in the area. Myrtle_04 is a smaller resource and does not have a significant thickness above the 5ft (1.52 m) plane. Lastly the deposit Myrtle_06, associated with the Murrells Inlet sand ridges, is extensive in its footprint and volume (Figure 68). Based on the reconnaissance data collected, this resource could likely have 36,690,000cy (28,515,518 m^3) of resources thicker than 5ft (1.52 m) and almost double that thicker than 3ft (0.91 m). Grain size statistics indicate that this deposit has a mean grain size of 0.25mm (2 phi) and a silt content of 2.12 percent. The identified sand shoals are highly variable in thickness and would require additional data to further constrain the potential beach compatible portions of the deposit and assess the available volume.

Figure 67: Identified potential sand resources delineated in the Myrtle study area

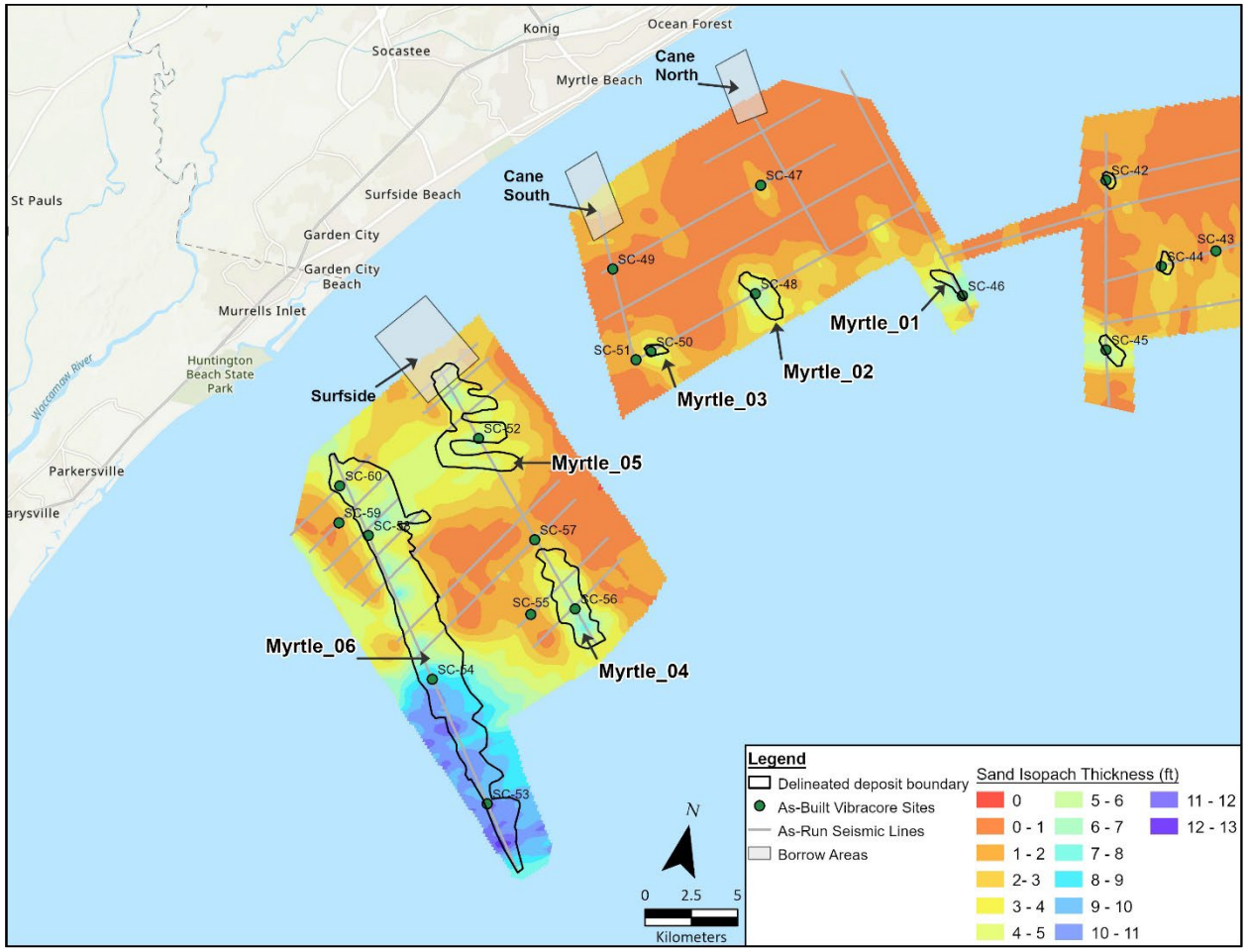
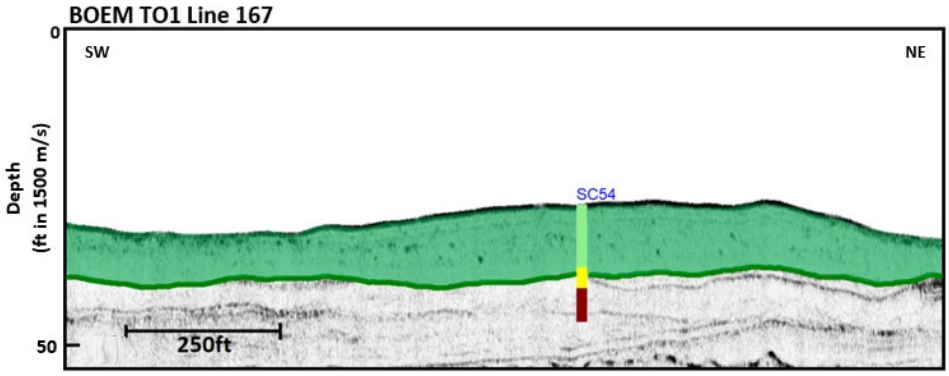


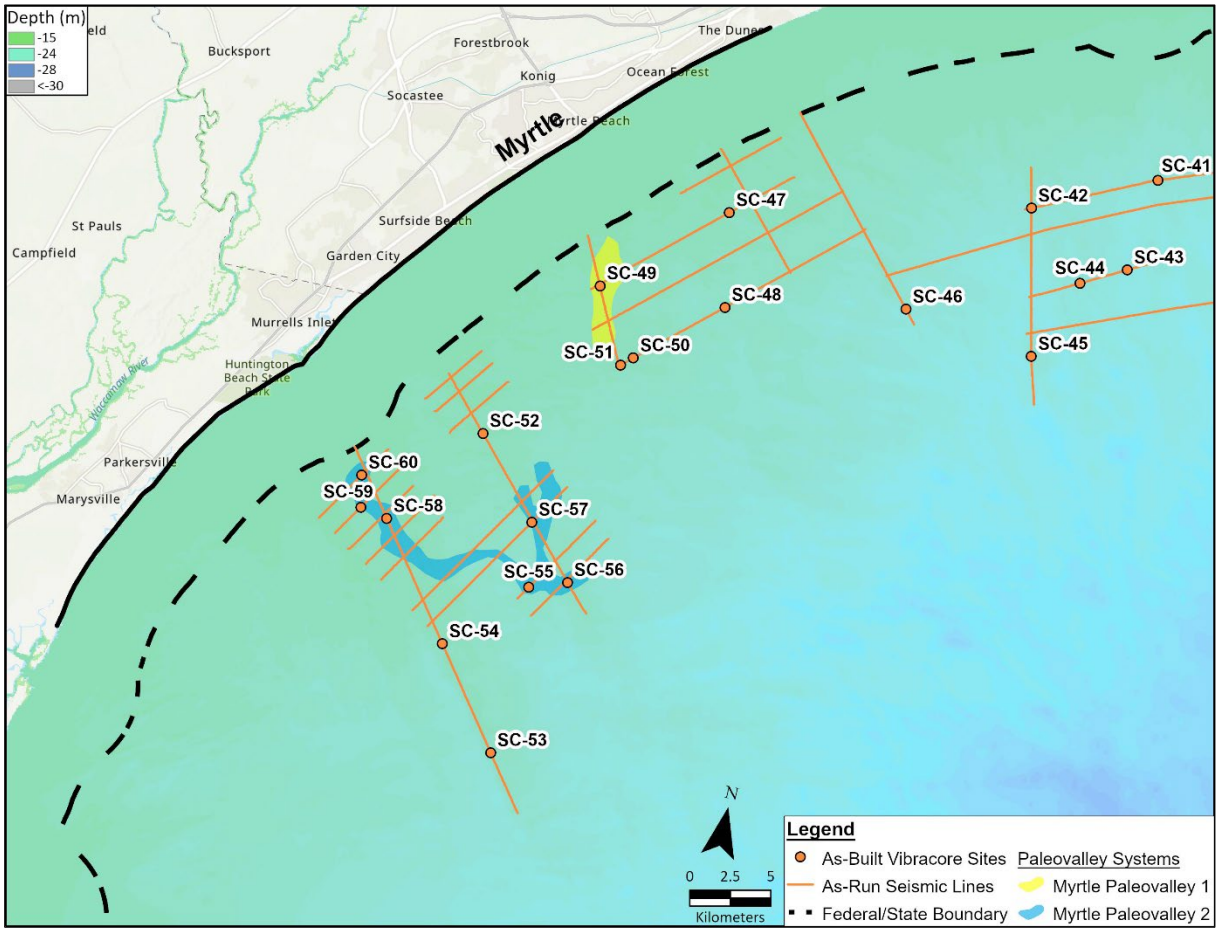
Figure 68: Seismic line BOEM_SBP_20220613_Line_167 with color coded vibracore BOEMVC-2022-SC-54

Seismic sub-bottom line with BOEMVC-2022-SC-54 color coded according to the schema developed for this project (see section 5.3.2.1 for color classification information). The green line on the profile indicates the reflector that best correlates with the bottom of the shoal boundary and the highlighted area represents the Murrells Inlet ridge deposit.



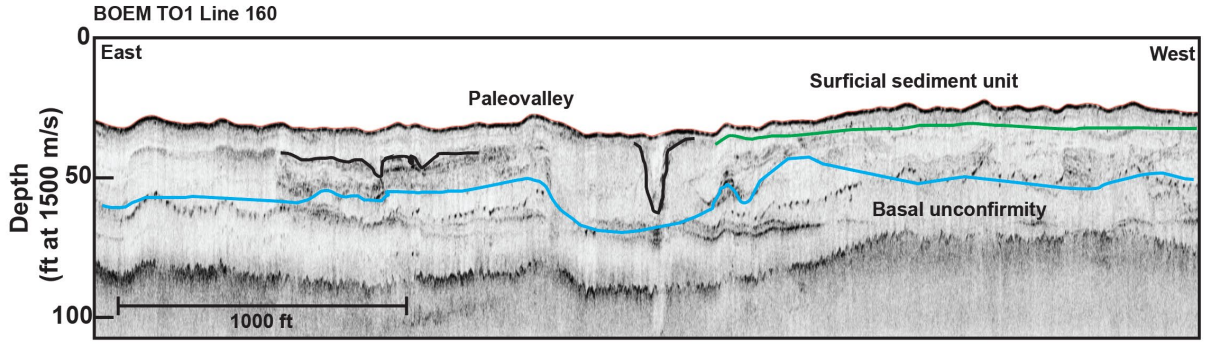
The Myrtle study area is located between Murrell's Inlet and Myrtle Beach. Numerous sand borrow areas have been previously identified within state waters adjacent to the region, often located within paleochannel systems (Baldwin et al., 2006). Additionally, the region contains a number of shore perpendicular shoals and sand ridges that extend into the OCS, but the origin and extent of which are unknown. Sub-bottom profiler and geologic interpretation (see above for example data and methods) allows for more in depth analysis of the distribution of potential sand resource units and the relationship between modern surficial features and subsurface architecture. The Myrtle region hosts several paleochannels and paleovalleys, of which at least two can be confidently correlated across the study area (Figure 69). Additionally, there are observed several surficial sediment units composed of the large shoals and sand ridges found within the region. Together this indicates the potential for Myrtle to contain both type 1 and type 2 deposits with a likelihood of bearing sediment resources.

Figure 69: Paleovalley systems across the Myrtle Area



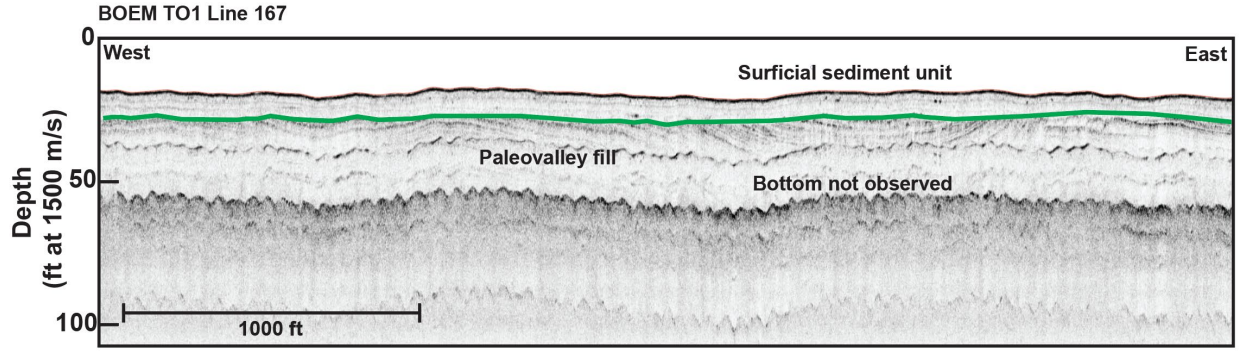
The Myrtle Paleovalley 2 appears to originate within state waters and transverse the federal OCS further offshore. It is defined by a broad basal unconformity, but in several locations the exact base of which is difficult to image. The associated paleovalley fill is highly variable in terms of acoustic facies as well as sedimentary character (Figure 70). The fill is typically chaotic or transparent, with several episodes of cut and fill leaving a compound structure. The upper portion of valley fill alternatively outcrops at the seafloor and is truncated by a transgressive ravinement or is overlain by a large surficial sedimentary unit. The valley ranges from 1000–5000 ft (304.8-1524 m) wide, with incisional depths between 20–40 ft (6.1-12.19 m). The nearby large linear shore-perpendicular sand shoal is located in close proximity to the location of the paleovalley. This is likely due to the availability of easily erodible material close to the seafloor associated with the upper paleovalley fill (Baldwin et al., 2006).

Figure 70. Example sub-bottom profiler data across Myrtle Paleovalley 2. Note the multiple incisions and complex fill pattern, along with adjacent surficial sediments overlying valley fill



Myrtle Paleovalley 1 is interpreted to have a more complex dendritic pattern (Figure 71) than other linear systems observed in the region. The system ranges in lateral extent from 1000–5000 ft (304.8-1524 m), with incisional depths up to 60 ft (18.29 m). In shallow bathymetry, the basal unconformity of the valley is not fully observed (Figure 71), but the complex valley fill of transparent, chaotic, and medium-amplitude laminated strata can still be observed. There exists in close association to Paleovalley 1 a significant type 1 deposit of surficial sands with up to two internal packages, but usually of transparent acoustic facies. This surficial unit is bounded by an erosional unconformity that is truncating the paleovalley fill located immediately below. This could indicate that erosion and reworking of paleovalley strata contributes the coarse-grained material necessary for shelf processes to form the surficial sands observed across the Myrtle region. This is similar to the reworking of coastal and fluvial lithosomes observed further to the south in Long Bay, where similar spatial correlation exists between sand shoals and underlying paleovalley systems (Long et al., 2021).

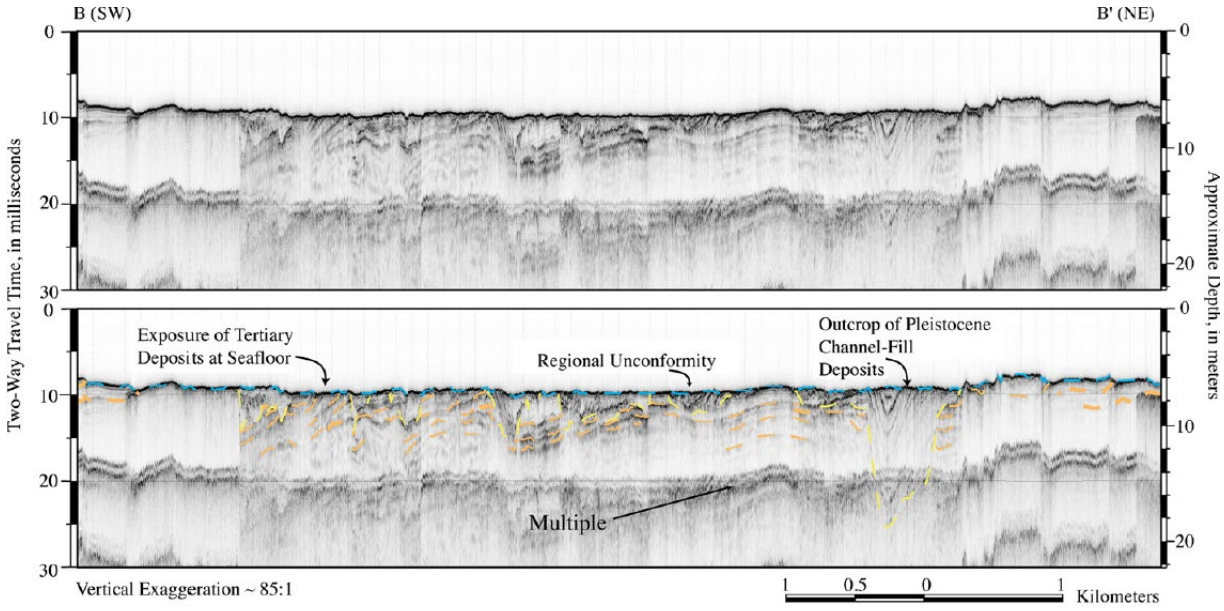
Figure 71. Example sub-bottom profiler data across Myrtle Paleovalley 1 showing complex valley fill strata and erosional truncation of uppermost units, with surficial sediments above



The observed paleovalley systems with complex cut-and-fill patterns are similar to those observed closer to shore by earlier studies (e.g., Baldwin et al., 2006; Barnhardt, 2009). The surrounding host basement stratigraphy is typically Tertiary in age, with significant variability in mechanical properties that likely play

a role in the extent and incision of the observed Quaternary paleovalley and paleochannel systems Figure 72).

Figure 72. Example of previous sub-bottom profiler data in Long Bay with complex exposure of Tertiary basement and compound Quaternary incision. Modified from Denny, 2007



Myrtle Regional Strategic Questions:

1) *Can existing and potential borrow areas be extended further offshore?*

This study indicates that some of the existing and potential borrow areas can be extended further into the OCS. Prior work found that many of the previously identified potential borrow areas are likely contained within paleovalley systems, several of which extend further into the Myrtle study area. However, ground truthing of some of these systems found the valleys themselves are often dominated by clay and finely interbedded sands, with a relatively clean surficial sand located above. It does not appear that the Cane North Arcshore and Cane South borrow areas can be extended with confidence across the OCS. The USACE Surfside resource does appear to extend into the OCS, following a paleovalley system trending perpendicular to the modern shore.

2) *Are the sand ridges found in the OCS off the coast of Murrell's Inlet a potential resource, and if so, what is the origin of the features and are they actively evolving?*

The Murrell's Inlet sand ridges represent a significant type 1 deposit and portions of them were able to be constrained and quantified as part of this study as a high-potential sand resource. The sand ridges and shoals overlie a large paleovalley that can be mapped across the study area, indicating a potential relationship between the thickest surficial sands and readily erodible sand-rich stratigraphy near the seafloor. Based on the acoustic character and bathymetry of the shoals and comparison to other sand ridges in the Atlantic OCS, it is likely that these systems are mobile on modern timescales and erosion of the surrounding strata continues to provide sediment to the ridge systems.

3) *Is there sand of significant thickness present off the coast of the cities of Myrtle Beach and North Myrtle Beach in the region from 4 to 8 miles (6.44-12.87 km) offshore, and if so, what is the nature, extent, and quality of the deposit(s)?*

This study identified several type 1 surficial sand deposits as well as numerous potential type 2 paleovalley deposits that have potential for hosting sediment resources. Two surficial type 1 sand bodies were able to be delineated and quantified within this area, with fine to medium grain quartz sands rated as good quality. These deposits are tens of thousands of square yards in extent, located further seaward near the 8-mile (12.87 km) mark. Additionally, this region contains a linear shore perpendicular paleovalley system with high potential for containing type 2 sand-bearing deposits, similar to those that have been found to contain borrow areas closer to the modern shore. While the position and extent of the paleovalleys was able to be regionally correlated, more detailed investigation is required to constrain the character and volume of potential sand resources contained within.

Myrtle Future Directions

- The observed paleovalley systems are consistent in characteristics with others observed further south in prior studies: the dendritic nature and shore oblique directional trend of the valleys indicates that they likely extend farther into the OCS or in between the reconnaissance lines collected by this study. Identified surficial sand resources occasionally occur in close proximity to identified paleovalley locations as well as above relatively uniform antecedent strata, making genetic linkages between surficial and subsurface units inconclusive. Future studies could better capture the geometry and overall extent of the systems, and further investigate whether surficial sand units approach potential resource-grade thicknesses due to modern geomorphic processes or underlying accommodation associated with the compound valley incisions.
- Several of the paleovalleys (both localized features observed on one line and those able to be regionally mappable) contain thick sequences of muddy and fine grained sediment that is either capped by an erosional ravinement or the modern seafloor. Further investigations of the sediment cores that penetrated these sequences could help constrain whether their fill was the result of terrestrial or marine processes, associated dates of deposition, and help constrain models of shelfal evolution in this region.

7 Conclusions

In 2021, the BOEM MMP, within the DOI, contracted APTIM under an ID/IQ to support the identification, characterization, and delineation of OCS sand to further MMP's development of a National Offshore Sand Inventory, as well as other marine minerals in support of development of a future National Offshore Critical Mineral Inventory. Under this ID/IQ, APTIM is tasked with assisting BOEM in the identification and characterization of sediment resource areas, determining the locations of potential OCS hard/critical minerals, and collecting baseline data to better understand and characterize potential physical, chemical, biological, and cultural impacts from marine mineral extraction. The first Task Order issued under the ID/IQ Contract No. 140M0121D0006 is to conduct geophysical and geological data acquisition and analysis in North Carolina and South Carolina offshore Carteret, Onslow, Pender, New Hanover, and Brunswick Counties.

APTIM and TWI approached this first Task Order following sequential research, survey, and interpretation procedures. The first task was to conduct a desktop study for each study area to compile previous datasets and geologic context and to work closely with BOEM on determining regional and project goals for each of the identified areas. Based on the results of this desktop study a comprehensive geophysical and geological survey plan was created and reviewed with stakeholders. APTIM collected 898 line-km (484.88 nm) of geophysical data and 60 vibracores along Onslow and Long Bays following the

incorporation of stakeholder input. Upon the completion of data collection, APTIM processed, analyzed, and interpreted all geophysical and geological data to determine the potential available surficial sand volume, where possible, within each study area as well as contribute to the conceptual geologic framework of each region. A generalized potential sediment resource bearing deposit classification system was defined for each area: surficial sedimentary units (type 1 deposits), discrete subsurface stratigraphic units contained within larger paleovalley or channel systems (type 2 deposits), ancient strata that form the substrate for inner continental shelf (type 3 deposit) and preserved coastal lithosomes preserved during shoreline retreat and transgression (type 4 deposit). A scoring system was developed to quantify the relative quality of sediment found in the geotechnical sampling effort, incorporating grain size, color, sorting, and other factors to help differentiate high to marginal quality sands found throughout the study area. From the correlation of the geotechnical and geophysical data, APTIM was able to identify and delineate several potential surficial sand resources along Topsail, New Hanover, Brunswick and Myrtle and a potential resource in Bogue with some overburden. Within the Brunswick, North Myrtle, and Myrtle region, APTIM and TWI were able to determine that there are numerous sand deposits located within broader paleovalley systems that could be further investigated as potential resources. Wherever possible, paleovalleys were regionally mapped to help define fairways where there is a high likelihood of finding potential sediment resources in future investigations. Additionally, surficial sand deposits extend from the already established USACE Cane South borrow area, potential borrow material within the Myrtle region. However, in Onslow and Long Bays, the nearshore USACE borrow areas are not as evident further offshore due to the abundance of hard-bottom reflecting the complex basement stratigraphy present in the area. In addition to surficial sedimentary units and regional features such as paleovalleys there were identified numerous smaller, isolated features. These local features can represent paleochannels, surficial sands, or other depositional units but are not able to be correlated at the regional scale allowed by this study. They may still have the potential to be sediment resource areas but require further investigation. Hard-bottom interpretation and delineation from both the sidescan sonar and seismic indicate that there are widespread basement stratigraphy of variable age and composition throughout all the bays both exposed at the seafloor as well as at depth. Sidescan sonar data identified regions of sand that include sand ripples, patch sand, and exposed bottom throughout the 5 survey regions, as well as 56 sidescan contacts. The majority of contacts represent unknown objects, biological features, and/or acoustic artifacts, as well as one artificial reef. Magnetic field data revealed a total of 58 magnetic anomalies. The majority of anomalies are described as unknown/modern debris, while 3 represent known artificial reefs. Aside from the contacts and anomalies that represent the known artificial reefs, these targets represent only small, potential hazards to be considered during future projects. These data were evaluated collectively to propose core sites to ground-truth geophysical interpretations and will inform future survey efforts. The geologic features, sand resources, and other features identified in this study are not exhaustive or inclusive of all potential resources that may exist within Onslow and Long Bays, but represent a focused subset developed based on the needs of BOEM and local stakeholders. The datasets and interpretations generated by this study can be used to inform future surveys, sand searches, and research studies at a more detailed scale by providing an initial framework for the region.

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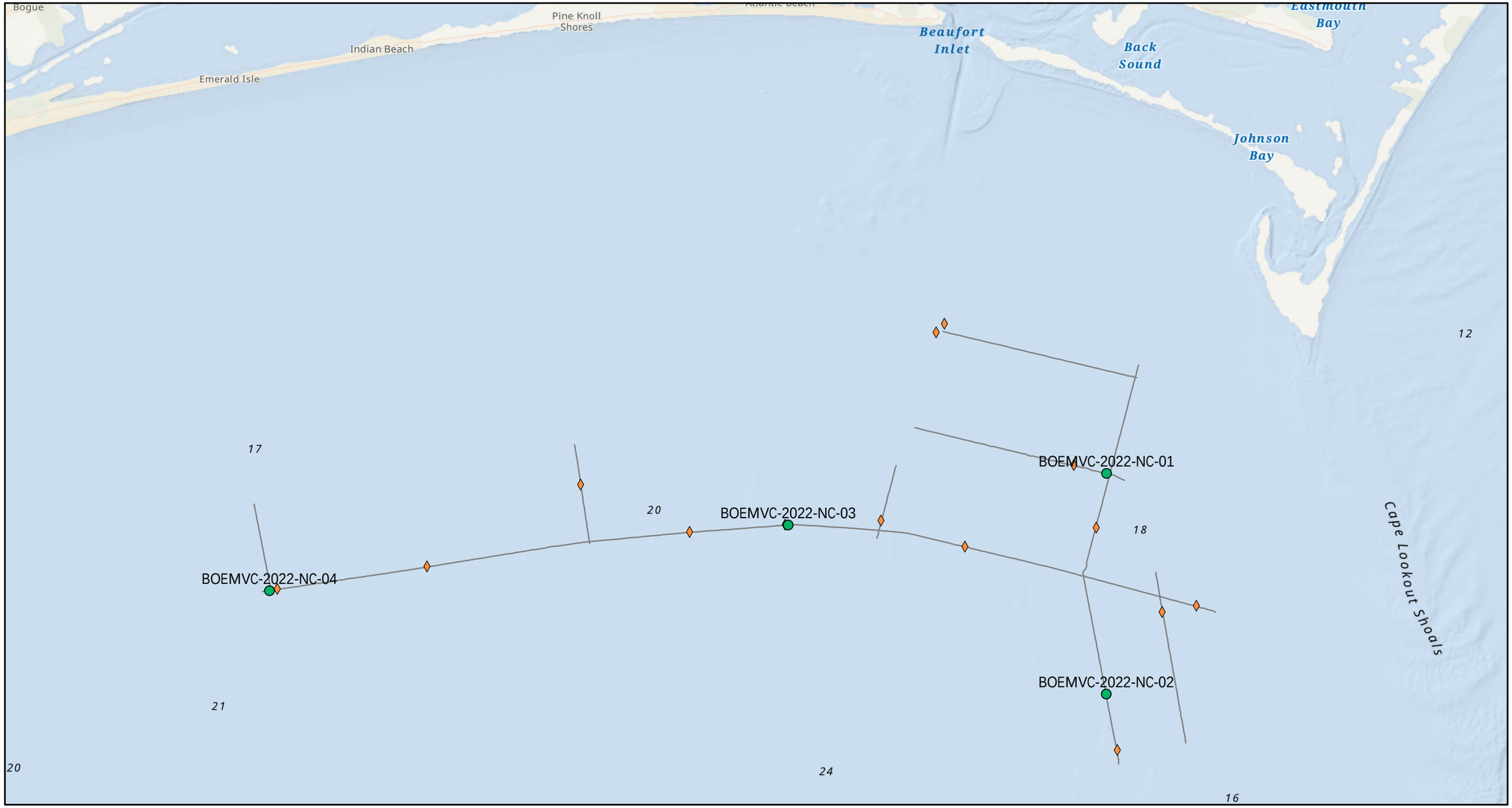
Appendix A: Map Series



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend:

- As Built Vibracore Sites
- As Run Tracklines
- Sound Velocity Casts

N
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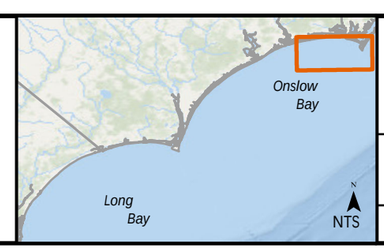
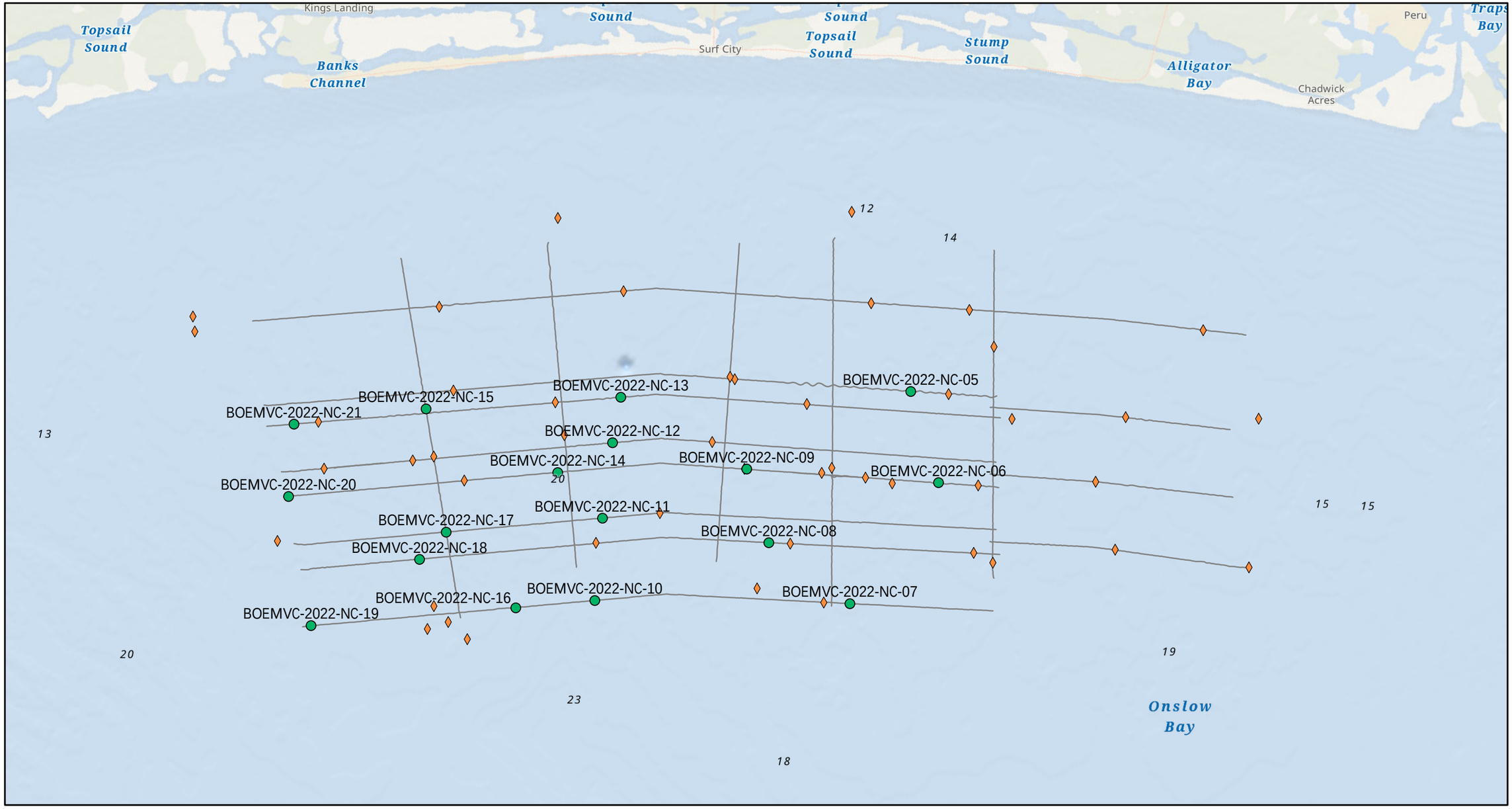


BOEM Task Order 1: Appendix A: Final Report Map Series
As Run and As Built - Bogue
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
725 US Highway 301 South
Tampa, FL 33619
APTIM.com

Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 1a



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Legend:

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- As Run Tracklines
- Sound Velocity Casts

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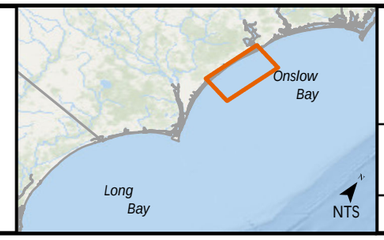
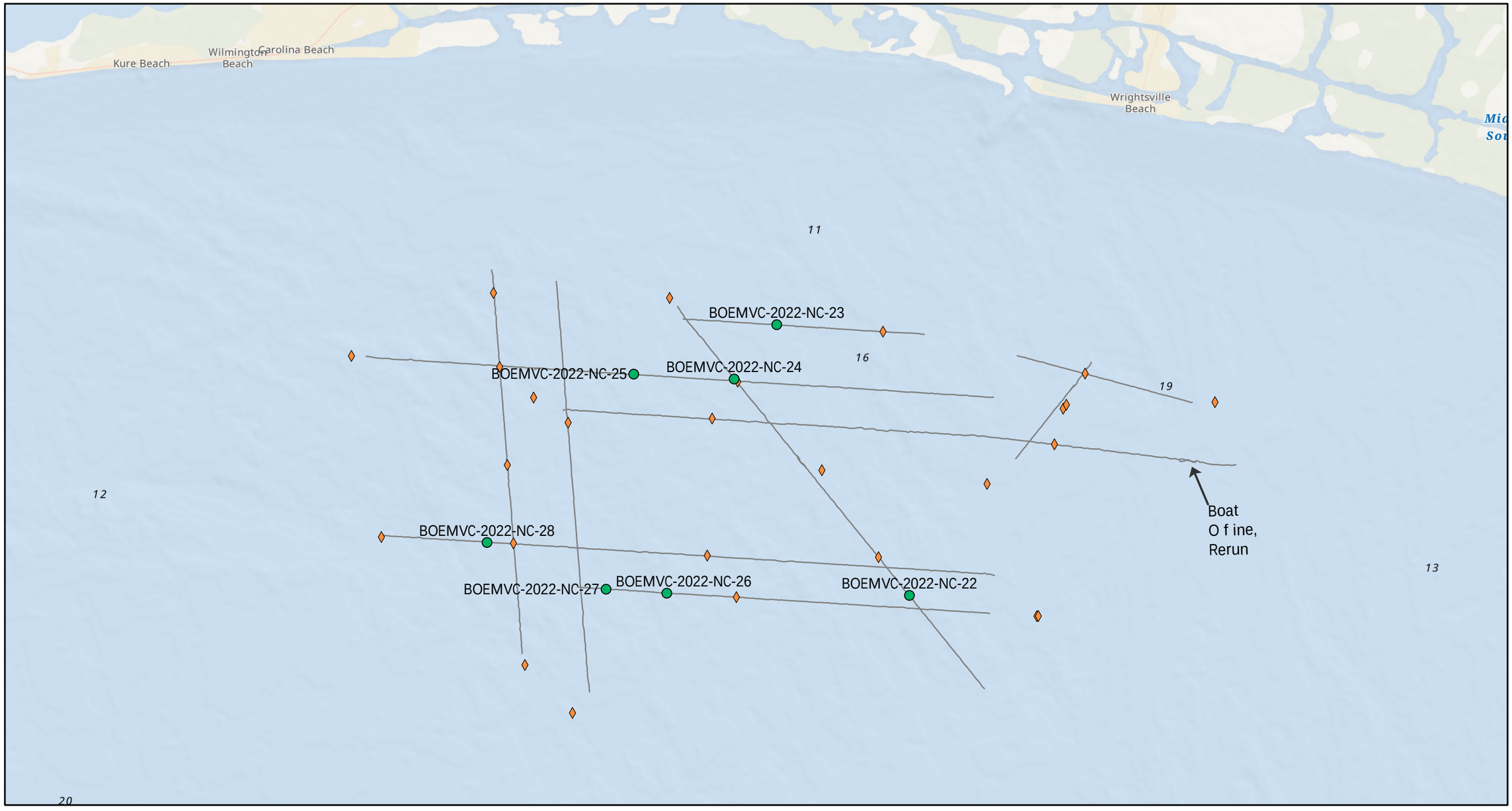
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
As Run and As Built - Topsail
Geophysical and Geological Data Acquisi t on and Analysis in Onslow Bay
O f shore North Carolina and Long Bay O f shore
North Carolina and South Carolina

APTIM
725 US Highway 301 South
Tampa, FL 33619
APTIM.com

Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 1b



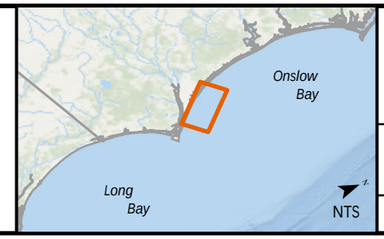
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend:

- As Built Vibracore Sites
- As Run Tracklines
- Sound Velocity Casts

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
As Run and As Built - New Hanover
Geophysical and Geological Data Acquisi t on and Analysis in Onslow Bay O f shore North Carolina and Long Bay O f shore North Carolina and South Carolina

APTIM
725 US Highway 301 South
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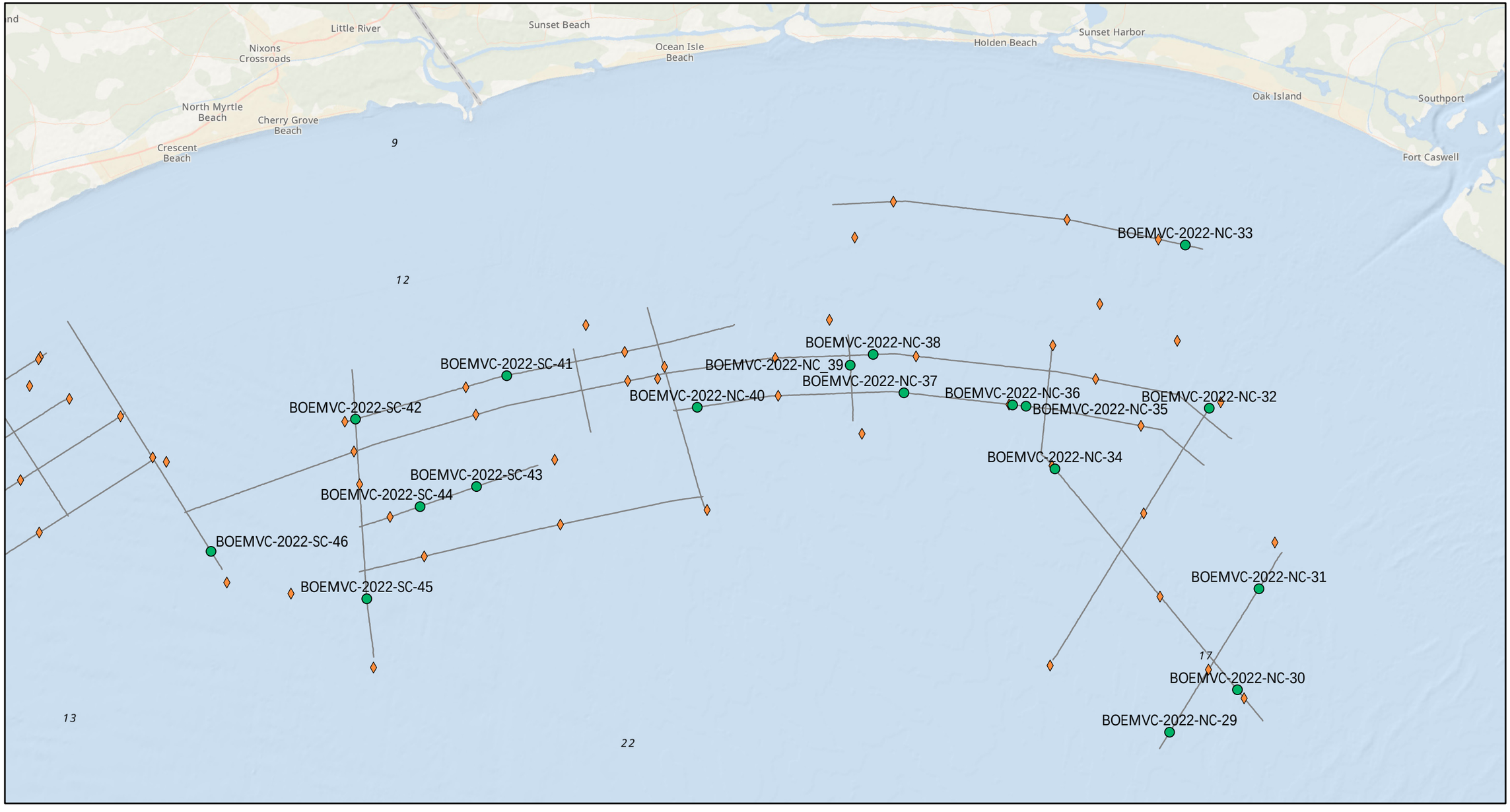
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 1c



Notes:

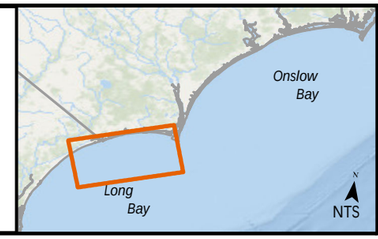
1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend:

- As Built Vibracore Sites
- As Run Tracklines
- Sound Velocity Casts

N
W E
S

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
As Run and As Built - Brunswick
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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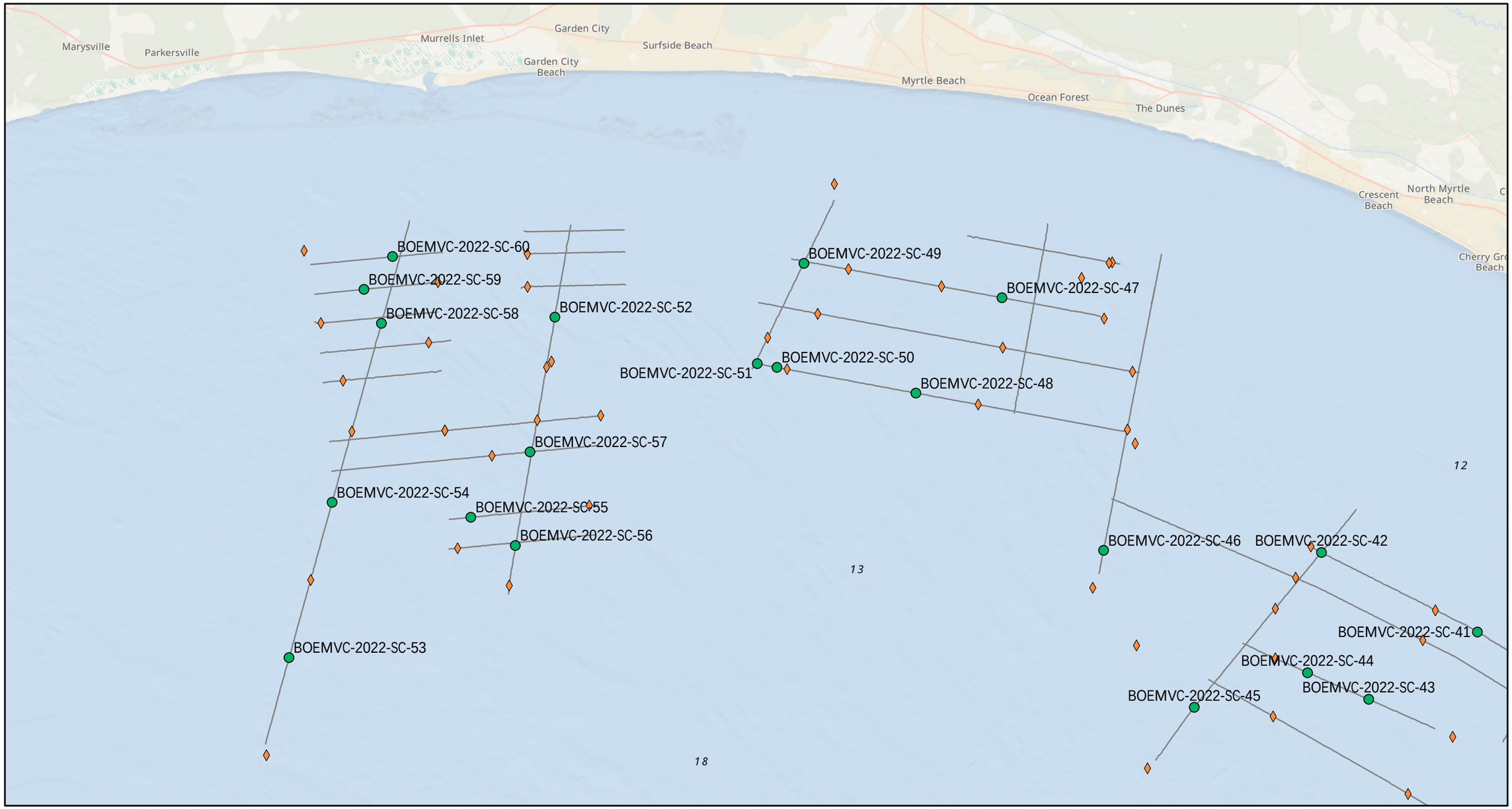
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 1d



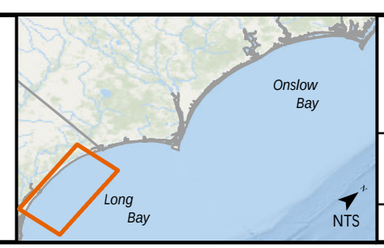
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend:

- As Built Vibracore Sites
- As Run Tracklines
- Sound Velocity Casts

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
As Run and As Built - Myrtle
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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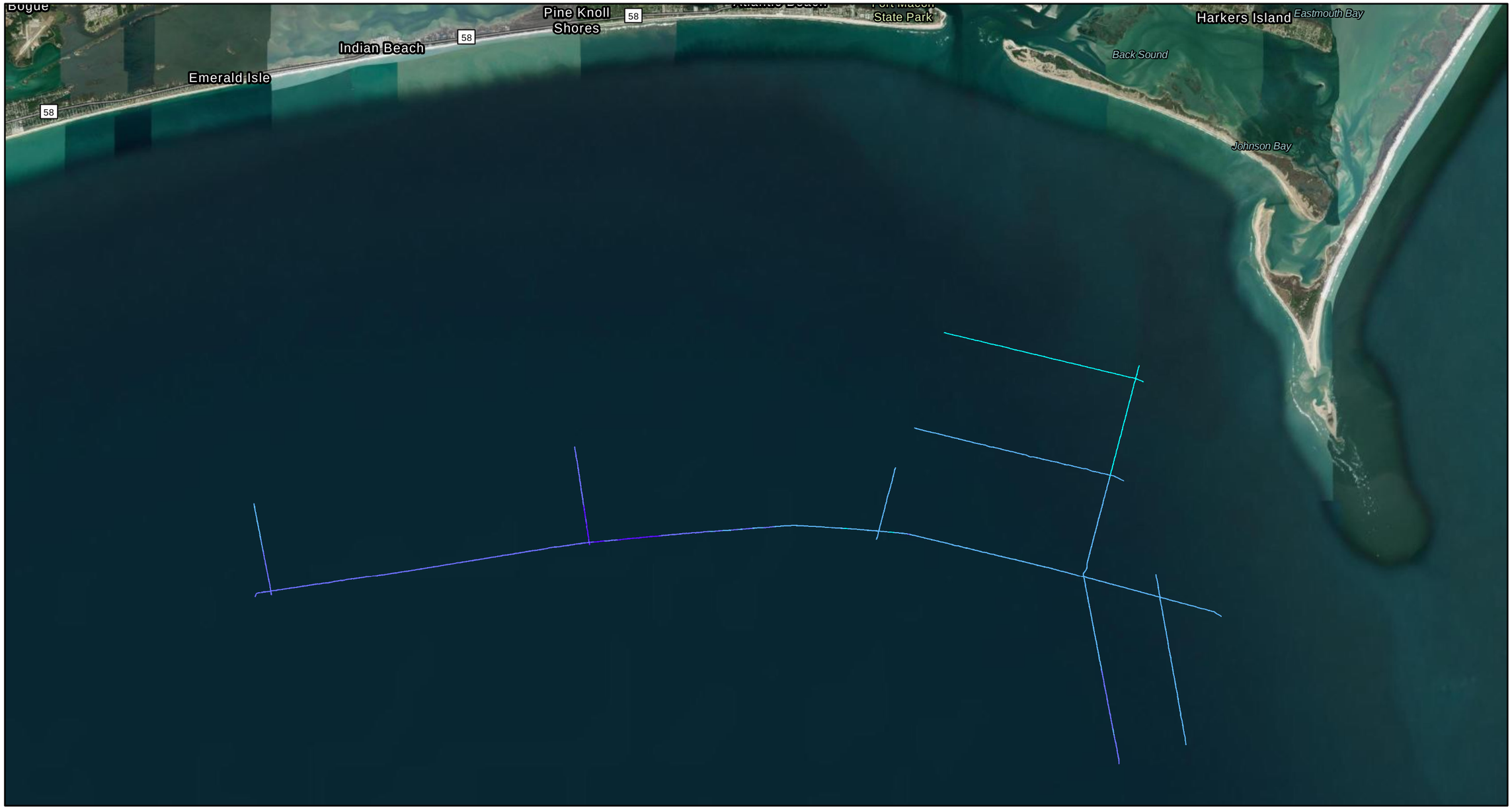
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 1e



Notes:

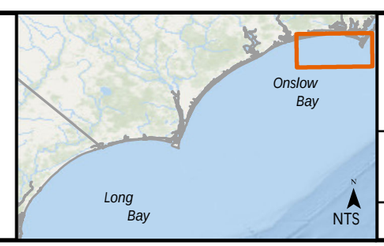
1. Background is Esri's World Imagery basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Depth (f, NAVD88):

- -29 - -25
- -34 - -30
- -39 - -35
- -44 - -40
- -49 - -45
- -54 - -50
- -59 - -55
- -64 - -60
- -69 - -65
- -71 - -70

N
W
E
S

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Bathymetry Surface- Bogue
Geophysical and Geological Data Acquisi t on and Analysis in Onslow Bay
O f shore North Carolina and Long Bay O f shore
North Carolina and South Carolina

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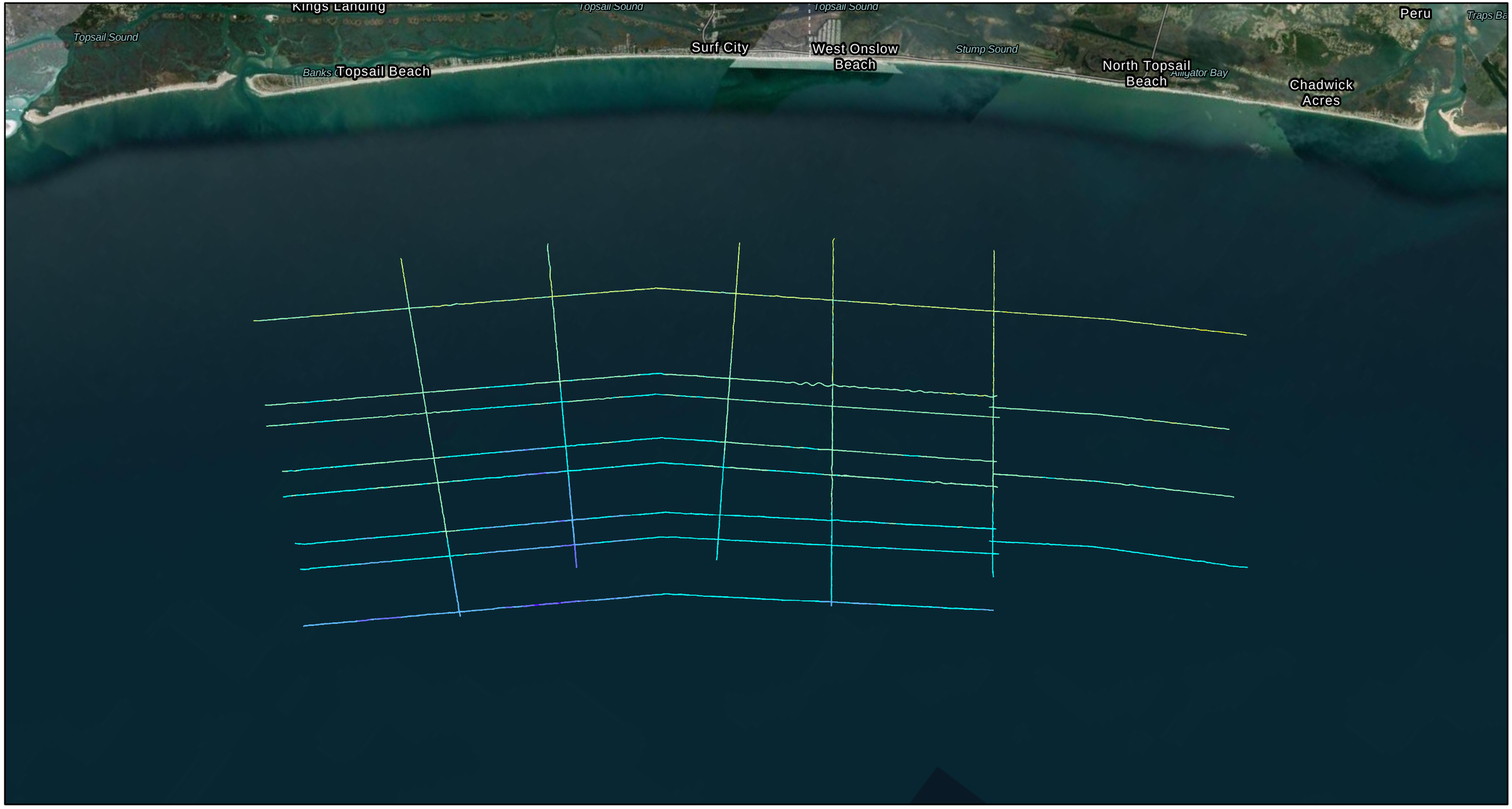
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 2a



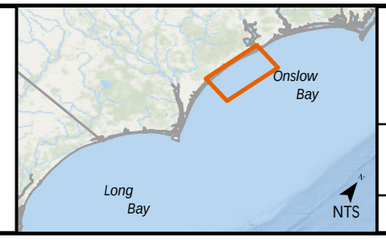
Notes:

1. Background is Esri's World Imagery basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Depth (f, NAVD88):

- -29 - -25
- -34 - -30
- -39 - -35
- -44 - -40
- -49 - -45
- -54 - -50
- -59 - -55
- -64 - -60
- -69 - -65
- -71 - -70

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Bathymetry Surface- Topsail
Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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Tampa, FL 33619
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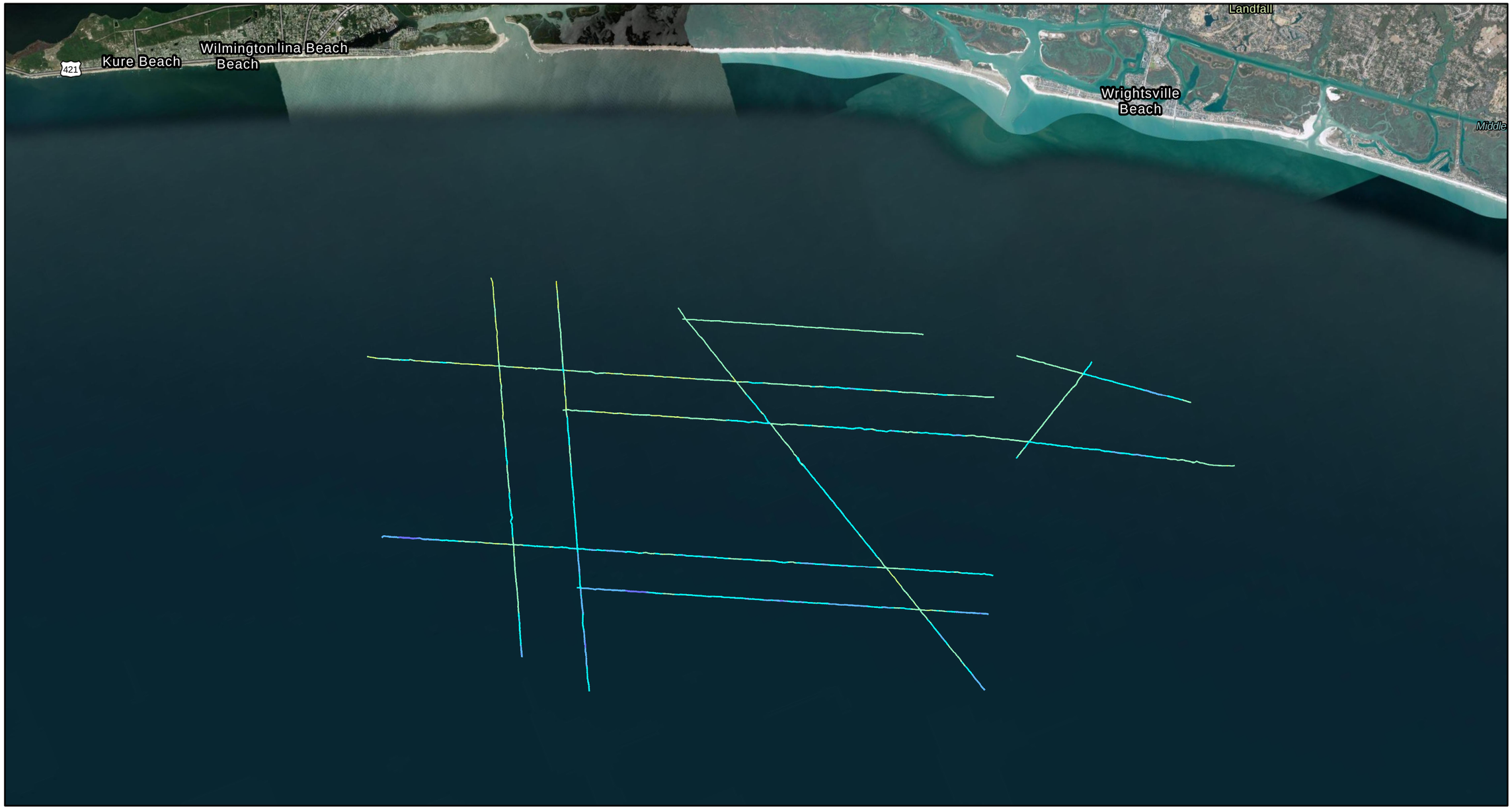
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 2b



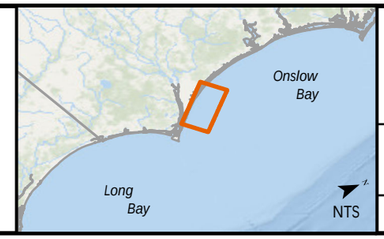
Notes:

1. Background is Esri's World Imagery basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Depth (f, NAVD88):

-29 - -25	-69 - -65
-34 - -30	-71 - -70
-39 - -35	
-44 - -40	
-49 - -45	
-54 - -50	
-59 - -55	
-64 - -60	

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Bathymetry Surface- New Hanover
Geophysical and Geological Data Acquisi t on and Analysis in Onslow Bay
O f shore North Carolina and Long Bay O f shore
North Carolina and South Carolina

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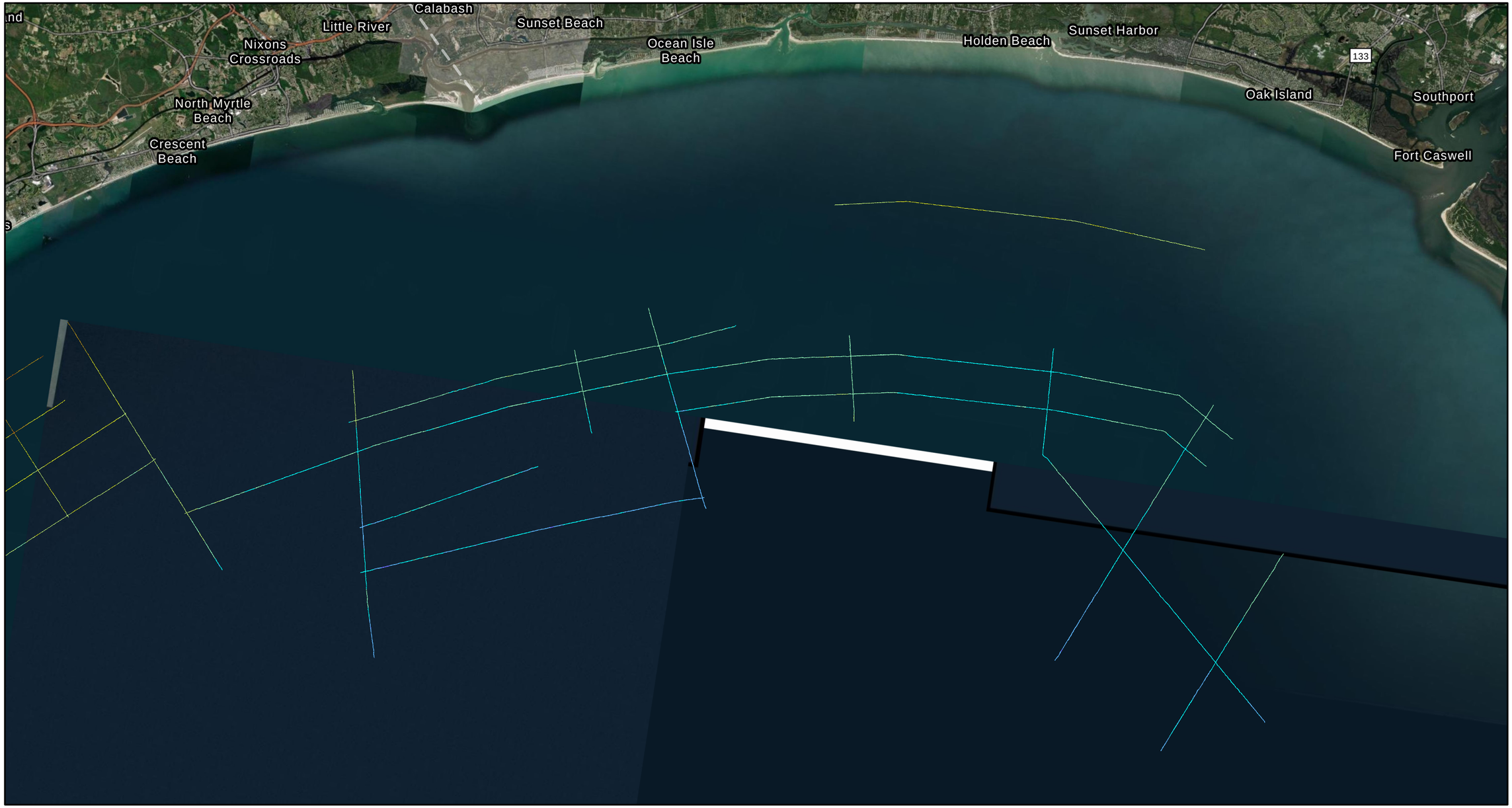
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 2c



Notes:

1. Background is Esri's World Imagery basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

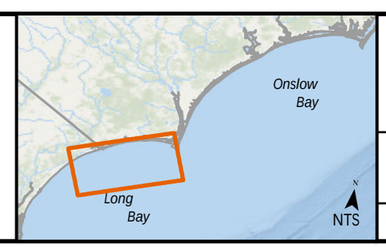
Depth (f, NAVD88):

-29 - -25	-69 - -65
-34 - -30	-71 - -70
-39 - -35	
-44 - -40	
-49 - -45	
-54 - -50	
-59 - -55	
-64 - -60	

N, W, E, S

0 1 2

Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Bathymetry Surface- Brunswick

Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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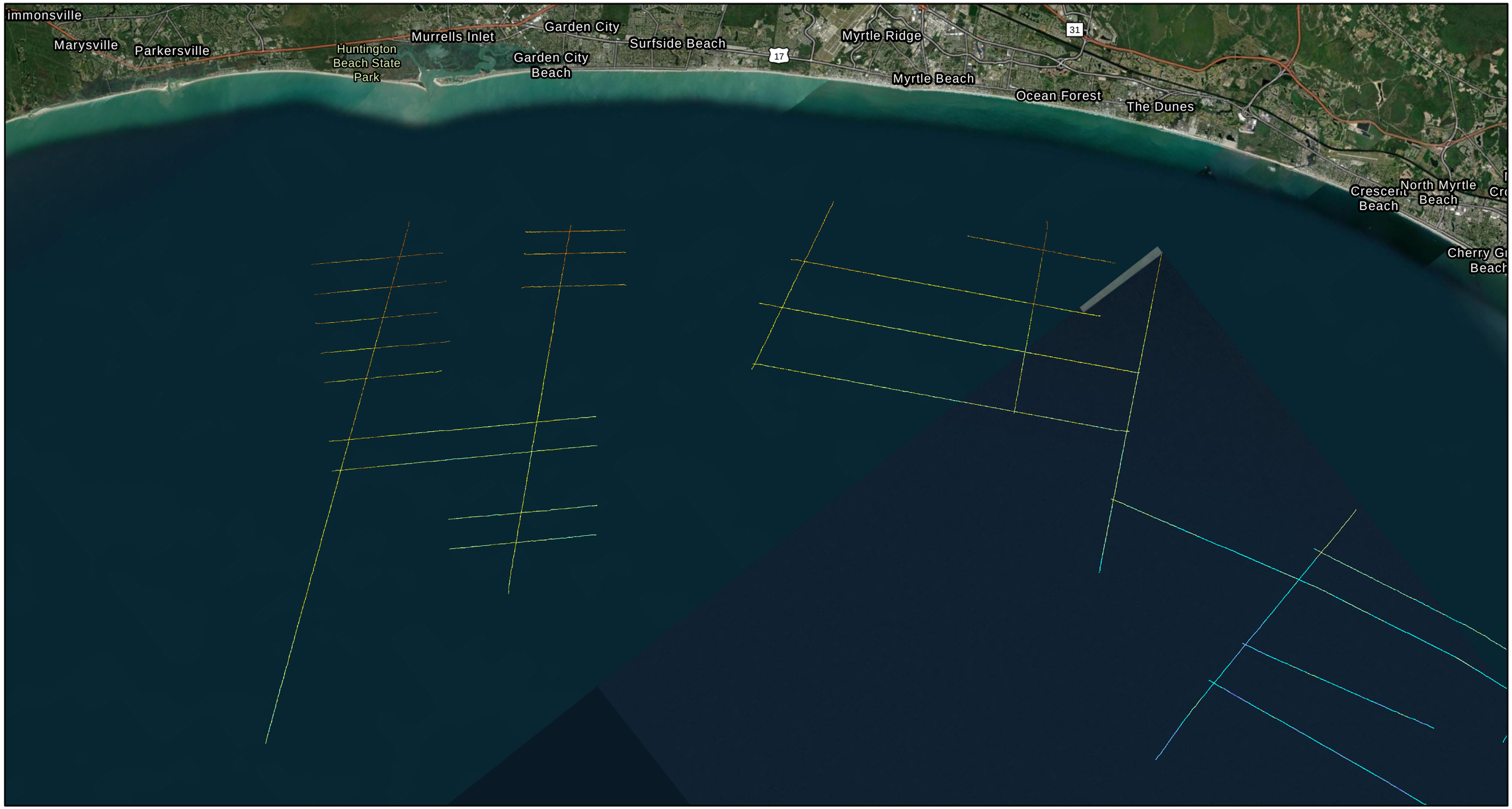
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 2d



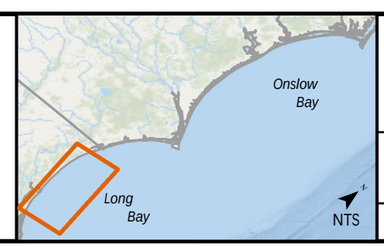
Notes:

1. Background is Esri's World Imagery basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Depth (f, NAVD88):

-29 - -25	-69 - -65
-34 - -30	-71 - -70
-39 - -35	
-44 - -40	
-49 - -45	
-54 - -50	
-59 - -55	
-64 - -60	

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Bathymetry Surface- Myrtle
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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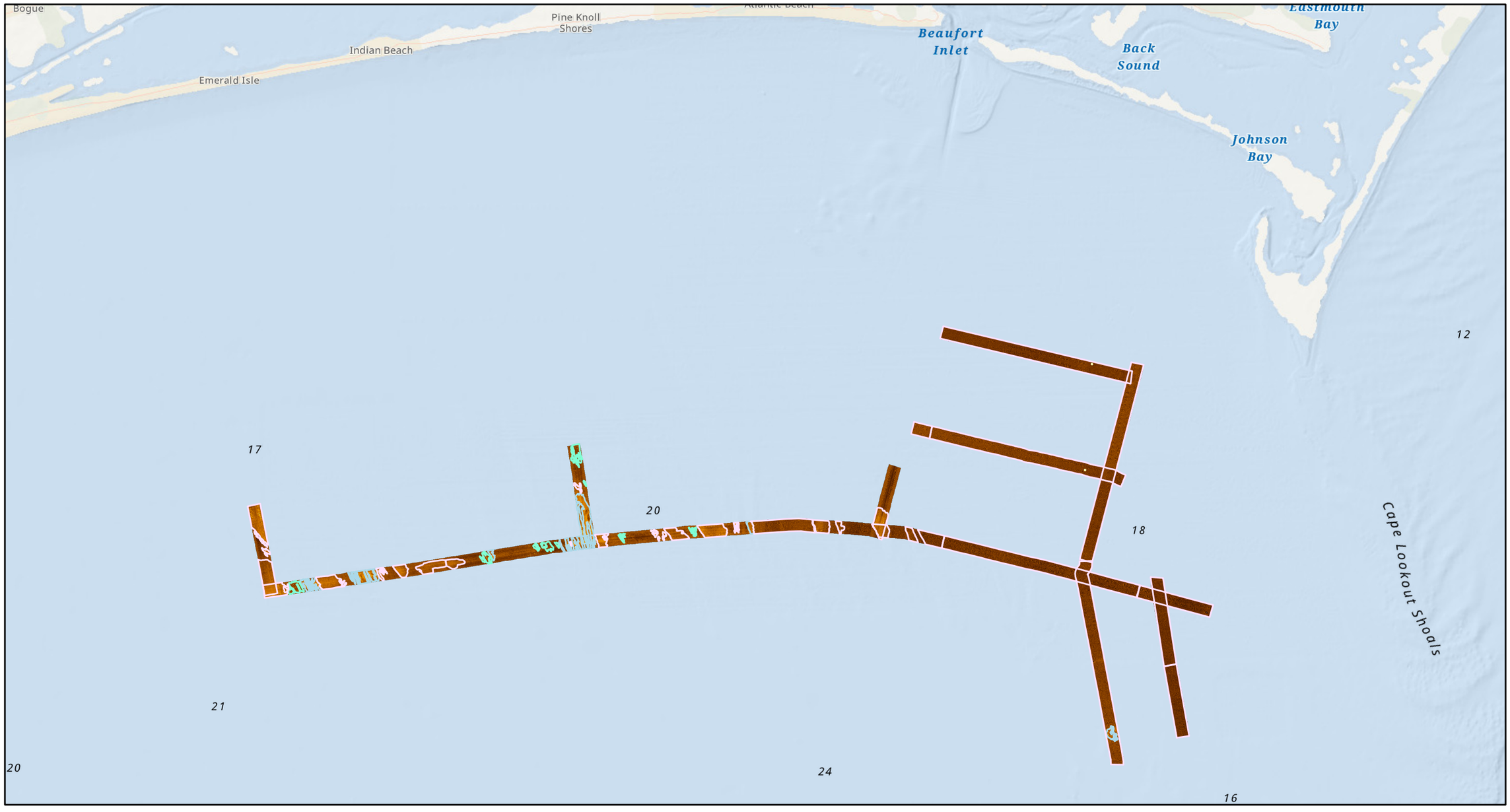
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 2e



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Hard-bottom
- Patch Sand
- Sand
- Sand Ripples
- Hard-bottom

N
W E
S

0 1 2
Kilometers

BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Mosaic and Delineations- Bogue
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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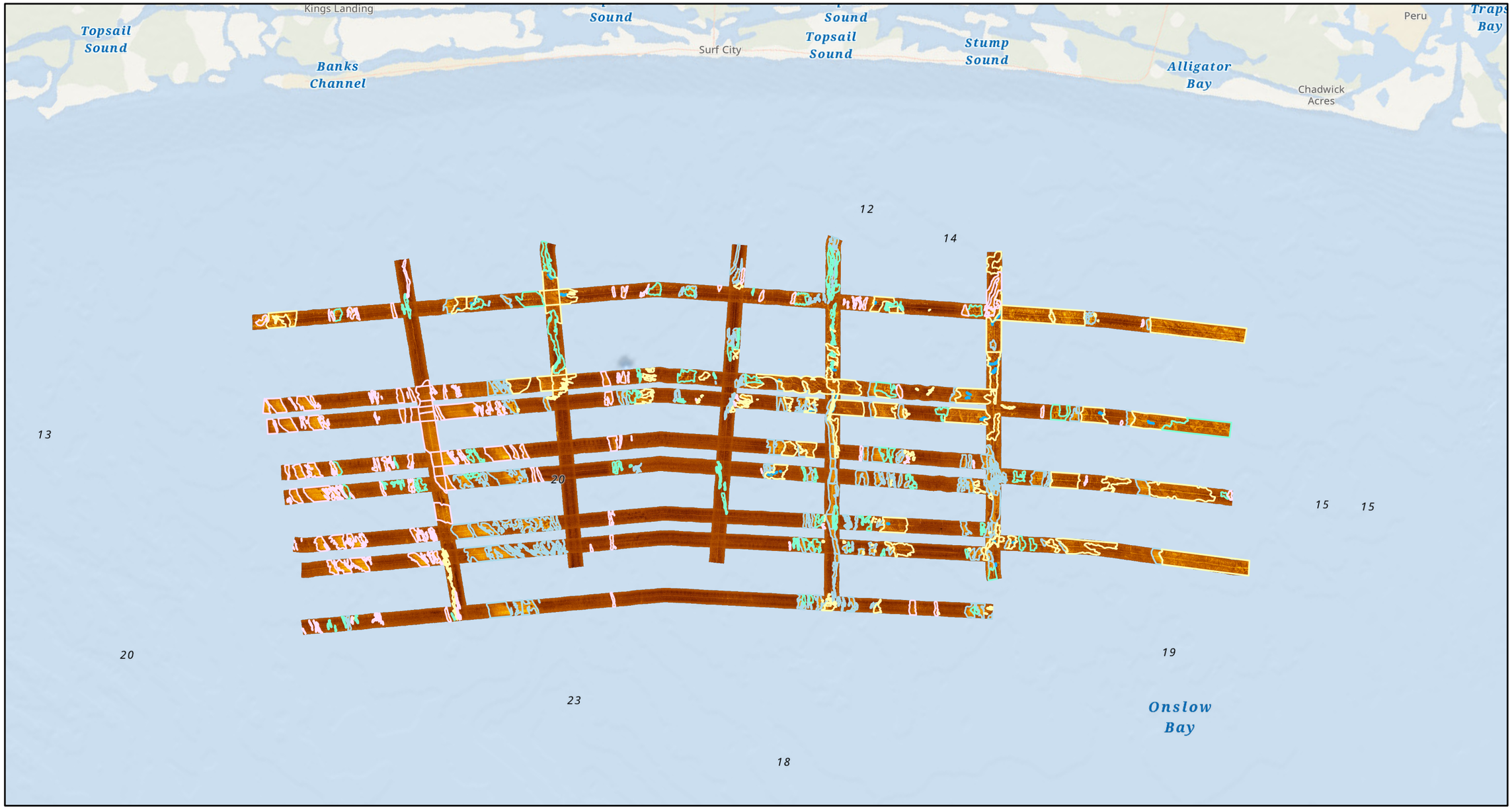
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 3a



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Hard-bottom
- Patch Sand
- Sand
- Sand Ripples
- Hard-bottom

0 1 2
Kilometers

BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Mosaic and Delineations- Topsail
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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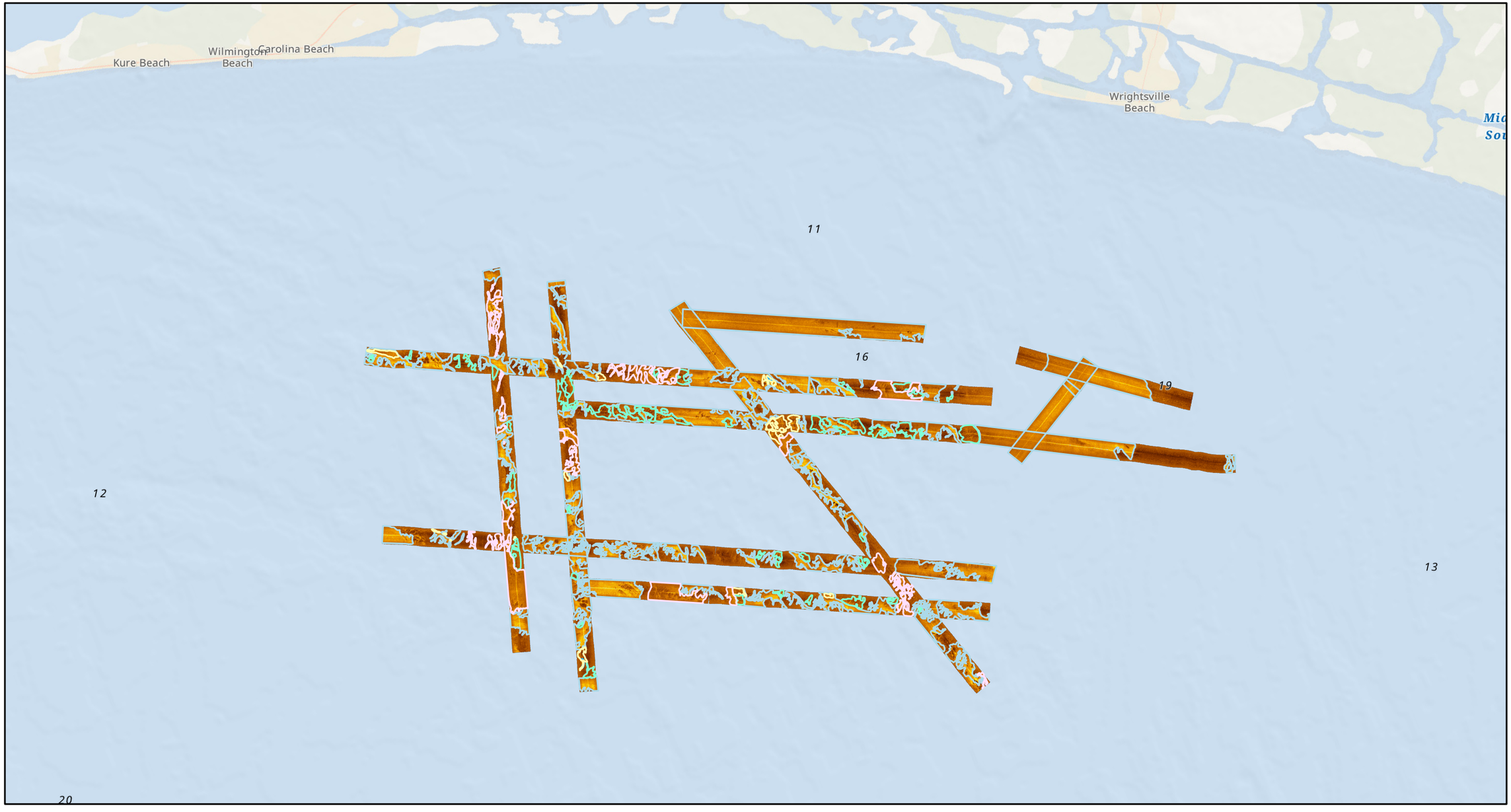
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 3b



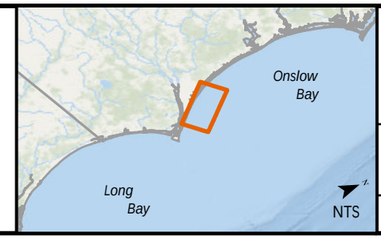
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Hard-bottom
- Patch Sand
- Sand
- Sand Ripples
- Hard-bottom

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Mosaic and Delineations- New Hanover
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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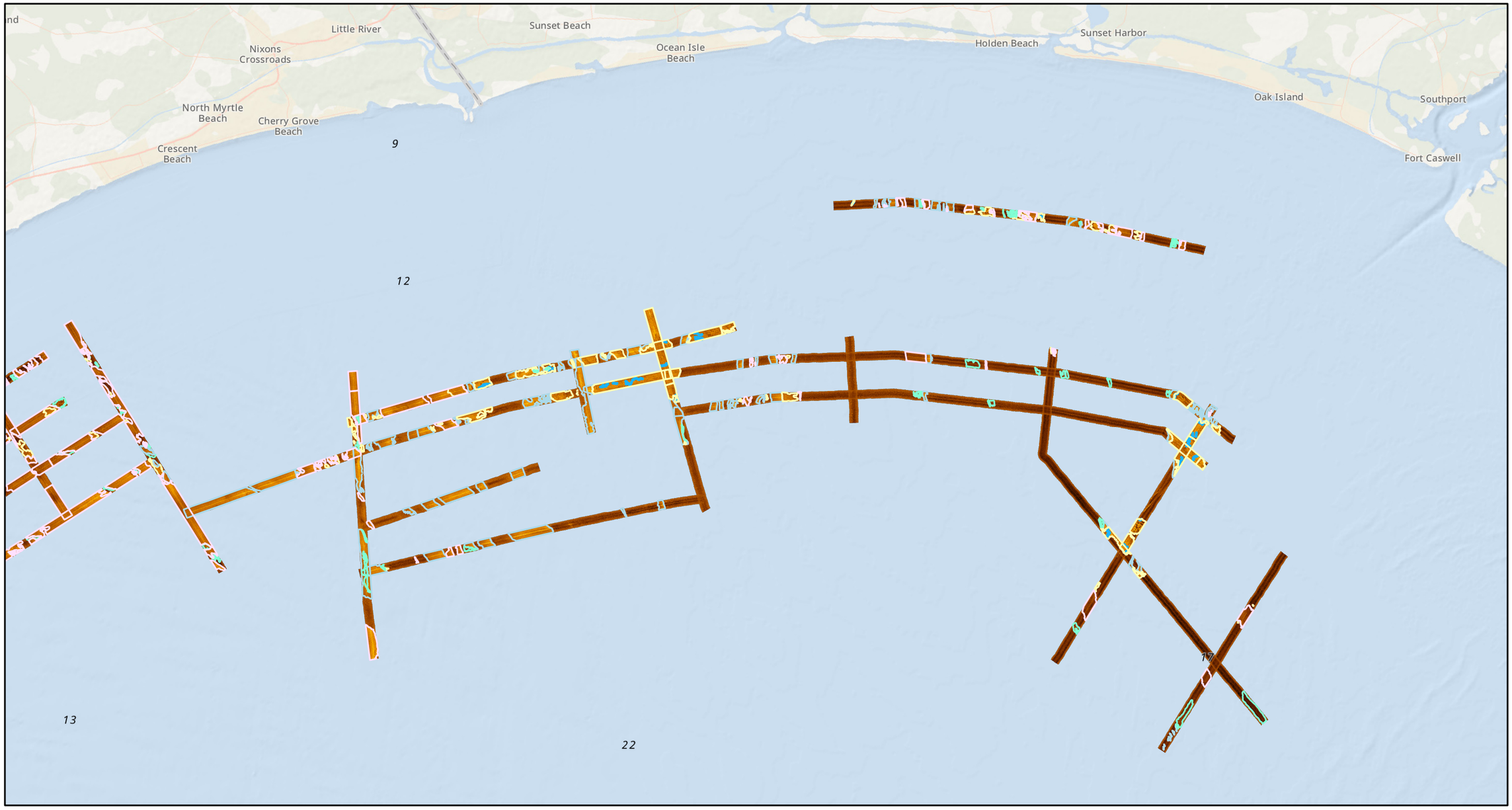
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 3c



Notes:

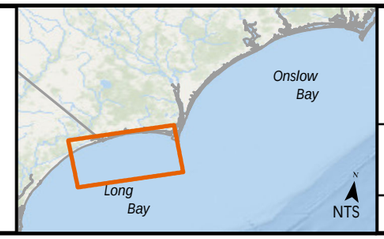
1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Hard-bottom
- Patch Sand
- Sand
- Sand Ripples
- Hard-bottom

N
W
E
S

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Mosaic and Delineations- Brunswick
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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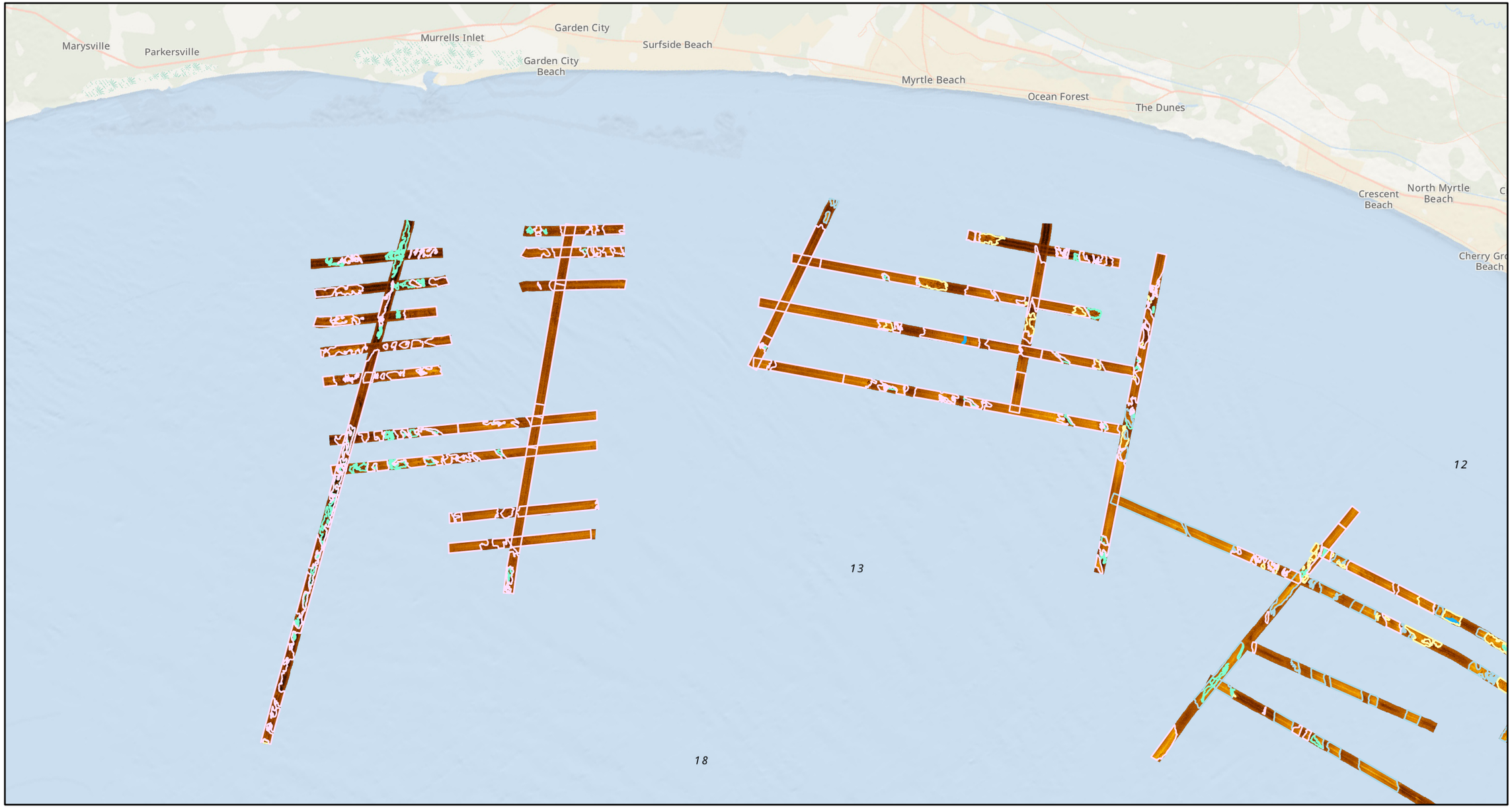
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 3d



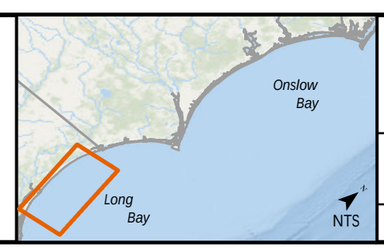
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Hard-bottom
- Patch Sand
- Sand
- Sand Ripples
- Hard-bottom

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Mosaic and Delineations- Myrtle
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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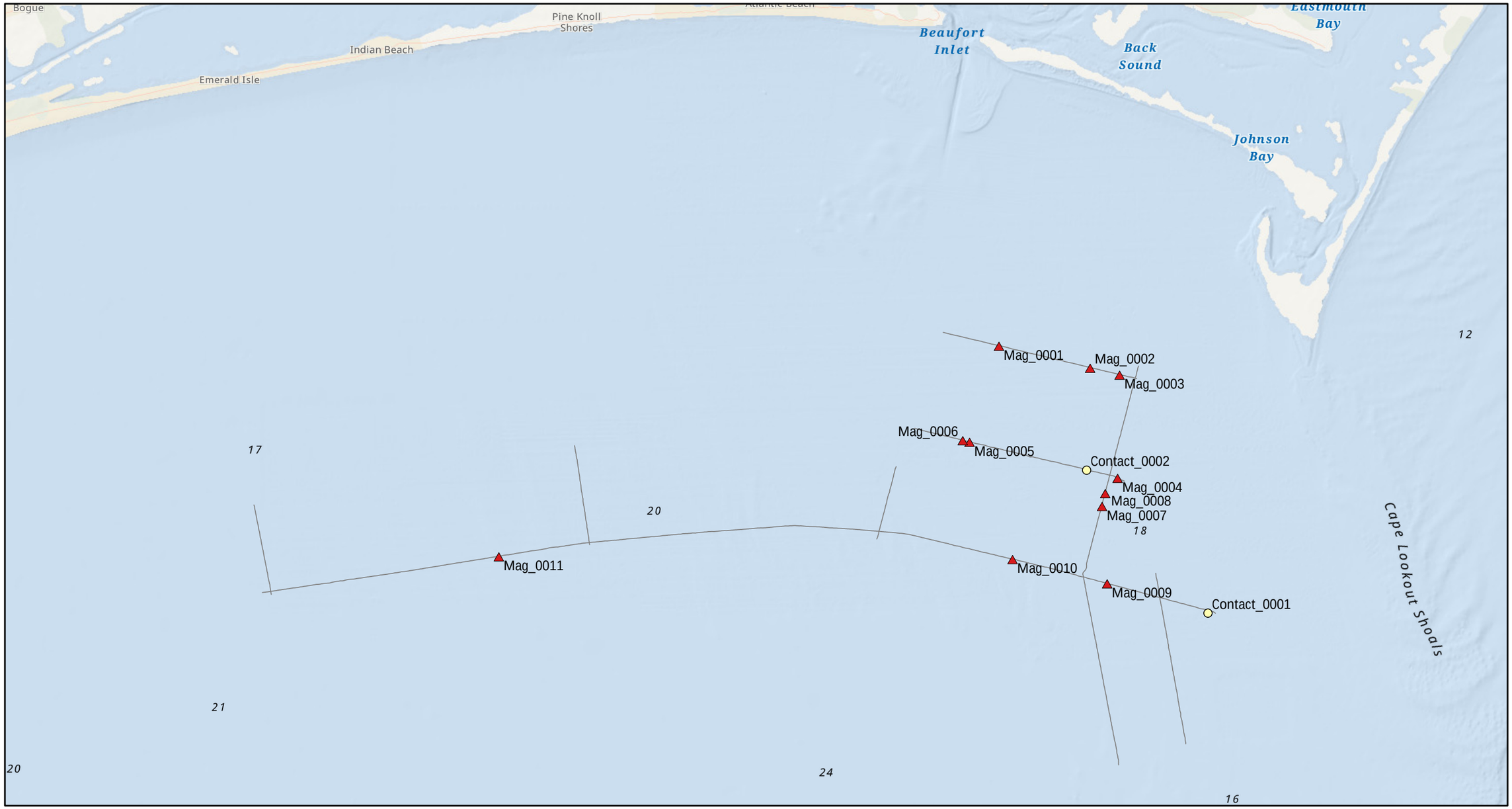
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 3e



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Sidescan Sonar Contacts
- Magnetic Anomalies
- As Run Tracklines

N
W E
S

0 1 2
Kilometers

BOEM Task Order 1: Appendix A: Final Report Map Series

Sidescan Sonar Contact and Magnetic Anomalies- Bogue

Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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Tampa, FL 33619
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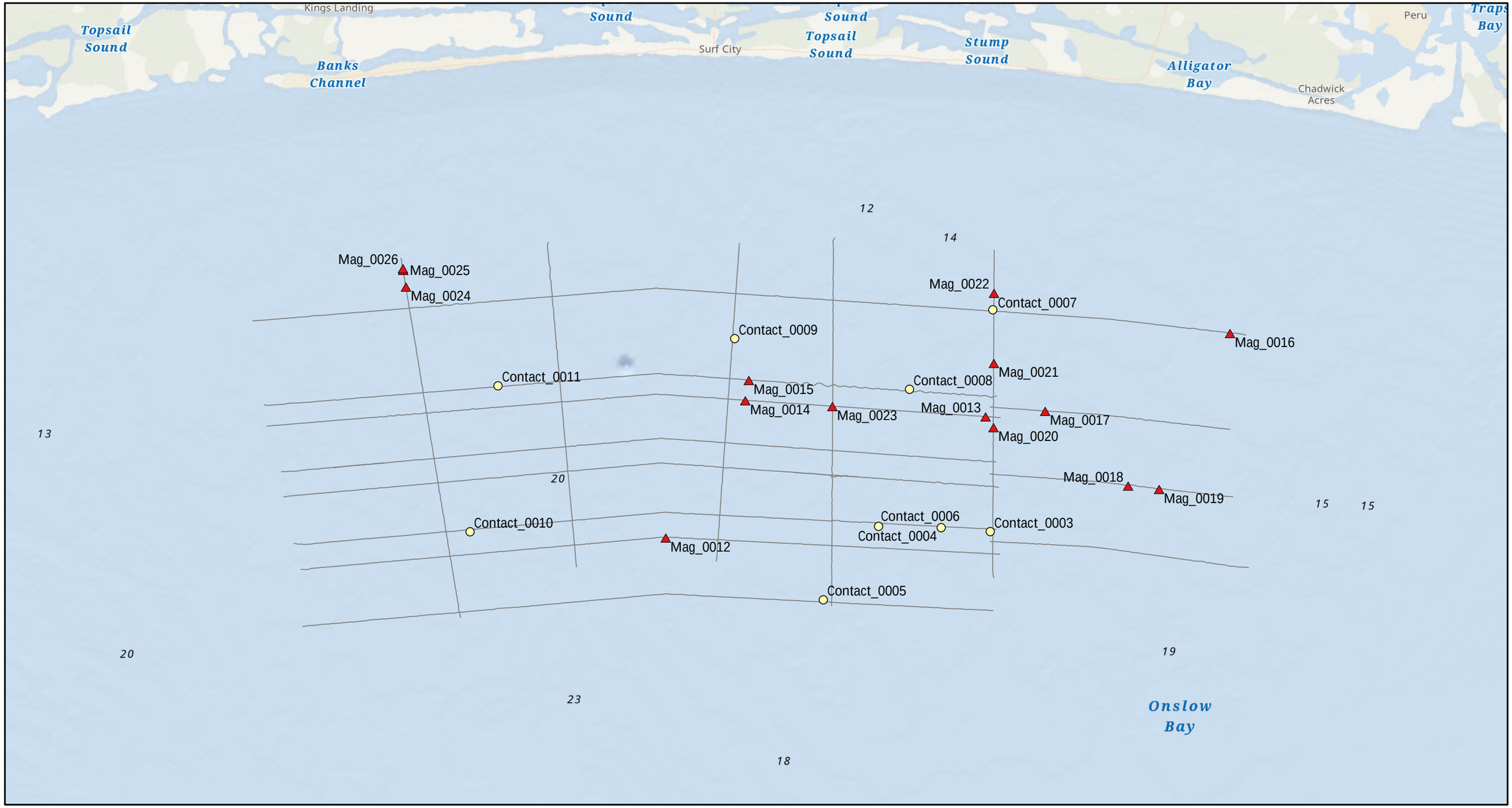
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 4a



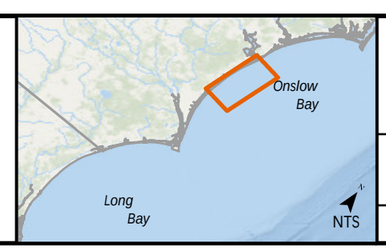
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Sidescan Sonar Contacts
- Magnetic Anomalies
- As Run Tracklines

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Contact and Magnetic Anomalies- Topsail
Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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Tampa, FL 33619
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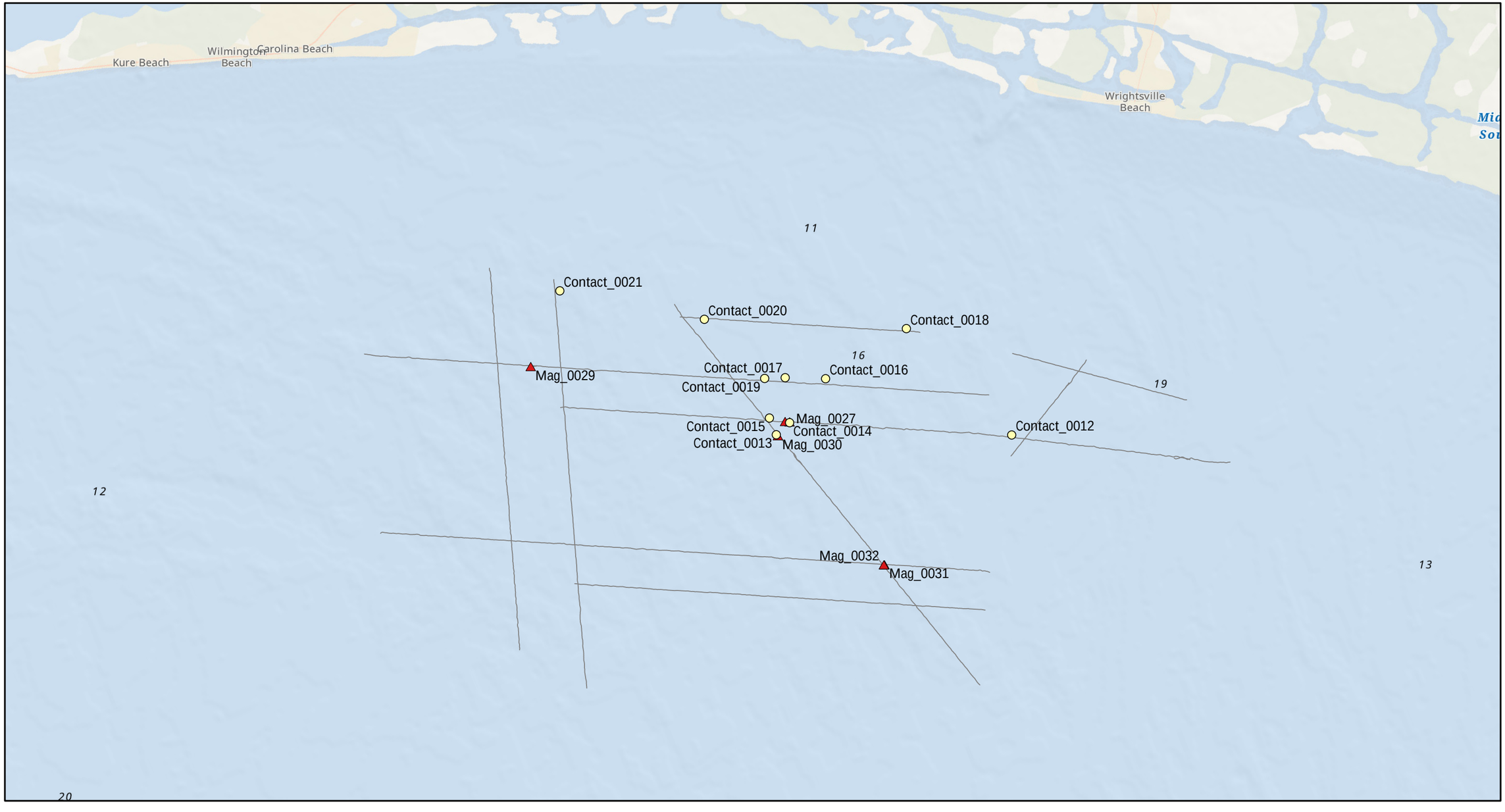
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 4b



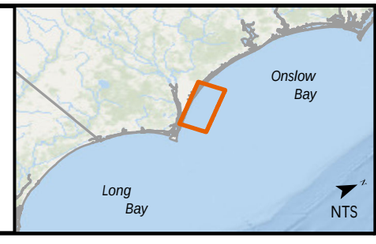
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Sidescan Sonar Contacts
- Magnetic Anomalies
- As Run Tracklines

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Sidescan Sonar Contact and Magnetic Anomalies- New Hanover

Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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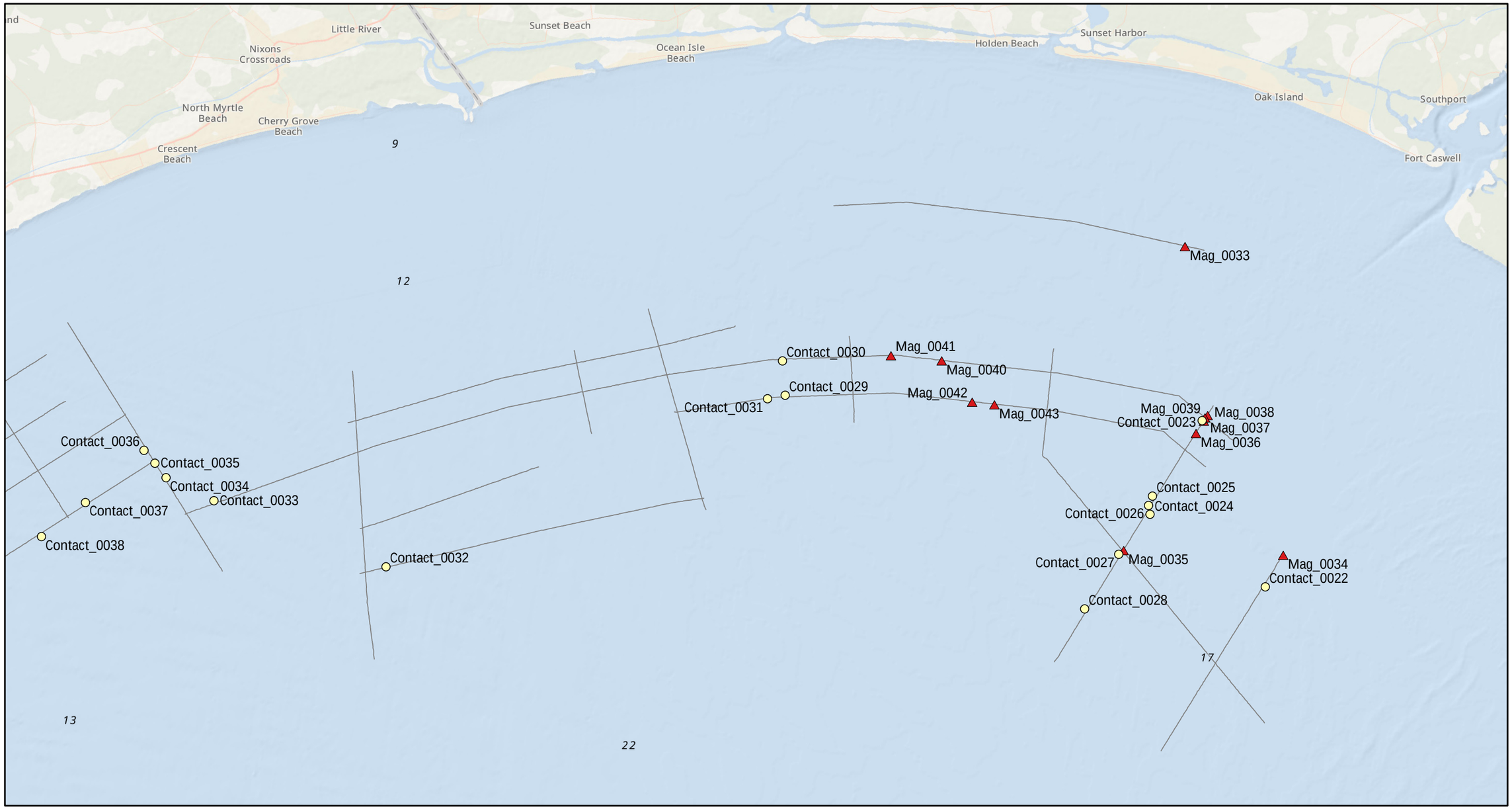
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 4c



Notes:

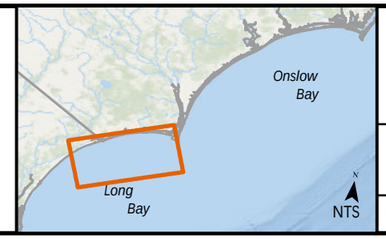
1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Sidescan Sonar Contacts
- Magnetic Anomalies
- As Run Tracklines

N
W
E
S

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Contact and Magnetic Anomalies- Brunswick
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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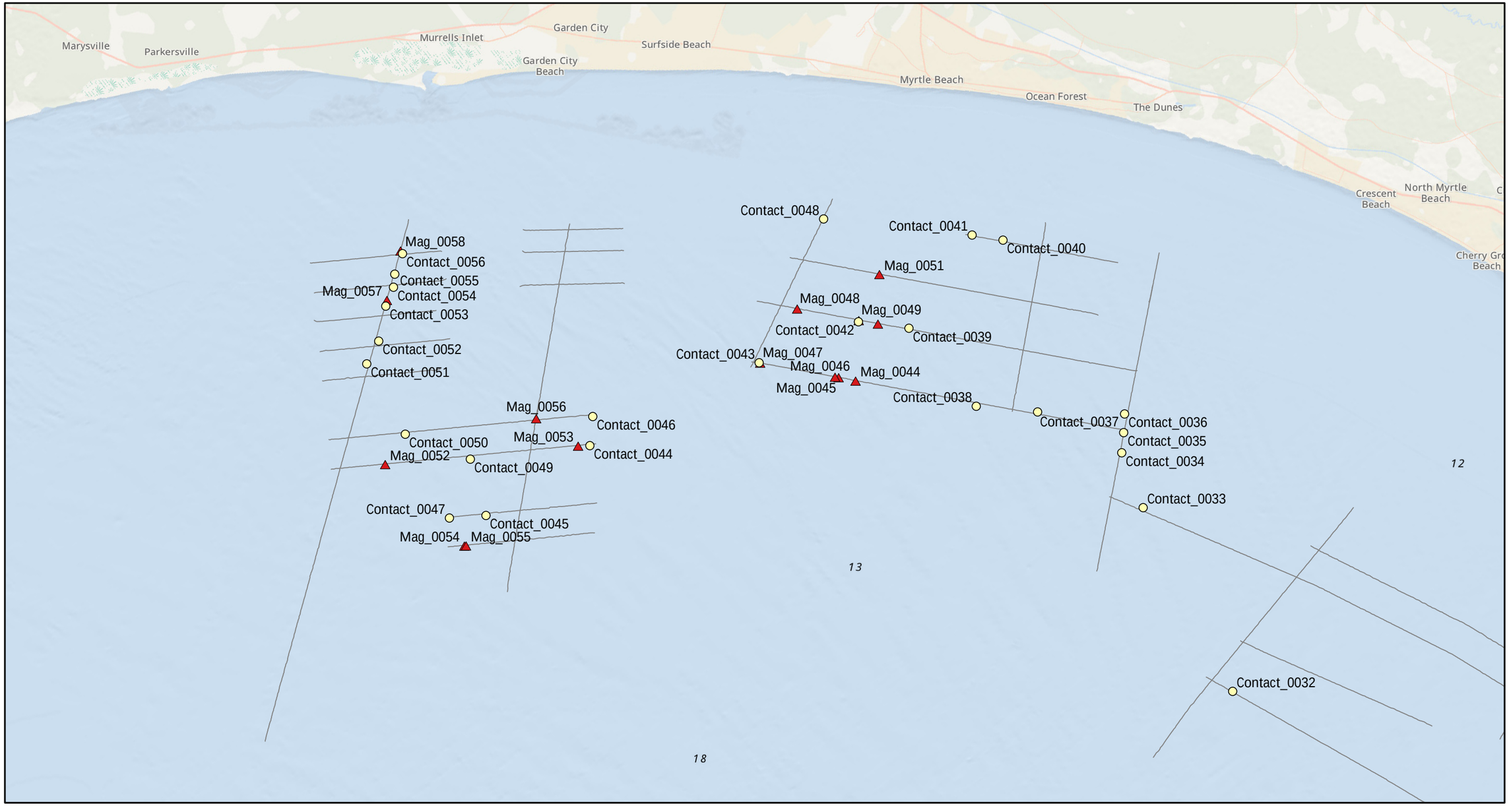
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 4d



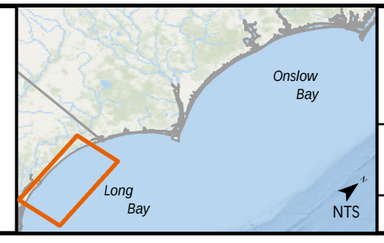
Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Sidescan Sonar Contacts
- Magnetic Anomalies
- As Run Tracklines

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Sidescan Sonar Contact and Magnetic Anomalies- Myrtle
Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
725 US Highway 301 South
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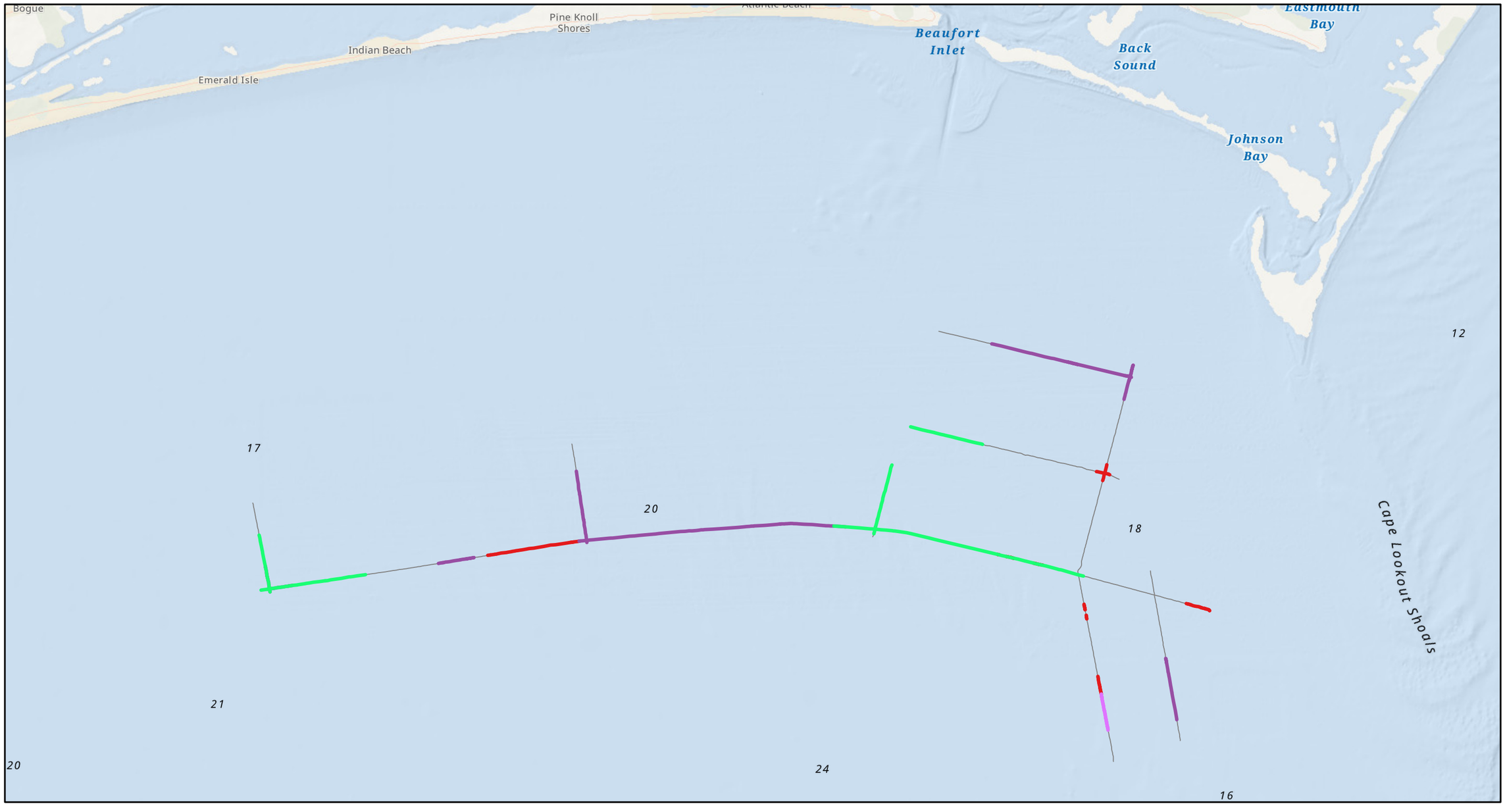
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 4e



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Base of Channel
- Valley Base
- Feature Base
- Deep Shoreface (top)

N
W E
S

0 1 2
Kilometers

BOEM Task Order 1: Appendix A: Final Report Map Series
Seismic Features - Bogue
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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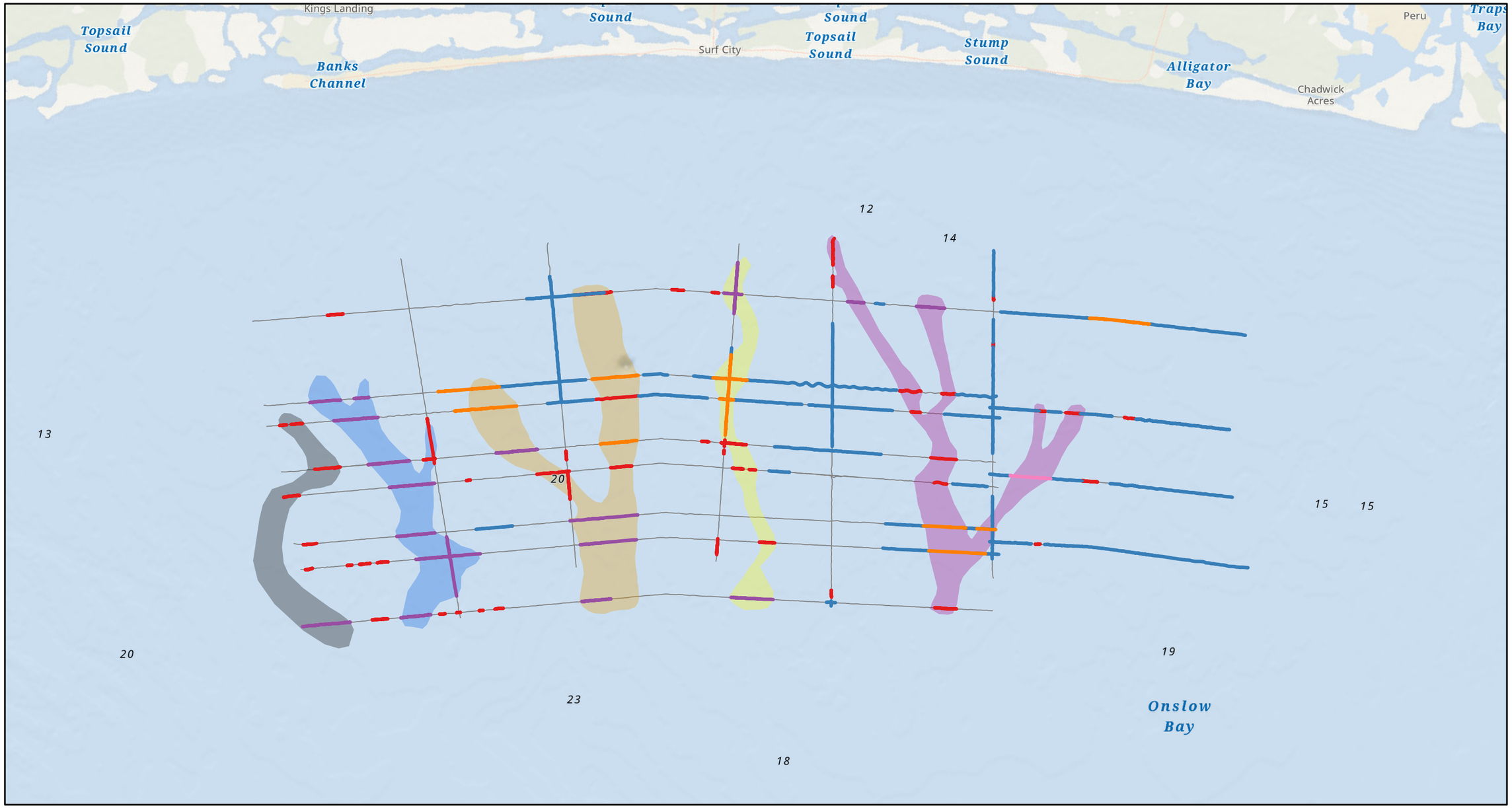
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 5a



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

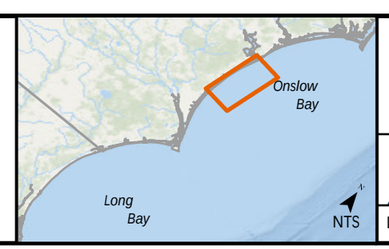
Legend:

- Base of Channel
- Consolidated Sediments
- Valley Base
- Surface Base
- Topsail Surficial Unit

Paleovalley Systems

- Topsail Paleovalley 1
- Topsail Paleovalley 2
- Topsail Paleovalley 3
- Topsail Paleovalley 4
- Topsail Paleovalley 5

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Seismic Features - Topsail
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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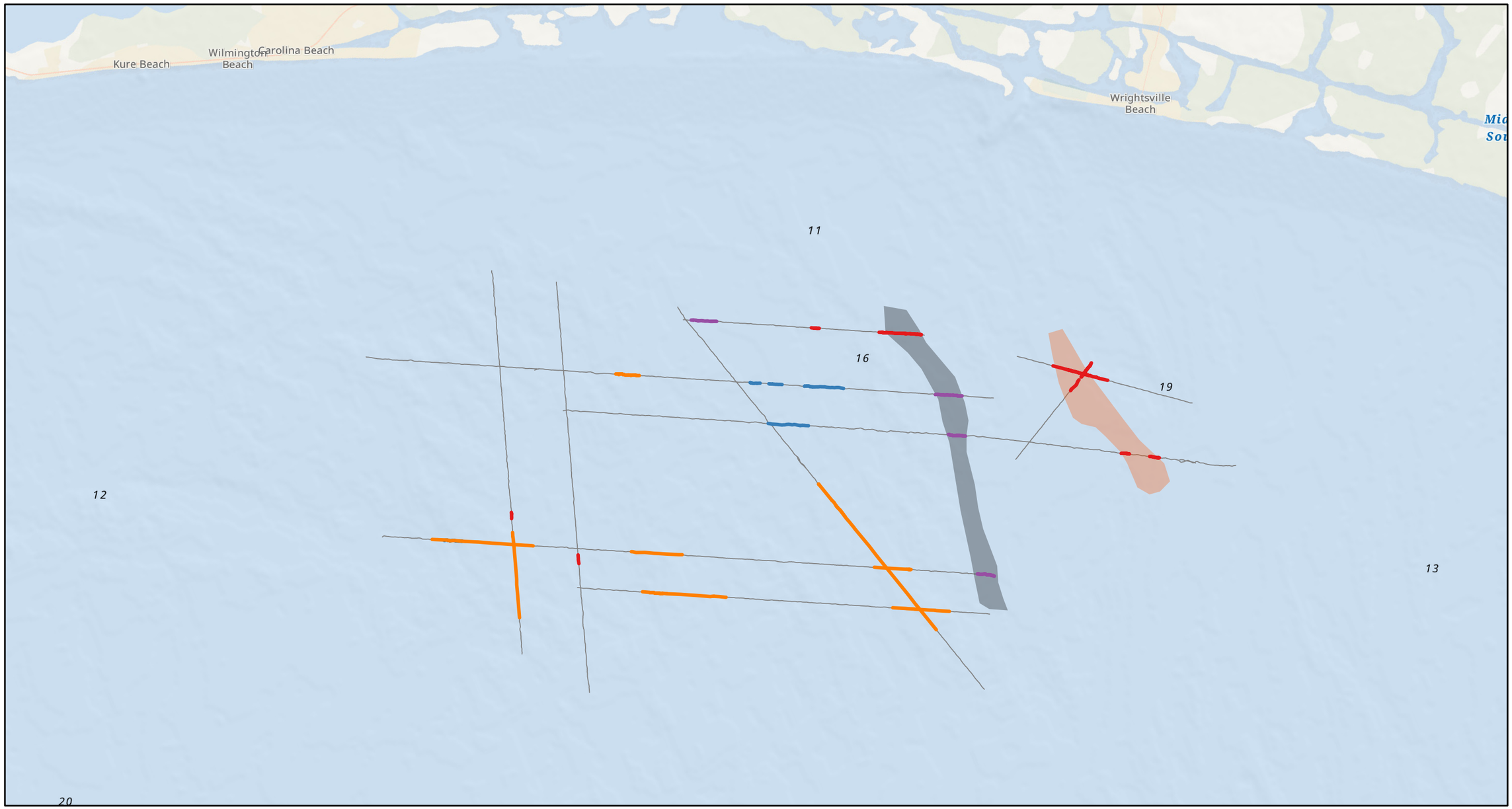
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 5b



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- Base of Channel
- Consolidated Sediments
- Valley Base
- Surface Base

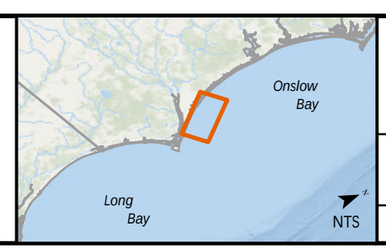
Paleovalley Systems

- New Hanover Paleovalley 1
- New Hanover Paleovalley 2

N

0 1 2

Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Seismic Features - New Hanover

Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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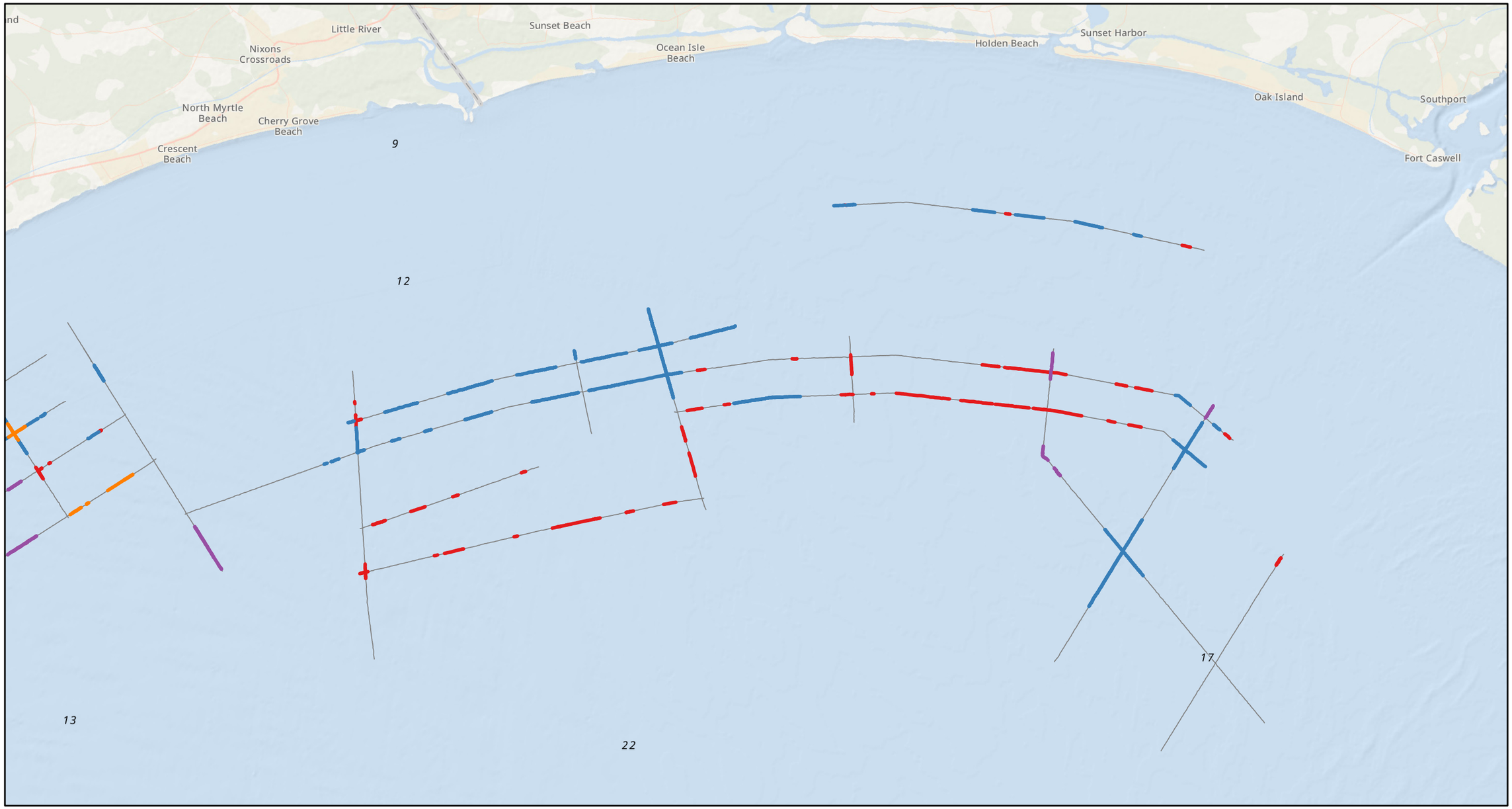
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 5c



Notes:

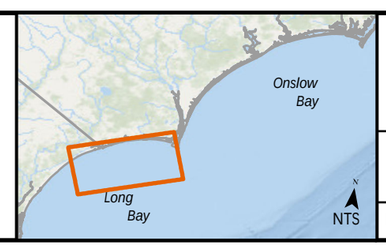
1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

Legend:

- As Run Tracklines
- Base of Channel
- Consolidated Sediments
- Valley Base
- Surface Base

N
W E
S

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Seismic Features - Brunswick
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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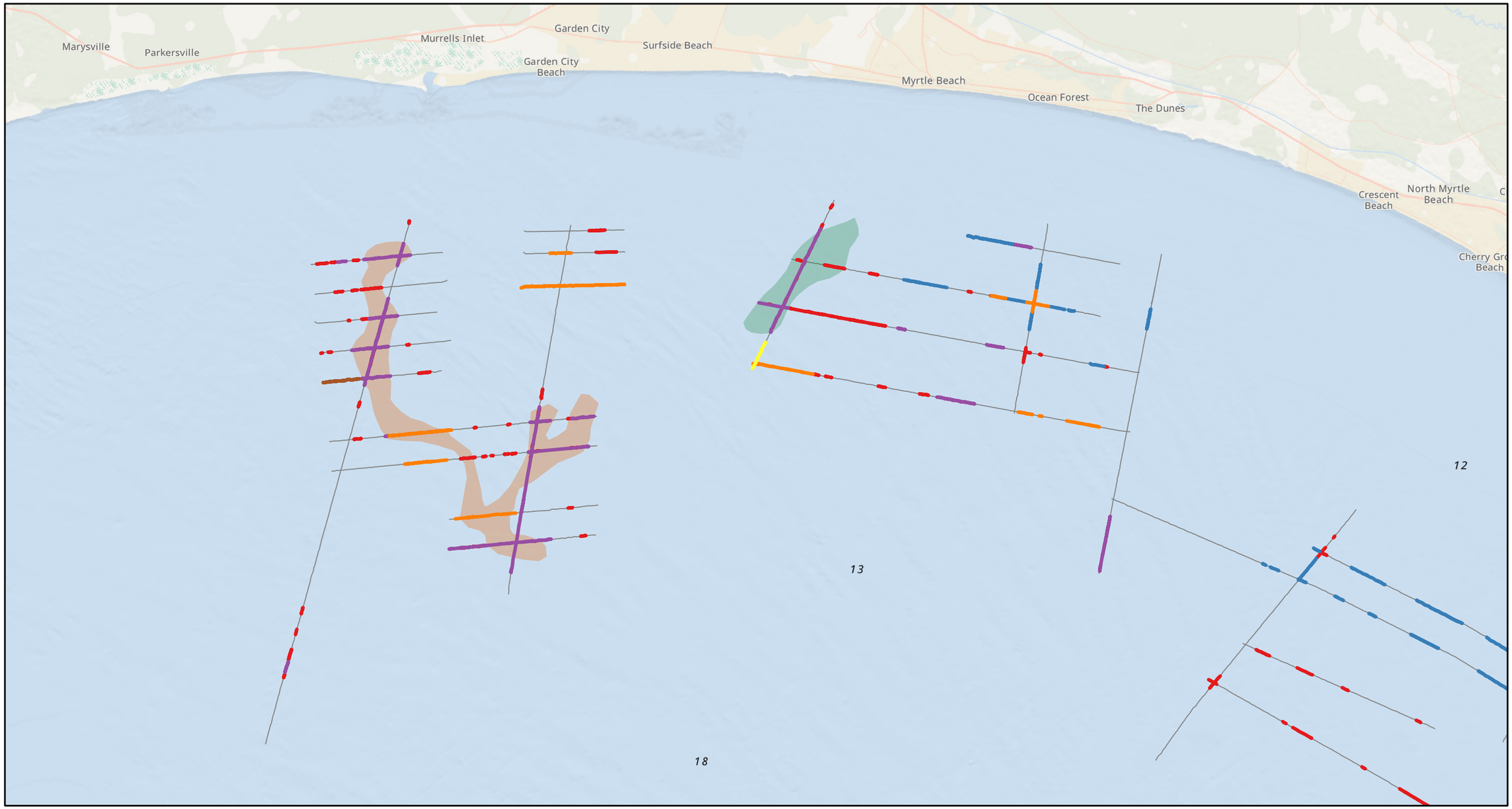
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 5d



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.

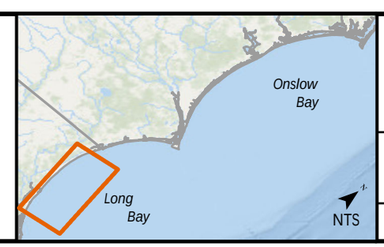
Legend:

- As Run Tracklines
- Base of Channel
- Consolidated Sediments
- Valley Base
- Surface Base
- Inclined_ Strata
- Onlap Surface

Paleovalley Systems

- Myrtle Paleovalley 1
- Myrtle Paleovalley 2

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Seismic Features - Myrtle
Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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Tampa, FL 33619
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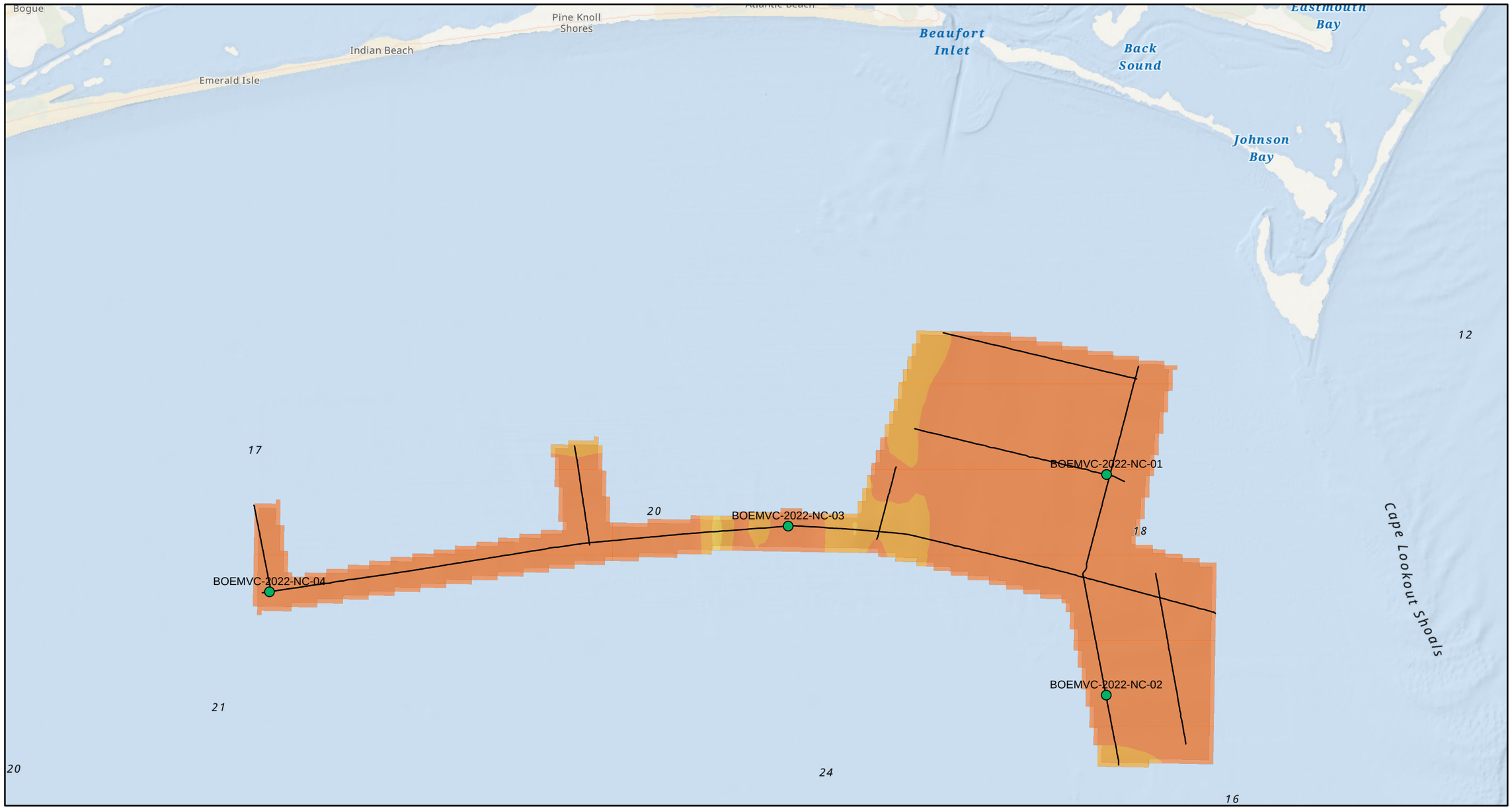
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 5e



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend

- As-Run Tracklines
- As Built Vibracore Sites

Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

N W E S

0 1 2

Kilometers

BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineaton - Bogue

Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

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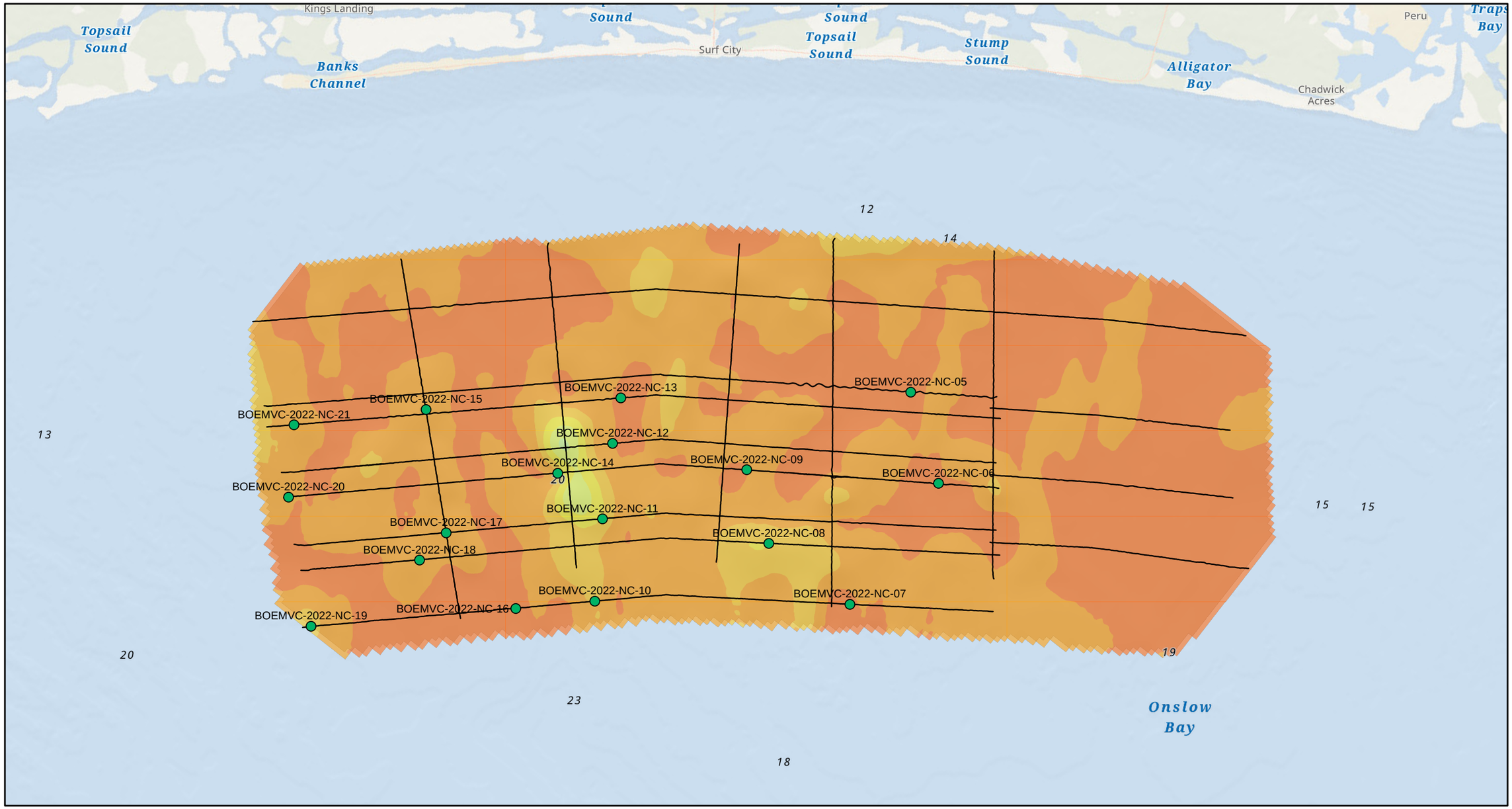
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 6a



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend

- As-Run Tracklines
- As Built Vibracore Sites

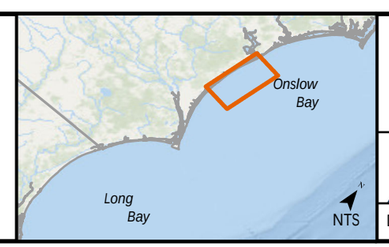
Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

N W E S

0 1 2

Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineation - Topsail

Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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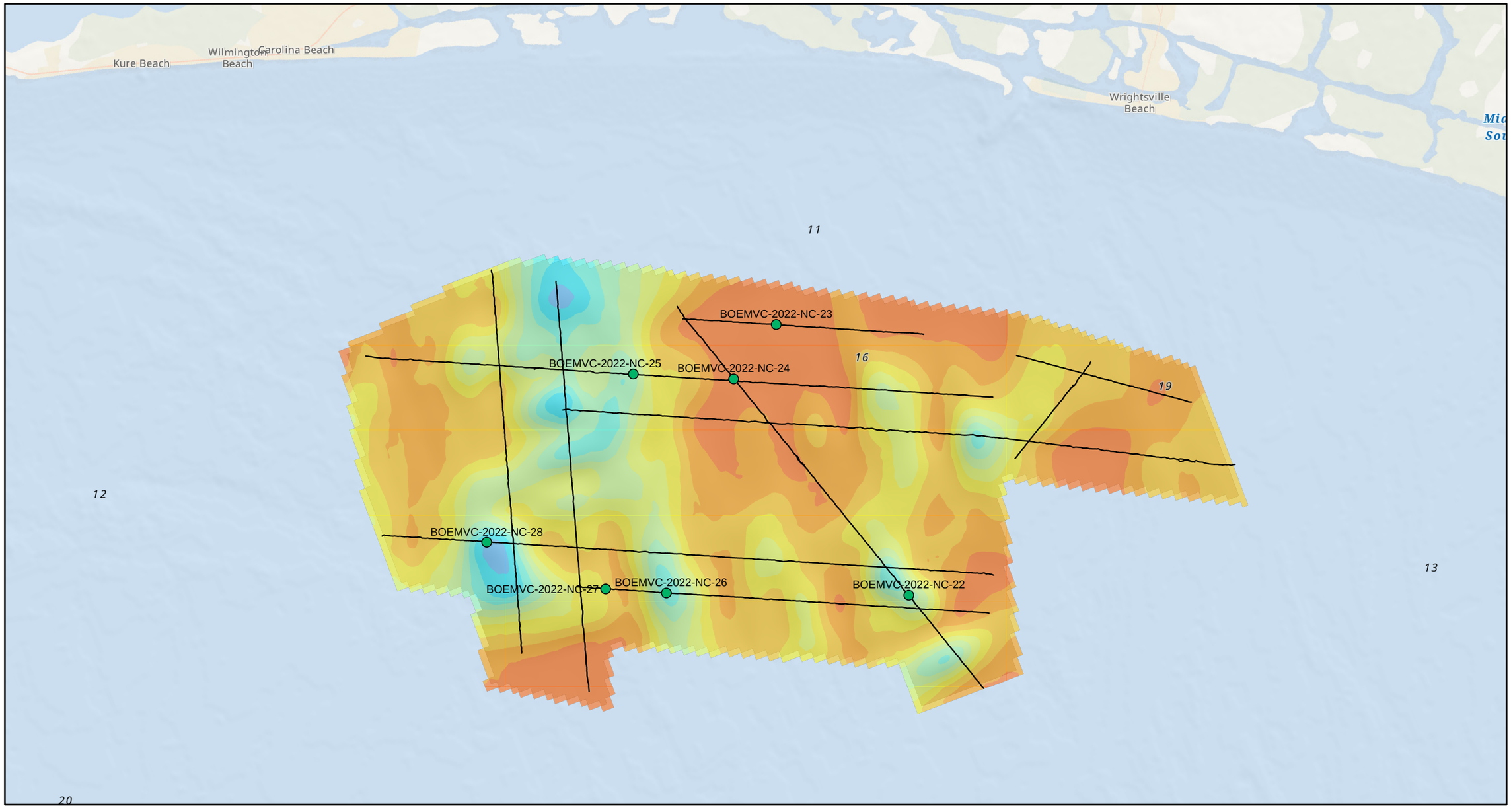
Tampa, FL 33619
APTIM.com

Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 6b



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend

- As-Run Tracklines
- As Built Vibracore Sites

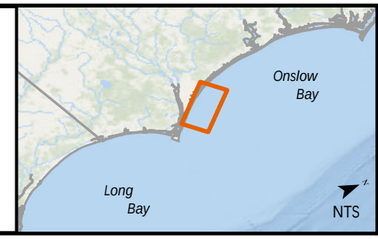
Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

N

0 1 2

Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineaton - New Hanover

Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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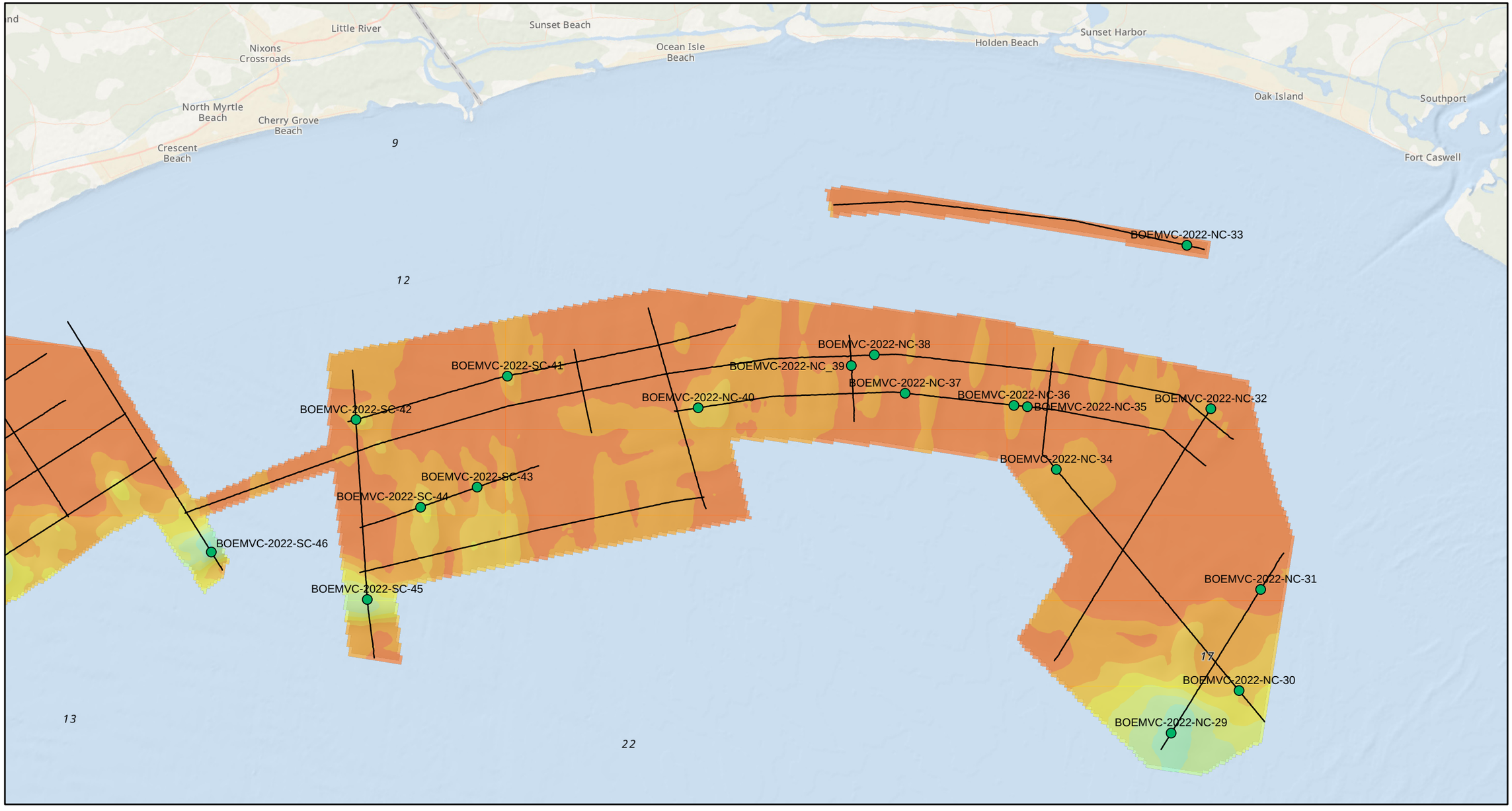
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 6c



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

Legend

- As-Run Tracklines
- As Built Vibracore Sites

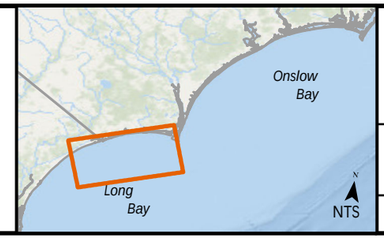
Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

N W E S

0 1 2

Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineaton - Brunswick

Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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Tampa, FL 33619
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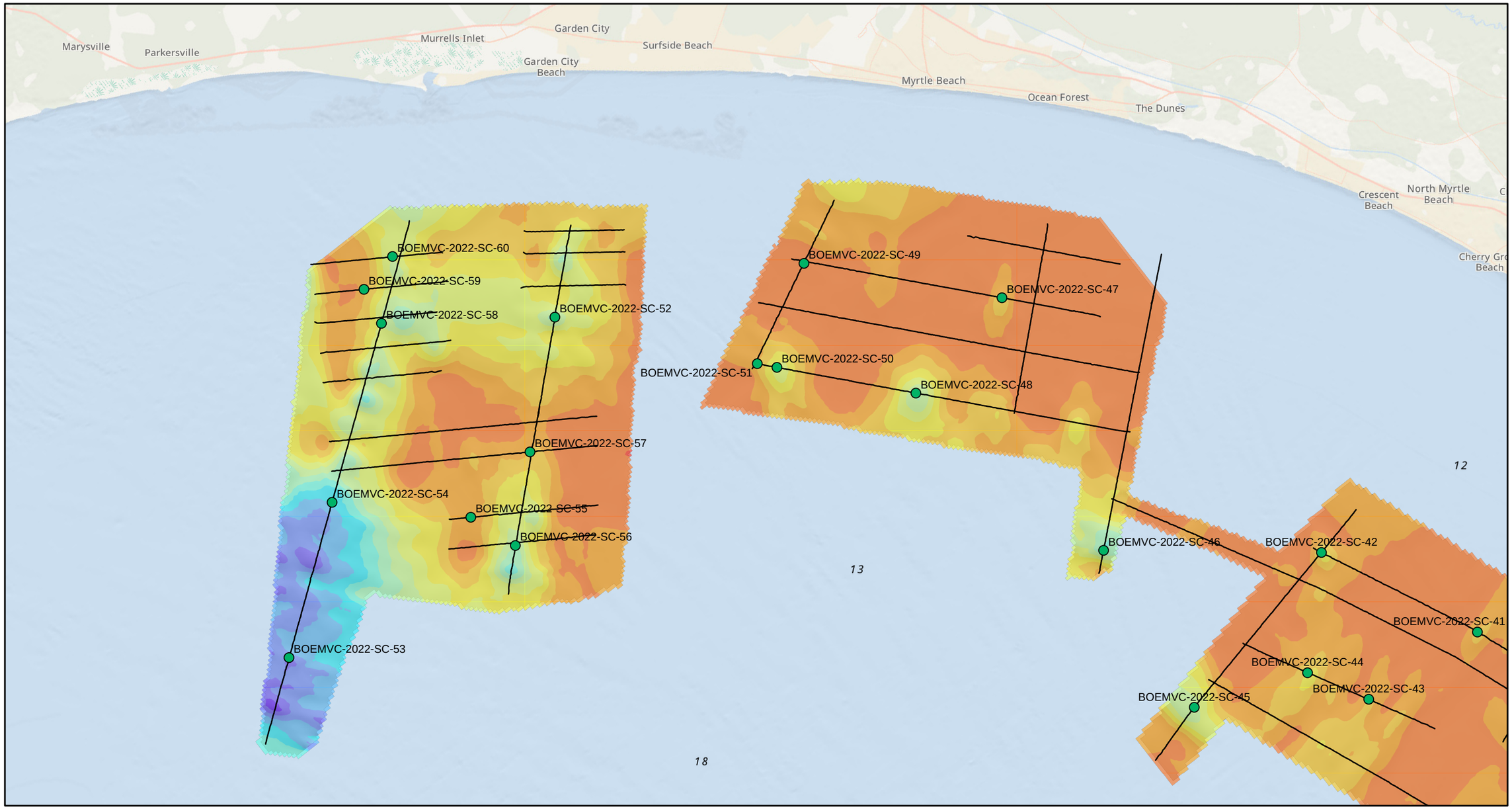
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 6d



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.

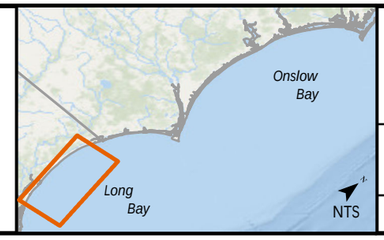
Legend

- As-Run Tracklines
- As Built Vibracore Sites

Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Surface Sand Delineaton - Myrtle
Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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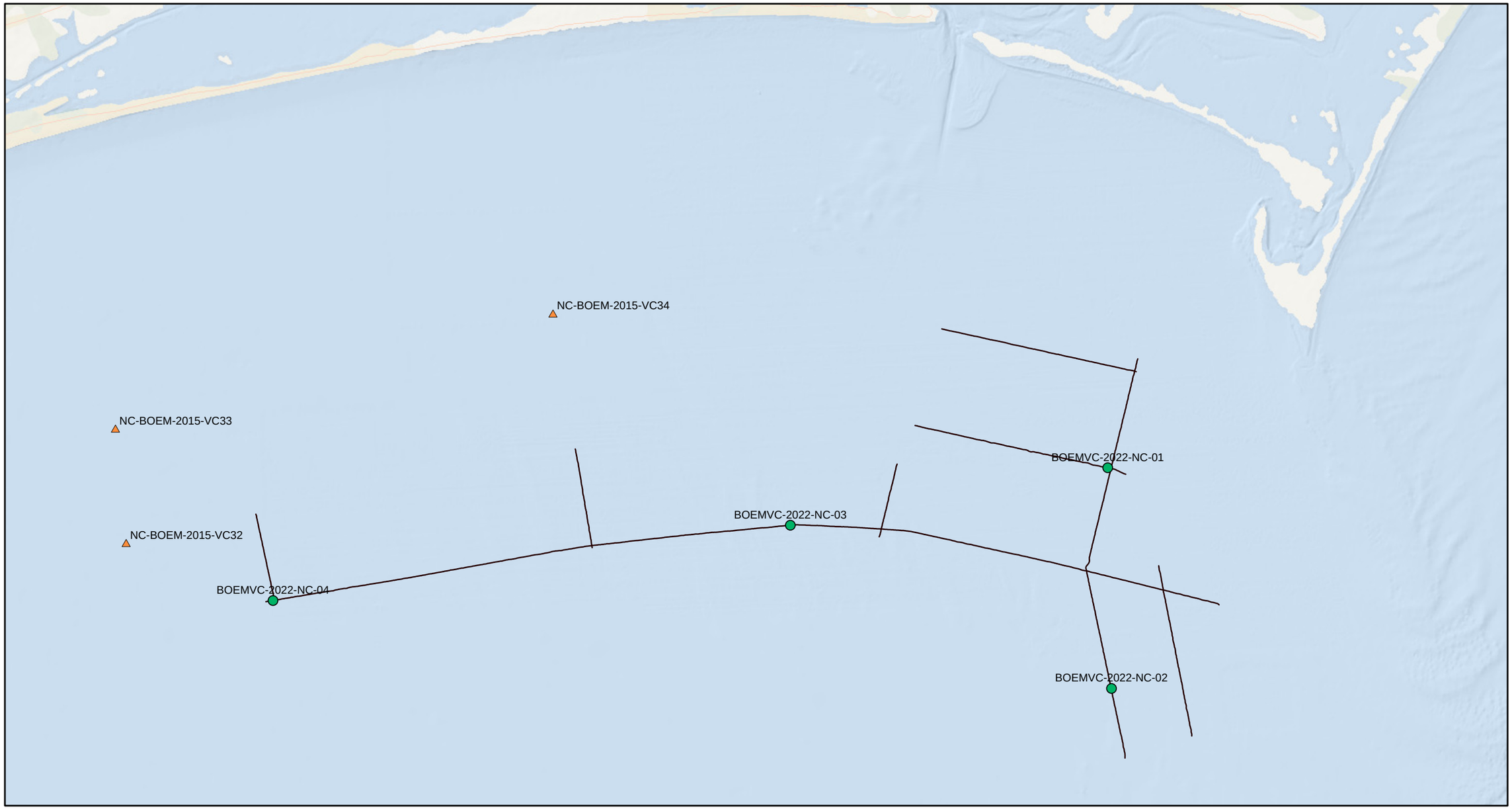
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 6e



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.
4. Thickness boundary interpreted by APTIM based on the NOAA Coastal Relief Model.

Legend

- As Built Vibracore Sites
- ASAP As Built Vibracore Sites
- As Run Tracklines

Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

N W E S

0 1 2

Kilometers

BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineaton - Bogue

Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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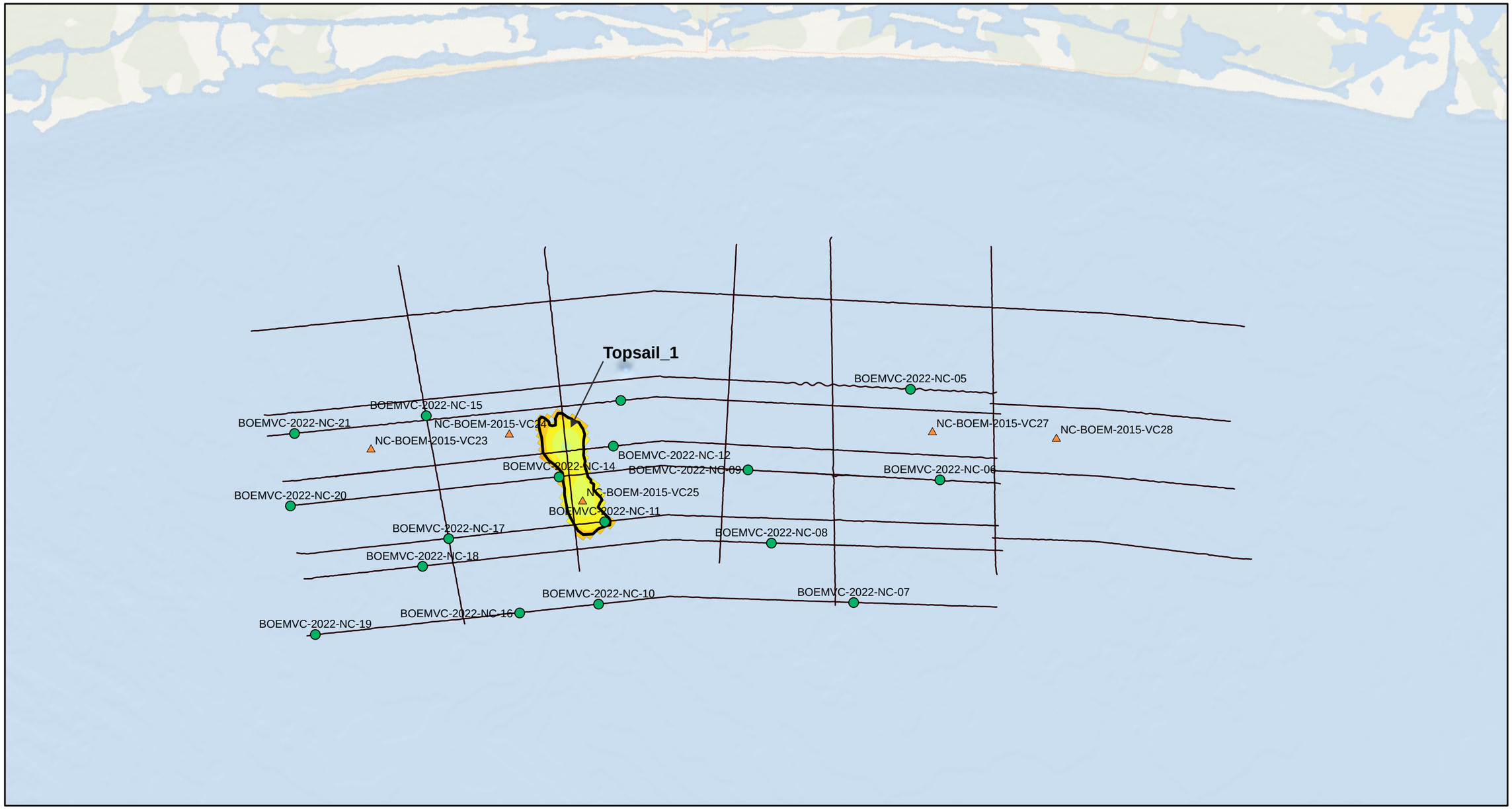
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 7a



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.
4. Thickness boundary interpreted by APTIM based on the NOAA Coastal Relief Model.

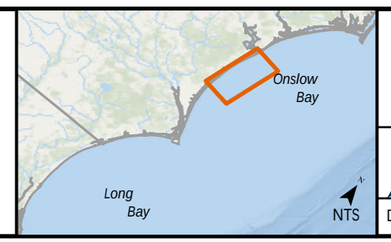
Legend

- As Built Vibracore Sites
- ASAP As Built Vibracore Sites
- As Run Tracklines

Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineaton - Topsail

Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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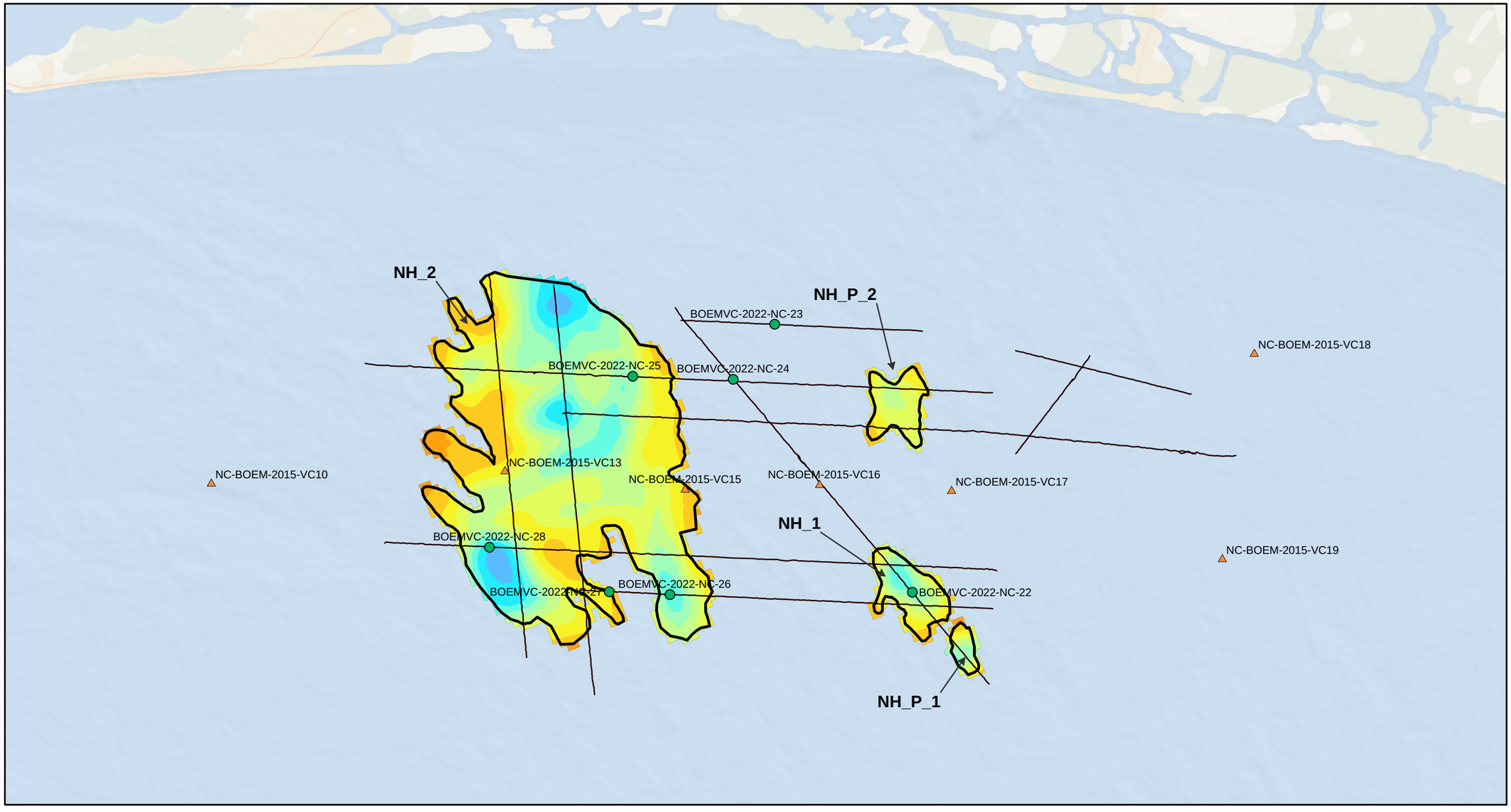
Tampa, FL 33619
APTIM.com

Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 7b



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.
4. Thickness boundary interpreted by APTIM based on the NOAA Coastal Relief Model.

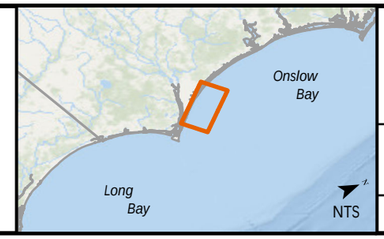
Legend

- As Built Vibracore Sites
- ASAP As Built Vibracore Sites
- As Run Tracklines

Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Surface Sand Delineaton - New Hanover
Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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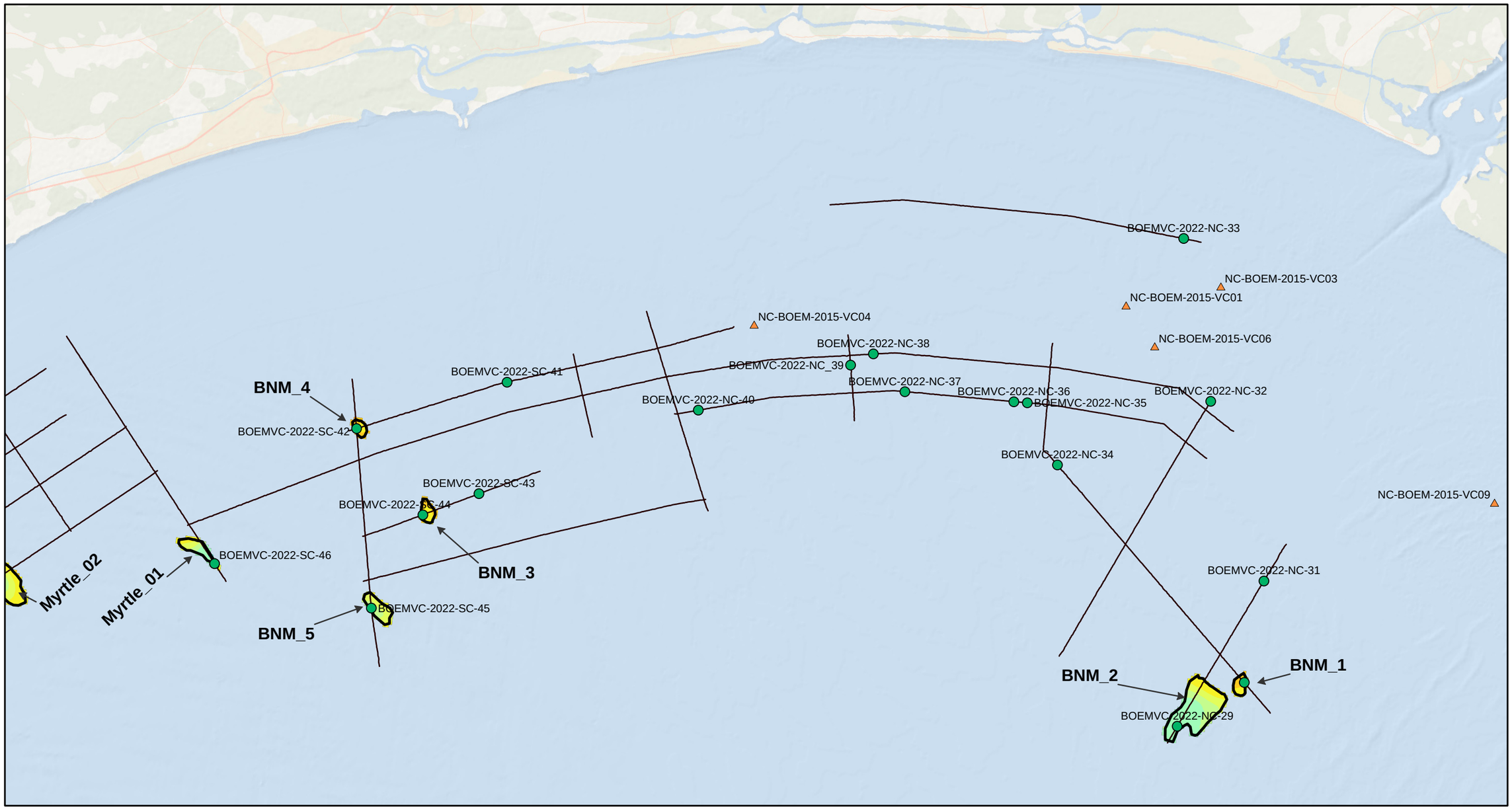
Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 7c



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.
4. Thickness boundary interpreted by APTIM based on the NOAA Coastal Relief Model.

Legend

- As Built Vibracore Sites
- ASAP As Built Vibracore Sites
- As Run Tracklines

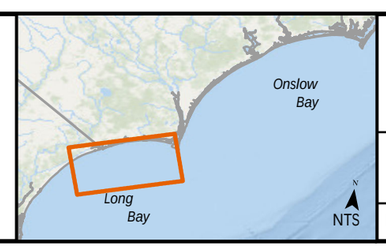
Sand Thickness (ft)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

N W E S

0 1 2

Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series

Surface Sand Delineation - Brunswick

Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
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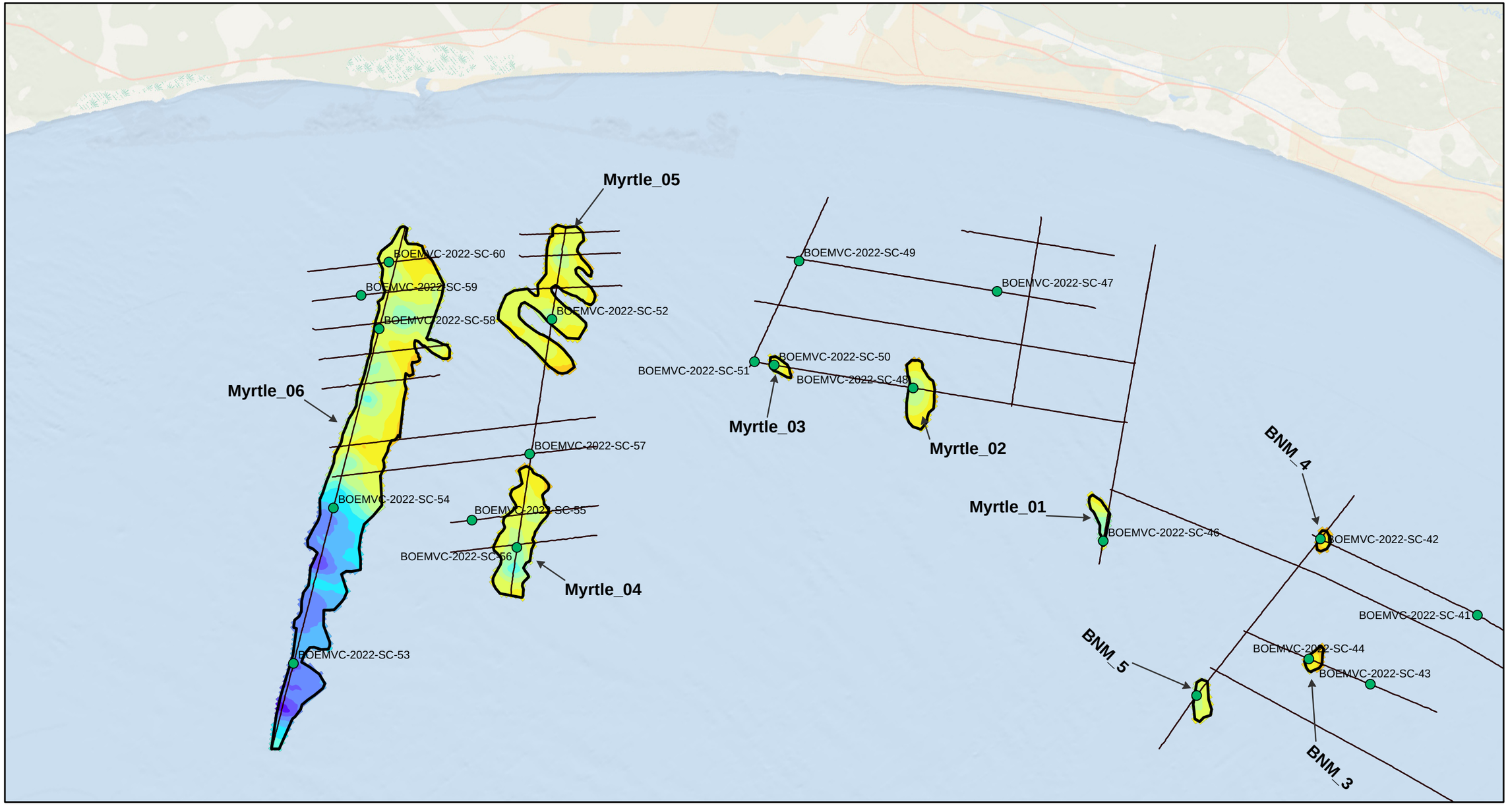
Tampa, FL 33619
APTIM.com

Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 7d



Notes:

1. Background is Esri's World Ocean basemap.
2. Geophysical data collected by APTIM between May 15, 2022 and June 16, 2022.
3. Geotechnical data collected by APTIM between October 10, 2022 and October 25, 2022.
4. Thickness boundary interpreted by APTIM based on the NOAA Coastal Relief Model.

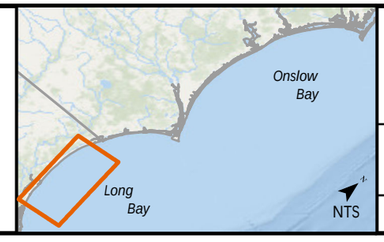
Legend

- As Built Vibracore Sites
- ASAP As Built Vibracore Sites
- As Run Tracklines

Sand Thickness (f)

0	7 - 8
0 - 1	8 - 9
1 - 2	9 - 10
2- 3	10 - 11
3 - 4	11 - 12
4 - 5	12 - 13
5 - 6	
6 - 7	

0 1 2
Kilometers



BOEM Task Order 1: Appendix A: Final Report Map Series
Surface Sand Delineaton - Myrtle
Geophysical and Geological Data Acquisiton and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

APTIM
725 US Highway 301 South
Tampa, FL 33619
APTIM.com

Date: 11/20/2023	Drawn by: AV	Contract Number 140M0121D0006	Figure No.: 7e

Appendix B: MMIS geodatabase (Digital only)

Appendix C: Mitigation procedures

Geophysical and Geologic Mitigation Measures and Survey Requirements

While impacts to marine mammals were not expected, the following mitigation protocols were implemented to reduce the already small chance of High Resolution Geophysical (HRG) survey impacts to marine mammals. These protocols reflected the most recent federal regulatory coordination document to address HRG systems, the Final Environmental Assessment on Sand Survey Activities for BOEM's Marine Mineral Program produced by BOEM (May 2019), specifically Appendix B: Survey Requirements and Mitigation Measures.

1 Observer Requirements

During geophysical and geological survey operations a National Marine Fisheries Service (NMFS)-approved, trained Protected Species Observer (PSO) maintained a vigilant watch for marine mammals, sea turtles, and protected fish (e.g., sturgeon and smalltooth sawfish) while both acoustic exclusion and vessel strike exclusion zones apply during survey operations. The exclusion zone was monitored by one PSO during both geophysical and geological survey operations. A NMFS-approval of PSO, who is in compliant with the training requirements specified in NMFS's national standard, will was dedicated to performing visual observer duties while on shift.

The PSO monitored the acoustic exclusion zone during sand survey activities using chirp (sub-bottom profiler sound source operating below 180 kHz) and vibracore. PSOs visually monitored the acoustic exclusion zone with a 328-ft (100-m) radius zone around the sound source or each vibracore location. The PSO conducted visual monitoring of acoustic exclusion zones by searching the area around the vessel using hand-held reticle binoculars and the unaided eye to observe and document the presence and behavior of marine mammals and sea turtles. The PSOs operated under the following guidelines:

- Other than brief alerts to make personnel aware of maritime hazards, no additional duties were assigned to observers during their watch.
- A watch was not longer than six continuous hours. At least two PSOs were on board vessels to monitor the acoustic exclusion zone when daily survey activities exceed six hours.
- A break of at least two hours occurred between six-hour watches; no other duties were assigned during this period.

One PSO monitored during daylight hours (dawn to dusk, i.e., from about 30 minutes before sunrise to 30 minutes after sunset) when vibracoring or for geophysical surveys using sources below 180 kHz. When conditions deteriorate (e.g., fog, rain, darkness) during daylight hours such that the observations were not possible, visual observations resumed as soon as conditions permit. Ongoing activities continued, but they were not initiated under such conditions (i.e., without appropriate pre activity monitoring). When operating during reduced visibility, observers monitored the waters around the acoustic exclusion zone using shipboard lighting, enhanced vision equipment, or night-vision equipment.

APTIM's PSO monitored the acoustic exclusion zone for chirp (i.e., sound sources operating below 180 kHz) and vibracores for all marine mammals and sea turtles prior to start-up and continued until operations ceased. Operators immediately shutdown the sound source or vibracoring operations if any non-delphinid marine mammal was detected within the acoustic exclusion zone or appeared to be entering it. Immediate shutdown of the sound source occurred if any sea turtle was detected entering or within the acoustic exclusion zone provided the source was operating below 2 kHz. Immediate shutdown of the vibracore also occurred if any sea turtle was detected entering or within the acoustic exclusion zone.

Subsequent restart of the equipment only occurred following a confirmation that the exclusion zone was clear of all marine mammals and sea turtles.

Operators were not required to shutdown sound sources operating below 180 kHz or vibracoring for delphinids approaching the vessel (or vessel's towed equipment) that indicates a "voluntary approach" on behalf of the animal. A "voluntary approach," or a clear approach toward the vessel by the animal(s), was determined by the PSO. When the PSO determined that the animal(s) is actively trying to avoid the vessel or the towed equipment, the operator immediately shutdown the acoustic sources or vibracore. The PSO recorded the details of any non-shutdowns in the presence of a delphinid, including the distance of the animal(s) from the vessel at the first sighting, heading, position relative to the vessel, duration of sighting, and behavior. The PSO on duty filled out and submitted daily logs and operation logs which include information on:

- Vessel name
- observers' names, affiliations, and resumes
- date
- time and latitude/longitude when daily visual survey began
- time and latitude/longitude when daily visual survey ended
- average environmental conditions during visual surveys including
- wind speed and direction
- sea state (glassy, slight, choppy, rough, or Beaufort scale)
- swell (low, medium, high, or swell height in meters)
- overall visibility (poor, moderate, good)
- species (or identification to lowest possible taxonomic level)
- certainty of identification (sure, most likely, best guess)
- total number of animals
- number of calves and juveniles (if applicable/distinguishable)
- description (as many distinguishing features as possible) of each individual seen, including length, shape, color and pattern, scars or marks, shape and size of dorsal fin, shape of head, and blow characteristics
- whether or not a shutdown was required
- direction of animal's travel relative to the vessel (drawing preferable)
- behavior (as explicit and detailed as possible; note any observed changes in behavior) and activity of vessel when sighting occurred.

2 Time-Area Restrictions for Geophysical Surveys to Avoid North Atlantic Right Whales

Based on the expected time of year for these surveys, and their location, APTIM was not operating in a Seasonal Management Area (SMA) or a Dynamic Management Area (DMA). Regardless, APTIM did not operate any active acoustics sources below 30 kHz in the northeast critical habitat and northeast SMAs (Great South Channel, April 1 through July 31; Off Race Point, March 1 through April 30), mid-Atlantic SMAs (November 1 through April 30), and southeast critical habitat and SMAs (November 15 through April 15) unless authorized separately by BOEM. Any operations that do occur in these areas during the specified times occurred during daylight hours only.

APTIM utilized the Early Warning System, Sighting Advisory System, and Mandatory Ship Reporting System while operating in the North Atlantic right whale critical habitat, SMAs, DMAs when necessary.

If, during the course of the geophysical survey, a DMA was established, use of all sound sources operating below 30 kHz in that DMA would have been discontinued within 24 hours of the DMA establishment. Any geophysical surveys in proximity of DMA boundaries remained beyond the distance of the acoustic exclusion zone (100 m [328 ft]) from the boundary. Any necessary exceptions or deviations would require BOEM approval.

3 Vibracore Sampling Protocol

During geotechnical operations APTIM did not operate the vibrahead until the vibracore platform made contact with the seabed and core barrel made contact with the seafloor to minimize sound level. The vibrahead was not operated when vibracore platform was being retrieved.

All seafloor sampling occurred within the effective coverage of geophysical data and not within the nadir or other gaps of sidescan sonar survey data. During vibracoring, vibracore penetration rates were monitored to help ensure minimum sampling in geologic units not indicative of surface sands and may be host to pre-historic or other cultural resources. During operations, any geologic or other information of archaeological interest were noted and photographed.

4 Vessel Strike Avoidance Protocol

APTIM subcontractors providing vessel services, maintained vessel speed at ≤18.5 km/hr (10 kn) in North Atlantic right whale areas or if one is sighted and 9.3 km/hr (5 kn) during nighttime transits in areas where sea turtles are present.

When transiting, APTIM reduced vessel speeds as safety allows to 18.5 km/hr (10 kn) or less when mother/calf pairs, pods, or large assemblages of North Atlantic right whales were observed. Additionally, APTIM abided by the 18.5 km/hr (10 kn) speed restriction in SMAs even when whales are not sighted in the Northeast feeding areas of Cape Cod Bay, Off Race Point and Great South Channel between January 1–May 15, March 1–April 30 and April 1–July 31, respectively, as well as in the mid-Atlantic migratory route from Block Island, Rhode Island to Savannah, Georgia, between November 1–April 30 and the Southeast Calving and Nursery Grounds in South Georgia and North Florida between November 15–April 15.

APTIM maintained a minimum distance of 500 m (1,640 ft) from North Atlantic right whales, 100 m (328 ft) from other whales, seals, and manatees and 50 m (164 ft) from delphinid cetaceans, sea turtles, and protected fish. If the vessel came within of 500 m (1,640 ft) from North Atlantic right whales while underway, APTIM's vessel operator steered a course away from the right whale at 18.5 km/hr (10 kn) or less until reaching the minimum separation distance. If a right whale was spotted in the path of the vessel or within 100 m (328 ft) of the vessel underway, the operator reduced speed and shifted engines to neutral. The operator only re-engage engines after the right whale has moved out of the path of the vessel and was more than 100 m (328 ft) away. If the right whale is still within 500 m (1,640 ft) of the vessel, the vessel selected a course away from the whale's course at a speed of 18.5 km/hr (10 kn) or less. The operator also followed this procedure if a right whale was spotted while a vessel is stationary. Whenever possible, a vessel remained parallel to the whale's course while transiting, avoiding abrupt changes in direction until it has left the area.

The survey vessel stayed at least 328 ft (100 m) away from other whales (i.e., not right whales), seals, or manatees and complied with other relevant manatee construction conditions when operating within the species' range. The vessel stayed at least 164 ft (50 m) away from delphinid cetaceans, at least 164 ft (50 m) away from sea turtles or other protected species whenever possible and did not re-engage engines until

the animals are clear of the 50-m (164-ft) exclusion area. The survey complied with other relevant sea turtle and smalltooth sawfish construction conditions summarized below when operating within the species' ranges. During transits vessel speed did exceed 5 kn (9.3 km/hr) in areas where sea turtles are most likely to be present. The vessel followed routes of deep water whenever possible, and if whales, seals, or manatees were encountered during transit, the vessel did attempt to remain parallel to the animal's course, avoiding excessive speed or abrupt changes in course.

4.1 Sea Turtle and Smalltooth Sawfish "Construction" Conditions

All APTIM personnel were alerted to the potential presence and need to avoid sea turtles and smalltooth sawfish, as well as the fact that there are penalties for harming, harassing, or killing these species. All vessels operated at "no wake/idle" speeds at all times while in water depths where the draft of the vessel provides less than a 4-ft (1.2-m) clearance from the bottom. If a sea turtle or smalltooth sawfish was observed within the acoustic exclusion zone of an active sound source or vibracore or 50 m (164 ft) of a moving vessel, APTIM implemented protections consistent with PSO shutdown requirements and stayed at least 164 ft (50 m) away from sea turtles or other protected species whenever possible. APTIM did not re-engage engines until the animals were clear of the 50-m (164-ft) exclusion area.

4.2 Bottom Avoidance Requirements

Prior to commencing geological operations APTIM took the necessary precautions to avoid munitions and ordnance, including unexploded shells and depth charges, that were present in military operating areas, ordnance disposal areas, or historical firing fans, co-located with the authorized area. APTIM avoided anchoring, geological sampling, and any other seafloor-disturbing activities in the vicinity of sensitive benthic habitat and associated communities, including live/hard bottom, topographic features, rippled scour depressions, cobbled seafloor, reef tract, and Habitat Areas of Particular Concern by at least 500 m (1,640 ft). APTIM avoided geological sampling near archaeological resources by a minimum of 50 m (164 ft). All associated anchoring, if any, avoided archaeological resources by 100 m (328 ft). If any archaeological resource was discovered while conducting operations, operations that would continue to affect the discovery were immediately halted.

APTIM provided as part of the GSP site-specific information to determine the presence of potential sensitive benthic resources and archaeological resources which was provided to BOEM prior to undertaking any seafloor-disturbing activities, including anchoring, unless required for safety or emergency purposes. APTIM's qualified maritime archaeologist determined whether any potential archaeological resources are present in the authorized area before vibracoring, grab sampling, and/or associated anchoring could occur.

The qualified maritime archaeologist met the Secretary of the Interior's Professional Qualifications Standards for Archaeology (48 FR 44738-44739) and has demonstrable, professional experience in interpretation of marine geophysical data, and demonstrate familiarity/experience with the archaeology of the Study Area.

All seafloor sampling occurred within the effective coverage of geophysical data and did not occur within the nadir or other gaps of sidescan sonar survey data. During vibracoring, vibracore penetration rates were monitored to help ensure minimum sampling in geologic units not indicative of surface sands and may be host to pre-historic or other cultural resources. During operations, any geologic or other information of archaeological interest were noted and photographed.

If benthic habitat and archaeological resources were not identified in advance of vibracoring and included in the geological sampling plan, APTIM would utilize live boating during sampling operations to avoid

unnecessary seafloor anchoring and disturbance. If unavoidable, APTIM would anchor in emergency situations or unexpected field situations and utilized a minimum-sized anchor/anchor array and be restricted to an area cleared, previously or in real-time, of sensitive habitat, cultural resources, and shallow hazards.

4.3 Marine Pollution Control Plan

APTIM conducted all activities under a marine pollution control plan included in the Project Management Plan (PMP) submitted prior to field operations, which addresses the marine debris awareness requirements below. APTIM prepared for and took all necessary precautions to prevent discharges of waste or hazardous materials that may impair water quality.

All vessels had sufficient fuel spill response equipment and supplies available onboard to contain and recover the maximum scenario fuel spill keyed to the proposed operations and disclosed in the marine pollution control plan. To reduce the likelihood of accidental fuel spills, APTIM fueled the vessels in port at a docking facility only; no at-sea cross-vessel fueling was conducted. All vessel operations were compliant with USCG regulations and the United States Environmental Protection Agency (USEPA)'s Vessel General Permit, as applicable.

4.4 Marine Debris Awareness Program

All survey participants were educated on marine trash and debris awareness elimination as required by NTL 2015-G03. All APTIM employees and subcontractors were aware of the environmental and socioeconomic impacts associated with marine trash and debris and their responsibilities for ensuring that trash and debris are not intentionally or accidentally discharged into the marine environment. Intentional marine littering is subject to strict laws such as the International Convention for the Prevention of Pollution from Ships Annex V and the Marine Plastic Pollution Research and Control Act, as well as regulations imposed by various agencies such as USCG and USEPA.

The deliberate discharge of containers and other similar materials (i.e., trash and debris) into the marine environment is prohibited. APTIM employees were required to identify equipment, tools, containers (especially drums), and other materials with durable markings.

4.5 Navigation and Commercial Fisheries Operations Conflict Minimization Requirements

Consistent with applicable USCG regulations, all vessels employed by APTIM greater than 20 m (65 ft) regardless of operational status were equipped with Automatic Information System and broadcasted vessel's identity, type, position, course, speed, and navigational status during surveying activities.

Vessels had the appropriate USCG-approved day shapes (mast head signals used to communicate with other vessels) and displayed the appropriate lighting during daylight and any nighttime operations to designate the vessel had limited maneuverability.

To minimize interaction with fishing gear that was present in the authorized area, the operator traversed or visually scanned the general survey area, or used other effective methods, prior to commencing survey operations to determine the presence of deployed fishing gear. Observed fishing gear were avoided by a minimum of 30 m (100 ft). Fishing gear were not be relocated or otherwise disturbed.

Appendix D: Vessel Diagram

BOEM TO1 Geophysical Survey
Vessel Diagram
R/V James K. Goodwin
(not to scale)

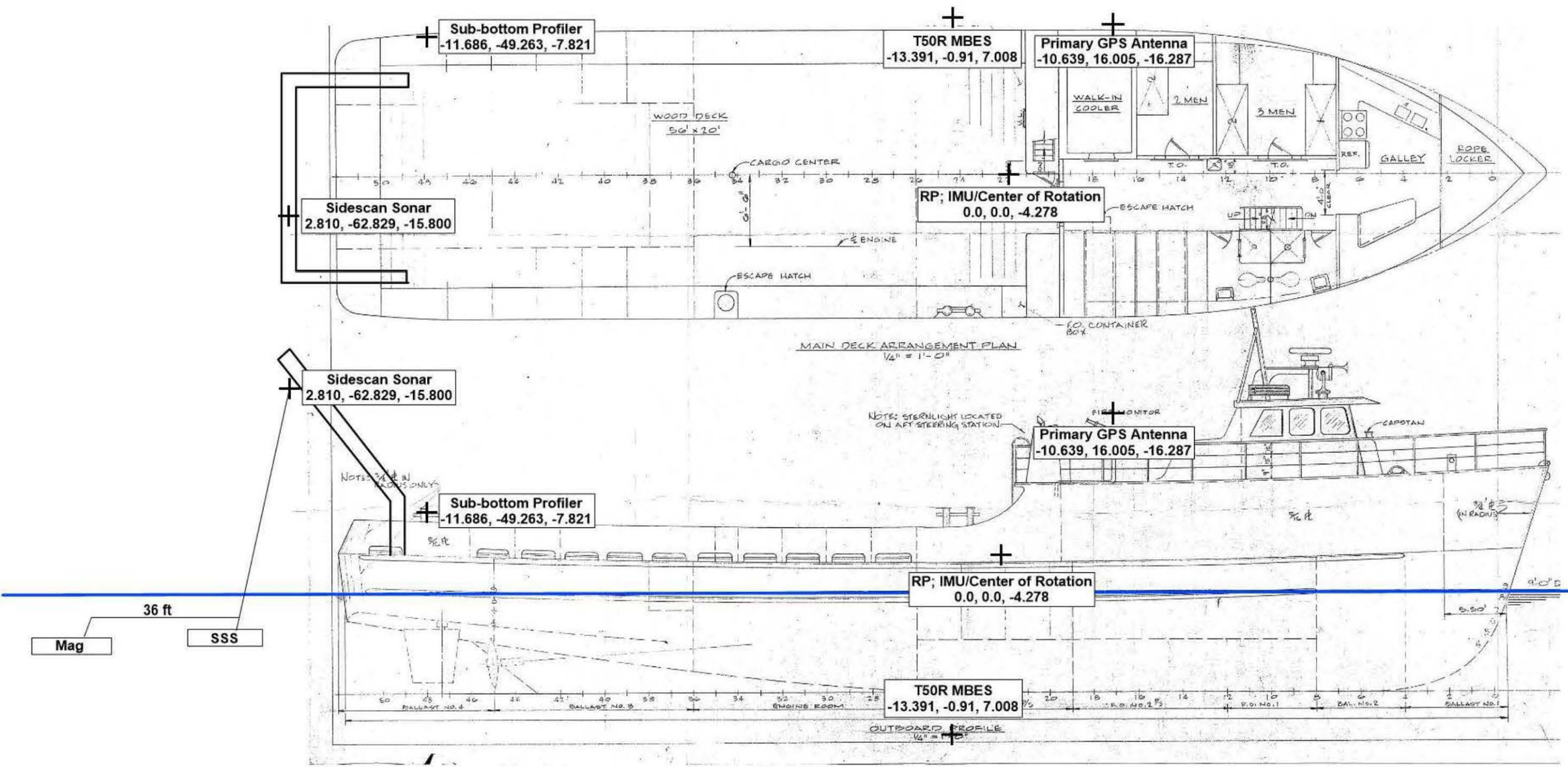


Table 1: Offset applied to systems during geophysical data collection.

R/V James K.Goodwin Offsets via Measured Relative to Permanent Shipboard Benchmarks. Offsets are relative to Reference Point (RP) or Waterline	**Forward Positive (ft)**	**Starboard Positive (ft)**	**Down Positive w.r.t. RP (ft)**	**Down Positive w. r.t Waterline (ft)**
RP; IMU/Center of Rotation	*0*	*0*	*0*	*-4.278*
TS0R Multi-Beam Echosounder	*-0.91*	*-13.391*	*11.286*	*7.008*
Primary GPS Antennae	*16.005*	*-10.639*	*-12.009*	*-16.287*
Sub-Bottom Profiler Tow Point	*-49.263*	*-11.686*	*-3.543*	*-7.821*
Sidescan Sonar Tow Point	*-62.829*	*2.81*	*-11.522*	*-15.8*

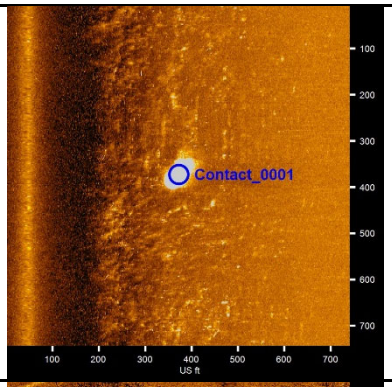
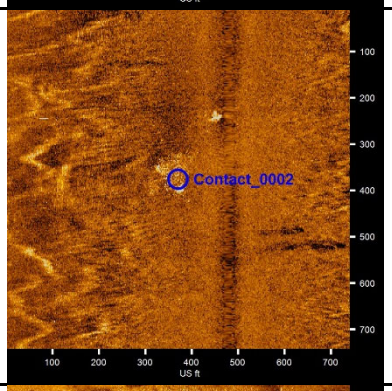
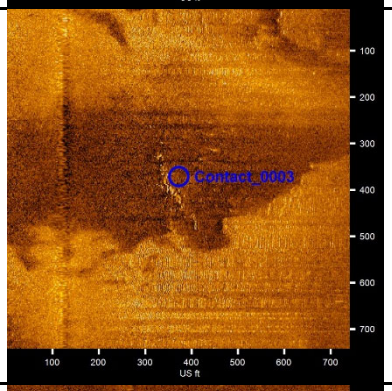
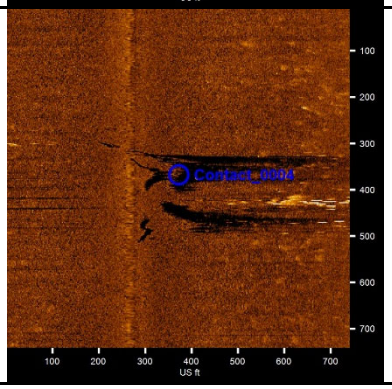
* Magnetometer was towed in tandem with SSS (trailing by 36ft)

Appendix E: Sound Velocity Profiles (Digital only)

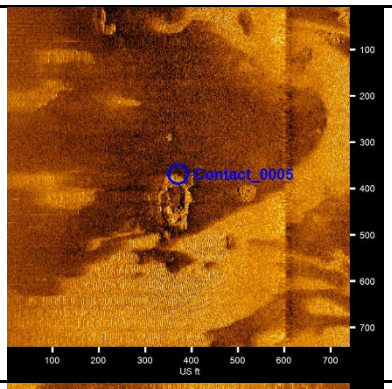
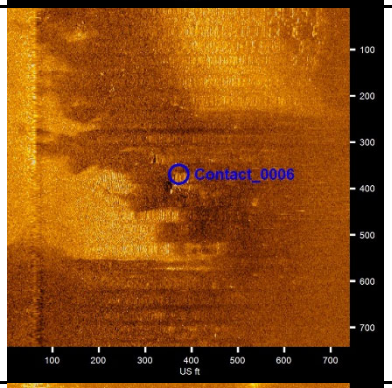
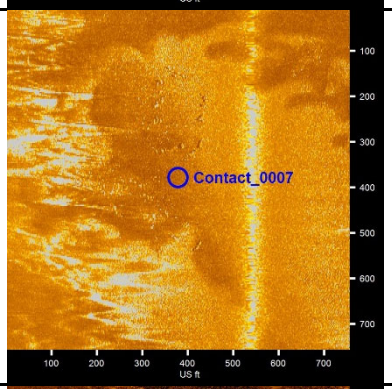
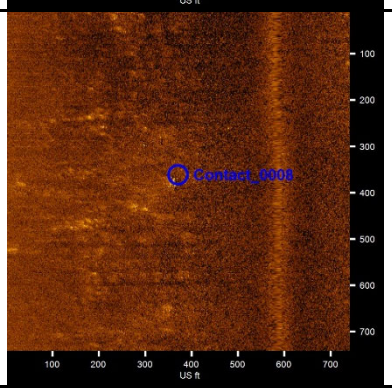
Appendix F: Sidescan Contact Report

Geophysical and Geological Data Acquisition and Analysis in Onslow Bay Offshore North Carolina and Long Bay Offshore North Carolina and South Carolina

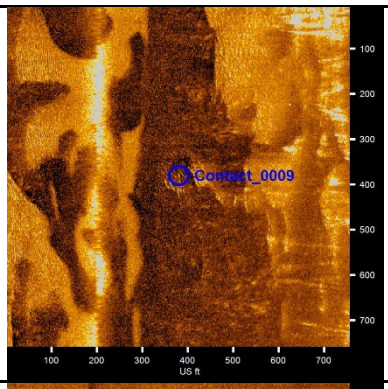
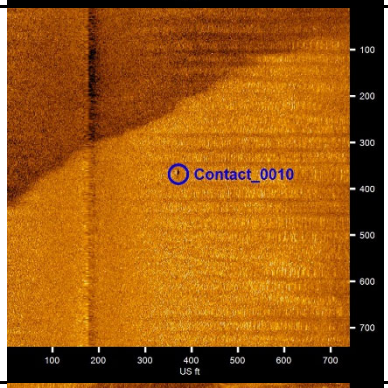
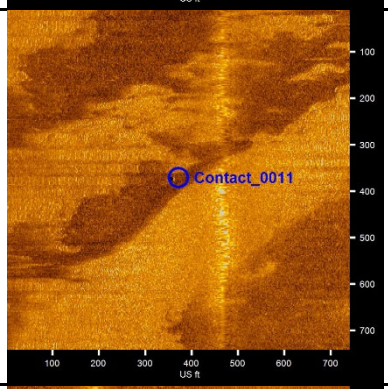
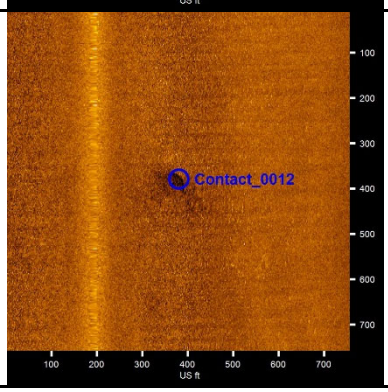
Sidescan Sonar Contact Report

Target Image	Target Info	User Entered Info
	**Contact_0001** • Map Projection: NC83F • Click Position 34.5052609829 -76.5749922430 (LocalLL) (X) 2730533.03 (Y) 283801.36 (Projected Coordinates) • Acoustic Source File: E:\RAW SSS Data\BOEM_SSS_20220525_Line_102.008.jsf • Line Name: BOEM_SSS_20220525_Line_102.008 • Sonar Time at Target: 5/25/2022 8:42:49 PM • Ping Number: 33647 • Heading: 108.290 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 44.65 US ft • Target Height: 0.00 US ft • Target Length: 76.82 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Bogue • Description: Unknown highly reflective object
	**Contact_0002** • Map Projection: NC83F • Click Position 34.5512284136 -76.6215373804 (LocalLL) (X) 2716113.25 (Y) 300186.32 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220524_Line_101.jsf • Line Name: BOEM_SSS_20220524_Line_101 • Sonar Time at Target: 5/24/2022 11:39:44 AM • Ping Number: 26367 • Heading: 271.590 Degrees	**Dimensions and attributes** • Classification1: Unknown feature • Target Width: 72.49 US ft • Target Height: 0.00 US ft • Target Length: 87.09 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Bogue • Description: assortment of small hard features
	**Contact_0003** • Map Projection: NC83F • Click Position 34.3671830460 -77.3765493983 (LocalLL) (X) 2489912.73 (Y) 228632.86 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220530_Line_113.003.jsf • Line Name: BOEM_SSS_20220530_Line_113.003 • Sonar Time at Target: 5/30/2022 6:32:55 PM • Ping Number: 115151 • Heading: 56.600 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 25.39 US ft • Target Height: 0.00 US ft • Target Length: 165.18 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: Unknown feature, potential debris
	**Contact_0004** • Map Projection: NC83F • Click Position 34.3599390845 -77.3902778689 (LocalLL) (X) 2485812.97 (Y) 225929.39 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220530_Line_113.002.jsf • Line Name: BOEM_SSS_20220530_Line_113.002 • Sonar Time at Target: 5/30/2022 6:21:49 PM • Ping Number: 113079 • Heading: 30.600 Degrees	**Dimensions and attributes** • Classification1: Dolphins • Target Width: 12.03 US ft • Target Height: 0.00 US ft • Target Length: 58.99 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: shadows cast by dolphins

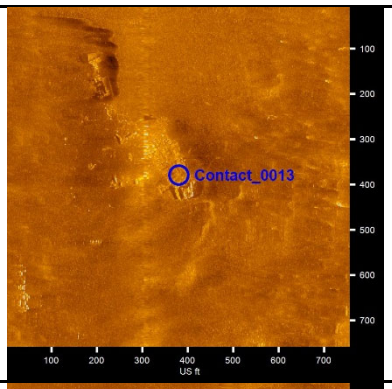
Sidescan Sonar Contact Report

	**Contact_0005** • Map Projection: NC83F • Click Position 34.3246649641 -77.4070194946 (LocalLL) (X) 2480966.79 (Y) 213011.97 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220530_Line_115.002.jsf • Line Name: BOEM_SSS_20220530_Line_115.002 • Sonar Time at Target: 5/30/2022 11:22:34 AM • Ping Number: 34854 • Heading: 13.300 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 72.44 US ft • Target Height: 0.00 US ft • Target Length: 121.03 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: Circular hardbottom formation
	**Contact_0006** • Map Projection: NC83F • Click Position 34.3498745778 -77.4070754310 (LocalLL) (X) 2480802.69 (Y) 222185.25 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220530_Line_113.002.jsf • Line Name: BOEM_SSS_20220530_Line_113.002 • Sonar Time at Target: 5/30/2022 6:07:41 PM • Ping Number: 110443 • Heading: 39.600 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 36.68 US ft • Target Height: 0.00 US ft • Target Length: 42.51 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: Small patch of debris
	**Contact_0007** • Map Projection: NC83F • Click Position 34.4161479346 -77.4200680004 (LocalLL) (X) 2476497.54 (Y) 246238.76 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220601_Line_108.003.jsf • Line Name: BOEM_SSS_20220601_Line_108.003 • Sonar Time at Target: 6/1/2022 10:32:03 AM • Ping Number: 37747 • Heading: 27.890 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 101.47 US ft • Target Height: 0.00 US ft • Target Length: 149.67 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: Hardbottom in a square formation
	**Contact_0008** • Map Projection: NC83F • Click Position 34.3849830233 -77.4262172417 (LocalLL) (X) 2474822.92 (Y) 234868.72 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220531_Line_109.002.jsf • Line Name: BOEM_SSS_20220531_Line_109.002 • Sonar Time at Target: 5/31/2022 7:31:30 PM • Ping Number: 149076 • Heading: 70.100 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 15.96 US ft • Target Height: 0.00 US ft • Target Length: 25.26 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: Small feature with high

Sidescan Sonar Contact Report

	**Contact_0009** • Map Projection: NC83F • Click Position 34.3671694994 -77.4824564326 (LocalLL) (X) 2457955.55 (Y) 228122.31 (Projected Coordinates) • Acoustic Source File: D:\BOEM_SSS_20220602_Line_121.jsf • Line Name: BOEM_SSS_20220602_Line_121 • Sonar Time at Target: 6/2/2022 7:23:23 AM • Ping Number: 14810 • Heading: 298.900 Degrees	**Dimensions and attributes** • Classification1: Unknown Linear Feature • Target Width: 3.54 US ft • Target Height: 0.00 US ft • Target Length: 47.21 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Topsail • Description: Unknown feature in Linear Formations
	**Contact_0010** • Map Projection: NC83F • Click Position 34.2811324987 -77.5137229364 (LocalLL) (X) 2448989.63 (Y) 196670.92 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220530_Line_113.jsf • Line Name: BOEM_SSS_20220530_Line_113 • Sonar Time at Target: 5/30/2022 4:34:58 PM • Ping Number: 93143 • Heading: 20.100 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 3.88 US ft • Target Height: 0.53 US ft • Target Length: 8.42 US ft • Target Shadow: 3.32 US ft • Mag Anomaly: • Area: Topsail • Description: Unknown object
	**Contact_0011** • Map Projection: NC83F • Click Position 34.3176687006 -77.5354585770 (LocalLL) (X) 2442227.82 (Y) 209868.84 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220531_Line_109.001.jsf • Line Name: BOEM_SSS_20220531_Line_109.001 • Sonar Time at Target: 5/31/2022 5:56:00 PM • Ping Number: 131257 • Heading: 15.190 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 3.22 US ft • Target Height: 2.15 US ft • Target Length: 7.45 US ft • Target Shadow: 6.45 US ft • Mag Anomaly: • Area: Topsail • Description: Unknown object
	**Contact_0012** • Map Projection: NC83F • Click Position 34.1538729540 -77.7227656622 (LocalLL) (X) 2386439.54 (Y) 149480.51 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_127.001.jsf • Line Name: BOEM_SSS_20220603_Line_127.001 • Sonar Time at Target: 6/3/2022 9:26:46 AM • Ping Number: 37732 • Heading: 224.200 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 6.58 US ft • Target Height: 0.00 US ft • Target Length: 46.49 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: New Hanover • Description: Unknown object

Sidescan Sonar Contact Report

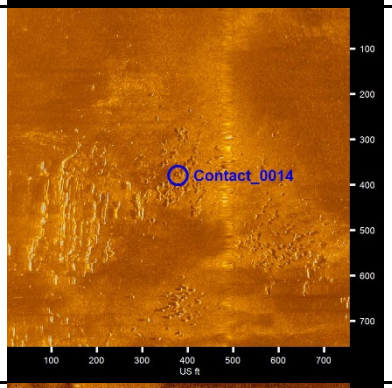


Contact_0013

- Map Projection: NC83F
- Click Position
  34.1036039016 -77.7466456907 (LocalLL)
  (X) 2379445.78 (Y) 131094.53 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_131.jsf
- Line Name: BOEM_SSS_20220603_Line_131
- Sonar Time at Target: 6/3/2022 3:46:45 PM
- Ping Number: 108629
- Heading: 72.800 Degrees

Dimensions and attributes

- Classification1: Artificial Reef
- Classification2: 220ft Barge
- Target Width: 82.82 US ft
- Target Height: 0.00 US ft
- Target Length: 376.50 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly: Mag_0030
- Area: New Hanover
- Description: NC Artificial Reef AR-327; 220-foot barge and associated debris

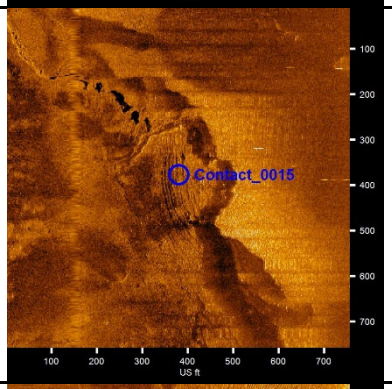


Contact_0014

- Map Projection: NC83F
- Click Position
  34.1074624746 -77.7484016098 (LocalLL)
  (X) 2378896.51 (Y) 132492.04 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_127.002.jsf
- Line Name: BOEM_SSS_20220603_Line_127.002
- Sonar Time at Target: 6/3/2022 10:08:43 AM
- Ping Number: 45559
- Heading: 213.900 Degrees

Dimensions and attributes

- Classification1: Artificial Reef
- Classification2: Concrete Rubble
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly: Mag_0027
- Area: New Hanover
- Description: NC Artificial Reef AR-372; group of concrete rubble

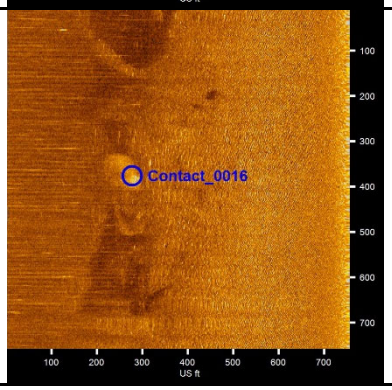


Contact_0015

- Map Projection: NC83F
- Click Position
  34.1035374714 -77.7516378932 (LocalLL)
  (X) 2377934.81 (Y) 131051.31 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_127.002.jsf
- Line Name: BOEM_SSS_20220603_Line_127.002
- Sonar Time at Target: 6/3/2022 10:12:26 AM
- Ping Number: 46254
- Heading: 218.200 Degrees

Dimensions and attributes

- Classification1: Unknown Bottom Texture
- Target Width: 62.26 US ft
- Target Height: 0.00 US ft
- Target Length: 250.39 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: New Hanover
- Description: Unknown bottom texture, linear striations



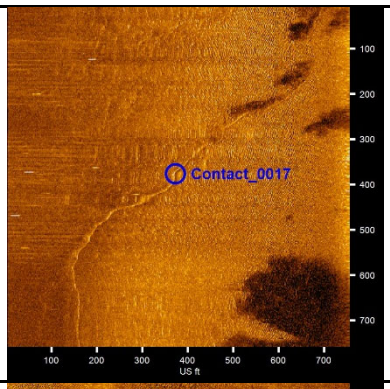
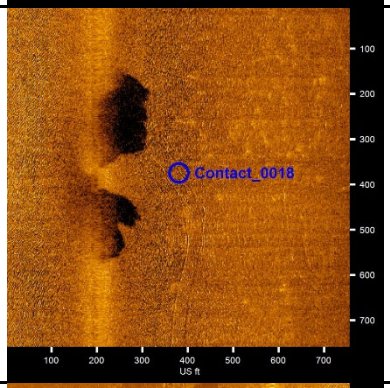
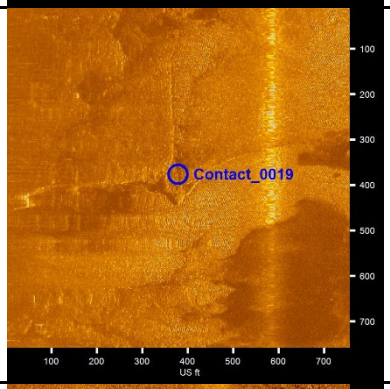
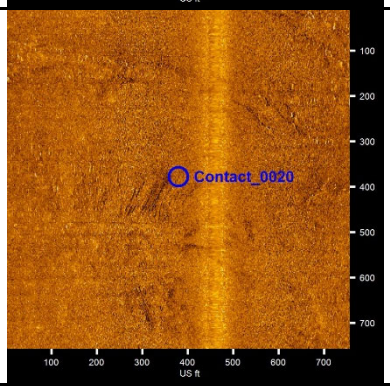
Contact_0016

- Map Projection: NC83F
- Click Position
  34.1188458446 -77.7560533877 (LocalLL)
  (X) 2376528.30 (Y) 136605.57 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_126.002.jsf
- Line Name: BOEM_SSS_20220603_Line_126.002
- Sonar Time at Target: 6/3/2022 1:21:56 PM
- Ping Number: 81610
- Heading: 342.800 Degrees

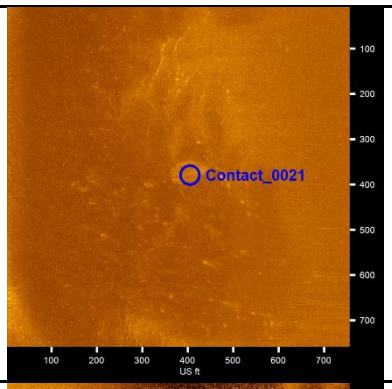
Dimensions and attributes

- Classification1: School of Fish
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: New Hanover
- Description: School of fish

Sidescan Sonar Contact Report

	**Contact_0017** • Map Projection: NC83F • Click Position 34.1102992732 -77.7604047734 (LocalLL) (X) 2375250.09 (Y) 133478.82 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_126.001.jsf • Line Name: BOEM_SSS_20220603_Line_126.001 • Sonar Time at Target: 6/3/2022 1:14:31 PM • Ping Number: 80226 • Heading: 348.500 Degrees	**Dimensions and attributes** • Classification1: Potential Cable • Target Width: 3.35 US ft • Target Height: 0.00 US ft • Target Length: 526.30 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: New Hanover • Description: Linear feature; potential cable, anchor chain, or pipeline
	**Contact_0018** • Map Projection: NC83F • Click Position 34.1403184771 -77.7607588570 (LocalLL) (X) 2375006.52 (Y) 144402.08 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_125.jsf • Line Name: BOEM_SSS_20220603_Line_125 • Sonar Time at Target: 6/3/2022 2:18:13 PM • Ping Number: 92112 • Heading: 217.290 Degrees	**Dimensions and attributes** • Classification1: Trawl Marks • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: New Hanover • Description: Parallel drag marks from trawl
	**Contact_0019** • Map Projection: NC83F • Click Position 34.1058492770 -77.7622862685 (LocalLL) (X) 2374700.75 (Y) 131852.26 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_126.001.jsf • Line Name: BOEM_SSS_20220603_Line_126.001 • Sonar Time at Target: 6/3/2022 1:10:45 PM • Ping Number: 79522 • Heading: 350.390 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: New Hanover • Description: Linear features with a central area and 3 different directions
	**Contact_0020** • Map Projection: NC83F • Click Position 34.0979398391 -77.7835709111 (LocalLL) (X) 2368292.71 (Y) 128894.19 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220603_Line_125.jsf • Line Name: BOEM_SSS_20220603_Line_125 • Sonar Time at Target: 6/3/2022 2:58:11 PM • Ping Number: 99569 • Heading: 219.900 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 100.45 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: New Hanover • Description: Parallel linear features

Sidescan Sonar Contact Report

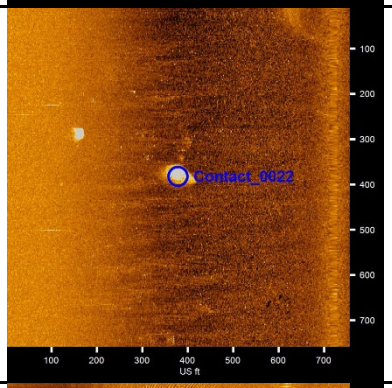


Contact_0021

- Map Projection: NC83F
- Click Position
  34.0694443736 -77.8054760974 (LocalLL)
  (X) 2361785.69 (Y) 118443.44 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220604_Line_132.001.jsf
- Line Name: BOEM_SSS_20220604_Line_132.001
- Sonar Time at Target: 6/4/2022 9:41:11 AM
- Ping Number: 41009
- Heading: 274.590 Degrees

Dimensions and attributes

- Classification1: School of Fish
- Target Width: 40.16 US ft
- Target Height: 0.00 US ft
- Target Length: 71.59 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: New Hanover
- Description: Shool of fish

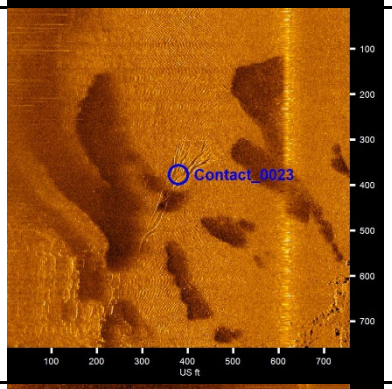


Contact_0022

- Map Projection: NC83F
- Click Position
  33.6866309138 -78.0765994198 (LocalLL)
  (X) 2280969.27 (Y) -21758.54 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_141.jsf
- Line Name: BOEM_SSS_20220608_Line_141
- Sonar Time at Target: 6/8/2022 6:50:05 AM
- Ping Number: 9427
- Heading: 222.290 Degrees

Dimensions and attributes

- Classification1: School of Fish
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: School of Fish

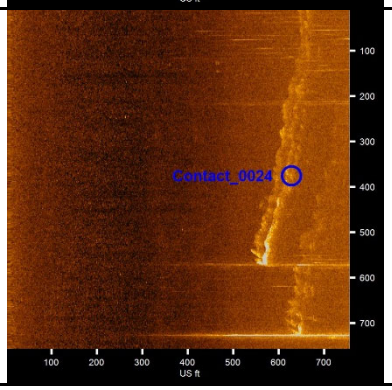


Contact_0023

- Map Projection: NC83F
- Click Position
  33.7574705186 -78.1241672777 (LocalLL)
  (X) 2266268.38 (Y) 3893.73 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_142.002.jsf
- Line Name: BOEM_SSS_20220608_Line_142.002
- Sonar Time at Target: 6/8/2022 10:45:14 AM
- Ping Number: 53299
- Heading: 352.500 Degrees

Dimensions and attributes

- Classification1: Anchor Scouring
- Target Width: 88.29 US ft
- Target Height: 0.00 US ft
- Target Length: 255.54 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: Anchor scouring



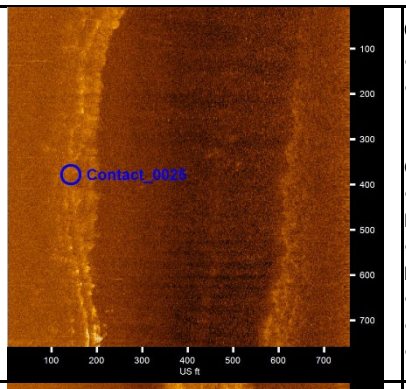
Contact_0024

- Map Projection: NC83F
- Click Position
  33.7116345960 -78.1447927817 (LocalLL)
  (X) 2260141.75 (Y) -12843.77 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_142.001.jsf
- Line Name: BOEM_SSS_20220608_Line_142.001
- Sonar Time at Target: 6/8/2022 10:04:46 AM
- Ping Number: 45749
- Heading: 344.600 Degrees

Dimensions and attributes

- Classification1: Boat Wake
- Target Width: 55.90 US ft
- Target Height: 0.00 US ft
- Target Length: 569.70 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: Vessel wake, fishing tournament vessels passing nearby in quick succession

Sidescan Sonar Contact Report

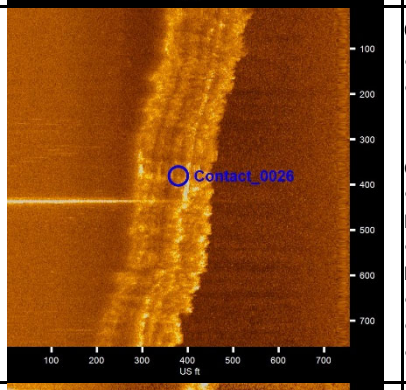


Contact_0025

- Map Projection: NC83F
- Click Position
  33.7200145742 -78.1449521060 (LocalLL)
  (X) 2260067.01 (Y) -9794.12 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_142.001.jsf
- Line Name: BOEM_SSS_20220608_Line_142.001
- Sonar Time at Target: 6/8/2022 10:11:01 AM
- Ping Number: 46917
- Heading: 349.600 Degrees

Dimensions and attributes

- Classification1: Boat Wake
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswich
- Description: Vessel wake, fishing tournament vessels passing nearby in quick succession

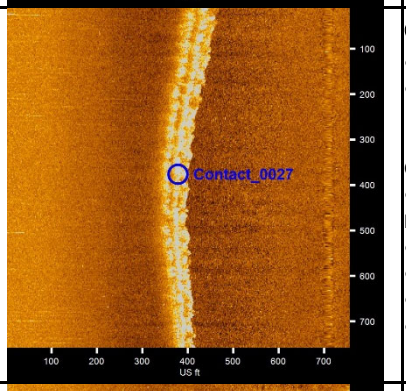


Contact_0026

- Map Projection: NC83F
- Click Position
  33.7155197875 -78.1463094929 (LocalLL)
  (X) 2259668.24 (Y) -11433.65 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_142.001.jsf
- Line Name: BOEM_SSS_20220608_Line_142.001
- Sonar Time at Target: 6/8/2022 10:07:17 AM
- Ping Number: 46219
- Heading: 349.300 Degrees

Dimensions and attributes

- Classification1: Boat Wake
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: Vessel wake, fishing tournament vessels passing nearby in quick succession

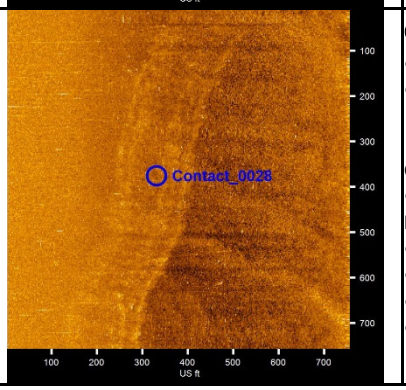


Contact_0027

- Map Projection: NC83F
- Click Position
  33.6914454166 -78.1585012476 (LocalLL)
  (X) 2256034.22 (Y) -20227.72 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_142.jsf
- Line Name: BOEM_SSS_20220608_Line_142
- Sonar Time at Target: 6/8/2022 9:45:34 AM
- Ping Number: 42167
- Heading: 345.500 Degrees

Dimensions and attributes

- Classification1: Boat Wake
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: Vessel wake, fishing tournament vessels passing nearby in quick succession



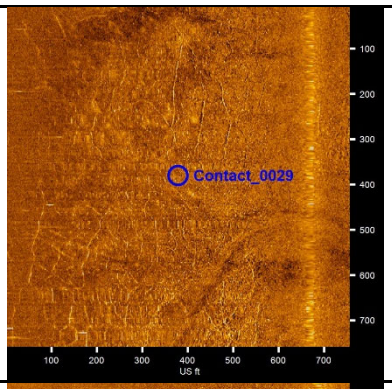
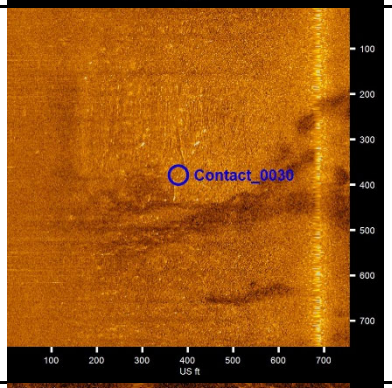
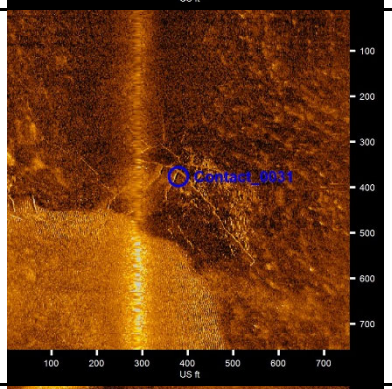
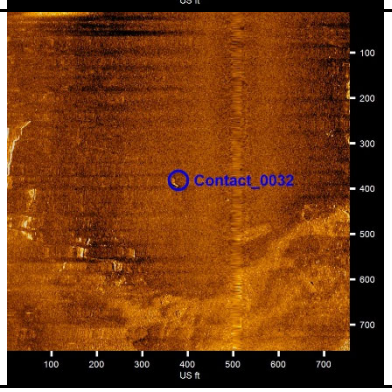
Contact_0028

- Map Projection: NC83F
- Click Position
  33.6644703790 -78.1724949789 (LocalLL)
  (X) 2251858.44 (Y) -30081.76 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_142.jsf
- Line Name: BOEM_SSS_20220608_Line_142
- Sonar Time at Target: 6/8/2022 9:20:34 AM
- Ping Number: 37504
- Heading: 349.800 Degrees

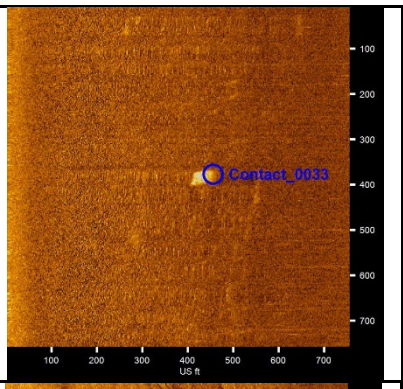
Dimensions and attributes

- Classification1: Boat Wake
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: Vessel wake, fishing tournament vessels passing nearby in quick succession

Sidescan Sonar Contact Report

	**Contact_0029** • Map Projection: NC83F • Click Position 33.7405647672 -78.3518415698 (LocalLL) (X) 2197092.77 (Y) -2790.81 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_137.jsf • Line Name: BOEM_SSS_20220608_Line_137 • Sonar Time at Target: 6/8/2022 4:19:26 PM • Ping Number: 115656 • Heading: 53.500 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Brunswick • Description: Cracked and linear looking features
	**Contact_0030** • Map Projection: NC83F • Click Position 33.7558846698 -78.3561206545 (LocalLL) (X) 2195755.43 (Y) 2776.75 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_136.003.jsf • Line Name: BOEM_SSS_20220608_Line_136.003 • Sonar Time at Target: 6/8/2022 2:25:56 PM • Ping Number: 94477 • Heading: 263.300 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 81.38 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Brunswick • Description: Unknown linear features
	**Contact_0031** • Map Projection: NC83F • Click Position 33.7377765253 -78.3611027353 (LocalLL) (X) 2194283.19 (Y) -3823.91 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220608_Line_137.jsf • Line Name: BOEM_SSS_20220608_Line_137 • Sonar Time at Target: 6/8/2022 4:12:51 PM • Ping Number: 114428 • Heading: 55.100 Degrees	**Dimensions and attributes** • Classification1: Unknown feature • Target Width: 109.01 US ft • Target Height: 0.00 US ft • Target Length: 332.57 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Brunswick • Description: Feature with a "cracked" look. Diverges at multiple points.
	**Contact_0032** • Map Projection: NC83F • Click Position 33.6355583069 -78.5534454319 (LocalLL) (X) 2135961.27 (Y) -41349.45 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220609_Line_139.jsf • Line Name: BOEM_SSS_20220609_Line_139 • Sonar Time at Target: 6/9/2022 1:56:00 PM • Ping Number: 8876 • Heading: 50.800 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 7.60 US ft • Target Height: 0.00 US ft • Target Length: 23.08 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Brunswick • Description: Unknown feature, potential debris

Sidescan Sonar Contact Report

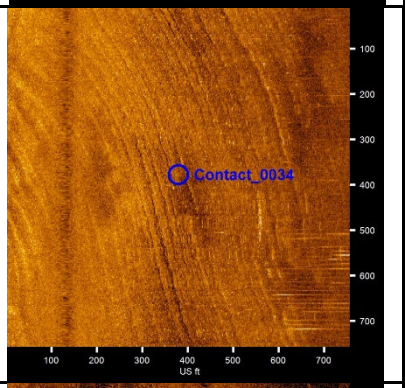


Contact_0033

- Map Projection: NC83F
- Click Position
  33.6534037632 -78.6518767882 (LocalLL)
  (X) 2105969.50 (Y) -34973.84 (Projected Coordinates)
- Acoustic Source File: D:\BOEM TASK 1\SSS\BOEM_SSS_20220610_Line_136.003.jsf
- Line Name: BOEM_SSS_20220610_Line_136.003
- Sonar Time at Target: 6/10/2022 8:12:38 PM
- Ping Number: 159460
- Heading: 250.900 Degrees

Dimensions and attributes

- Classification1: School of fish
- Target Width: 37.06 US ft
- Target Height: 0.00 US ft
- Target Length: 24.98 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Brunswick
- Description: School of Fish

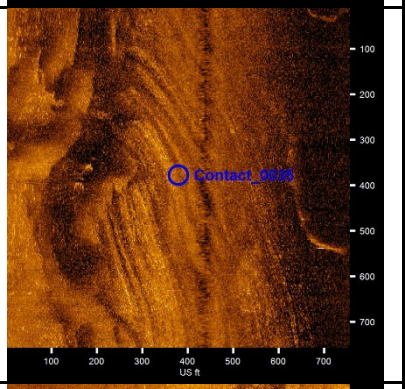


Contact_0034

- Map Projection: SC83F
- Click Position
  33.6604415989 -78.6796751582 (LocalLL)
  (X) 2705865.33 (Y) 672683.48 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_151.jsf
- Line Name: BOEM_SSS_20220611_Line_151
- Sonar Time at Target: 6/11/2022 7:19:28 AM
- Ping Number: 14569
- Heading: 293.900 Degrees

Dimensions and attributes

- Classification1: Unknown Texture
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Unknown bottom texture; linear striations

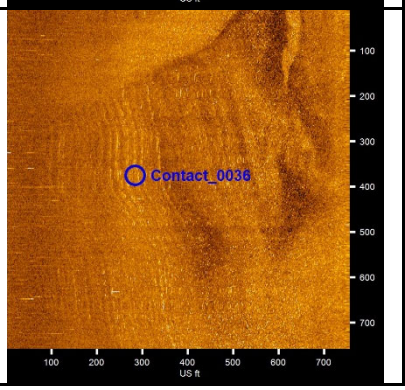


Contact_0035

- Map Projection: SC83F
- Click Position
  33.6661912191 -78.6868964531 (LocalLL)
  (X) 2703622.09 (Y) 674725.55 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_151.jsf
- Line Name: BOEM_SSS_20220611_Line_151
- Sonar Time at Target: 6/11/2022 7:26:21 AM
- Ping Number: 15853
- Heading: 291.800 Degrees

Dimensions and attributes

- Classification1: Unknown Texture
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Unknown bottom texture; linear striations



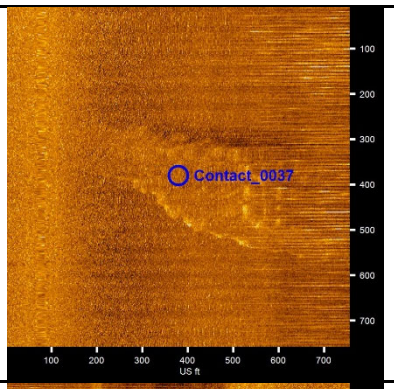
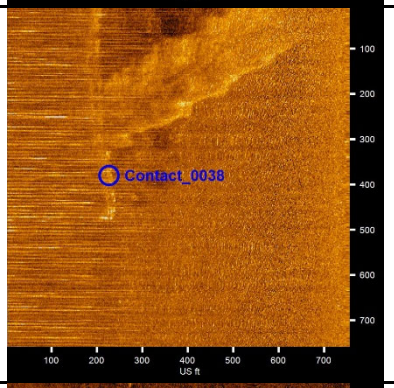
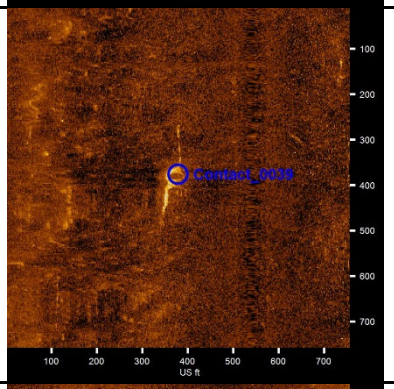
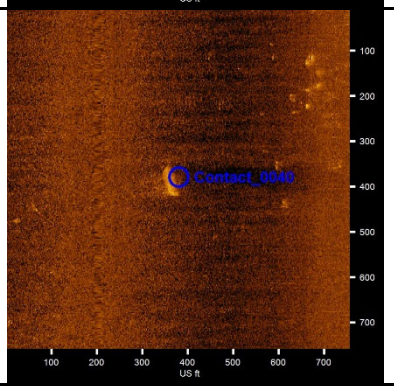
Contact_0036

- Map Projection: SC83F
- Click Position
  33.6712432076 -78.6938629446 (LocalLL)
  (X) 2701462.28 (Y) 676515.76 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_151.001.jsf
- Line Name: BOEM_SSS_20220611_Line_151.001
- Sonar Time at Target: 6/11/2022 7:32:51 AM
- Ping Number: 17065
- Heading: 298.500 Degrees

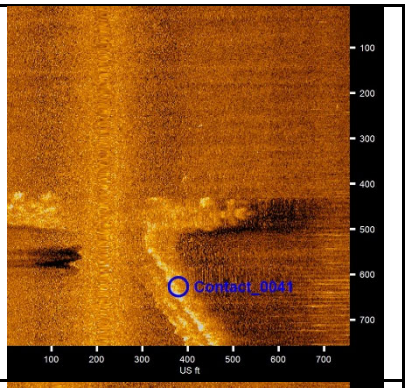
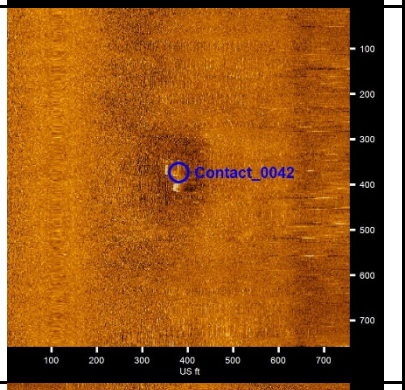
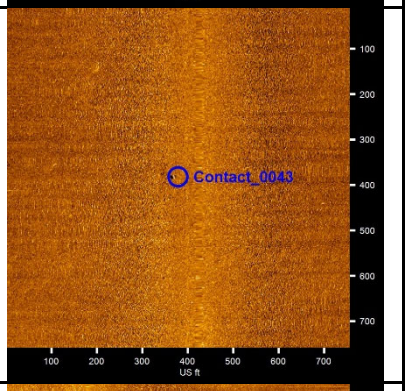
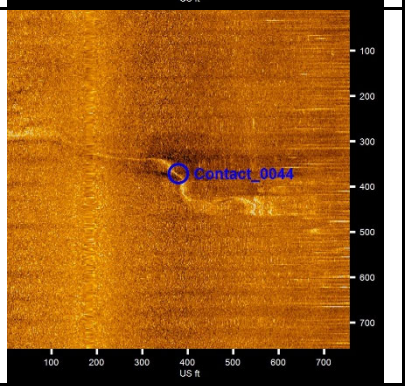
Dimensions and attributes

- Classification1: Unknown Texture
- Target Width: 0.00 US ft
- Target Height: 0.00 US ft
- Target Length: 0.00 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Unknown bottom texture; linear striations

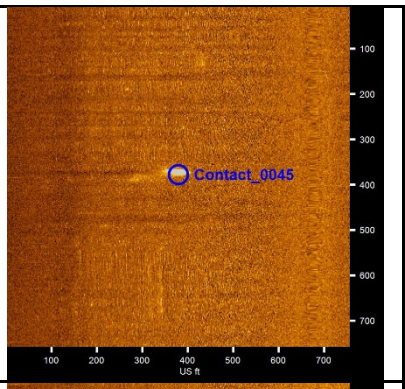
Sidescan Sonar Contact Report

	**Contact_0037** • Map Projection: SC83F • Click Position 33.6435651880 -78.7211103936 (LocalLL) (X) 2693397.70 (Y) 666264.48 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_147.jsf • Line Name: BOEM_SSS_20220611_Line_147 • Sonar Time at Target: 6/11/2022 12:54:29 PM • Ping Number: 75695 • Heading: 235.700 Degrees	**Dimensions and attributes** • Classification1: Boat Wake • Target Width: 173.76 US ft • Target Height: 0.00 US ft • Target Length: 689.56 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Boat wake
	**Contact_0038** • Map Projection: SC83F • Click Position 33.6251180747 -78.7419819634 (LocalLL) (X) 2687194.72 (Y) 659415.23 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_147.001.jsf • Line Name: BOEM_SSS_20220611_Line_147.001 • Sonar Time at Target: 6/11/2022 1:15:48 PM • Ping Number: 79671 • Heading: 234.590 Degrees	**Dimensions and attributes** • Classification1: Boat Wake • Target Width: 26.79 US ft • Target Height: 0.00 US ft • Target Length: 455.71 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Two intersecting boat wakes
	**Contact_0039** • Map Projection: SC83F • Click Position 33.6231343180 -78.7927023499 (LocalLL) (X) 2671776.41 (Y) 658360.19 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_148.001.jsf • Line Name: BOEM_SSS_20220611_Line_148.001 • Sonar Time at Target: 6/11/2022 3:56:24 PM • Ping Number: 109636 • Heading: 4.190 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 47.31 US ft • Target Height: 0.00 US ft • Target Length: 191.44 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Unknown linear feature
	**Contact_0040** • Map Projection: SC83F • Click Position 33.6760454733 -78.7982947105 (LocalLL) (X) 2669664.58 (Y) 677569.77 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_150.jsf • Line Name: BOEM_SSS_20220611_Line_150 • Sonar Time at Target: 6/11/2022 9:52:02 AM • Ping Number: 41652 • Heading: 238.200 Degrees	**Dimensions and attributes** • Classification1: School of Fish • Target Width: 24.50 US ft • Target Height: 0.00 US ft • Target Length: 62.18 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: School of fish with associated shadow

Sidescan Sonar Contact Report

	**Contact_0041** • Map Projection: SC83F • Click Position 33.6673215295 -78.8096600201 (LocalLL) (X) 2666275.50 (Y) 674323.05 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_150.001.jsf • Line Name: BOEM_SSS_20220611_Line_150.001 • Sonar Time at Target: 6/11/2022 10:02:06 AM • Ping Number: 43530 • Heading: 210.790 Degrees	**Dimensions and attributes** • Classification1: Boat Wake • Target Width: 91.75 US ft • Target Height: 0.00 US ft • Target Length: 298.05 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Boat wake interference
	**Contact_0042** • Map Projection: SC83F • Click Position 33.6083921280 -78.8105430238 (LocalLL) (X) 2666461.12 (Y) 652882.39 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_148.jsf • Line Name: BOEM_SSS_20220611_Line_148 • Sonar Time at Target: 6/11/2022 3:38:36 PM • Ping Number: 106316 • Heading: 15.000 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Classification2: Potential Debris • Target Width: 31.17 US ft • Target Height: 0.00 US ft • Target Length: 58.31 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Small feature, potential debris
	**Contact_0043** • Map Projection: SC83F • Click Position 33.5657551893 -78.8248229866 (LocalLL) (X) 2662441.44 (Y) 637281.92 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220611_Line_147.002.jsf • Line Name: BOEM_SSS_20220611_Line_147.002 • Sonar Time at Target: 6/11/2022 2:34:37 PM • Ping Number: 94377 • Heading: 229.790 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Classification2: Potential Debris • Target Width: 5.37 US ft • Target Height: 0.00 US ft • Target Length: 8.87 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: Mag_0047 • Area: Myrtle • Description: Unknown debris
	**Contact_0044** • Map Projection: SC83F • Click Position 33.4897615194 -78.8440604685 (LocalLL) (X) 2657160.28 (Y) 609517.46 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_163.001.jsf • Line Name: BOEM_SSS_20220612_Line_163.001 • Sonar Time at Target: 6/12/2022 11:49:17 AM • Ping Number: 65218 • Heading: 347.800 Degrees	**Dimensions and attributes** • Classification1: Potential Cable • Target Width: 9.87 US ft • Target Height: 0.00 US ft • Target Length: 647.08 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Long linear feature, potential cable, anchor chain, pipeline, etc.

Sidescan Sonar Contact Report

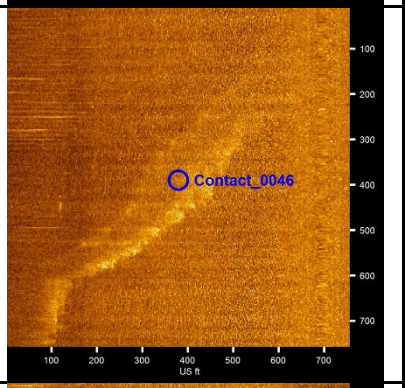


Contact_0045

- Map Projection: SC83F
- Click Position
  33.4383023988 -78.8485146897 (LocalLL)
  (X) 2656192.48 (Y) 590771.70 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_164.jsf
- Line Name: BOEM_SSS_20220612_Line_164
- Sonar Time at Target: 6/12/2022 12:54:52 PM
- Ping Number: 77457
- Heading: 222.700 Degrees

Dimensions and attributes

- Classification1: Unknown Feature
- Target Width: 57.17 US ft
- Target Height: 0.00 US ft
- Target Length: 18.27 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Unknown highly reflective feature with associated shadow

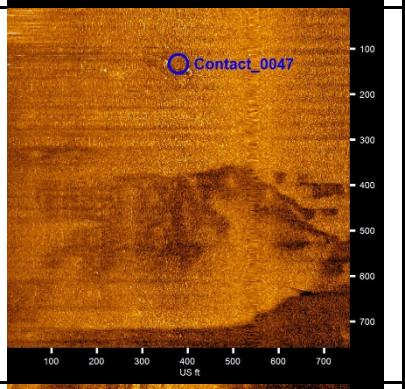


Contact_0046

- Map Projection: SC83F
- Click Position
  33.4980962879 -78.8544602930 (LocalLL)
  (X) 2653927.76 (Y) 612483.14 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_162.jsf
- Line Name: BOEM_SSS_20220612_Line_162
- Sonar Time at Target: 6/12/2022 8:22:13 AM
- Ping Number: 26585
- Heading: 227.700 Degrees

Dimensions and attributes

- Classification1: Boat Wake
- Target Width: 121.24 US ft
- Target Height: 0.00 US ft
- Target Length: 739.88 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Boat Wake

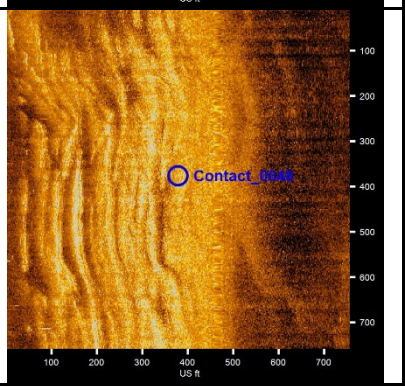


Contact_0047

- Map Projection: SC83F
- Click Position
  33.4257874302 -78.8586004217 (LocalLL)
  (X) 2653211.14 (Y) 586155.69 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_164.001.jsf
- Line Name: BOEM_SSS_20220612_Line_164.001
- Sonar Time at Target: 6/12/2022 1:08:27 PM
- Ping Number: 79991
- Heading: 232.900 Degrees

Dimensions and attributes

- Classification1: Unknown Feature
- Classification2: Potential Debris
- Target Width: 19.01 US ft
- Target Height: 0.00 US ft
- Target Length: 20.18 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Unknown debris



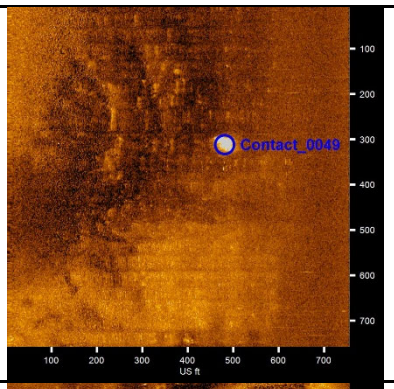
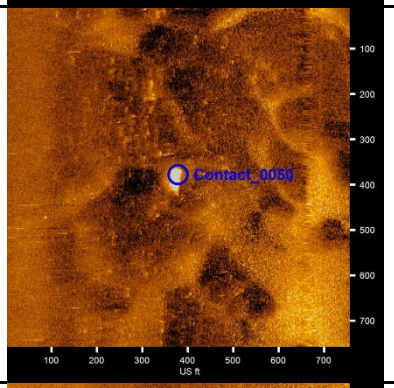
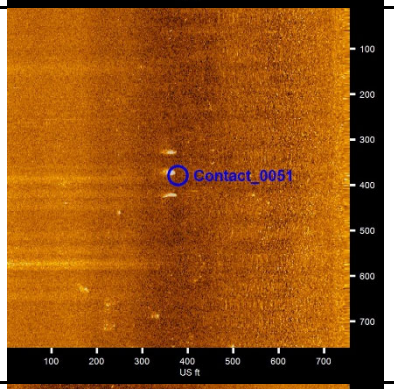
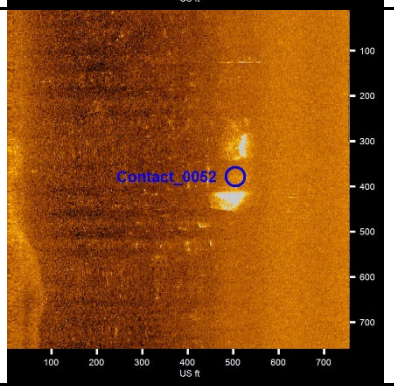
Contact_0048

- Map Projection: SC83F
- Click Position
  33.6232215144 -78.8610198602 (LocalLL)
  (X) 2650986.66 (Y) 657954.70 (Projected Coordinates)
- Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_153.jsf
- Line Name: BOEM_SSS_20220612_Line_153
- Sonar Time at Target: 6/12/2022 6:40:25 AM
- Ping Number: 7590
- Heading: 168.290 Degrees

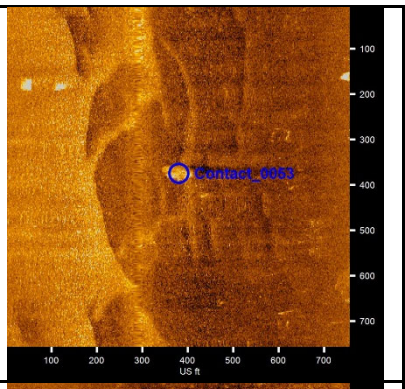
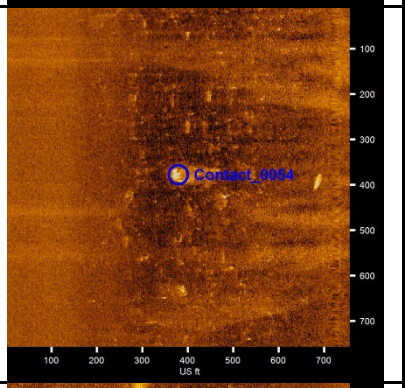
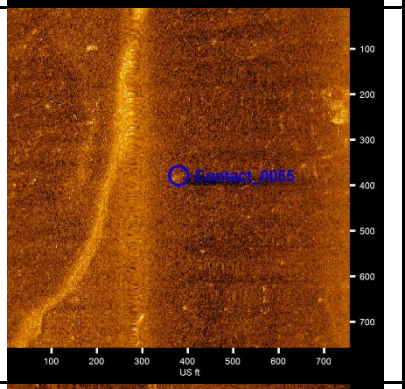
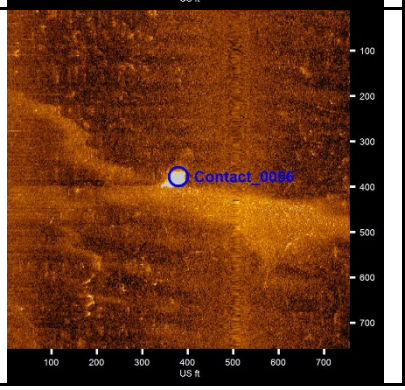
Dimensions and attributes

- Classification1: Unknown Texture
- Target Width: 490.09 US ft
- Target Height: 0.00 US ft
- Target Length: 727.84 US ft
- Target Shadow: 0.00 US ft
- Mag Anomaly:
- Area: Myrtle
- Description: Highly reflective wavy texture

Sidescan Sonar Contact Report

	**Contact_0049** • Map Projection: SC83F • Click Position 33.4475328843 -78.8750592654 (LocalLL) (X) 2648028.57 (Y) 593961.65 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_163.jsf • Line Name: BOEM_SSS_20220612_Line_163 • Sonar Time at Target: 6/12/2022 11:05:18 AM • Ping Number: 57013 • Heading: 347.800 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 41.96 US ft • Target Height: 0.00 US ft • Target Length: 36.07 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Unknown highly reflective feature
	**Contact_0050** • Map Projection: SC83F • Click Position 33.4327468282 -78.9044286997 (LocalLL) (X) 2639182.22 (Y) 588400.52 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220612_Line_162.001.jsf • Line Name: BOEM_SSS_20220612_Line_162.001 • Sonar Time at Target: 6/12/2022 9:31:27 AM • Ping Number: 39502 • Heading: 230.900 Degrees	**Dimensions and attributes** • Classification1: Unknown feature • Target Width: 27.33 US ft • Target Height: 0.00 US ft • Target Length: 52.95 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Highly reflective feature
	**Contact_0051** • Map Projection: SC83F • Click Position 33.4380962760 -78.9433247894 (LocalLL) (X) 2627281.08 (Y) 590107.99 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220613_Line_167.002.jsf • Line Name: BOEM_SSS_20220613_Line_167.002 • Sonar Time at Target: 6/13/2022 8:55:26 AM • Ping Number: 32405 • Heading: 300.690 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 26.79 US ft • Target Height: 0.00 US ft • Target Length: 103.01 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: 3 high intensity reflectors with equidistant spacing and in a line
	**Contact_0052** • Map Projection: SC83F • Click Position 33.4477608977 -78.9485272287 (LocalLL) (X) 2625624.76 (Y) 593591.88 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220613_Line_167.003.jsf • Line Name: BOEM_SSS_20220613_Line_167.003 • Sonar Time at Target: 6/13/2022 9:03:54 AM • Ping Number: 33987 • Heading: 293.500 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 68.64 US ft • Target Height: 0.00 US ft • Target Length: 168.60 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Unknown high intensity reflector

Sidescan Sonar Contact Report

	**Contact_0053** • Map Projection: SC83F • Click Position 33.4589261075 -78.9599516763 (LocalLL) (X) 2622060.97 (Y) 597584.17 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220613_Line_167.003.jsf • Line Name: BOEM_SSS_20220613_Line_167.003 • Sonar Time at Target: 6/13/2022 9:15:32 AM • Ping Number: 36157 • Heading: 296.800 Degrees	**Dimensions and attributes** • Classification1: School of Fish • Target Width: 66.04 US ft • Target Height: 0.00 US ft • Target Length: 29.28 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: School of fish with associated shadow
	**Contact_0054** • Map Projection: SC83F • Click Position 33.4662343962 -78.9649464510 (LocalLL) (X) 2620485.77 (Y) 600212.48 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220613_Line_158.jsf • Line Name: BOEM_SSS_20220613_Line_158 • Sonar Time at Target: 6/13/2022 11:32:29 AM • Ping Number: 61703 • Heading: 231.790 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 21.60 US ft • Target Height: 0.00 US ft • Target Length: 32.01 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Unknown high intensity reflector
	**Contact_0055** • Map Projection: SC83F • Click Position 33.4699568562 -78.9696240644 (LocalLL) (X) 2619033.14 (Y) 601538.45 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220613_Line_167.003.jsf • Line Name: BOEM_SSS_20220613_Line_167.003 • Sonar Time at Target: 6/13/2022 9:26:11 AM • Ping Number: 38142 • Heading: 294.400 Degrees	**Dimensions and attributes** • Classification1: School of Fish • Target Width: 39.71 US ft • Target Height: 0.00 US ft • Target Length: 27.08 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: School of fish with associated shadow
	**Contact_0056** • Map Projection: SC83F • Click Position 33.4776705286 -78.9752265417 (LocalLL) (X) 2617270.26 (Y) 604310.74 (Projected Coordinates) • Acoustic Source File: D:\RAW SSS Data\BOEM_SSS_20220613_Line_157.jsf • Line Name: BOEM_SSS_20220613_Line_157 • Sonar Time at Target: 6/13/2022 10:53:25 AM • Ping Number: 54414 • Heading: 353.690 Degrees	**Dimensions and attributes** • Classification1: Unknown Feature • Target Width: 58.69 US ft • Target Height: 0.00 US ft • Target Length: 39.83 US ft • Target Shadow: 0.00 US ft • Mag Anomaly: • Area: Myrtle • Description: Unknown high intensity reflector

Appendix G: Vibracore logs, photographs, reports, curves (also digital)

Introduction: These appendices contain geotechnical data collected for BOEM Task Order 1, Onslow and Long Bays NC/SC. In 2022, a total of sixty (60) vibracores were collected within the investigation area in North and South Carolina. The vibracore data are provided in the form of vibracore logs, photographs, granularmetric reports, grain size distribution curves/histograms, carbonate analysis report and mini vane shear test results.

1. **2022 APTIM Vibracore Logs**
   This appendix contains sixty (60) vibracore logs. Laboratory and descriptive information for each vibracore is presented on the log sheets. Unified Soils Classification System terminology is used in the core layer descriptions and key grain size information (mean grain size, fines content and sorting) for each vibracore sample is presented under the Remarks column. Multiple layer intervals are sometimes represented by a single sample. The Box or Sample column is used to identify the specific sample that represents a specific layer.

2. **2022 APTIM Vibracore Photographs**
   Photographs of the sixty (60) vibracores are presented in this appendix.

3. **2022 APTIM Individual Vibracore Granularmetric Reports**
   This appendix contains individual granularmetric reports for the vibracore samples collected.

4. **2022 APTIM Individual Vibracore Grain Size Distribution Curves/Histograms (Digital Only)** This appendix contains individual grain size distribution curves/histograms for the vibracore samples collected.

5. **2022 APTIM Vibracore Carbonate Analysis Report**
   This appendix contains a carbonate analysis report for the selected vibracore samples.

6. **2022 APTIM Vibracore Mini Vane Shear Test Results**
   This appendix contains a mini vane shear test report for the associated vibracore.

APPENDIX
2022 APTIM VIBRACORE LOGS

Aptim Environmental & Infrastructure, LLC
6401 Congress Avenue, Suite 140
Boca Raton, Florida 33487
Phone # 1-561-391-8102

Legend for Geotechnical Data

(SP), (SM), etc. Refers to the Army Corps of Engineers Unified Soils Classification System. Class types are defined primarily by grain size, sorting and percent of material passing the 200 sieve. Classification of materials on the core logs based on visual field examinations are identified on the core logs under the Classification of Materials Description. Classifications based on laboratory sieve analyses are identified on the core logs in the Legend and under Remarks.

Grain Size Terms

Unified Soil Classification System (USCS) (ASTM D2487/2488)		APTIM Standard Sieve Stack		
		Sieve Number	Size (phi)	Size (mm)
Gravel	Coarse Gravel	3/4	-4.25	19.03
	Fine Gravel	5/8	-4.00	16.00
		7/16	-3.50	11.20
		5/16	-3.00	8.00
		3 ½	-2.50	5.60
		4	-2.25	4.75
Sand	Coarse Sand	5	-2.00	4.00
		7	-1.50	2.80
		10	-1.00	2.00
	Medium Sand	14	-0.50	1.40
		18	0.00	1.00
		25	0.50	0.71
		35	1.00	0.50
	Fine Sand	45	1.50	0.36
		60	2.00	0.25
		80	2.50	0.18
		120	3.00	0.13
		170	3.50	0.09
		200	3.75	0.08
Fines	Silt/Clay	230	4.00	0.06

Proportional definition of descriptive terms

Descriptive Term	Range of Proportions
Sandy, gravelly, etc.	35 % to 50 %
Some	20 % to 35 %
Little	10 % to 20 %
Trace	1 % to 10 %

Note: Information is after ACOE Atlantic Division Manual # 1110-1-1 titled *Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations*

Aptim Environmental & Infrastructure, LLC
6401 Congress Avenue, Suite 140
Boca Raton, Florida 33487
Phone # 1-561-391-8102

Legend for Geotechnical Data

GW		Well graded gravels or gravel-sand mixtures, little or no fines	ML		Inorganic silts and very fine sands, rock flour, sandy silts or clayey silts with slight plasticity
GP		Poorly graded gravels or gravel-sand mixtures, w/ little or no fines	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soild, elastic silts
GM		Silty gravels, gravel-sand-silt mixtures	OL		Organic silts and organic silt-clays of low plasticity
GC		Clayey gravels, gravel-sand-clay mixtures	OH		Organic clays of medium to high plasticity, organic silts
SW		Well graded sands or gravelly sands, little or no fines	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
SP		Poorly graded sands or gravelly sands, little or no fines	CH		Inorganic clays of high plasticity, fat clays
SM		Silty sands, sand-silt mixtures	PT		Peat and other highly organic soils
SC		Clayey sands, sand-clay mixtures	SP-SM		Poorly-graded silty sand
SW-SM		Well-graded silty sand	SM-SC		Silty clayey sand
GW-GM		Well-graded silty gravel	ML-CL		Inorganic silty lean clay
GM-GC		Clayey silty gravel			

Note: Information is after ACOE Atlantic Division Manual # 1110-1-1 titled *Engineering and Design Geotechnical Manual for Surface and Subsurface Investigations*

Boring Designation BOEMVC-2022-NC-01

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-01 | LOCATION COORDINATES (ft): X = 2,718,444 Y = 299,756

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 8 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-11-22 | COMPLETED: 10-11-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -60.3 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18 Ft.

8. TOTAL DEPTH OF BORING: 18.6 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-60.3	0.0					
-61.3	1.0		SAND, fine grained, quartz, little silt, trace shell fragments, trace shell hash, trace whole shell, shell fragments typically up to 0.5", (1.0" x 0.5") shell fragment @ 0.3', 1.5" shell fragment @ 0.7', (1.0" x 0.25") whole shell @ 0.8', (1.25" x 1.0") shell fragment @ 0.9', very dark gray (N-3/0), (SW-SM).		1	Sample #1, Depth = 0.5' Mean (mm): 0.20, Phi Sorting: 1.40 Fines (230): 11.63% Fines (200): 11.76% (SW-SM)
-62.4	2.1				2	Sample #2, Depth = 1.6' Mean (mm): 0.37, Phi Sorting: 2.01 Fines (230): 7.87% Fines (200): 7.93% (SW-SM)
-63.3	3.0		SAND, fine grained, quartz, little shell hash, trace shell fragments, trace silt, trace whole shell, shell fragments typically up to 1.0", (1.0" x 0.25") whole shell @ 1.1', 0.5" whole shell @ 1.8', (2.0" x 1.75") shell fragment @ 2.0', very dark greenish gray (10Y-3/1), (SW-SM).		3	Sample #3, Depth = 2.6' Mean (mm): 0.16, Phi Sorting: 0.96 Fines (230): 19.60% Fines (200): 20.05% (SM)
			SAND, fine grained, quartz, some silt, trace shell hash, very dark greenish gray (10Y-3/1), (SM).		4	Sample #4, Depth = 4.8' Mean (mm): 0.14, Phi Sorting: 0.70 Fines (230): 44.05% Fines (200): 44.35% (SC)
-66.9	6.6		Clayey SAND, fine grained, quartz, trace shell hash, trace silt, clay is very soft, very dark greenish gray (10Y-3/1), (SC).			
			SAND, fine grained, quartz, little silt, trace clay, trace shell fragments, trace shell hash, trace whole shell, shell fragments and whole shells up to 0.25", clay distributed in pockets typically up to 1.0", (3.0" x 2.0") clay pocket @ 8.2', very dark greenish gray (10Y-3/1), (SM).		5	Sample #5, Depth = 10.0' Mean (mm): 0.14, Phi Sorting: 0.82 Fines (230): 15.25% Fines (200): 15.75% (SM)
-73.7	13.4					
-75.7	15.4		SAND, fine grained, little shell hash, trace rock fragments, trace shell fragments, trace silt, layer comprised of quartz and phosphates, rock fragments are lithified silt and shell hash, shell fragments up to 0.5", (1.0" x 0.5") rock fragment @ 14.3', (3.0" x 2.0") rock fragment @ 14.4', black (N-2.5/0), (SW).		6	Sample #6, Depth = 14.4' Mean (mm): 0.33, Phi Sorting: 1.20 Fines (230): 3.44% Fines (200): 3.52% (SW)
-77.1	16.8		SAND, fine grained, quartz, little shell fragments, little shell hash, trace silt, trace whole shell, shell fragments typically up to 1.0", 2 (2.5" x 1.75") shell fragments @ 15.5', (1.5" x 0.25") whole shell @ 16.1', (1.5" x 1.25") shell fragment @ 16.4', very dark gray (N-3/0), (SW).		7	Sample #7, Depth = 16.0' Mean (mm): 0.51, Phi Sorting: 2.04 Fines (230): 3.83% Fines (200): 3.95% (SW)
-78.3	18.0				8	Sample #8, Depth = 17.5' Mean (mm): 0.24, Phi Sorting: 1.45 Fines (230): 3.99% Fines (200): 4.12% (SW)
-78.9	18.6		SAND, fine grained, quartz, little shell hash, trace shell fragments, trace silt, trace whole shell, shell hash increases with depth in layer, shell fragments and whole shells typically up to 1.5", (2.0" x 1.0") shell fragment @ 17.2', dark gray (N-4/0), (SW).			
			No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-02

DRILLING LOG

DIVISION		**INSTALLATION**	**SHEET 1 OF 1 SHEETS**

1. PROJECT BOEM 2022 Onslow and Long Bays, NC/SC		**9. SIZE AND TYPE OF BIT** 3.0 In.	
		10. COORDINATE SYSTEM/DATUM North Carolina State Plane	**HORIZONTAL** NAD 1983 / **VERTICAL** NAVD 88
2. BORING DESIGNATION BOEMVC-2022-NC-02	**LOCATION COORDINATES (ft)** X = 2,718,858 Y = 274,067	**11. MANUFACTURER'S DESIGNATION OF DRILL** APTIM SEAS VC-700 Vibracore	☐ AUTO HAMMER ☐ MANUAL HAMMER
3. DRILLING AGENCY APTIM	**CONTRACTOR FILE NO.**	**12. TOTAL SAMPLES**	**DISTURBED** 6 / **UNDISTURBED (UD)** 6
4. NAME OF DRILLER Patrick Bryce, P. G.		**13. TOTAL NUMBER CORE BOXES**	
5. DIRECTION OF BORING ☒ VERTICAL ☐ INCLINED	**DEG. FROM VERTICAL** / **BEARING**	**14. ELEVATION GROUND WATER**	
		15. DATE BORING	**STARTED** 10-11-22 / **COMPLETED** 10-11-22
6. THICKNESS OF OVERBURDEN 0.0 Ft.		**16. ELEVATION TOP OF BORING** -66.2 Ft.	
7. DEPTH DRILLED INTO ROCK 0.0 Ft.		**17. TOTAL RECOVERY FOR BORING** 17.4 Ft.	
8. TOTAL DEPTH OF BORING 19.4 Ft.		**18. SIGNATURE AND TITLE OF INSPECTOR** BF	

ELEV. (ft)	DEPTH (ft)	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-66.2	0.0				
		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, 0.5" clay pocket @ 1.3', (0.75" x 0.25") shell fragment @ 2.6', (2.5" x 1.5") shell fragment @ 2.7', 1.0" shelly pocket @ 5.7', shell is shell hash and shell fragments up to 1.0", very dark greenish gray (10Y-3/1), (SP-SM).		1	Sample #1, Depth = 3.0' Mean (mm): 0.16, Phi Sorting: 0.62 Fines (230): 9.21% Fines (200): 9.60% (SP-SM)
-72.2	6.0				
		SAND, fine grained, quartz, trace shell hash, trace silt, shell hash increases with depth in layer, very dark greenish gray (10Y-3/1), (SP).		2	Sample #2, Depth = 6.5' Mean (mm): 0.24, Phi Sorting: 0.73 Fines (230): 3.12% Fines (200): 3.16% (SP)
-73.5	7.3				
-73.8	7.6	SAND, fine grained, quartz, little silt, trace shell hash, very dark greenish gray (10Y-3/1), (SW-SM).		3	
-74.1	7.9			2	
		SAND, fine grained, quartz, trace shell hash, trace silt, very dark greenish gray (10Y-3/1), (SP).		3	Sample #3, Depth = 8.7' Mean (mm): 0.21, Phi Sorting: 0.97 Fines (230): 10.15% Fines (200): 10.27% (SW-SM)
-75.8	9.6	SAND, fine grained, quartz, little silt, trace clay, trace shell hash, clay distributed in laminae, shell hash distributed in laminae and pockets up to 1.0", very dark greenish gray (10Y-3/1), (SW-SM).		4	Sample #4, Depth = 10.1' Mean (mm): 0.72, Phi Sorting: 1.58 Fines (230): 4.59% Fines (200): 4.62% (SW)
-76.7	10.5			5	
-77.2	11.0	Shelly SAND, fine grained, quartz, trace silt, trace whole shell, shell component is shell hash and shell fragments up to 1.5", (1.0" x 0.5") whole shell @ 9.8', dark greenish gray (10Y-4/1), (SW).		6	Sample #5, Depth = 10.7' Mean (mm): 0.72, Phi Sorting: 1.62 Fines (230): 2.25% Fines (200): 2.29% (SW)
-79.2	13.0				
-79.7	13.5	Shelly SAND, fine grained, quartz, trace silt, shell component is shell hash, shell fragments up to 1.0" and whole shells up to 0.5", dark grayish brown (10YR-4/2), (SW).		5	Sample #6, Depth = 12.0' Mean (mm): 0.43, Phi Sorting: 1.17 Fines (230): 1.52% Fines (200): 1.55% (SW)
-80.5	14.3	SAND, fine grained, quartz, some shell hash, trace silt, dark gray (2.5Y-4/1), (SW).		6	
-81.1	14.9	Shelly SAND, fine grained, quartz, trace silt, shell component is shell hash, shell fragments up to 1.0" and whole shells up to 0.5", dark grayish brown (10YR-4/2), (SW).		5	
-83.6	17.4	SAND, fine grained, quartz, some shell hash, trace silt, dark gray (2.5Y-4/1), (SW).		6	
-85.6	19.4	Shelly SAND, fine grained, quartz, trace silt, shell component is shell hash, shell fragments up to 1.0" and whole shells up to 0.5", dark grayish brown (10YR-4/2), (SW).			
		SAND, fine grained, quartz, some shell hash, little shell fragments, trace silt, trace whole shell, shell fragments up to 2.0", whole shells typically up to 0.5", (1.0" x 0.5") whole shell @ 15.9', (2.0" x 1.0") whole shell @ 16.1', 1.0" whole shell @ 15.7', (3.0" x 1.5") shell fragment @ 16.8', (3.0" x 2.0") whole shell @ 17.0', (2.5" x 2.0") shell fragment @ 17.1', bit sample from 16.8' to 17.4', dark gray (2.5Y-4/1), (SW).			
		No Recovery.			
		End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-03

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-03 | LOCATION COORDINATES (ft): X = 2,681,476 Y = 293,102

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 8 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-11-22 | COMPLETED 10-11-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -63.2 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.2 Ft.

8. TOTAL DEPTH OF BORING: 16.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-63.2	0.0					
			SAND, fine grained, quartz, little silt, trace shell fragments, trace shell hash, trace whole shell, shell fragments typically up to 0.5", whole shells up to 0.25", 2 (2.0" x 0.5") shell fragments @ 3.0', (1.25" x 0.5") shell fragment @ 3.6', very dark greenish gray (10Y-3/1), (SW-SM).		1	Sample #1, Depth = 1.7' Mean (mm): 0.19, Phi Sorting: 1.11 Fines (230): 9.94% Fines (200): 10.36% (SW-SM)
-67.5	4.3					
			SAND, fine grained, quartz, some shell hash, trace shell fragments, trace silt, trace whole shell, shell fragments and whole shells up to 2.0", black (N-2.5/0), (SW-SM).		2	Sample #2, Depth = 5.0' Mean (mm): 0.44, Phi Sorting: 1.74 Fines (230): 5.55% Fines (200): 5.63% (SW-SM)
-68.7	5.5					
			SAND, fine grained, quartz, little shell fragments, little silt, trace clay, trace whole shell, shell fragments and whole shells up to 2.0", very dark greenish gray (10Y-3/1), (SM).		3	Sample #3, Depth = 6.2' Mean (mm): 0.45, Phi Sorting: 1.88 Fines (230): 14.20% Fines (200): 14.27% (SM)
-69.9	6.7					
			SAND, fine grained, quartz, little clay, little shell hash, trace shell fragments, trace silt, trace whole shell, clay distributed throughout layer, shell fragments up to 1.0", whole shells up to 1.5", very dark greenish gray (10Y-3/1), (SC).		4	Sample #4, Depth = 7.4' Mean (mm): 0.43, Phi Sorting: 1.65 Fines (230): 15.06% Fines (200): 15.22% (SC)
-71.2	8.0					
			SAND, fine grained, quartz, little shell hash, little silt, trace clay, trace shell fragments, trace whole shell, clay distributed in pockets up to 1.0", shell fragments and whole shells up to 1.0", very dark greenish gray (10Y-3/1), (SW-SM).		5	Sample #5, Depth = 9.1' Mean (mm): 0.34, Phi Sorting: 1.37 Fines (230): 11.75% Fines (200): 11.84% (SW-SM)
-74.9	11.7					
			SHELL, little clay, trace rock fragments, trace sand, fine grained, quartz, trace silt, shell component is shell hash and shell fragments and whole shells up to 3.0", (2.0" x 1.0") rock fragment @ 12.3', (1.5" x 1.0") rock fragment @ 14.9', gray (N-5/0), (SC).		6	Sample #6, Depth = 13.6' Mean (mm): 1.13, Phi Sorting: 2.36 Fines (230): 14.62% Fines (200): 14.70% (SC)
-78.4	15.2					
			SHELL, little rock fragments, trace clay, trace sand, fine grained, quartz, trace silt, shell component is shell hash, shell fragments and whole shells up to 2.5", rock fragments typically up to 1.0", (4.0" x 3.0") rock fragment @ 15.7', (2.0" x 1.5") rock fragment @ 16.2', dark greenish gray (10Y-4/1), (SW-SC).		7	Sample #7, Depth = 15.8' Mean (mm): 2.43, Phi Sorting: 2.08 Fines (230): 9.83% Fines (200): 9.90% (SW-SC)
-79.7	16.5					
-80.4	17.2				8	Sample #8, Depth = 16.8' Mean (mm): 1.27, Phi Sorting: 1.82 Fines (230): 31.33% Fines (200): 31.35% (SC)
			Clayey SHELL HASH, little shell fragments, trace sand, fine grained, quartz, trace silt, shell fragments up to 1.0", expansion from 16.5' to 17.2', very dark gray (2.5Y-3/1), (SC).			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-04

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-04 | LOCATION COORDINATES (ft): X = 2,621,214 Y = 284,398

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 5 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-11-22 | COMPLETED 10-11-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -67.4 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 15.2 Ft.

8. TOTAL DEPTH OF BORING: 15.6 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-67.4	0.0					
-67.6	0.2		SAND, fine to medium grained, quartz, little shell hash, trace silt, trace whole shell, (1.0" x 0.5") whole shell @ 0.1', very dark gray (2.5Y-3/1), (SW).		1	Sample #1, Depth = 0.1' Mean (mm): 0.47, Phi Sorting: 0.91 Fines (230): 3.25% Fines (200): 3.28% (SW)
-71.5	4.1		SAND, fine grained, quartz, little silt, trace shell fragments, trace shell hash, trace whole shell, shell fragments up to 2.0", whole shells up to 1.0", shell increases with depth in layer, very dark gray (2.5Y-3/1), (SW-SM).		2	Sample #2, Depth = 2.3' Mean (mm): 0.30, Phi Sorting: 1.05 Fines (230): 10.98% Fines (200): 11.19% (SW-SM)
-73.6	6.2		SAND, fine grained, quartz, little silt, trace shell hash, very dark gray (2.5Y-3/1), (SM).		3	Sample #3, Depth = 5.0' Mean (mm): 0.15, Phi Sorting: 0.69 Fines (230): 13.96% Fines (200): 14.56% (SM)
-78.8	11.4		SAND, fine grained, quartz, some clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, black (5Y-2.5/1), (SC).		4	Sample #4, Depth = 9.0' Mean (mm): 0.23, Phi Sorting: 0.86 Fines (230): 25.16% Fines (200): 25.44% (SC)
-79.0	11.6		SAND, fine grained, quartz, little silt, trace shell hash, very dark gray (2.5Y-3/1), (SW-SM).		2	
-79.5	12.1		SAND, fine grained, quartz, some clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, black (5Y-2.5/1), (SC).		4	
-81.2	13.8		SAND, fine to medium grained, quartz, some shell hash, trace clay, trace silt, 1.0" clay pocket @ 13.6', dark gray (2.5Y-4/1), (SW-SM).		5	Sample #5, Depth = 13.0' Mean (mm): 1.16, Phi Sorting: 1.19 Fines (230): 5.30% Fines (200): 5.35% (SW-SM)
-82.6	15.2		Shelly SAND, fine grained, quartz, trace silt, shell component is shell hash, layer is partially lithified, dark gray (2.5Y-4/1), (GW).			
-83.0	15.6		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-05

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-05

LOCATION COORDINATES (ft): X = 2,475,048 Y = 234,784

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore

☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM

CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 6 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-12-22 | COMPLETED 10-12-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -51.5 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.3 Ft.

8. TOTAL DEPTH OF BORING: 19.4 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-51.5	0.0					
-52.2	0.7		SAND, fine grained, quartz, some silt, trace rock fragments, trace shell fragments, trace shell hash, shell fragments up to 0.5", (1.25" x 1.0") fragment of lithified silt and shell hash @ 0.6', very dark greenish gray (10Y-3/1), (SM).		1	Sample #1, Depth = 0.4' Mean (mm): 0.18, Phi Sorting: 1.39 Fines (230): 20.83% Fines (200): 21.20% (SM)
-52.8	1.3		Shelly SAND, fine grained, quartz, trace rock fragments, trace shell fragments, trace silt, shell fragments up to 0.5", 1.0" rock fragment @ 0.8', gray (5Y-5/1), (SW-SM).		2	Sample #2, Depth = 1.0' Mean (mm): 0.88, Phi Sorting: 1.45 Fines (230): 8.32% Fines (200): 8.40% (SW-SM)
-57.0	5.5		SAND, fine grained, quartz, some shell hash, trace clay, trace rock fragments, trace silt, rock fragments are lithified silt typically up to 1.0", (3.0" x 1.0") rock fragment @ 2.1', (3.0" x 2.5") rock fragment @ 2.8', (2.0" x1.0") clay pocket @ 1.8' and 4.0', (3.0" x 0.5") clay pocket @ 4.4', 1.5" rock fragment @ 5.4', light olive gray (5Y-6/2), (SW-SM).		3	Sample #3, Depth = 3.4' Mean (mm): 0.44, Phi Sorting: 1.91 Fines (230): 8.32% Fines (200): 8.40% (SW-SM)
-63.5	12.0		SAND, fine grained, quartz, trace clay, trace rock fragments, trace shell hash, trace silt, rock fragments are limestone typically up to 2.0", 1.0" clay pocket @ 6.5', (2.5" x 1.0") limestone fragment @ 6.8', (3.0" x 2.0") limestone fragment @ 8.7', (2.5"x 1.0") limestone fragment @ 9.8', 2 (2.5" x 1.5") limestone fragments @ 11.3', gray (5Y-6/1), (SP-SM).		4	Sample #4, Depth = 7.6' Mean (mm): 0.20, Phi Sorting: 0.78 Fines (230): 10.77% Fines (200): 10.86% (SP-SM)
-66.8	15.3		SAND, fine grained, quartz, little silt, trace rock fragments, trace shell hash, rock fragments are typically limestone, (2.0" x 1.5") limestone fragment @ 12.1', (2.0" x 1.5") fragment of lithified sand @ 12.8' and 13.1', (3.0" x 2.0") limestone fragment @ 13.9', pocket of limestone fragments up to 2.0" @ 15.0', light yellowish brown (2.5Y-6/3), (SW-SM).		5	Sample #5, Depth = 13.5' Mean (mm): 0.21, Phi Sorting: 0.92 Fines (230): 11.83% Fines (200): 11.89% (SW-SM)
-69.8	18.3		SAND, fine grained, quartz, some rock fragments, little silt, trace shell hash, rock fragments are limestone fragments up to 3.0", bit sample from 18.1' to 18.3', light yellowish brown (2.5Y-6/3), (SW-SM).		6	Sample #6, Depth = 16.8' Mean (mm): 0.99, Phi Sorting: 2.47 Fines (230): 11.01% Fines (200): 11.21% (SW-SM)
-70.9	19.4		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-06

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-06 | LOCATION COORDINATES (ft): X = 2,482,826 Y = 229,322

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 5 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-12-22 | COMPLETED: 10-12-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -53.7 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 16.7 Ft.

8. TOTAL DEPTH OF BORING: 18.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-53.7	0.0					
-55.4	1.7		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in laminae, dark greenish gray (10Y-4/1), (SP-SM).		1	Sample #1, Depth = 1.0' Mean (mm): 0.14, Phi Sorting: 0.38 Fines (230): 9.12% Fines (200): 9.44% (SP-SM)
-56.7	3.0		Sandy CLAY, soft, little rock fragments, trace shell fragments, trace silt, rock is limestone fragments up to 1.5", shell fragments up to 1.0", very dark gray (N-3/0), (CL).			
-58.9	5.2		SAND, fine grained, quartz, some clay, trace shell fragments, trace shell hash, trace silt, clay distributed in pockets up to 1.5" and laminae, shell fragments up to 0.25", gray (5Y-5/1), (SP-SC).		2	Sample #2, Depth = 4.0' Mean (mm): 0.19, Phi Sorting: 0.76 Fines (230): 11.58% Fines (200): 11.70% (SP-SC)
-60.1	6.4		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, silt and clay distributed in laminae, shell fragments up to 0.25", gray (2.5Y-5/1), (SW-SM).		3	Sample #3, Depth = 5.8' Mean (mm): 0.21, Phi Sorting: 1.04 Fines (230): 11.48% Fines (200): 11.59% (SW-SM)
-70.4	16.7		SAND, fine grained, quartz, little silt, trace rock fragments, trace shell fragments, trace shell hash, rock fragments are limestone fragments typically up to 1.0", shell fragments up to 0.25", 2 (3.0") limestone fragments @ 8.2', 2 (1.25") limestone fragments @ 13.8', (2.5" x 1.5") limestone fragment @ 13.9' and 14.0', (2.0" x 1.0") limestone fragment @ 14.5' and 14.7', (2.5" x 2.0") limestone fragment @ 15.2', bit sample from 16.3' to 16.7', light olive brown (2.5Y-5/3), (SM).		4	Sample #4, Depth = 10.0' Mean (mm): 0.22, Phi Sorting: 1.08 Fines (230): 12.73% Fines (200): 12.82% (SM)
					5	Sample #5, Depth = 14.0' Mean (mm): 0.28, Phi Sorting: 1.16 Fines (230): 13.53% Fines (200): 13.64% (SM)
-72.0	18.3		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-07

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-07 | LOCATION COORDINATES (ft): X = 2,483,283 Y = 214,361

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 5 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-12-22 | COMPLETED 10-12-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -59.9 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.5 Ft.

8. TOTAL DEPTH OF BORING: 18.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-59.9	0.0					
-61.3	1.4		Shelly SAND, fine grained, quartz, trace rock fragments, trace silt, shell component is shell hash, shell fragments typically up to 1.0" and whole shells up to 1.0", rock fragments are limestone fragments up to 1.5" (3.0" x 2.0") shell fragment @ 0.9', very dark gray (N-3/0), (SW-SM).		1	Sample #1, Depth = 0.8' Mean (mm): 0.76, Phi Sorting: 2.14 Fines (230): 6.21% Fines (200): 6.27% (SW-SM)
-62.8	2.9		SAND, fine grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, dark gray (N-4/0), (SC).		2	Sample #2, Depth = 2.2' Mean (mm): 0.37, Phi Sorting: 1.27 Fines (230): 13.22% Fines (200): 13.25% (SC)
-64.6	4.7		SAND, fine grained, quartz, little clay, little shell hash, trace rock fragments, trace shell fragments, trace silt, rock fragments are limestone fragments up to 2.0", shell fragments typically up to 1.0", (3.0" x 2.0") shell fragment @ 3.1', 2 (1.5") shell fragments @ 3.0', dark gray (N-4/0), (SC).		3	Sample #3, Depth = 3.7' Mean (mm): 1.13, Phi Sorting: 2.45 Fines (230): 12.11% Fines (200): 12.22% (SC)
-73.9	14.0		SAND, fine grained, quartz, little shell hash, trace silt, clay, clay distributed in pockets up to 2.0", dark greenish gray (10Y-4/1), (SC).		4	Sample #4, Depth = 9.0' Mean (mm): 0.26, Phi Sorting: 1.09 Fines (230): 23.63% Fines (200): 23.70% (SC)
-78.4	18.5		SAND, fine grained, quartz, some clay, trace shell hash, trace silt, clay distributed in pockets up to 1.5", clay decreases with depth in layer, expansion from 18.2' to 18.5', dark greenish gray (10Y-4/1), (SC).		5	Sample #5, Depth = 16.0' Mean (mm): 0.22, Phi Sorting: 0.83 Fines (230): 30.57% Fines (200): 30.61% (SC)
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-08

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-08 | LOCATION COORDINATES (ft): X = 2,473,161 Y = 214,174

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 1 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-12-22 | COMPLETED 10-12-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -56.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 14.2 Ft.

8. TOTAL DEPTH OF BORING: 15.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-56.8	0.0					
-59.4	2.6		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, silt distributed in laminae, silt increases with depth in layer, shell fragments typically up to 1.0", (3.0" x 2.5") shell fragment @ 0.8', dark greenish gray (10Y-4/1), (SW).		1	Sample #1, Depth = 1.2' Mean (mm): 0.20, Phi Sorting: 0.97 Fines (230): 2.76% Fines (200): 2.83% (SW)
-66.0	9.2		CLAY, very stiff, some sand, fine grained, quartz, trace shell hash, trace silt, black (N-2.5/0), (CL).		T1	Sample #T1, Depth = 7.0' Ave. Field Vane (tsf): 0.20
-71.0	14.2		CLAY, stiff, some sand, fine grained, quartz, trace rock fragments, trace shell hash, rock fragments are limestone, (3.0" x 2.0") limestone fragment at bottom of core, black (N-2.5/0), (CL).		T2	Sample #T2, Depth = 12.3' Ave. Field Vane (tsf): 0.13
-72.3	15.5		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-09

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-09 | LOCATION COORDINATES (ft): X = 2,466,902 Y = 218,615

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 5 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-12-22 | COMPLETED: 10-12-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -54.1 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 19.2 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-54.1	0.0					
-55.5	1.4		SAND, fine grained, quartz, little shell hash, little silt, trace clay, trace rock fragments, trace shell fragments, trace whole shell, clay distributed in laminae, shell fragments typically up to 1.0", whole shells up to 0.25", 1.0" limestone fragment @ 0.4', (2.0" x 1.0") shell fragment @ 1.0', very dark gray (N-3/0), (SW-SM).		1	Sample #1, Depth = 0.7' Mean (mm): 0.38, Phi Sorting: 1.40 Fines (230): 11.88% Fines (200): 11.91% (SW-SM)
-58.5	4.4		SAND, fine grained, quartz, some clay, little shell hash, trace shell fragments, trace silt, clay distributed in pockets up to 1.5" and laminae, shell fragments up to 1.5", very dark gray (N-3/0), (SC).		2	Sample #2, Depth = 3.0' Mean (mm): 0.71, Phi Sorting: 2.08 Fines (230): 19.24% Fines (200): 19.35% (SC)
-62.4	8.3		SAND, fine grained, quartz, some clay, trace rock fragments, trace shell hash, trace silt, clay distributed in pockets up to 2.0", rock fragments are limestone fragments typically up to 1.0", 2.0" limestone fragment @ 6.7', very dark gray (N-3/0), (SC).		3	Sample #3, Depth = 6.2' Mean (mm): 0.31, Phi Sorting: 1.37 Fines (230): 19.04% Fines (200): 19.11% (SC)
-70.4	16.3		SAND, fine grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0", very dark greenish gray (10Y-3/1), (SC).		4	Sample #4, Depth = 12.0' Mean (mm): 0.19, Phi Sorting: 0.69 Fines (230): 12.11% Fines (200): 12.21% (SC)
-73.3	19.2		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, bit sample from 18.8' to 19.2', dark greenish gray (10Y-4/1), (SP-SM).		5	Sample #5, Depth = 17.7' Mean (mm): 0.17, Phi Sorting: 0.61 Fines (230): 11.44% Fines (200): 11.54% (SP-SM)
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-10

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-10 | LOCATION COORDINATES (ft): X = 2,463,015 Y = 198,943

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-13-22 | COMPLETED: 10-13-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -63.2 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 14.5 Ft.

8. TOTAL DEPTH OF BORING: 16.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-63.2	0.0					
-66.8	3.6		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, silt distributed in laminae, shell hash increases with depth in layer, shell fragments typically up to 0.25", (3.0" x 1.0") shell hash pocket @ 0.0', 1.1' and 2.8', (2.0" x 1.0") clay pocket @ 1.3', 1.0" clay pocket @ 1.7', (2.0" x 1.0") shell fragment @ 2.0' and 3.0', 0.5" shell fragment @ 2.3', 1.0" shell fragment @ 3.3', dark greenish gray (10Y-4/1), (SP).		1	Sample #1, Depth = 1.8' Mean (mm): 0.24, Phi Sorting: 0.77 Fines (230): 2.35% Fines (200): 2.36% (SP)
-75.2	12.0		SAND, fine grained, quartz, little silt, trace clay, trace shell fragments, trace shell hash, clay distributed in laminae, shell fragments typically up to 0.25", shell hash decreases with depth in layer, 0.5" shell fragment @ 6.7', (1.5" x 1.0") shell fragment @ 8.1', very dark greenish gray (10Y-3/1), (SM).		2	Sample #2, Depth = 6.6' Mean (mm): 0.19, Phi Sorting: 0.86 Fines (230): 10.55% Fines (200): 10.68% (SW-SM)
					3	Sample #3, Depth = 9.6' Mean (mm): 0.20, Phi Sorting: 0.90 Fines (230): 11.93% Fines (200): 12.07% (SM)
-77.7	14.5		SAND, fine grained, quartz, trace shell hash, trace silt, silt distributed in laminae, dark gray (2.5Y-4/1), (SP).		4	Sample #4, Depth = 13.4' Mean (mm): 0.17, Phi Sorting: 0.37 Fines (230): 4.59% Fines (200): 4.73% (SP)
-79.2	16.0		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-11

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-11 | LOCATION COORDINATES (ft): X = 2,458,567 Y = 205,890

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-13-22 | COMPLETED: 10-13-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -57.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.8 Ft.

8. TOTAL DEPTH OF BORING: 19.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-57.8	0.0					
			SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, clay distributed in laminae, silt increases with depth in layer, shell fragments and whole shells up to 1.0", (2.0" x 1.0") shell fragment @ 2.6', (3.0" x 2.0") shelly pocket @ 3.2', shell component is shell hash and shell fragments and whole shells up to 1.5", dark gray (N-4/0), (SP).		1	Sample #1, Depth = 1.7' Mean (mm): 0.21, Phi Sorting: 0.75 Fines (230): 2.17% Fines (200): 2.24% (SP)
-61.2	3.4					
			SAND, fine grained, quartz, little silt, trace clay, trace shell hash, clay distributed in laminae, very dark gray (N-3/0), (SP-SM).		2	Sample #2, Depth = 6.0' Mean (mm): 0.13, Phi Sorting: 0.42 Fines (230): 10.35% Fines (200): 10.79% (SP-SM)
-66.3	8.5					
			SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0", dark greenish gray (10Y-4/1), (SP-SC).		3	Sample #3, Depth = 13.3' Mean (mm): 0.13, Phi Sorting: 0.31 Fines (230): 10.19% Fines (200): 10.60% (SP-SC)
-74.6	16.8					
-75.6	17.8		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, (2.0" x 1.0") whole shell @ 16.9', dark greenish gray (10Y-4/1), (SP). No Recovery.		4	Sample #4, Depth = 17.5' Mean (mm): 0.18, Phi Sorting: 0.37 Fines (230): 2.93% Fines (200): 2.96% (SP)
-77.1	19.3		End of Boring			

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-12

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-12 | LOCATION COORDINATES (ft): X = 2,454,726 Y = 212,442

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-13-22 | COMPLETED: 10-13-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -54.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 16.5 Ft.

8. TOTAL DEPTH OF BORING: 19.4 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-54.8	0.0					
-57.1	2.3		SAND, fine grained, quartz, little shell hash, trace rock fragments, trace shell fragments, trace silt, trace whole shell, silt increases with depth in layer, shell fragments up to 2.0", whole shells up to 1.0", 3.0" limestone fragment @ 1.2', very dark greenish gray (10Y-3/1), (SW).		1	Sample #1, Depth = 1.0' Mean (mm): 0.31, Phi Sorting: 0.88 Fines (230): 2.77% Fines (200): 2.78% (SW)
-63.2	8.4		SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, trace whole shell, clay distributed in laminae, shell fragments up to 0.25", whole shells up to 1.0", very dark greenish gray (10Y-3/1), (SW).		2	Sample #2, Depth = 5.0' Mean (mm): 0.34, Phi Sorting: 1.25 Fines (230): 4.88% Fines (200): 4.95% (SW)
-67.6	12.8		SAND, fine grained, quartz, little shell hash, trace clay, trace silt, clay distributed in pockets up to 1.5" and laminae, very dark greenish gray (10Y-3/1), (SW-SC).		3	Sample #3, Depth = 11.0' Mean (mm): 0.24, Phi Sorting: 1.11 Fines (230): 9.15% Fines (200): 9.27% (SW-SC)
-69.6	14.8		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in laminae, dark gray (2.5Y-4/1), (SW).		4	Sample #4, Depth = 13.8' Mean (mm): 0.29, Phi Sorting: 0.91 Fines (230): 2.49% Fines (200): 2.55% (SW)
-71.3	16.5		SAND, fine grained, quartz, little shell hash, trace clay, trace silt, clay distributed in laminae, very dark greenish gray (10Y-3/1), (SW-SC).		3	
-74.2	19.4		No Recovery.			
			End of Boring			

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BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-13

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

2. BORING DESIGNATION: BOEMVC-2022-NC-13
LOCATION COORDINATES (ft): X = 2,452,585 Y = 216,526

3. DRILLING AGENCY: APTIM
CONTRACTOR FILE NO.:

4. NAME OF DRILLER: Patrick Bryce, P. G.

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL:
BEARING:

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

8. TOTAL DEPTH OF BORING: 19.1 Ft.

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane
HORIZONTAL: NAD 1983
VERTICAL: NAVD 88

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore
☐ AUTO HAMMER ☐ MANUAL HAMMER

12. TOTAL SAMPLES: DISTURBED 6 UNDISTURBED (UD) 0

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-13-22 COMPLETED 10-13-22

16. ELEVATION TOP OF BORING: -53.6 Ft.

17. TOTAL RECOVERY FOR BORING: 18.1 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-53.6	0.0					
-54.8	1.2		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell hash decreases with depth in layer, (2.0" x 1.0") shell fragment @ 0.2', dark greenish gray (10Y-4/1), (SP-SM).		1	Sample #1, Depth = 0.8' Mean (mm): 0.15, Phi Sorting: 0.41 Fines (230): 6.82% Fines (200): 6.92% (SP-SM)
-56.7	3.1		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in laminae, very dark greenish gray (10Y-3/1), (SP-SM).		2	Sample #2, Depth = 2.2' Mean (mm): 0.15, Phi Sorting: 0.50 Fines (230): 9.62% Fines (200): 9.75% (SP-SM)
-63.4	9.8		SAND, fine grained, quartz, some clay, little silt, trace shell fragments, trace shell hash, trace whole shell, clay distributed in pockets up to 2.0" and laminae, shell fragments and whole shells up to 0.25", very dark greenish gray (10Y-3/1), (SC).		3	Sample #3, Depth = 6.0' Mean (mm): 0.14, Phi Sorting: 0.59 Fines (230): 16.00% Fines (200): 16.63% (SC)
-66.2	12.6		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, dark gray (2.5Y-4/1), (SP).		4	Sample #4, Depth = 11.4' Mean (mm): 0.24, Phi Sorting: 0.80 Fines (230): 3.56% Fines (200): 3.61% (SP)
-70.7	17.1		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", (2.0"x 1.0") whole shell @ 15.0', 1.0" whole shell @ 15.4', 15.7' and 15.8', dark gray (2.5Y-4/1), (SW).		5	Sample #5, Depth = 15.0' Mean (mm): 0.26, Phi Sorting: 0.86 Fines (230): 2.75% Fines (200): 2.87% (SW)
-71.7	18.1		SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, clay distributed in pockets up to 1.0", shell fragments up to 0.5", dark gray (2.5Y-4/1), (SW).		6	Sample #6, Depth = 17.6' Mean (mm): 0.41, Phi Sorting: 1.23 Fines (230): 3.69% Fines (200): 3.73% (SW)
-72.7	19.1		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-14

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-14 | LOCATION COORDINATES (ft): X = 2,452,244 Y = 206,728

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 6 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-13-22 | COMPLETED 10-13-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -61.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.8 Ft.

8. TOTAL DEPTH OF BORING: 19.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-61.0	0.0					
-61.6	0.6		SAND, fine grained, quartz, some shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", whole shells typically up to 1.0", (2.0" x 1.0") whole shell @ 0.5', dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 0.3' Mean (mm): 0.48, Phi Sorting: 2.35 Fines (230): 3.90% Fines (200): 3.95% (SW)
-62.0	1.0				2	
-63.5	2.5		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 1.0", dark gray (2.5Y-4/1), (SP).		3	Sample #2, Depth = 0.8' Mean (mm): 0.20, Phi Sorting: 0.70 Fines (230): 3.78% Fines (200): 3.86% (SP)
-68.3	7.3		SAND, fine grained, quartz, trace shell hash, trace silt, dark gray (2.5Y-4/1), (SP-SM). SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", (2.0" x 1.0") whole shell @ 7.1', very dark greenish gray (10Y-3/1), (SP).		4	Sample #3, Depth = 1.7' Mean (mm): 0.18, Phi Sorting: 0.77 Fines (230): 9.14% Fines (200): 9.24% (SP-SM) Sample #4, Depth = 5.0' Mean (mm): 0.21, Phi Sorting: 0.69 Fines (230): 3.64% Fines (200): 3.70% (SP)
-73.6	12.6		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, dark greenish gray (10Y-4/1), (SP-SM).		5	Sample #5, Depth = 9.8' Mean (mm): 0.17, Phi Sorting: 0.34 Fines (230): 5.97% Fines (200): 6.09% (SP-SM)
-78.8	17.8		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, silt and clay distributed in laminae, silt and clay increase with depth in layer, mottled very dark gray (2.5Y-3/1) with, dark gray (2.5Y-4/1), (SP).		6	Sample #6, Depth = 15.0' Mean (mm): 0.17, Phi Sorting: 0.36 Fines (230): 4.61% Fines (200): 4.70% (SP)
-80.0	19.0		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-15

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-15 | LOCATION COORDINATES (ft): X = 2,437,974 Y = 203,649

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -51.2 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 15.6 Ft.

8. TOTAL DEPTH OF BORING: 15.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-51.2	0.0					
-53.2	2.0		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", (2.0" x 1.0") whole shell @ 0.8', very dark gray (2.5Y-3/1), (SW).		1	Sample #1, Depth = 1.0' Mean (mm): 0.40, Phi Sorting: 1.03 Fines (230): 1.41% Fines (200): 1.43% (SW)
-56.4	5.2		SAND, fine grained, quartz, little silt, trace clay, trace shell fragments, trace shell hash, trace whole shell, clay distributed in pockets up to 0.5", clay increases with depth in layer, shell fragments and whole shells up to 2.0", shell decreases with depth in layer, very dark greenish gray (10Y-3/1), (SM).		2	Sample #2, Depth = 3.3' Mean (mm): 0.22, Phi Sorting: 1.21 Fines (230): 24.17% Fines (200): 24.32% (SM)
-59.6	8.4		SAND, fine grained, quartz, some clay, trace shell fragments, trace shell hash, trace silt, clay is soft, shell fragments up to 0.5", very dark greenish gray (10Y-3/1), (SC).		3	Sample #3, Depth = 6.7' Mean (mm): 0.22, Phi Sorting: 1.22 Fines (230): 23.51% Fines (200): 23.78% (SC)
-66.8	15.6		SAND, fine grained, quartz, little silt, trace clay, trace rock fragments, trace shell hash, clay distributed in laminae, (3.0" x 1.5") limestone fragment @ 11.7', bit sample from 15.3' to 15.6', expansion from 15.5' to 15.6', olive gray (5Y-5/2), (SM).		4	Sample #4, Depth = 12.0' Mean (mm): 0.18, Phi Sorting: 1.25 Fines (230): 22.47% Fines (200): 22.79% (SM)
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-16

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-16 | LOCATION COORDINATES (ft): X = 2,457,246 Y = 193,514

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 3 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -63.6 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.8 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-63.6	0.0					
			SAND, fine grained, quartz, some shell hash, little shell fragments, little silt, little whole shell, trace clay, clay distributed in pockets up to 1.5", shell fragments up to 2.0", whole shells up to 0.25", very dark greenish gray (10Y-3/1), (SW-SM).		1	Sample #1, Depth = 1.8' Mean (mm): 0.30, Phi Sorting: 1.60 Fines (230): 10.69% Fines (200): 10.85% (SW-SM)
-67.3	3.7					
			SAND, fine grained, quartz, little silt, trace clay, trace shell hash, clay distributed in pockets up to 1.0", silt distributed in laminae, shell hash increases with depth in layer, dark greenish gray (10Y-4/1), (SP-SM).		2	Sample #2, Depth = 7.5' Mean (mm): 0.19, Phi Sorting: 0.73 Fines (230): 10.48% Fines (200): 10.52% (SP-SM)
-75.6	12.0					
			SAND, fine grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0" and laminae, bit sample from 18.6' to 18.8', olive gray (5Y-4/2), (SC).		3	Sample #3, Depth = 16.5' Mean (mm): 0.16, Phi Sorting: 0.57 Fines (230): 15.65% Fines (200): 15.98% (SC)
-82.4	18.8					
-82.8	19.2		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-17

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-17 | LOCATION COORDINATES (ft): X = 2,447,124 Y = 195,190

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -52.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.8 Ft.

8. TOTAL DEPTH OF BORING: 18.7 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-52.8	0.0					
-55.9	3.1		SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, clay distributed in pockets up to 1.0", shell fragments up to 2.0", very dark gray (N-3/0), (SW-SM).		1	Sample #1, Depth = 1.5' Mean (mm): 0.36, Phi Sorting: 1.63 Fines (230): 4.97% Fines (200): 5.01% (SW-SM)
-61.8	9.0		SAND, fine grained, quartz, some clay, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 2.0" and laminae, shell hash decreases with depth in layer, (2.5" x 2.0") whole shell @ 3.3', (2.0" x 0.5") whole shell @ 3.4', 0.5" whole shell @ 3.9', very dark gray (N-3/0), (SC).		2	Sample #2, Depth = 5.6' Mean (mm): 0.30, Phi Sorting: 1.35 Fines (230): 21.89% Fines (200): 21.95% (SC)
-70.6	17.8		SAND, fine grained, quartz, little clay, trace rock fragments, trace shell hash, trace silt, clay distributed in pockets up to 2.0" and laminae, 2.0" limestone fragments @ 10.8' and 15.3', (3.0" x 2.0") limestone fragment @ 12.4', 3 (1.0") limestone fragments @ 13.0', 3.0" limestone fragment @ 14.2', 1.0" limestone fragment @ 17.2', bit sample from 17.7' to 17.8', mottled dark greenish gray (10Y-4/1) with, gray (2.5Y-5/1), (SC).		3	Sample #3, Depth = 11.5' Mean (mm): 0.22, Phi Sorting: 0.63 Fines (230): 11.45% Fines (200): 11.49% (SP-SC)
					4	Sample #4, Depth = 15.0' Mean (mm): 0.30, Phi Sorting: 0.94 Fines (230): 12.08% Fines (200): 12.12% (SC)
-71.5	18.7		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-18

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-18 | LOCATION COORDINATES (ft): X = 2,446,698 Y = 191,413

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -58.6 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 19.2 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-58.6	0.0					
-59.6	1.0		SAND, fine grained, quartz, some shell hash, little shell fragments, trace coral, trace silt, trace whole shell, shell fragments up to 1.5", (2.0" x 0.5") whole shell @ 0.2', (2.0" x 1.5") coral fragment @ 0.6', dark gray (2.5Y-4/1), (SW-SM).		1	Sample #1, Depth = 0.5' Mean (mm): 0.65, Phi Sorting: 2.00 Fines (230): 6.15% Fines (200): 6.22% (SW-SM)
-63.0	4.4		SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, trace whole shell, clay distributed in pockets up to 0.5", shell fragments up to 2.0", whole shells up to 1.5", very dark greenish gray (10Y-3/1), (SW-SM).		2	Sample #2, Depth = 2.6' Mean (mm): 0.36, Phi Sorting: 1.50 Fines (230): 9.62% Fines (200): 9.67% (SW-SM)
-71.1	12.5		SAND, fine grained, quartz, little clay, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 2.0", clay is soft, whole shells up to 0.25", very dark greenish gray (10Y-3/1), (SC).		3	Sample #3, Depth = 8.0' Mean (mm): 0.21, Phi Sorting: 1.00 Fines (230): 17.42% Fines (200): 17.51% (SC)
-77.8	19.2		SAND, fine grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0" and laminae decreasing with depth in layer, clay is soft, bit sample from 19.0' to 19.2', expansion from 19.1' to 19.2', dark gray (2.5Y-4/1), (SC).		4	Sample #4, Depth = 15.0' Mean (mm): 0.15, Phi Sorting: 0.39 Fines (230): 13.61% Fines (200): 13.80% (SC)
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-19

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-19 | LOCATION COORDINATES (ft): X = 2,442,223 Y = 179,544

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 5 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -61.4 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.2 Ft.

8. TOTAL DEPTH OF BORING: 19.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-61.4	0.0					
-62.3	0.9		SAND, fine grained, quartz, little shell fragments, little shell hash, trace silt, trace whole shell, shell fragments typically up to 1.5", whole shells up to 0.5", (3.0" x 2.0") shell fragment @ 0.5', (2.0" x 1.0") shell fragment @ 0.7', dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 0.4' Mean (mm): 0.32, Phi Sorting: 1.52 Fines (230): 1.97% Fines (200): 2.00% (SW)
-65.4	4.0		SAND, fine grained, quartz, trace shell hash, trace silt, dark gray (2.5Y-4/1), (SP-SM).		2	Sample #2, Depth = 2.0' Mean (mm): 0.15, Phi Sorting: 0.45 Fines (230): 8.46% Fines (200): 8.81% (SP-SM)
					3	Sample #3, Depth = 7.0' Mean (mm): 0.14, Phi Sorting: 0.34 Fines (230): 12.38% Fines (200): 12.70% (SC)
-75.0	13.6		SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 1.0" and laminae, whole shells up to 0.25", dark gray (N-4/0), (SC).		4	Sample #4, Depth = 11.0' Mean (mm): 0.13, Phi Sorting: 0.33 Fines (230): 14.77% Fines (200): 15.54% (SC)
-79.6	18.2		SAND, fine grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0", very dark greenish gray (10Y-3/1), (SC).		5	Sample #5, Depth = 16.0' Mean (mm): 0.14, Phi Sorting: 0.58 Fines (230): 15.96% Fines (200): 16.67% (SC)
-80.7	19.3		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-20

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-20 | LOCATION COORDINATES (ft): X = 2,432,531 Y = 188,316

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 3 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -55.6 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.3 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-55.6	0.0					
			SAND, fine grained, quartz, little shell hash, trace rock fragments, trace shell fragments, trace silt, trace whole shell, whole shells up to 1.0", (2.0" x 1.0") shell fragment @ 1.4', 0.5" limestone fragment @ 0.9', dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 0.7' Mean (mm): 0.37, Phi Sorting: 1.44 Fines (230): 1.75% Fines (200): 1.78% (SW)
-57.1	1.5					
					2	Sample #2, Depth = 7.0' Mean (mm): 0.13, Phi Sorting: 0.40 Fines (230): 24.60% Fines (200): 25.36% (SC)
			SAND, fine grained, quartz, some clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0" and laminae, clay is soft, very dark greenish gray (10Y-3/1), (SC).			
					3	Sample #3, Depth = 12.0' Mean (mm): 0.12, Phi Sorting: 0.34 Fines (230): 18.30% Fines (200): 19.84% (SC)
-73.9	18.3					
-74.8	19.2		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-21

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-21 | LOCATION COORDINATES (ft): X = 2,428,519 Y = 194,339

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 3 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-14-22 | COMPLETED: 10-14-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -56.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.3 Ft.

8. TOTAL DEPTH OF BORING: 17.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-56.0	0.0					
			SAND, fine grained, quartz, little shell hash, trace shell fragments, trace silt, trace whole shell, shell fragments typically up to 0.25", whole shells up to 0.25", (1.0" x 0.25") shell fragment @ 1.5', 2.5" shell fragment @ 7.6', (2.0" x 1.0") shell fragment @ 11.6', dark gray (2.5Y-4/1), (SW-SM).		1	Sample #1, Depth = 4.0' Mean (mm): 0.21, Phi Sorting: 1.07 Fines (230): 6.76% Fines (200): 6.84% (SW-SM)
					2	Sample #2, Depth = 8.0' Mean (mm): 0.21, Phi Sorting: 1.13 Fines (230): 4.11% Fines (200): 4.20% (SW)
-68.3	12.3					
			SAND, fine grained, quartz, some shell hash, trace silt, dark gray (2.5Y-4/1), (SW).		3	Sample #3, Depth = 15.0' Mean (mm): 0.37, Phi Sorting: 1.75 Fines (230): 1.94% Fines (200): 1.99% (SW)
-73.3	17.3					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-22

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-22 | LOCATION COORDINATES (ft): X = 2,395,561 Y = 136,504

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 4 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-15-22 | COMPLETED 10-15-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -50.1 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.5 Ft.

8. TOTAL DEPTH OF BORING: 18.7 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-50.1	0.0					
			SAND, fine to medium grained, quartz, little shell hash, trace shell fragments, trace silt, shell fragments typically up to 0.75", dark gray (2.5Y-4/1), (SP).		1	Sample #1, Depth = 2.0' Mean (mm): 0.23, Phi Sorting: 0.76 Fines (230): 2.88% Fines (200): 2.92% (SP)
-54.3	4.2					
			SAND, fine to medium grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, shell fragments typically up to 0.75", (1.75" x 0.75") shell fragment @ 7.4', 2.0" clay pocket @ 8.2', dark gray (2.5Y-4/1), (SW).		2	Sample #2, Depth = 6.4' Mean (mm): 0.27, Phi Sorting: 1.07 Fines (230): 1.75% Fines (200): 1.79% (SW)
-59.3	9.2					
-60.0	9.9		SHELL HASH, some rock fragments, little clay, little shell fragments, trace sand, rock fragments are limestone fragments typically up to 1.0", shell fragments typically up to 1.0", (1.25" x 1.0") shell fragment @ 9.2', (2.75" x 1.5") limestone fragment @ 9.4', (2.25" x 1.25") limestone fragment @ 9.5', 2.0" shell fragment @ 9.6', (3.25" x 2.0") limestone fragment @ 9.6' and 9.8', gray (N-5/0), (GC).			
-60.5	10.4		CLAY, very soft, some shell hash, little rock fragments, trace silt, trace whole shell, rock fragments are limestone fragments up to 0.75", whole shells up to 0.5", dark gray (N-4/0), (CL).		3	Sample #3, Depth = 12.0' Mean (mm): 0.21, Phi Sorting: 0.79 Fines (230): 20.78% Fines (200): 20.87% (SC)
			SAND, fine to medium grained, quartz, little clay, trace rock fragments, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, (1.75" x 1.25") rock fragment @ 13.9', (1.75" x 1.5") limestone fragment @ 16.7', mottled light olive gray (5Y-6/2) with, dark gray (N-4/0), (SC).		4	Sample #4, Depth = 16.2' Mean (mm): 0.20, Phi Sorting: 0.72 Fines (230): 15.17% Fines (200): 15.31% (SC)
-67.6	17.5					
-68.8	18.7		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-23

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-23 | LOCATION COORDINATES (ft): X = 2,370,588 Y = 134,171

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-15-22 | COMPLETED 10-15-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -51.3 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18 Ft.

8. TOTAL DEPTH OF BORING: 19.1 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SP

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-51.3	0.0					
-51.5	0.2		SAND, fine to medium grained, quartz, trace clay, trace shell hash, trace silt, greenish gray (10Y-6/1), (SM).		1	Sample #1, Depth = 0.1' Mean (mm): 0.29, Phi Sorting: 0.89 Fines (230): 13.96% Fines (200): 14.28% (SM)
-52.6	1.3		SAND, medium to coarse grained, quartz, little shell fragments, little shell hash, trace clay, trace silt, shell fragments up to 1.0", greenish gray (10Y-5/1), (SW-SM).		2	Sample #2, Depth = 0.8' Mean (mm): 0.85, Phi Sorting: 1.35 Fines (230): 5.85% Fines (200): 5.93% (SW-SM)
-52.9	1.6		Silty SAND, medium to coarse grained, quartz, little shell hash, trace clay, trace rock fragments, trace shell fragments, shell fragments up to 1.0", rock fragments are limestone fragments up to 0.5", dark gray (N-4/0), (SM).			
			Clayey SAND, fine grained, quartz, some rock fragments, trace shell fragments, trace shell hash, trace silt, layer is partially lithified, rock fragments are limestone fragments up to 6.0", shell fragments up to 2.0", silt lamina @ 4.6', light greenish gray (10Y-7/1), (SC).			
-69.3	18.0					
-70.4	19.1		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-24

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

2. BORING DESIGNATION: BOEMVC-2022-NC-24
LOCATION COORDINATES (ft): X = 2,373,560 Y = 129,256

3. DRILLING AGENCY: APTIM
CONTRACTOR FILE NO.:

4. NAME OF DRILLER: Patrick Bryce, P. G.

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL:
BEARING:

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane
HORIZONTAL: NAD 1983
VERTICAL: NAVD 88

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore
☐ AUTO HAMMER ☐ MANUAL HAMMER

12. TOTAL SAMPLES: DISTURBED 4 UNDISTURBED (UD) 0

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-15-22 COMPLETED 10-15-22

16. ELEVATION TOP OF BORING: -48.9 Ft.

17. TOTAL RECOVERY FOR BORING: 18.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-48.9	0.0					
			SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, trace whole shell, clay increases with depth in layer, shell fragments up to 1.0", 1.75" whole shell @ 0.1', mottled dark gray (2.5Y-4/1) with, dark gray (N-4/0), (SW-SM).		1	Sample #1, Depth = 2.9' Mean (mm): 0.22, Phi Sorting: 0.91 Fines (230): 5.99% Fines (200): 6.06% (SW-SM)
-52.7	3.8					Sample #2, Depth = 4.1' Mean (mm): 0.84, Phi Sorting: 2.20 Fines (230): 13.77% Fines (200): 13.80% (SM)
-53.3	4.4		SAND, fine to medium grained, quartz, some shell hash, little silt, trace clay, trace shell fragments, shell fragments up to 0.5", mottled light gray (5Y-7/1) with, very dark gray (N-3/0), (SM).		2	
			Clayey SAND, fine to medium grained, quartz, little rock fragments, little shell hash, trace silt, clay distributed in laminae and throughout layer, clay increases with depth in layer, rock fragments are fragments of partially lithified sand up to 1.25", gray (5Y-6/1), (SC).		3	Sample #3, Depth = 6.4' Mean (mm): 0.23, Phi Sorting: 0.52 Fines (230): 35.34% Fines (200): 35.41% (SC)
-58.4	9.5					
			SAND, fine grained, quartz, some silt, little rock fragments, trace clay, layer becomes more lithified with depth, rock fragments are lithified sand typically up to 2.0", (2.75" x 1.0") rock fragment @ 13.9', (3.0" x 1.25") rock fragment @ 14.2', (3.0" x 2.5") rock fragment @ 14.9', dark gray (5Y-4/1), (SM).		4	Sample #4, Depth = 12.8' Mean (mm): 0.21, Phi Sorting: 0.39 Fines (230): 31.89% Fines (200): 31.92% (SM)
-67.4	18.5					
-68.1	19.2		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-25

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-25 | LOCATION COORDINATES (ft): X = 2,370,213 Y = 121,590

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 3 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-15-22 | COMPLETED 10-15-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -46.1 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.6 Ft.

8. TOTAL DEPTH OF BORING: 19.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SP

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-46.1	0.0					
			SAND, fine to medium grained, quartz, little shell hash, trace shell fragments, trace silt, trace whole shell, shell fragments typically up to 0.75", (1.25" x 1.0") shell fragment @ 4.3', (1.75" x 1.0") shell fragment @ 5.9', (2.75" x 2.0") pocket of shell fragments @ 6.0', dark greenish gray (10Y-4/1), (SW).		1	Sample #1, Depth = 2.1' Mean (mm): 0.28, Phi Sorting: 1.02 Fines (230): 2.00% Fines (200): 2.06% (SW)
-52.4	6.3					
			SAND, fine grained, quartz, trace clay, trace rock fragments, trace shell fragments, trace shell hash, trace silt, trace whole shell, silt and clay increase with depth in layer, shell fragments typically up to 0.75", (1.25" x 1.0") shell fragment @ 6.4', 0.5" whole shell @ 7.6', (2.75" x 1.5") pocket of shell fragments @ 8.5', 1.0" rock fragment @ 8.5', (1.5" x 1.25") rock fragment @ 8.5', dark gray (N-4/0), (SP-SM).		2	Sample #2, Depth = 7.1' Mean (mm): 0.20, Phi Sorting: 0.85 Fines (230): 5.98% Fines (200): 6.05% (SP-SM)
-54.7	8.6					
			CLAY, firm, little silt, trace sand, fine grained, quartz, trace shell fragments, trace shell hash, sand decreases with depth in the layer, silt distributed in laminae and pockets, 1.25" shell fragment @ 8.8', (1.5" x 0.75") shell fragment @ 14.5', (1.75" x 1.0") pocket of shell fragments @ 14.9', (3.5" x 2.75") silty pocket @ 12.1', (3.0" x 2.75") silty pocket @ 15.6', very dark gray (N-3/0), (CL).		T1	Sample #T1, Depth = 13.0' Ave. Field Vane (tsf): 0.07
-62.9	16.8					
			SAND, fine grained, quartz, some silt, trace clay, trace shell hash, silty clay is found between 16.8' and 17.0', greenish gray (10Y-5/1), (SM).		3	Sample #3, Depth = 17.3' Mean (mm): 0.18, Phi Sorting: 0.93 Fines (230): 23.50% Fines (200): 23.96% (SM)
-63.7	17.6		No Recovery.			
-65.1	19.0		End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-26

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-26 | LOCATION COORDINATES (ft): X = 2,388,233 Y = 117,699

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 3 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-15-22 | COMPLETED 10-15-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -50.9 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.2 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-50.9	0.0					
			SAND, fine grained, quartz, little shell hash, trace silt, dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 2.3' Mean (mm): 0.23, Phi Sorting: 0.91 Fines (230): 2.09% Fines (200): 2.15% (SW)
-55.5	4.6					
-56.2	5.3		SAND, fine grained, quartz, little clay, little shell hash, little silt, clay distributed in pockets up to 0.5" and laminae, very dark greenish gray (10Y-3/1), (SC).		2	Sample #2, Depth = 4.9' Mean (mm): 0.20, Phi Sorting: 0.97 Fines (230): 19.03% Fines (200): 19.15% (SC)
			SAND, fine grained, quartz, little shell hash, trace coarse grains, trace gravel, trace shell fragments, trace silt, shell fragments up to 1.0", pocket coarse grained sand and gravel from 10.7' to 11.2', dark gray (2.5Y-4/1), (SW).		1	
-62.1	11.2					
			SAND, fine grained, quartz, little silt, trace clay, trace rock fragments, trace shell fragments, trace shell hash, rock fragments are limestone fragments, clay distributed in pockets up to 1.0" and laminae, silt distributed in laminae, shell fragments up to 0.5", (2.0" x 1.0") limestone fragment @ 13.0', (3.0" x 1.5") limestone fragment @ 14.3', mottled dark gray (N-4/0) with, gray (5Y-5/1), (SM).		3	Sample #3, Depth = 15.0' Mean (mm): 0.27, Phi Sorting: 0.77 Fines (230): 16.22% Fines (200): 16.29% (SM)
-69.1	18.2					
-70.1	19.2		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-27

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-27 | LOCATION COORDINATES (ft): X = 2,386,130 Y = 113,092

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 3 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-15-22 | COMPLETED 10-15-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -63.5 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.4 Ft.

8. TOTAL DEPTH OF BORING: 18.4 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-63.5	0.0					
			SAND, fine grained, quartz-carbonate, some shell hash, trace silt, gray (2.5Y-6/1), (SP-SM).		1	Sample #1, Depth = 3.2' Mean (mm): 0.33, Phi Sorting: 0.81 Fines (230): 5.93% Fines (200): 6.00% (SP-SM)
-69.0	5.5					
			SAND, fine grained, quartz-carbonate, little clay, little gravel, little shell hash, trace rock fragments, trace shell fragments, trace silt, rock fragments are fragments of partially lithified sand up to 1.0", shell fragments up to 0.5", 3.0" pocket of gravel @ 5.5', 1.5" clay pocket @ 5.9', 2.5" clay pocket @ 6.2', 3.0" clay pocket @ 7.0', mottled gray (2.5Y-6/1) with, dark gray (N-4/0), (SW-SC).		2	Sample #2, Depth = 6.6' Mean (mm): 0.46, Phi Sorting: 1.45 Fines (230): 7.83% Fines (200): 7.94% (SW-SC)
-71.7	8.2					
			SAND, fine grained, quartz-carbonate, some rock fragments, little silt, trace clay, trace shell fragments, trace shell hash, rock fragments are fragments of partially lithified sand typically up to 1.25", (3.25" x 1.75") rock fragment @ 9.1', 3.0" rock fragment @ 9.3', (3.0" x 2.0") rock fragment @ 9.7' and 10.1', (2.25" x 1.75") rock fragment @ 11.9', (1.0" x 0.75") shell fragment @ 12.8', bit sample from 17.2' to 17.4', mottled light olive gray (5Y-6/2) with, gray (2.5Y-6/1), (SW-SM).		3	Sample #3, Depth = 14.5' Mean (mm): 0.29, Phi Sorting: 1.08 Fines (230): 11.46% Fines (200): 11.55% (SW-SM)
-80.9	17.4					
-81.9	18.4		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-28

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-28 | LOCATION COORDINATES (ft): X = 2,378,984 Y = 105,212

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 5 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-15-22 | COMPLETED: 10-15-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -48.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.6 Ft.

8. TOTAL DEPTH OF BORING: 18.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-48.8	0.0					
			SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, clay distributed in pockets typically up to 1.0", shell fragments typically up to 1.0", silt increases with depth in layer, whole shells up to 0.25", clay laminae @ 6.2', 6.3' and 6.4', (2.0" x 1.5") shell fragment @ 7.8', 3.0" clay pocket @ 9.8', dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 4.0' Mean (mm): 0.21, Phi Sorting: 0.70 Fines (230): 2.50% Fines (200): 2.55% (SP)
					2	Sample #2, Depth = 8.0' Mean (mm): 0.23, Phi Sorting: 1.01 Fines (230): 3.15% Fines (200): 3.21% (SW)
-61.2	12.4					
			SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, clay distributed in pockets up to 1.0", shell fragments up to 0.25", very dark gray (2.5Y-3/1), (SW-SM).		3	Sample #3, Depth = 13.5' Mean (mm): 0.47, Phi Sorting: 1.43 Fines (230): 5.89% Fines (200): 5.95% (SW-SM)
-63.3	14.5					
			SAND, fine grained, quartz, little shell hash, little silt, trace rock fragments, trace shell fragments, layer is partially lithified, rock fragments are lithified sand fragments up to 2.0", shell fragments up to 1.0", light gray (2.5Y-7/2), (SW-SM).		4	Sample #4, Depth = 16.0' Mean (mm): 0.33, Phi Sorting: 1.47 Fines (230): 10.90% Fines (200): 11.03% (SW-SM)
-65.6	16.8					
			SAND, fine grained, quartz, little silt, trace rock fragments, trace shell fragments, shell fragments up to 1.0", 1.5" limestone fragment @ 16.9', gray (2.5Y-5/1), (SW-SM).		5	Sample #5, Depth = 17.2' Mean (mm): 0.29, Phi Sorting: 1.15 Fines (230): 11.10% Fines (200): 11.20% (SW-SM)
-66.4	17.6					
-67.0	18.2		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-29

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-29 | LOCATION COORDINATES (ft): X = 2,269,332 Y = -48,426

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 6 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-16-22 | COMPLETED 10-16-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -59.4 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 13.4 Ft.

8. TOTAL DEPTH OF BORING: 14.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SP

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-59.4	0.0					
-61.2	1.8		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, (0.75" x 0.5") shell fragment @ 0.7', (0.5" x 0.25") shell fragment @ 1.3', 0.25" whole shell @ 1.4', (0.5" x 0.25") shell fragment @ 1.5', (1.25" x 0.75") shell fragment @ 1.6', gray (5Y-5/1), (SP).		1	Sample #1, Depth = 1.0' Mean (mm): 0.22, Phi Sorting: 0.77 Fines (230): 2.01% Fines (200): 2.11% (SP)
-61.7	2.3				2	Sample #2, Depth = 2.0' Mean (mm): 0.41, Phi Sorting: 1.08 Fines (230): 1.67% Fines (200): 1.70% (SW)
-64.1	4.7		SAND, medium grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments typically up to 1.0", (1.25" x 0.5") shell fragment @ 2.2', (2.5" x 1.5") shell fragment @ 2.2', (1.25" x 0.5") whole shell @ 2.2', gray (5Y-6/1), (SW).		3	Sample #3, Depth = 3.6' Mean (mm): 0.24, Phi Sorting: 1.01 Fines (230): 4.17% Fines (200): 4.36% (SW)
-66.1	6.7		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments and whole shells typically up to 0.5", (1.0" x 0.25") shell fragment @ 3.9', 0.75" shell fragment @ 4.6', gray (5Y-5/1), (SW).		4	Sample #4, Depth = 5.7' Mean (mm): 0.16, Phi Sorting: 0.81 Fines (230): 22.85% Fines (200): 23.80% (SM)
-67.3	7.9		SAND, fine grained, quartz, some silt, trace clay, trace organics, trace shell hash, clay and organics distributed in laminae and throughout layer, organic laminae @ 5.2' and 6.1', clay laminae @ 5.5' and 5.8', very dark gray (N-3/0), (SM).		5	Sample #5, Depth = 7.2' Mean (mm): 0.40, Phi Sorting: 1.04 Fines (230): 10.34% Fines (200): 10.50% (SW-SM)
-72.8	13.4		SAND, fine to medium grained, quartz, little silt, trace clay, trace organics, trace shell hash, alternating layers of organics and clay between 7.4' and 7.9', very dark gray (N-3/0), (SW-SM). SAND, fine to medium grained, quartz, trace clay, trace organics, trace shell fragments, trace shell hash, trace silt, clay increases with depth in layer, (1.0" x 0.75") shell fragment @ 8.1', organic lamina @ 8.1', clay laminae @ 8.8', 9.7', 10.0' and 13.0', (1.5" x 1.0") clay pocket @ 10.8', (2.75" x 1.0") clayey pocket @ 13.3', gray (2.5Y-5/1), (SP).		6	Sample #6, Depth = 11.3' Mean (mm): 0.40, Phi Sorting: 0.59 Fines (230): 1.53% Fines (200): 1.54% (SP)
-73.9	14.5		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-30

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

2. BORING DESIGNATION: BOEMVC-2022-NC-30
LOCATION COORDINATES (ft): X = 2,279,392 Y = -39,673

3. DRILLING AGENCY: APTIM
CONTRACTOR FILE NO.:

4. NAME OF DRILLER: Patrick Bryce, P. G.

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL:
BEARING:

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

8. TOTAL DEPTH OF BORING: 12.8 Ft.

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane
HORIZONTAL: NAD 1983
VERTICAL: NAVD 88

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore
☐ AUTO HAMMER ☐ MANUAL HAMMER

12. TOTAL SAMPLES: DISTURBED: 2 UNDISTURBED (UD): 0

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED: 10-16-22 COMPLETED: 10-16-22

16. ELEVATION TOP OF BORING: -59.4 Ft.

17. TOTAL RECOVERY FOR BORING: 12.4 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-59.4	0.0					
-62.5	3.1		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 0.5", whole shells up to 0.25", 1.0" clay pocket @ 3.0', dark olive gray (5Y-3/2), (SW).		1	Sample #1, Depth = 1.5' Mean (mm): 0.22, Phi Sorting: 0.93 Fines (230): 2.92% Fines (200): 3.06% (SW)
-71.8	12.4		SAND, fine to medium grained, quartz, trace clay, trace rock fragments, trace shell fragments, trace silt, clay distributed in pockets up to 4.0" and laminae, silt distributed in laminae, layer is silty from 3.6' to 5.0', shell fragments up to 1.0", 1.0" limestone fragment @ 11.3', (1.5" x 1.0") limestone fragment @ 12.1', 0.5" rock fragment @ 12.1', mottled gray (5Y-5/1), very dark greenish gray (10Y-3/1) with, dark gray (2.5Y-4/1), (SP).		2	Sample #2, Depth = 8.6' Mean (mm): 0.61, Phi Sorting: 0.62 Fines (230): 4.24% Fines (200): 4.27% (SP)
-72.2	12.8		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-31

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-31 | LOCATION COORDINATES (ft): X = 2,280,303 Y = -22,497

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 4 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-16-22 | COMPLETED 10-16-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -54.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 10.1 Ft.

8. TOTAL DEPTH OF BORING: 12.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-54.0	0.0					
			SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, silt distributed in laminae, silt increases with depth in layer, clay distributed in laminae, (2.0" x 0.5") shell fragment @ 1.9', (1.0" x 0.5") shell fragment @ 2.9', 1.0" shell fragment @ 3.7', very dark gray (2.5Y-3/1), (SW-SM).		1	Sample #1, Depth = 2.5' Mean (mm): 0.19, Phi Sorting: 1.19 Fines (230): 8.36% Fines (200): 8.57% (SW-SM)
-59.0	5.0					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", dark gray (2.5Y-4/1), (SP-SM).		2	Sample #2, Depth = 6.0' Mean (mm): 0.16, Phi Sorting: 0.79 Fines (230): 6.45% Fines (200): 6.75% (SP-SM)
-60.9	6.9					
			SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 0.5", 1.0" whole shell @ 7.0', dark grayish brown (2.5Y-4/2), (SW).		3	Sample #3, Depth = 7.6' Mean (mm): 0.37, Phi Sorting: 1.39 Fines (230): 2.82% Fines (200): 2.91% (SW)
-62.3	8.3					
			SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, 1.0" shell fragment @ 9.0', very dark greenish gray (10Y-3/1), (SW-SM).		4	Sample #4, Depth = 8.7' Mean (mm): 0.30, Phi Sorting: 1.22 Fines (230): 7.59% Fines (200): 7.82% (SW-SM)
-63.4	9.4					
			SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.5", dark grayish brown (2.5Y-4/2), (SW). No Recovery.		3	
-64.1	10.1					
-66.2	12.3		End of Boring			

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-32

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-32 | LOCATION COORDINATES (ft): X = 2,267,415 Y = 5,913

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 6 | UNDISTURBED (UD) 8

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-16-22 | COMPLETED 10-16-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -51.4 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.4 Ft.

8. TOTAL DEPTH OF BORING: 18.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-51.4	0.0				
-52.0	0.6	SAND, fine grained, quartz, trace shell hash, trace silt, dark grayish brown (2.5Y-4/2), (SW).		1	Sample #1, Depth = 0.3' Mean (mm): 0.19, Phi Sorting: 0.86 Fines (230): 2.91% Fines (200): 3.04% (SW)
-52.6	1.2	Shelly SAND, fine grained, quartz, trace silt, shell component is shell hash, shell fragments typically up to 0.5" and whole shells up to 0.5", 2 (1.0") shell fragments @ 1.0', (2.0" x 1.5") shell fragment @ 1.1', very dark gray (5Y-3/1), (SW).		2	
-54.0	2.6	SAND, fine grained, quartz, trace clay, trace shell hash, trace silt, trace whole shell, clay distributed in laminae, whole shells up to 0.25", dark gray (2.5Y-4/1), (SW-SM).		3	Sample #2, Depth = 0.8' Mean (mm): 0.63, Phi Sorting: 1.75 Fines (230): 2.59% Fines (200): 2.64% (SW)
-57.2	5.8	SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, trace whole shell, clay distributed in laminae, shell fragments up to 0.5", (2.0" x 1.0") whole shell @ 5.6', very dark gray (2.5Y-3/1), (SW-SM).		4	Sample #3, Depth = 2.0' Mean (mm): 0.31, Phi Sorting: 1.46 Fines (230): 11.12% Fines (200): 11.16% (SW-SM)
-59.4	8.0	SAND, fine grained, quartz, little clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 1.5" and laminae, shell fragments up to 0.5", (1.0" x 0.25") whole shell @ 7.4', greenish black (10Y-2.5/1), (SC).		5	Sample #4, Depth = 4.0' Mean (mm): 0.27, Phi Sorting: 1.25 Fines (230): 6.36% Fines (200): 6.53% (SW-SM)
-61.9	10.5	CLAY, firm, some sand, fine grained, quartz, sand distributed in pockets up to 2.0", greenish black (10Y-2.5/1), (CL).		T1	Sample #5, Depth = 6.8' Mean (mm): 0.34, Phi Sorting: 1.42 Fines (230): 16.34% Fines (200): 16.45% (SC)
-63.5	12.1	SAND, fine to coarse grained, quartz, trace clay, trace silt, clay distributed in laminae, very dark gray (2.5Y-3/1), (SP).		6	Sample #T1, Depth = 9.8' Ave. Field Vane (tsf): 0.05
-64.0	12.6	CLAY, stiff, trace sand, greenish black (10Y-2.5/1), (CL).		T2	Sample #6, Depth = 11.5' Mean (mm): 0.44, Phi Sorting: 0.85 Fines (230): 3.52% Fines (200): 3.54% (SP)
-65.1	13.7	SAND, fine to coarse grained, quartz, trace clay, trace silt, clay distributed in laminae, very dark gray (2.5Y-3/1), (SP).		6	Sample #T2, Depth = 12.4' Ave. Field Vane (tsf): 0.13
-66.4	15.0	CLAY, stiff, trace sand, fine to coarse grained, quartz, sand distributed in pockets up to 2.0", greenish black (10Y-2.5/1), (CL).		T3	
-66.9	15.5	SAND, fine to coarse grained, quartz, trace clay, trace silt, clay distributed in laminae, very dark gray (2.5Y-3/1), (SP).		6	Sample #T3, Depth = 14.3' Ave. Field Vane (tsf): 0.10
-68.3	16.9	CLAY, stiff, trace sand, fine to coarse grained, sand distributed in pockets up to 2.0", greenish black (10Y-2.5/1), (CL).		T4	
-69.5	18.1	SAND, fine to coarse grained, quartz, trace clay, trace silt, trace wood fragments, clay distributed in pockets up to 1.5", 1.0" wood fragment @ 17.0', very dark gray (2.5Y-3/1), (SP).		6	Sample#T4, Depth = 16.0' Ave. Field Vane (tsf): 0.15
-69.8	18.4	CLAY, stiff, trace sand, fine to coarse grained, expansion from 18.0' to 18.4', greenish black (10Y-2.5/1), (CL).		T5	
		End of Boring			Sample #T5, Depth = 18.3' Ave. Field Vane (tsf): 0.13

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-33

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-33 | LOCATION COORDINATES (ft): X = 2,259,226 Y = 32,144

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 4 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

14. ELEVATION GROUND WATER

15. DATE BORING | STARTED: 10-18-22 | COMPLETED: 10-18-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -46.1 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 15.2 Ft.

8. TOTAL DEPTH OF BORING: 18.6 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-46.1	0.0					
-46.9	0.8		SAND, fine grained, quartz, trace shell hash, trace silt, very dark gray (2.5Y-3/1), (SP).		1	Sample #1, Depth = 0.4' Mean (mm): 0.21, Phi Sorting: 0.71 Fines (230): 2.54% Fines (200): 2.66% (SP)
-47.3	1.2		Shelly SAND, fine grained, quartz, trace silt, shell component is shell hash and shell fragments up to 1.0", black (2.5Y-2.5/1), (SW).		2	Sample #2, Depth = 1.0' Mean (mm): 0.49, Phi Sorting: 1.57 Fines (230): 2.80% Fines (200): 2.87% (SW)
-49.6	3.5		Silty SAND, fine grained, quartz, little clay, trace shell fragments, trace wood fragments, clay distributed in pockets up to 1.0" and laminae, (2.0" x 1.0") shell fragment @ 2.2', (3.0" x 2.0") shell fragment @ 2.3', 1.0" wood fragments @ 2.3' and 2.5', black (N-2.5/0), (SW-SM).			
			SAND, fine grained, quartz, little clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 1.5", whole shells up to 1.5", (2.0" x 1.0") shell hash pocket @ 3.9', (2.5" x 1.0") shell fragment @ 3.9', very dark greenish gray (10Y-3/1), (SW-SC).		3	Sample #3, Depth = 8.0' Mean (mm): 0.30, Phi Sorting: 1.05 Fines (230): 11.89% Fines (200): 11.95% (SW-SC)
-58.2	12.1					
-60.8	14.7		SAND, fine to medium grained, quartz, little clay, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 2.0", whole shells up to 0.25", dark greenish gray (10Y-4/1), (SW-SC).		4	Sample #4, Depth = 13.4' Mean (mm): 0.64, Phi Sorting: 1.05 Fines (230): 10.49% Fines (200): 10.51% (SW-SC)
-61.3	15.2		SAND, fine grained, quartz, some silt, little shell hash, trace clay, trace rock fragments, layer is partially lithified, bit sample from 15.0' to 15.2', 3.0" limestone fragment in the bit sample, white (2.5Y-8/1), (GW).			
			No Recovery.			
-64.7	18.6					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-34

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-34 | LOCATION COORDINATES (ft): X = 2,243,606 Y = -8,088

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-18-22 | COMPLETED 10-18-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -54.7 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 19.2 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SP

ELEV. (ft)	DEPTH (ft)	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-54.7	0.0				
-54.9	0.2	Silty CLAY, some shell hash, little sand, trace coral, trace shell fragments, shell fragments typically up to 0.5", (1.0" x 0.5") shell fragment @ 0', 0.5" shell fragment @ 0', (1.0" x 0.75") coral fragment @ 0', very dark greenish gray (10Y-3/1), (SM-SC).		1	Sample #1, Depth = 2.0' Mean (mm): 0.19, Phi Sorting: 0.66 Fines (230): 4.76% Fines (200): 4.83% (SP)
-58.0	3.3	SAND, fine grained, quartz, trace clay, trace coral, trace shell fragments, trace silt, trace whole shell, shell fragments typically up to 1.0", clay lamina @ 0.6', (2.75" x 0.5") whole shell @ 2.6', 0.25" coral fragment @ 2.9', (1.0" x 0.75") whole shell @ 3.1', very dark greenish gray (10Y-3/1), (SP).			
-62.0	7.3	SAND, fine grained, quartz, some shell fragments, some shell hash, some silt, trace clay, trace coral, trace whole shell, clay and silt distributed throughout layer, coral fragments and shell fragments typically up to 1.0", 4.0" shelly sand pocket @ 3.4', 0.5" whole shell @ 4.1', (1.75" x 1.5") shell fragment @ 5.9', 1.0" whole shell @ 6.1', (2.0" x 1.0") coral fragment @ 7.0', 3.0" pocket of shelly sand and coral fragments @ 7.3', dark gray (N-4/0), (GM).		2	Sample #2, Depth = 8.3' Mean (mm): 0.43, Phi Sorting: 1.25 Fines (230): 8.90% Fines (200): 8.93% (SW-SM)
-63.6	8.9	SAND, fine grained, quartz, trace clay, trace coral, trace shell fragments, trace shell hash, trace silt, clay and silt distributed throughout layer, shell fragments typically up to 0.75", (0.75" x 0.5") shell fragment @ 7.5', (1.5" x 0.75") shell fragment @ 7.9', (1.25" x 0.5") shell fragment @ 8.5', very dark gray (N-3/0), (SW-SM).			
-64.5	9.8				
-66.4	11.7	Silty SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, (1.0" x 0.25") shell fragment @ 9.2', 2 (0.5" x 0.25") shell fragments @ 9.3', very dark gray (N-3/0), (SM-SC).			
-68.5	13.8	CLAY, very soft, little coral, little shell fragments, trace rock fragments, trace shell hash, shell fragments typically up to 1.5", rock fragments typically up to 2.0", (2.0" x 1.5") shell fragment @ 11.4', 6.0" pocket @ 9.9' and 4.0" pocket @ 11.3' of shell hash, shell fragments, coral fragments and rock fragments, (3.25" x 2.25") rock fragment @ 11.3', greenish gray (10Y-5/1), (CL).			
		Clayey SILT, little sand, trace shell fragments, trace shell hash, 0.5" shell fragment @ 13.1', very dark greenish gray (10Y-3/1), (ML).			
-73.9	19.2	Silty CLAY, trace sand, trace shell fragments, trace shell hash, 0.5" shell fragment @ 14.9', bit sample from 18.8' to 19.2', very dark greenish gray (10Y-3/1), (CL).			
		End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-35

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-35 | LOCATION COORDINATES (ft): X = 2,237,214 Y = 1,470

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-18-22 | COMPLETED 10-18-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -55.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.6 Ft.

8. TOTAL DEPTH OF BORING: 19.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-55.0	0.0					
-56.4	1.4		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, 1.0" clay pocket @ 0.4', (1.25" x 0.5") shell fragment @ 0.8', (1.0" x 0.5") whole shell @ 0.8', (1.0" x 0.75") shell fragment @ 0.9', clay lamina @ 1.2', dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 0.8' Mean (mm): 0.23, Phi Sorting: 0.86 Fines (230): 4.43% Fines (200): 4.53% (SW)
					T1	Sample #T1, Depth = 2.2' Ave. Field Vane (tsf): 0.13
-64.1	9.1		CLAY, stiff, little sand, fine grained, quartz, trace shell hash, trace silt, sand distributed in laminae, very dark gray (N-3/0), (CL).		T2	Sample #T2, Depth = 6.2' Ave. Field Vane (tsf): 0.20
-68.2	13.2		SAND, fine grained, quartz, some shell hash, little silt, trace clay, trace rock fragments, trace shell fragments, trace whole shell, shell fragments typically up to 1.0", whole shells up to 1.25", (2.0" x 1.0") shell fragment @ 11.2', (1.5" x 1.0") shell fragment @ 11.2', (1.5" x 0.75") shell fragment @ 11.2', (1.5" x 1.0") rock fragment @ 12.6', gray (2.5Y-5/1), (SM).		2	Sample #2, Depth = 10.4' Mean (mm): 0.34, Phi Sorting: 1.46 Fines (230): 17.59% Fines (200): 17.65% (SM)
-72.6	17.6		Silty CLAY, very soft, little sand, trace shell hash, sand distributed in laminae at top of layer, 1.5" sand pockets @ 13.4' and 14.3', bit sample from 17.4' to 17.6', mottled very dark gray (2.5Y-3/1) with, gray (5Y-5/1), (CL).			
-74.3	19.3		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-36

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-36 | LOCATION COORDINATES (ft): X = 2,234,971 Y = 1,328

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 3 | UNDISTURBED (UD): 3

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-18-22 | COMPLETED: 10-18-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -55.2 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 16.7 Ft.

8. TOTAL DEPTH OF BORING: 19.4 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: SF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-55.2	0.0					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, (1.5" x 0.5") shell fragments @ 0.7' and 1.1', (1.5" x 0.75") shell fragment @ 1.1', 1.5" pocket of shell hash @ 1.0', dark gray (2.5Y-4/1), (SP).		1	Sample #1, Depth = 0.6' Mean (mm): 0.25, Phi Sorting: 0.79 Fines (230): 2.17% Fines (200): 2.22% (SP)
-56.4	1.2					
			SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments typically up to 0.75", whole shells up to 1.0", clay lamina @ 1.4', (2.0" x 1.25") shell fragment @ 1.7', dark gray (2.5Y-4/1), (SP).		2	Sample #2, Depth = 2.3' Mean (mm): 0.20, Phi Sorting: 0.66 Fines (230): 4.69% Fines (200): 4.83% (SP)
-58.6	3.4					
			SAND, fine grained, quartz, little clay, little shell hash, trace shell fragments, trace silt, clay distributed in laminae, clay increases with depth in layer, shell fragments typically up to 0.75", (1.5" x 1.25") shell fragment @ 3.8', very dark gray (N-3/0), (SC).		3	Sample #3, Depth = 4.8' Mean (mm): 0.22, Phi Sorting: 1.15 Fines (230): 16.01% Fines (200): 16.31% (SC)
-61.4	6.2					
					T1	Sample #T1, Depth = 7.2' Ave. Field Vane (tsf): 0.05
			CLAY, stiff, trace sand, fine grained, quartz, trace shell hash, 1.5" pocket of sand and shell hash @ 6.9', bit sample from 16.5' to 16.7', very dark gray (N-3/0), (CL).		T2	Sample #T2, Depth = 11.1' Ave. Field Vane (tsf): 0.15
					T3	Sample #T3, Depth = 16.0' Ave. Field Vane (tsf): 0.15
-71.9	16.7					
			No Recovery.			
-74.6	19.4					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-37

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-37 | LOCATION COORDINATES (ft): X = 2,216,776 Y = 492

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 1 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-18-22 | COMPLETED: 10-18-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -55.6 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-55.6	0.0					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", 2.0" whole shell @ 0.7', (1.5" x 0.25") whole shell @ 1.7', very dark gray (2.5Y-3/1), (SW-SM).		1	Sample #1, Depth = 1.0' Mean (mm): 0.17, Phi Sorting: 0.93 Fines (230): 8.88% Fines (200): 9.04% (SW-SM)
-57.3	1.7					
			CLAY, very stiff, some sand, trace organics, trace shell hash, organics distributed in laminae, sand distributed in pockets up to 2.0", sand decreases with depth in layer, black (2.5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 4.6' Ave. Field Vane (tsf): 0.26
-60.5	4.9					
			Silty SAND, fine grained, quartz, little clay, trace shell fragments, trace shell hash, layer is partially lithified, shell fragments typically up to 1.5", (3.5" x 3.0") shell fragment @ 7.7', bit sample from 16.8' to 17.0', light gray (2.5Y-7/2), (GW).			
-72.6	17.0					
			No Recovery.			
-74.8	19.2					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-38

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-38 | LOCATION COORDINATES (ft): X = 2,210,715 Y = 6,009

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 1 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-19-22 | COMPLETED: 10-19-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -53.6 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 8.9 Ft.

8. TOTAL DEPTH OF BORING: 10.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-53.6	0.0					
			SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 1.0", (1.0" x 0.25") whole shells @ 0.3', 2.0' and 3.3', 3 (1.5" x 0.5") shell fragment @ 0.8', 2.0" whole shell @ 2.9', 3 (1.5" x 0.5") shell fragments @ 2.9', 2 (1.5") shell fragments @ 4.2', 1.0" whole shell @ 4.9', dark olive gray (5Y-3/2), (SP-SC).		1	Sample #1, Depth = 2.5' Mean (mm): 0.16, Phi Sorting: 0.82 Fines (230): 9.01% Fines (200): 9.21% (SP-SC)
-58.6	5.0					
			CLAY, firm, little sand, trace shell hash, sand and shell hash distributed in pockets up to 2.0", very dark gray (2.5Y-3/1), (CL).		T1	Sample #T1, Depth = 7.5' Ave. Field Vane (tsf): 0.08
-62.5	8.9					
			No Recovery.			
-64.1	10.5					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-39

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-39 | LOCATION COORDINATES (ft): X = 2,207,215 Y = 3,638

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 0 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-19-22 | COMPLETED: 10-19-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -50.9 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 13 Ft.

8. TOTAL DEPTH OF BORING: 14.7 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-50.9	0.0					
-51.3	0.4		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.5", dark gray (5Y-4/1), (SP).			
-53.5	2.6		CLAY, soft, some sand, fine grained, quartz, trace shell hash, sand distributed in pockets up to 1.0" and laminae, dark olive gray (5Y-3/2), (CL).			
-59.6	8.7		CLAY, soft, trace sand, trace shell hash, sand distributed in laminae, dark olive gray (5Y-3/2), (CL).		T1	Sample #T1, Depth = 5.0' Ave. Field Vane (tsf): 0.03
-61.1	10.2		SAND, fine to coarse grained, quartz, little clay, trace shell fragments, trace shell hash, trace silt, clay distributed in pockets up to 2.0", shell fragments up to 0.25", very dark greenish gray (10Y-3/1), (SC).			
-62.1	11.2		CLAY, soft, some sand, fine grained, quartz, trace rock fragments, trace silt, (3.5" x 2.0") rock fragment @ 11', very dark gray (2.5Y-3/1), (CL).			
-62.7	11.8		SAND, fine grained, quartz, little clay, trace silt, clay distributed in pockets up to 1.0", dark gray (2.5Y-4/1), (SC).			
-63.9	13.0		Gravely SAND, fine to coarse grained, quartz, little clay, little silt, gravel component is limestone fragments up to 2.5", clay distributed in pockets up to 1.0", silt distributed throughout layer, bit sample from 12.9' to 13.0', black (5Y-2.5/1), (GW).			
-65.6	14.7		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-NC-40

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-NC-40 | LOCATION COORDINATES (ft): X = 2,183,146 Y = -7,273

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 1 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-19-22 | COMPLETED: 10-19-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -56.9 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 13.8 Ft.

8. TOTAL DEPTH OF BORING: 15.8 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-56.9	0.0					
-59.2	2.3		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments typically up to 0.5", (3.0" x 1.5") shell fragment @ 1.8', (2.0" x 0.75") shell fragment @ 1.9', dark olive gray (5Y-3/2), (SP-SM).		1	Sample #1, Depth = 1.2' Mean (mm): 0.16, Phi Sorting: 0.68 Fines (230): 8.01% Fines (200): 8.31% (SP-SM)
-67.7	10.8		CLAY, stiff, trace sand, trace shell hash, trace silt, sand and shell hash in pockets up to 1.0" from 2.3' to 3.3', black (2.5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 6.5' Ave. Field Vane (tsf): 0.13
-70.7	13.8		Sandy CLAY, soft, little silt, trace rock fragments, trace shell hash, sand distributed in pockets up to 1.0" and laminae, rock fragments are limestone fragments up to 1.5', 3.0" pocket of limestone fragments @ 10.9', bit sample from 13.2' to 13.8', very dark gray (2.5Y-3/1), (CL).			
-72.7	15.8		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-41

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-41 | LOCATION COORDINATES (ft): X = 2,150,976 Y = -7,045

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-20-22 | COMPLETED 10-20-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -48.3 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 10.8 Ft.

8. TOTAL DEPTH OF BORING: 11.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-48.3	0.0					
			SAND, fine grained, quartz, little shell hash, trace silt, shell hash increases with depth in layer, dark olive gray (5Y-3/2), (SP-SM).		1	Sample #1, Depth = 2.5' Mean (mm): 0.21, Phi Sorting: 0.68 Fines (230): 5.91% Fines (200): 6.07% (SP-SM)
-54.0	5.7					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments and whole shells up to 1.0", dark olive gray (5Y-3/2), (SW).		2	Sample #2, Depth = 6.9' Mean (mm): 0.18, Phi Sorting: 1.09 Fines (230): 4.40% Fines (200): 4.63% (SW)
-56.3	8.0					
			CLAY, soft, some sand, fine grained, quartz, trace shell fragments, trace shell hash, sand distributed in pockets up to 1.5", shell hash distributed in sand pockets, shell fragments up to 0.5", very dark greenish gray (10Y-3/1), (CL).			
-58.3	10.0					
			Sandy CLAY, soft, some shell hash, trace rock fragments, (3.5" x 1.5") rock fragment @ 10.8', dark olive gray (5Y-3/2), (GC).			
-59.1	10.8					
			No Recovery.			
-59.8	11.5					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-42

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-42 | LOCATION COORDINATES (ft): X = 2,127,225 Y = -18,129

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 3 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-20-22 | COMPLETED: 10-20-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -47.5 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 15.9 Ft.

8. TOTAL DEPTH OF BORING: 17.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-47.5	0.0					
			SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments typically up to 0.5", 1.0" whole shell @ 1.3', (2.0" x 0.5") shell fragment @ 4.5', dark gray (2.5Y-4/1), (SW).		1	Sample #1, Depth = 2.3' Mean (mm): 0.35, Phi Sorting: 0.96 Fines (230): 1.38% Fines (200): 1.42% (SW)
-52.2	4.7					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", 1.0" whole shell @ 6.2', dark gray (2.5Y-4/1), (SP-SM).		2	Sample #2, Depth = 6.4' Mean (mm): 0.20, Phi Sorting: 0.73 Fines (230): 4.92% Fines (200): 5.09% (SP-SM)
-55.2	7.7					
			SAND, fine grained, quartz, little shell hash, trace shell fragments, trace silt, trace whole shell, shell fragments and whole shells up to 1.0", (2.0" x 1.5") shell fragment @ 8.3', 1.5" shell fragment @ 8.4', dark olive gray (5Y-3/2), (SW-SM).		3	Sample #3, Depth = 8.3' Mean (mm): 0.53, Phi Sorting: 1.54 Fines (230): 7.21% Fines (200): 7.27% (SW-SM)
-57.4	9.9					
			CLAY, very stiff, trace organics, trace sand, organics distributed in laminae, sand distributed in laminae, bit sample from 15.5' to 15.9', dark olive gray (5Y-3/2), (CL).		T1	Sample #T1, Depth = 13.5' Ave. Field Vane (tsf): 0.26
-63.4	15.9					
			No Recovery.			
-64.5	17.0					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-43

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-43 | LOCATION COORDINATES (ft): X = 2,148,894 Y = -26,064

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 3 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-20-22 | COMPLETED: 10-20-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -56.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 11.7 Ft.

8. TOTAL DEPTH OF BORING: 12.1 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-56.8	0.0					
-57.1	0.3		SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, (1.5" x 1.0") shell fragment @ 0.1', dark gray (5Y-4/1), (SW).		1	Sample #1, Depth = 0.1' Mean (mm): 0.38, Phi Sorting: 1.07 Fines (230): 1.39% Fines (200): 1.43% (SW)
			SAND, fine to coarse grained, quartz, little shell hash, trace shell fragments, trace silt, trace whole shell, shell fragments up to 1.0", 1.0" whole shell @ 2.3', (2.5" x 2.0") whole shell @ 2.5', dark olive gray (5Y-3/2), (SW).		2	Sample #2, Depth = 2.7' Mean (mm): 0.34, Phi Sorting: 1.15 Fines (230): 2.58% Fines (200): 2.63% (SW)
-61.0	4.2					Sample #3, Depth = 4.9'
-62.1	5.3		SAND, fine grained, quartz, trace shell fragments, trace silt, trace whole shell, shell fragments and whole shells up to 0.25", dark olive gray (5Y-3/2), (SP-SM).		3	Mean (mm): 0.19, Phi Sorting: 0.73 Fines (230): 5.81% Fines (200): 6.02% (SP-SM)
			SAND, fine grained, quartz, some clay, little shell fragments, trace shell hash, trace whole shell, clay distributed in pockets up to 1.5", shell fragments up to 2.0", whole shells up to 1.0", 3.0" pocket of shell hash and shell fragments @ 5.4', dark olive gray (5Y-3/2), (SC).			
-67.3	10.5					
-68.5	11.7		CLAY, very stiff, bit sample from 11.2' to 11.7', black (5Y-2.5/2), (CL).		T1	Sample #T1, Depth = 10.8' Ave. Field Vane (tsf): 0.31
-68.9	12.1		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-44

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-44 | LOCATION COORDINATES (ft): X = 2,140,131 Y = -30,846

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 2 | UNDISTURBED (UD): 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-20-22 | COMPLETED: 10-20-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -53.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 13.3 Ft.

8. TOTAL DEPTH OF BORING: 16.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-53.0	0.0					
-53.5	0.5		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-57.6	4.6		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", dark olive gray (5Y-3/2), (SP).		1	Sample #1, Depth = 2.5' Mean (mm): 0.25, Phi Sorting: 0.67 Fines (230): 1.84% Fines (200): 1.91% (SP)
-59.3	6.3		SAND, fine grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 1.0" and laminae, clay increases with depth in layer, black (2.5Y-2.5/1), (SW-SC).		2	Sample #2, Depth = 5.2' Mean (mm): 0.21, Phi Sorting: 1.13 Fines (230): 10.31% Fines (200): 10.42% (SW-SC)
-64.1	11.1		CLAY, stiff, void in this layer from 8.4' to 8.6', black (5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 8.1' Ave. Field Vane (tsf): 0.10
-66.3	13.3		CLAY, soft, little sand, fine grained, quartz, trace shell fragments, sand distributed in pockets up to 1.0", 0.5" shell fragment @ 12.7', bit sample from 13.0' to 13.3', black (5Y-2.5/1), (CL).			
-69.0	16.0		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-45

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: North Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-45 | LOCATION COORDINATES (ft): X = 2,133,768 Y = -47,395

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 1 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-20-22 | COMPLETED 10-20-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -53.9 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 15.5 Ft.

8. TOTAL DEPTH OF BORING: 16.7 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-53.9	0.0					
-54.3	0.4		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC48 #1	
-61.2	7.3		SAND, fine grained, quartz, trace clay, trace shell fragments, trace silt, trace whole shell, shell fragments and whole shells typically up to 1.0", (2.5" x 0.5") whole shell @ 2.2', 2.0" clay pocket @ 4.0', (2.75" x 2.5") shell fragment @ 7.2', olive gray (5Y-5/2), (SP).		1	Sample #1, Depth = 3.3' Mean (mm): 0.26, Phi Sorting: 0.69 Fines (230): 1.70% Fines (200): 1.75% (SP)
-61.8	7.9		Silty SAND, fine grained, quartz, trace clay, trace shell hash, clay distributed in laminae, black (5Y-2.5/1), (SC).			
-65.2	11.3		CLAY, stiff, little sand, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, sand distributed in pockets up to 1.0", (1.5" x 1.0") shell fragment @ 10.3', black (2.5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 9.7' Ave. Field Vane (tsf): 0.10
-67.5	13.6		SAND, fine to medium grained, quartz, some clay, trace shell fragments, trace silt, trace whole shell, shell fragments typically up to 1.0", 2.0" shell fragment @ 11.6', (3.5" x 2.0") whole shell @ 13.2', (3.5" x 3.0") whole shell @ 13.4', 2 (2.0") shell fragment @ 13.5', very dark gray (2.5Y-3/1), (SC).			
-69.4	15.5		Shelly CLAY, very soft, trace whole shell, shell component is shell hash, (2.0" x 1.0") whole shell @ 14.0', bit sample from 15.2' to 15.5', very dark gray (2.5Y-3/1), (CL).			
-70.6	16.7		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-46

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-46 | LOCATION COORDINATES (ft): X = 2,715,478 Y = 661,660

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-21-22 | COMPLETED 10-21-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -51.8 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 11.5 Ft.

8. TOTAL DEPTH OF BORING: 12.0 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-51.8	0.0					
-54.8	3.0		SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 1.0", dark olive gray (5Y-3/2), (SW).		1	Sample #1, Depth = 1.5' Mean (mm): 0.37, Phi Sorting: 1.14 Fines (230): 1.85% Fines (200): 1.88% (SW)
-58.8	7.0		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", 2.0" shell fragment pocket @ 6.8', dark olive gray (5Y-3/2), (SW).		2	Sample #2, Depth = 4.5' Mean (mm): 0.23, Phi Sorting: 0.86 Fines (230): 2.25% Fines (200): 2.40% (SW)
-61.6	9.8		Clayey SAND, fine grained, quartz, trace shell hash, clay is soft, clay is distributed in pockets up to 2.0", dark olive gray (5Y-3/2), (SC).			
-63.3	11.5		CLAY, hard, bit sample from 10.8' to 11.5', black (5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 10.4' Ave. Field Vane (tsf): 0.36
-63.8	12.0		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-47

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-47 | LOCATION COORDINATES (ft): X = 2,676,128 Y = 672,162

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 1 | UNDISTURBED (UD): 5

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-21-22 | COMPLETED: 10-21-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -41.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.1 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-41.0	0.0					
-41.5	0.5		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-43.3	2.3		SAND, fine to medium grained, quartz, little shell hash, trace clay, trace shell fragments, trace silt, shell hash decreases with depth in layer, shell fragments up to 1.0", clay lamina @ 2.2', layer shows a fining downwards sequence, dark olive gray (5Y-3/2), (SW).		1	Sample #1, Depth = 1.5' Mean (mm): 0.40, Phi Sorting: 1.18 Fines (230): 1.83% Fines (200): 1.86% (SW)
-45.0	4.0		SAND, fine to medium grained, quartz, little shell hash, trace shell fragments, trace silt, shell hash decreases with depth in layer, shell fragments up to 0.5", layer shows a fining downwards sequence, dark olive gray (5Y-3/2), (SW).		1	
-55.7	14.7		CLAY, stiff, trace sand, fine to medium grained, quartz, trace shell hash, sand and shell hash distributed in laminae, very dark gray (N-3/0), (CL).		T1	Sample #T1, Depth = 10.0' Ave. Field Vane (tsf): 0.15
-56.2	15.2		CLAY, very soft, very dark gray (N-3/0), (CL).		T2	Sample #T2, Depth = 15.1' Ave. Field Vane (tsf): 0.00
-58.1	17.1		CLAY, hard, bit sample from 16.9' to 17.1', black (5Y-2.5/1), (CL).		T3	Sample #T3, Depth = 16.2' Ave. Field Vane (tsf): 0.47
-60.2	19.2		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-48

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-48 | LOCATION COORDINATES (ft): X = 2,679,806 Y = 653,296

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-21-22 | COMPLETED 10-21-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -44.3 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.5 Ft.

8. TOTAL DEPTH OF BORING: 17.6 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-44.3	0.0					
-44.6	0.3		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		1	Sample #1, Depth = 0.1' Mean (mm): 0.30, Phi Sorting: 0.72 Fines (230): 2.54% Fines (200): 2.58% (SP)
-50.9	6.6		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, clay and silt distributed in laminae, shell fragments typically up to 0.25", (1.5" x 1.0") shell fragment @ 1.0', olive gray (5Y-4/2), (SP).		2	Sample #2, Depth = 3.5' Mean (mm): 0.26, Phi Sorting: 0.75 Fines (230): 2.63% Fines (200): 2.70% (SP)
-57.0	12.7		CLAY, very stiff, trace sand, fine grained, quartz, trace shell fragments, trace shell hash, trace whole shell, sand distributed in pockets up to 1.0", 1.0" shelly pocket @ 7.7', shell component is shell hash, shell fragments and whole shells up to 0.25", black (2.5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 10.4' Ave. Field Vane (tsf): 0.18
-60.2	15.9		Shelly SAND, fine to coarse grained, quartz, trace silt, shell component is shell hash and shell fragments typically up to 2.0", (3.5" x 3.0") shell fragment @ 14.3', (2.5" x 2.0") shell fragment @ 15.2', (2.5" x 1.5") shell fragment @ 15.8', dark gray (2.5Y-4/1), (GW).			
-61.3	17.0		SAND, fine to coarse grained, quartz, trace clay, trace shell hash, trace silt, trace whole shell, clay distributed in pockets up to 1.0" and laminae, whole shells up to 0.25", dark gray (2.5Y-4/1), (SW).			
-61.8	17.5		CLAY, firm, trace sand, fine grained, quartz, trace shell fragments, shell fragments up to 1.5", bit sample, black (2.5Y-2.5/1), (CL).			
-61.9	17.6		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-49

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-49 | LOCATION COORDINATES (ft): X = 2,654,237 Y = 651,536

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 0 | UNDISTURBED (UD): 3

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING | STARTED: 10-21-22 | COMPLETED: 10-21-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -39.6 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 17.7 Ft.

8. TOTAL DEPTH OF BORING: 17.6 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-39.6	0.0					
-39.7	0.1		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-41.4	1.8		Clayey SHELL HASH, trace sand, fine grained, quartz, trace shell fragments, (3.0" x 2.0") shell fragment @ 0.4', very dark greenish gray (10Y-3/1), (GC).			
			CLAY, stiff, trace sand, fine grained, quartz, trace shell hash, sand distributed in laminae, shell hash distributed in pockets up to 1.0", very dark greenish gray (10Y-3/1), (CL).		T1	Sample #T1, Depth = 5.6' Ave. Field Vane (tsf): 0.15
-49.8	10.2					
			CLAY, soft, some sand, fine grained, quartz, trace organics, sand distributed in pockets up to 1.5", organics distributed in laminae, very dark greenish gray (10Y-3/1), (CL).			
-52.1	12.5					
-52.4	12.8		SAND, fine to coarse grained, quartz, trace silt, very dark gray (5Y-3/1), (SW).			
-53.6	14.0		CLAY, soft, some sand, fine grained, quartz, trace organics, sand distributed in pockets up to 1.5", organics distributed in laminae, very dark greenish gray (10Y-3/1), (CL).			
-54.6	15.0					Sample #T2, Depth = 15.3' Ave. Field Vane (tsf): 0.31
-55.1	15.5		SAND, fine to coarse grained, quartz, trace silt, very dark gray (5Y-3/1), (SW).		T2	
			CLAY, very stiff, very dark greenish gray (10Y-3/1), (CL).			
-57.3	17.7		SAND, fine to medium grained, quartz, little clay, trace shell hash, trace silt, clay distributed in pockets up to 2.0" and laminae, clay increases with depth in layer, silt distributed in laminae, expansion from 17.6' to 17.7', olive gray (5Y-4/2), (SC).			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-50

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-50 | LOCATION COORDINATES (ft): X = 2,664,253 Y = 638,972

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 1 | UNDISTURBED (UD): 0

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-21-22 | COMPLETED: 10-21-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -41.7 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 14.6 Ft.

8. TOTAL DEPTH OF BORING: 14.6 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-41.7	0.0					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.5", dark olive gray (5Y-3/2), (SW).		1	Sample #1, Depth = 3.2' Mean (mm): 0.33, Phi Sorting: 0.98 Fines (230): 3.36% Fines (200): 3.40% (SW)
-48.1	6.4					
			SAND, fine grained, quartz, some clay, some shell hash, trace shell fragments, trace silt, trace whole shell, clay distributed in pockets up to 2.0", clay increases with depth in layer, shell fragments typically up to 1.0", 1.0" whole shell @ 7.3', (3.5" x 3.0") shell fragment @ 7.4' and 9.7', dark greenish gray (10Y-4/1), (SC).			
-55.3	13.6					
			CLAY, firm to partially lithified, bit sample from 14.1' to 14.6', greenish black (10Y-2.5/1), (CL).			
-56.3	14.6					
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-51

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-51 | LOCATION COORDINATES (ft): X = 2,662,043 Y = 636,953

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 1 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-21-22 | COMPLETED 10-21-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -43.7 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 7.8 Ft.

8. TOTAL DEPTH OF BORING: 9.7 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-43.7	0.0					
-44.1	0.4		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-45.7	2.0		SAND, fine to coarse grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", silt increases with depth in layer, very dark gray (5Y-3/1), (SW).		1	Sample #1, Depth = 1.4' Mean (mm): 0.44, Phi Sorting: 0.98 Fines (230): 2.89% Fines (200): 2.91% (SW)
-48.6	4.9		CLAY, very stiff, trace sand, fine to coarse grained, quartz, sand distributed in pockets up to 1.0" and laminae, black (2.5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 4.2' Ave. Field Vane (tsf): 0.20
-51.5	7.8		SAND, fine to coarse grained, quartz, some clay, trace shell hash, trace silt, clay distributed in pockets typically up to 1.0" and laminae, clay increases with depth in layer, 3.0" clay pocket @ 7.3', mottled black (2.5Y-2.5/1) with, dark gray (2.5Y-4/1), (SC).			
-53.4	9.7		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-52

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-52 | LOCATION COORDINATES (ft): X = 2,638,307 Y = 616,893

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 1 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-22-22 | COMPLETED 10-22-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -30.3 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 15.1 Ft.

8. TOTAL DEPTH OF BORING: 17.5 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-30.3	0.0					
-30.7	0.4		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
			SAND, fine to medium grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments and whole shells up to 1.0", shell hash increases with depth in layer, 0.5" clay pocket @ 4.7', 1.5" shell fragment @ 7.9', dark gray (2.5Y-4/1), (SP).		1	Sample #1, Depth = 4.0' Mean (mm): 0.34, Phi Sorting: 0.76 Fines (230): 2.47% Fines (200): 2.49% (SP)
-39.4	9.1					
-40.8	10.5		Shelly SAND, fine to coarse grained, quartz, trace clay, trace silt, shell component is shell hash, shell fragments typically up to 2.0" and whole shells up to 2.0", (3.0" x 2.0") shell fragment @ 10.1', very dark gray (2.5Y-3/1), (GW).			
			Shelly CLAY, soft, shell component is shell hash and shell fragments up to 3.5", clay is very soft from 11.8' to 12.2', dark gray (N-4/0), (GC).			
-44.7	14.4					
-45.4	15.1		CLAY, soft, little shell hash, trace sand, trace silt, bit sample from 14.8' to 15.1', black (N-2.5/0), (CL).			
			No Recovery.			
-47.8	17.5		End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-53

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-53 | LOCATION COORDINATES (ft): X = 2,655,173 Y = 554,510

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-24-22 | COMPLETED 10-24-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -44.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 19 Ft.

8. TOTAL DEPTH OF BORING: 19.1 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-44.0	0.0					
			SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", gray (5Y-5/1), (SW).		1	Sample #1, Depth = 3.0' Mean (mm): 0.33, Phi Sorting: 0.88 Fines (230): 1.25% Fines (200): 1.27% (SW)
-51.7	7.7					
			SAND, fine grained, quartz, trace shell hash, trace silt, 1.5" shell hash pockets @ 11.1' and 12.5', gray (5Y-5/1), (SP).		2	Sample #2, Depth = 12.0' Mean (mm): 0.27, Phi Sorting: 0.73 Fines (230): 2.58% Fines (200): 2.67% (SP)
-60.4	16.4					
			CLAY, very stiff, trace sand, fine to coarse grained, quartz, sand distributed in pockets up to 1.0", sand decreases with depth in layer, black (5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 17.9' Ave. Field Vane (tsf): 0.20
-63.0	19.0					
-63.1	19.1		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-54

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

2. BORING DESIGNATION: BOEMVC-2022-SC-54
LOCATION COORDINATES (ft): X = 2,640,463 Y = 573,601

3. DRILLING AGENCY: APTIM
CONTRACTOR FILE NO.:

4. NAME OF DRILLER: Patrick Bryce, P. G.

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED
DEG. FROM VERTICAL:
BEARING:

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

8. TOTAL DEPTH OF BORING: 19.0 Ft.

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane
HORIZONTAL: NAD 1983
VERTICAL: NAVD 88

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore
☐ AUTO HAMMER ☐ MANUAL HAMMER

12. TOTAL SAMPLES: DISTURBED 2 UNDISTURBED (UD) 1

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-24-22 COMPLETED 10-24-22

16. ELEVATION TOP OF BORING: -39.8 Ft.

17. TOTAL RECOVERY FOR BORING: 18.8 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-39.8	0.0					
			SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, trace whole shell, shell fragments up to 1.0", increased shell hash from 1.5' to 1.8' and from 6.5' to 7.1', 1.0" whole shell @ 6.7', dark olive gray (5Y-3/2), (SP).		1	Sample #1, Depth = 5.0' Mean (mm): 0.20, Phi Sorting: 0.70 Fines (230): 2.21% Fines (200): 2.32% (SP)
-49.8	10.0					
			SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.5", dark olive gray (5Y-3/2), (SP-SM).		2	Sample #2, Depth = 11.5' Mean (mm): 0.17, Phi Sorting: 0.65 Fines (230): 4.68% Fines (200): 5.00% (SP-SM)
-53.2	13.4					
			Organic CLAY, soft, organic component is wood fragments up to 3.0", wood fragments are branches, roots and pieces of bark, mottled black (2.5Y-2.5/1) with, very dark brown (10YR-2/2), (CL).			
-55.8	16.0					
			Sandy CLAY, soft to firm, sand increases with depth in layer, dark gray (2.5Y-4/1), (CL).		T1	Sample #T1, Depth = 17.8' Ave. Field Vane (tsf): 0.20
-58.6	18.8					
-58.8	19.0		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-55

DRILLING LOG | DIVISION | INSTALLATION | SHEET 1 OF 1 SHEETS

1. **PROJECT** BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. **SIZE AND TYPE OF BIT** 3.0 In.

10. **COORDINATE SYSTEM/DATUM** South Carolina State Plane | **HORIZONTAL** NAD 1983 | **VERTICAL** NAVD 88

2. **BORING DESIGNATION** BOEMVC-2022-SC-55 | **LOCATION COORDINATES (ft)** X = 2,654,704 Y = 588,870

11. **MANUFACTURER'S DESIGNATION OF DRILL** APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. **DRILLING AGENCY** APTIM | **CONTRACTOR FILE NO.**

12. **TOTAL SAMPLES** | **DISTURBED** 2 | **UNDISTURBED (UD)** 3

4. **NAME OF DRILLER** Patrick Bryce, P. G.

13. **TOTAL NUMBER CORE BOXES**

5. **DIRECTION OF BORING** ☒ VERTICAL ☐ INCLINED | **DEG. FROM VERTICAL** | **BEARING**

14. **ELEVATION GROUND WATER**

15. **DATE BORING** | **STARTED** 10-24-22 | **COMPLETED** 10-24-22

6. **THICKNESS OF OVERBURDEN** 0.0 Ft.

16. **ELEVATION TOP OF BORING** -49.3 Ft.

7. **DEPTH DRILLED INTO ROCK** 0.0 Ft.

17. **TOTAL RECOVERY FOR BORING** 16.9 Ft.

8. **TOTAL DEPTH OF BORING** 18.6 Ft.

18. **SIGNATURE AND TITLE OF INSPECTOR** BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-49.3	0.0					
-49.6	0.3		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-51.4	2.1		SAND, fine to coarse grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, shell fragments up to 1.0", (3.0" x 1.0") clay pocket @ 1.7', very dark gray (5Y-3/1), (SW).		1	Sample #1, Depth = 1.1' Mean (mm): 0.37, Phi Sorting: 0.89 Fines (230): 1.90% Fines (200): 1.92% (SW)
-52.7	3.4		SAND, fine grained, quartz, trace coral, trace shell fragments, trace silt, trace whole shell, 2 (1.0" x 0.75") shell fragments @ 2.5', 2.0" shelly pocket @ 3.2', shell component is shell hash, shell fragments up to 1.0" and whole shells up to 0.5", 1.0" coral fragment @ 3.3', dark olive gray (5Y-3/2), (SP).		2	Sample #2, Depth = 2.6' Mean (mm): 0.19, Phi Sorting: 0.85 Fines (230): 4.02% Fines (200): 4.14% (SP)
					T1	Sample #T1, Depth = 7.0' Ave. Field Vane (tsf): 0.23
			CLAY, very stiff to hard, trace sand, fine grained, quartz, trace shell hash, sand distributed in pockets up to 1.0" and laminae, 1.0" shell hash pocket @ 4.7', bit sample from 16.7' to 16.9', very dark gray (2.5Y-3/1), (CL).			
					T2	Sample #T2, Depth = 14.0' Ave. Field Vane (tsf): 0.33
-66.2	16.9					
-67.9	18.6		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-56

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-56 | LOCATION COORDINATES (ft): X = 2,662,084 Y = 591,669

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 2 | UNDISTURBED (UD): 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING | STARTED: 10-24-22 | COMPLETED: 10-24-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -43.1 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 16.7 Ft.

8. TOTAL DEPTH OF BORING: 16.4 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-43.1	0.0					
-43.4	0.3		SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-52.1	9.0		SAND, fine to medium grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments typically up to 0.25", 0.5" shell hash pocket @ 1.0', (1.5" x 0.5") shell fragment @ 3.1', (1.0" x 0.5") shell fragment @ 4.2', (9.0" x 1.0") pocket with surface oxidation @ 4.5', dark greenish gray (10Y-4/1), (SW).		1	Sample #1, Depth = 4.0' Mean (mm): 0.32, Phi Sorting: 0.98 Fines (230): 1.21% Fines (200): 1.23% (SW)
-52.7	9.6		SAND, fine grained, quartz, some shell hash, little shell fragments, trace whole shell, shell fragments up to 1.0", (2.0" x 1.75") whole shell @ 9.3', dark greenish gray (10Y-4/1), (SW).			
-53.6	10.5				1	
-54.3	11.2		SAND, fine to medium grained, quartz, trace shell hash, trace silt, trace whole shell, (1.5" x 0.5") whole shell @ 10.2', dark greenish gray (10Y-4/1), (SW).			
-59.8	16.7		SAND, fine grained, quartz, some shell hash, little shell fragments, trace silt, shell fragments up to 1.5", dark greenish gray (10Y-4/1), (SW). SAND, fine grained, quartz, little shell hash, trace clay, trace silt, trace whole shell, shell fragments typically up to 1.0", 3.0" shell fragment @ 13.9', (2.0" x 1.0") whole shell @ 14.2', 1.0" whole shell @ 14.9', 1.0" clay pocket @ 15.1', 0.5" clay pocket @ 16.4', expansion from 16.4' to 16.7', dark gray (N-4/0), (SW-SM).		2	Sample #2, Depth = 14.6' Mean (mm): 0.36, Phi Sorting: 1.00 Fines (230): 5.70% Fines (200): 5.71% (SW-SM)
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-57

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-57 | LOCATION COORDINATES (ft): X = 2,652,199 Y = 601,821

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-24-22 | COMPLETED 10-24-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -46.4 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 19 Ft.

8. TOTAL DEPTH OF BORING: 18.9 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-46.4	0.0					
-46.8	0.4		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	Sample #1, Depth = 1.3' Mean (mm): 0.46, Phi Sorting: 0.83 Fines (230): 1.15% Fines (200): 1.16% (SP)
-48.6	2.2		SAND, fine to coarse grained, quartz, trace clay, trace shell hash, trace silt, (2.0" x 1.0") clay pocket @ 0.6', dark olive gray (5Y-3/2), (SP).		1	Sample #2, Depth = 3.0' Mean (mm): 0.19, Phi Sorting: 0.89 Fines (230): 6.35% Fines (200): 6.46% (SW-SM)
-50.2	3.8		SAND, fine grained, quartz, trace shell fragments, trace shell hash, trace silt, shell fragments typically up to 0.5", silt distributed in laminae, 1.0" shell fragment @ 3.7', dark olive gray (5Y-3/2), (SW-SM).		2	
-53.4	7.0		Clayey SAND, fine grained, quartz, some shell hash, very dark greenish gray (10Y-3/1), (SC).			
-55.9	9.5		CLAY, soft, some sand, fine grained, quartz, little shell hash, sand distributed in pockets up to 1.0", dark greenish gray (10Y-4/1), (CL).			
-65.4	19.0		CLAY, hard, trace sand, fine grained, quartz, trace shell hash, sand distributed in pockets up to 0.5" and laminae, expansion from 18.9' to 19.0', very dark greenish gray (10Y-3/1), (CL).		T1	Sample #T1, Depth = 15.0' Ave. Field Vane (tsf): 0.33
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-58

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-58 | LOCATION COORDINATES (ft): X = 2,623,479 Y = 595,569

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 2 | UNDISTURBED (UD) 2

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

14. ELEVATION GROUND WATER:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

15. DATE BORING: STARTED 10-25-22 | COMPLETED 10-25-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -36.3 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 16.9 Ft.

8. TOTAL DEPTH OF BORING: 19.3 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-36.3	0.0					
-36.5	0.2		SAND, fine to medium grained, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-41.8	5.5		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, shell fragments up to 0.25", (2.0" x 1.0") clay pocket @ 3.0', dark gray (2.5Y-4/1), (SP).		1	Sample #1, Depth = 3.4' Mean (mm): 0.24, Phi Sorting: 0.84 Fines (230): 1.62% Fines (200): 1.66% (SP)
-43.5	7.2		SHELL, trace clay, trace sand, fine grained, quartz, trace silt, shell component is shell hash and shell fragments and whole shells up to 1.0", gray (5Y-5/1), (GW).			
-46.6	10.3		SAND, fine grained, quartz, little shell hash, trace rock fragments, trace shell fragments, trace silt, shell fragments up to 0.25", (2.5" x 1.5") limestone fragment @ 9.8', dark gray (2.5Y-4/1), (SW).		2	Sample #2, Depth = 9.0' Mean (mm): 0.28, Phi Sorting: 0.86 Fines (230): 4.17% Fines (200): 4.21% (SW)
-53.2	16.9		CLAY, very stiff, trace sand, fine to medium grained, quartz, 1.0" sand pocket @ 16.6', bit sample from 16.6' to 16.9', black (5Y-2.5/1), (CL).		T1	Sample #T1, Depth = 13.5' Ave. Field Vane (tsf): 0.18
-55.6	19.3		No Recovery.			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-59

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-59 | LOCATION COORDINATES (ft): X = 2,617,844 Y = 596,524

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES | DISTURBED: 0 | UNDISTURBED (UD): 1

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES

14. ELEVATION GROUND WATER

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL | BEARING

15. DATE BORING | STARTED: 10-25-22 | COMPLETED: 10-25-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -41.1 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 18.2 Ft.

8. TOTAL DEPTH OF BORING: 18.1 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-41.1	0.0					
-41.7	0.6		Silty SAND, fine grained, quartz, little shell hash, trace clay, trace shell fragments, clay distributed in pockets up to 0.5", shell fragments up to 0.25", black (2.5Y-2.5/1), (SC).			
-47.9	6.8		Clayey SHELL HASH, trace sand, fine grained, quartz, trace shell fragments, trace silt, clay increases with depth in layer, shell fragments typically up to 1.0", (3.5" x 2.5") shell fragment @ 2.2', very dark greenish gray (10Y-3/1), (GC).			
-54.0	12.9		Sandy CLAY, soft, trace shell hash, sand is fine grained quartz typically distributed in pockets up to 1.5" and laminae, (3.5" x 2.0") pocket of fine to coarse grained sand @ 12.3', very dark greenish gray (10Y-3/1), (CL).			
-57.7	16.6		CLAY, very stiff, little sand, fine to coarse grained, quartz, sand distributed in pockets up to 2.0", very dark gray (2.5Y-3/1), (CL).		T1	Sample #T1, Depth = 14.8' Ave. Field Vane (tsf): 0.20
-59.3	18.2		SAND, fine to coarse grained, quartz, trace clay, trace shell hash, trace silt, 1.0" clay pocket @ 16.9', expansion from 18.1' to 18.2', very dark grayish brown (2.5Y-3/2), (SP).			
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

Boring Designation BOEMVC-2022-SC-60

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 1 SHEETS

1. PROJECT: BOEM 2022 Onslow and Long Bays, NC/SC

APTIM

9. SIZE AND TYPE OF BIT: 3.0 In.

10. COORDINATE SYSTEM/DATUM: South Carolina State Plane | HORIZONTAL: NAD 1983 | VERTICAL: NAVD 88

2. BORING DESIGNATION: BOEMVC-2022-SC-60 | LOCATION COORDINATES (ft): X = 2,616,473 Y = 602,891

11. MANUFACTURER'S DESIGNATION OF DRILL: APTIM SEAS VC-700 Vibracore | ☐ AUTO HAMMER ☐ MANUAL HAMMER

3. DRILLING AGENCY: APTIM | CONTRACTOR FILE NO.:

12. TOTAL SAMPLES: DISTURBED 1 | UNDISTURBED (UD) 3

4. NAME OF DRILLER: Patrick Bryce, P. G.

13. TOTAL NUMBER CORE BOXES:

5. DIRECTION OF BORING: ☒ VERTICAL ☐ INCLINED | DEG. FROM VERTICAL: | BEARING:

14. ELEVATION GROUND WATER:

15. DATE BORING: STARTED 10-25-22 | COMPLETED 10-25-22

6. THICKNESS OF OVERBURDEN: 0.0 Ft.

16. ELEVATION TOP OF BORING: -32.4 Ft.

7. DEPTH DRILLED INTO ROCK: 0.0 Ft.

17. TOTAL RECOVERY FOR BORING: 19.3 Ft.

8. TOTAL DEPTH OF BORING: 19.2 Ft.

18. SIGNATURE AND TITLE OF INSPECTOR: BF

ELEV. (ft)	DEPTH (ft)	LEGEND	CLASSIFICATION OF MATERIALS Depths and elevations based on measured values	% REC.	BOX OR SAMPLE	REMARKS
-32.4	0.0					
-32.6	0.2		SAND, fine to medium grained, quartz, trace shell hash, trace silt, grayish brown (2.5Y-5/2), (SP).		SC-48 #1	
-36.8	4.4		SAND, fine grained, quartz, trace clay, trace shell fragments, trace shell hash, trace silt, shell fragments typically up to 0.25", 2.0" shell hash pocket @ 1.4', (2.0" x 0.5") clay pocket @ 1.5', (2.0" x 1.5") shell fragment @ 4.2', dark gray (2.5Y-4/1), (SP).		1	Sample #1, Depth = 2.5' Mean (mm): 0.21, Phi Sorting: 0.74 Fines (230): 2.78% Fines (200): 2.84% (SP)
-41.1	8.7		Shelly CLAY, soft, little sand, fine grained, quartz, trace shell fragments, trace silt, trace whole shell, shell fragments typically up to 0.25", (2.5" x 1.5") whole shell @ 7.0', (2.0" x 0.75") shell fragment @ 7.0', very dark greenish gray (10Y-3/1), (GC).			
-42.4	10.0		CLAY, soft to firm, trace sand, fine grained, quartz, trace shell hash, 1.0" shell hash pocket @ 9.4', dark greenish gray (5GY-4/1), (CL).		T1	Sample #T1, Depth = 9.2' Ave. Field Vane (tsf): 0.26
-45.2	12.8		Clayey SAND, fine grained, quartz, little shell hash, trace silt, dark greenish gray (10Y-4/1), (SC).			
-51.7	19.3		CLAY, very stiff, trace sand, fine grained, quartz, sand distributed in laminae, bit sample from 18.8' to 19.3', expansion from 19.2 to 19.3', very dark greenish gray (10Y-3/1), (CL).		T2	Sample #T2, Depth = 16.2' Ave. Field Vane (tsf): 0.26
			End of Boring			

0 5 10 15 20 25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 2/20/23

SAJ FORM 1836
JUN 04

APPENDIX
2022 APTIM VIBRACORE PHOTOGRAPHS


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
12.0'-14.0'

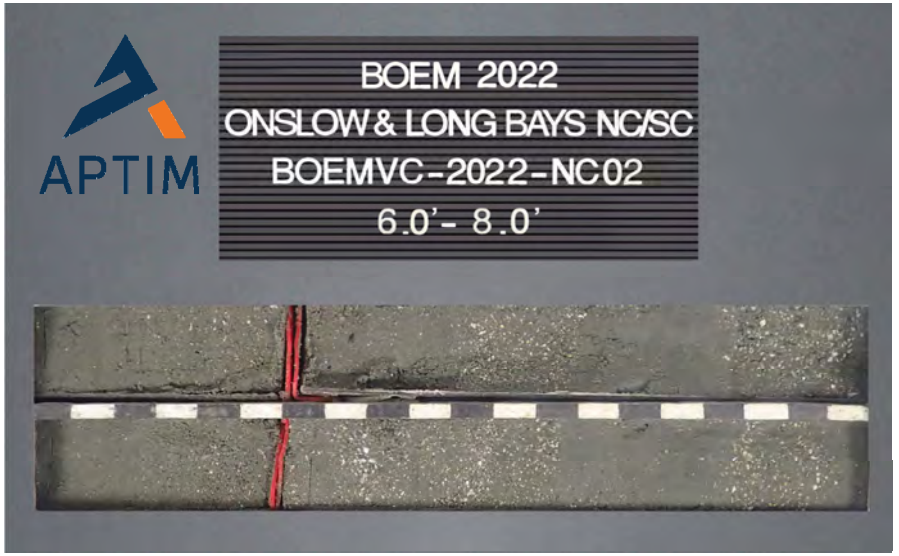

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC01
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC02
16.0'-17.4'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
10.0'-12.0'

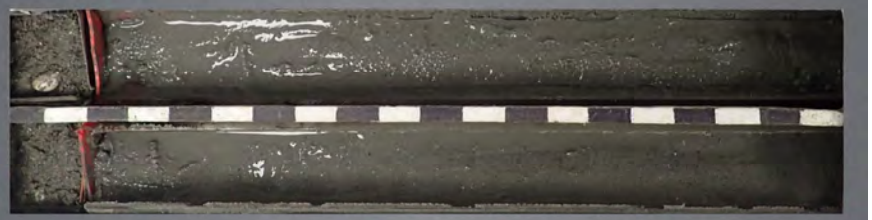

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC03
16.0'-17.2'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
0.0'- 2.0'

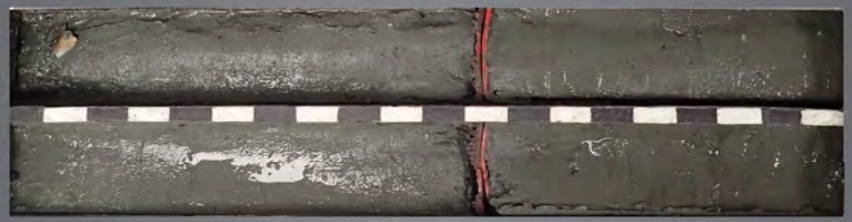


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
4.0'- 6.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
6.0'- 8.0'

APTIM

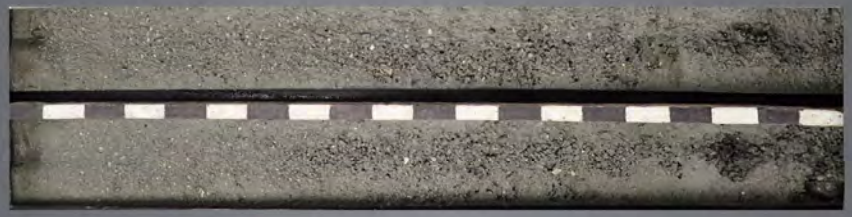
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
12.0'-14.0'



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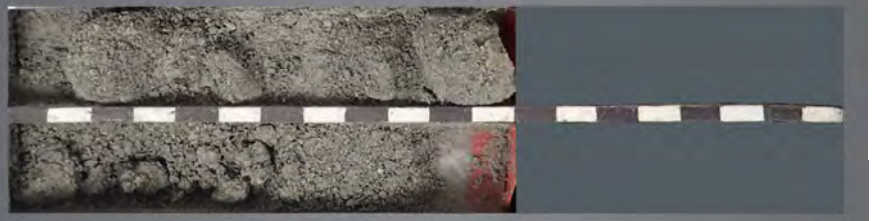
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC04
14.0'-15.2'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC05
18.0'-18.3'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
4.0'- 6.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC06
16.0'-16.7'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
4.0'- 6.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC07
18.0'-18.5'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
6.0'- 8.0'

APTIM

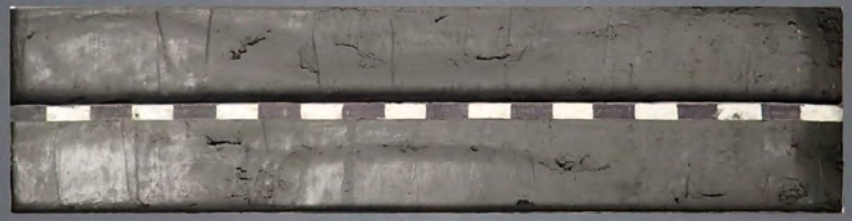
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC08
14.0'-14.2'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC09
18.0'-19.2'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
4.0'- 6.0'

APTIM

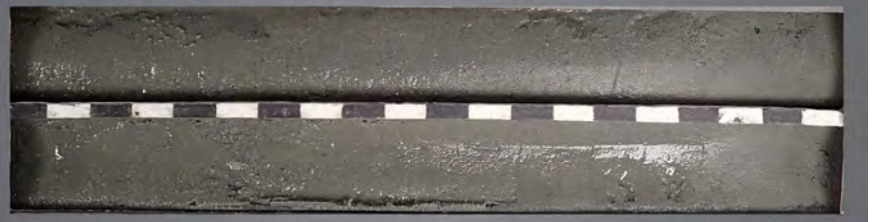
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
10.0'-12.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC10
14.0'-14.5'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC11
16.0'-17.8'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
12.0'-14.0'

APTIM

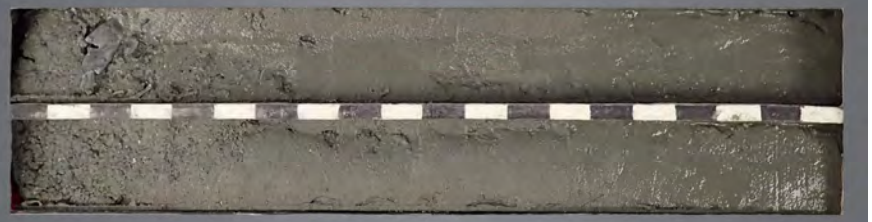
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
14.0'-16.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC12
16.0'-16.5'

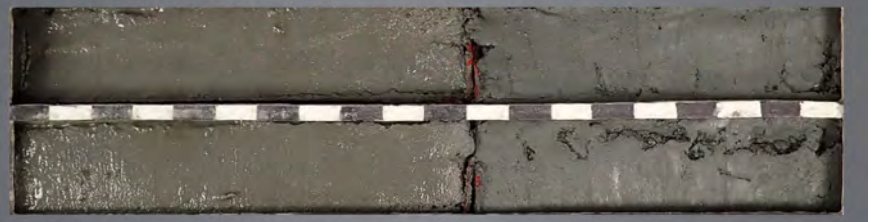
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
0.0'- 2.0'



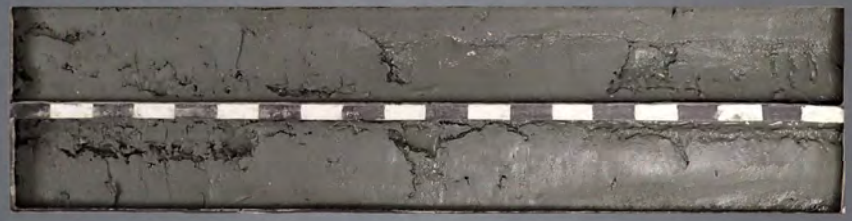
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
2.0'- 4.0'



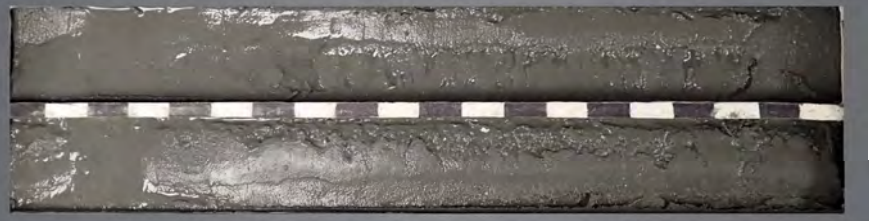
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
4.0'- 6.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
6.0'- 8.0'

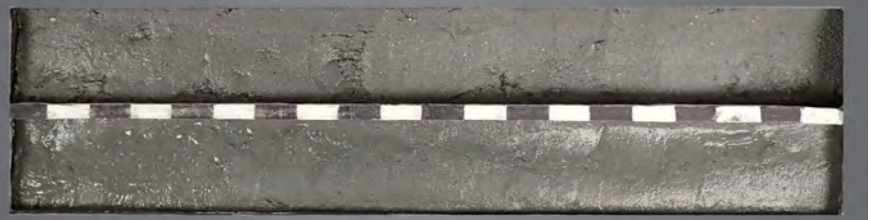


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
8.0'-10.0'

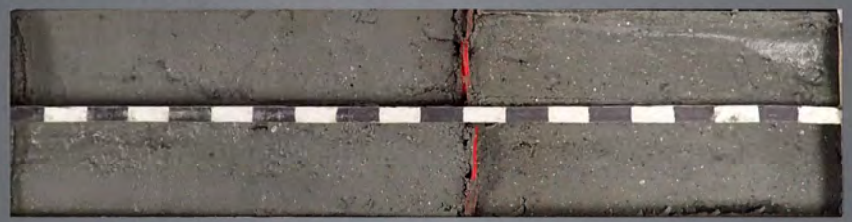
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
10.0'-12.0'



APTIM

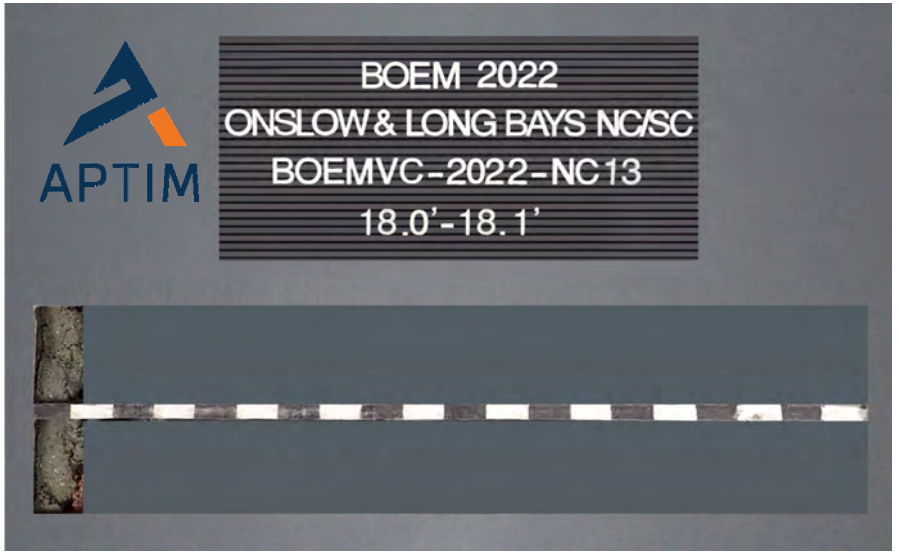
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC13
18.0'-18.1'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC14
16.0'-17.8'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
12.0'-14.0'

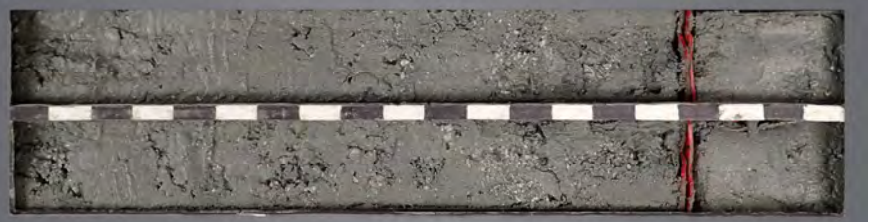

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC15
14.0'-15.6'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
2.0'- 4.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
4.0'- 6.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
6.0'- 8.0'

APTIM

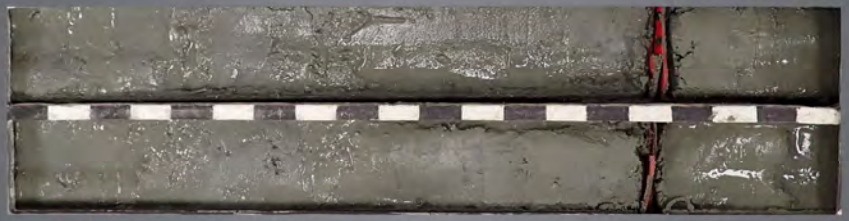
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
10.0'-12.0'

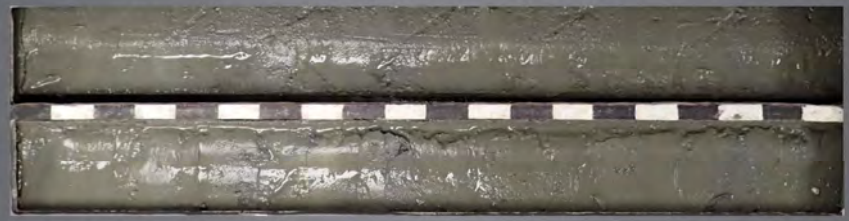
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC16
18.0'-18.8'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
0.0'- 2.0'

APTIM

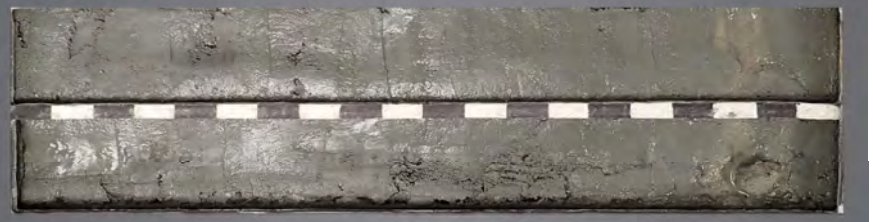
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
4.0'- 6.0'

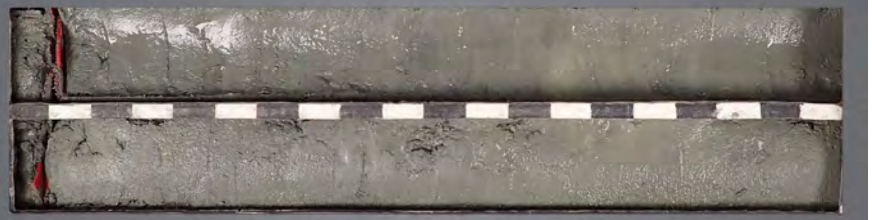
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
6.0'- 8.0'



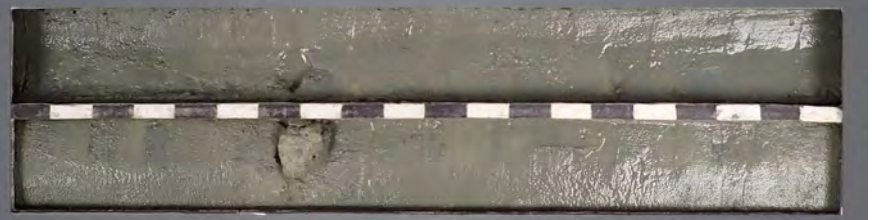
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
8.0'-10.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
10.0'-12.0'

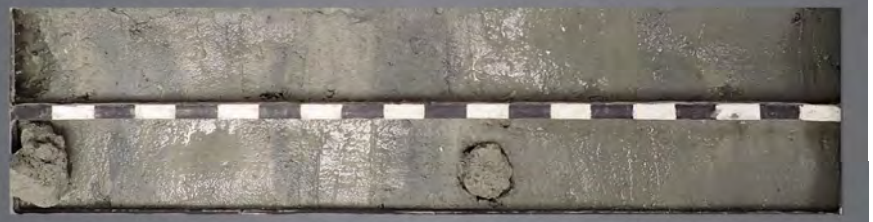


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC17
16.0'-17.8'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
0.0'- 2.0'

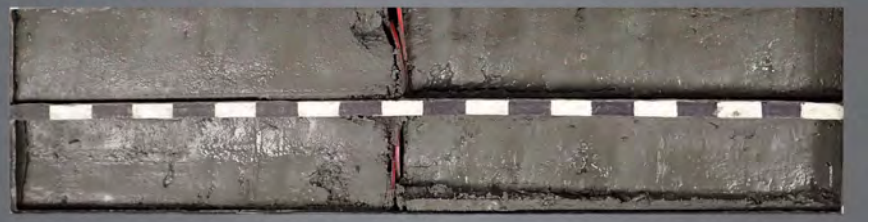

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
6.0'- 8.0'

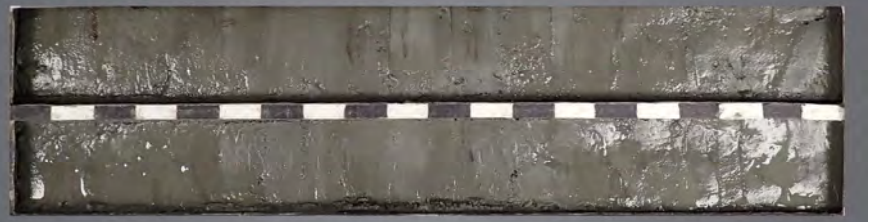
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
8.0'-10.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
10.0'-12.0'

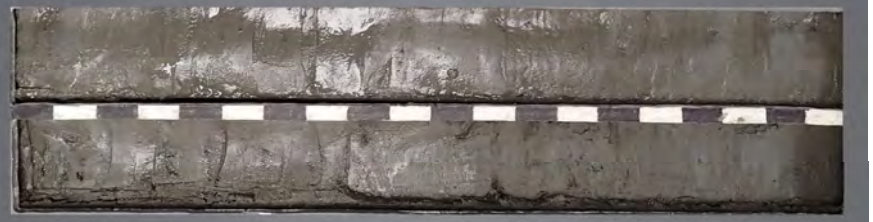


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC18
18.0'-19.2'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
6.0'- 8.0'

APTIM

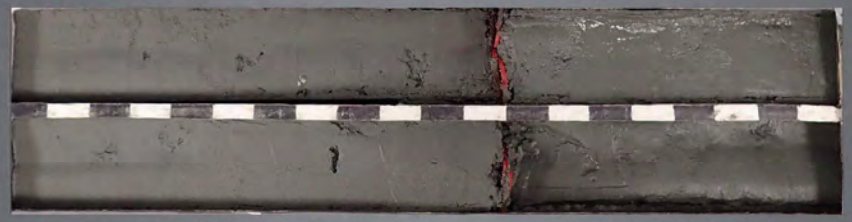
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
14.0'-16.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
16.0'-18.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC19
18.0'-18.2'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC20
18.0'-18.3'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC21
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 21
16.0'-17.3'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
0.0'- 2.0'

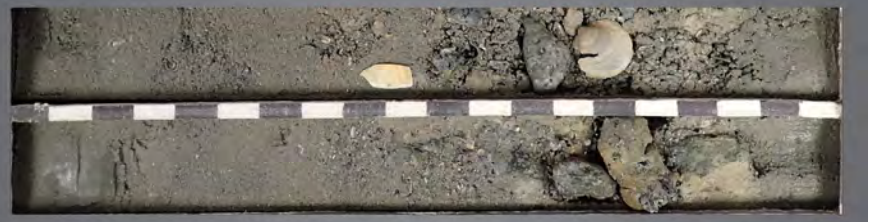

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
8.0'-10.0'



APTIM

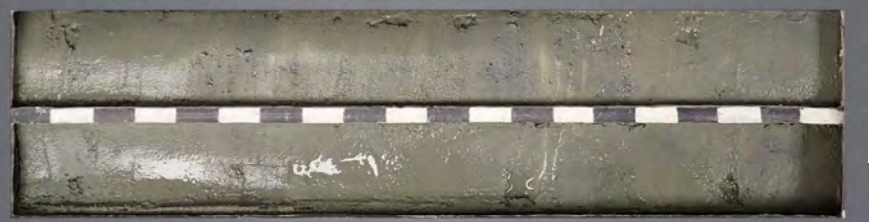
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC22
16.0'-17.5'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
0.0'- 2.0'

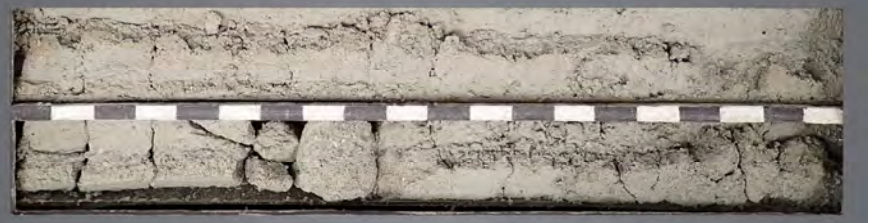

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
6.0'- 8.0'

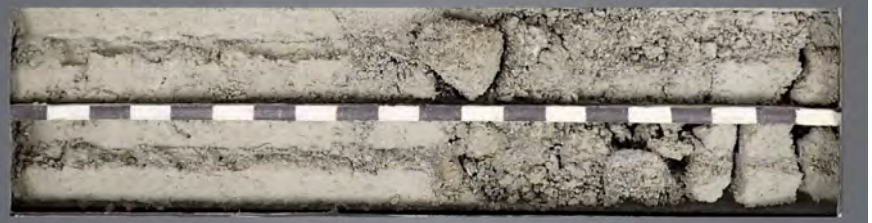
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
8.0'-10.0'



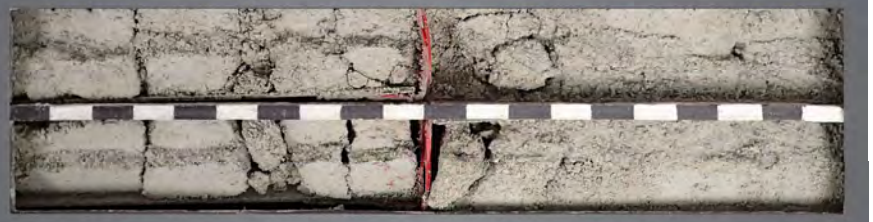
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
10.0'-12.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
12.0'-14.0'



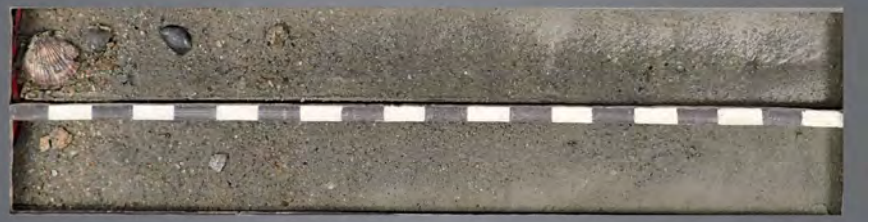
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC23
16.0'-18.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC24
0.0'- 2.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC24
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC24
4.0'- 6.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC24
6.0'- 8.0'

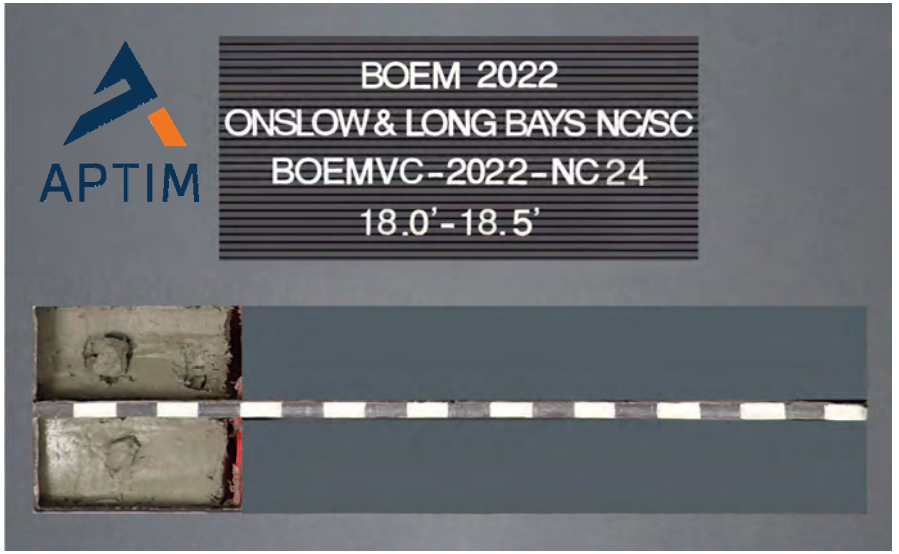

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 24
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 24
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 24
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 24
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC24
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC24
18.0'-18.5'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
0.0'- 2.0'

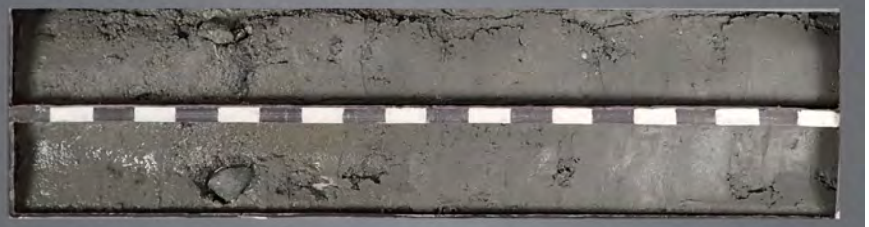

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
8.0'-10.0'



APTIM

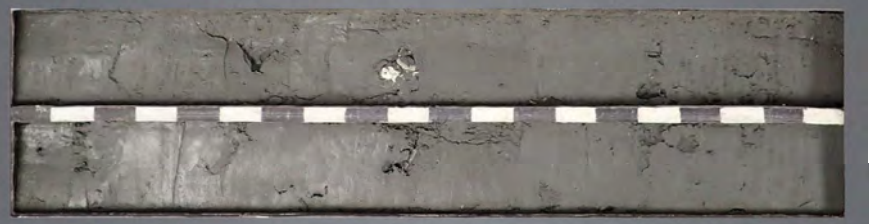
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC25
16.0'-17.6'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC26
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC26
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC26
4.0'- 6.0'

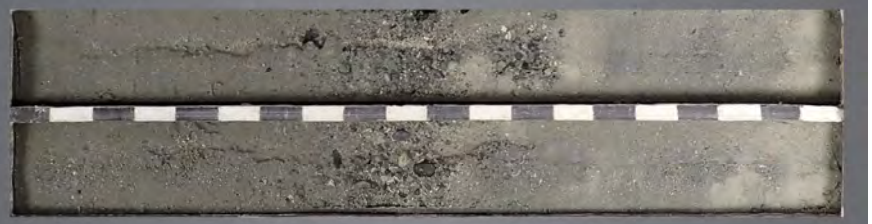

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC26
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 26
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 26
10.0'-12.0'



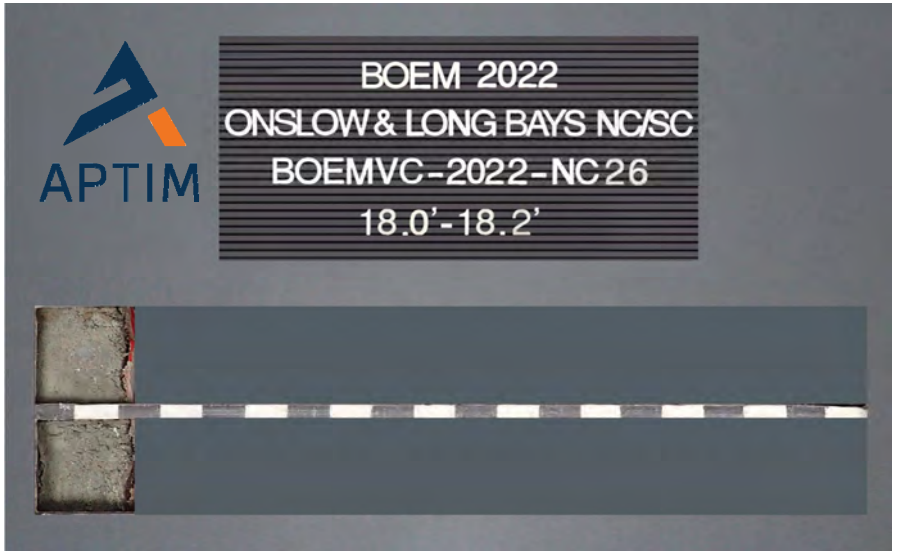
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 26
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 26
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC26
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC26
18.0'-18.2'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC27
16.0'-17.4'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC28
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 28
16.0'-17.6'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC29
12.0'-13.4'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC30
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC30
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC30
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC30
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 30
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 30
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 30
12.0'-12.4'

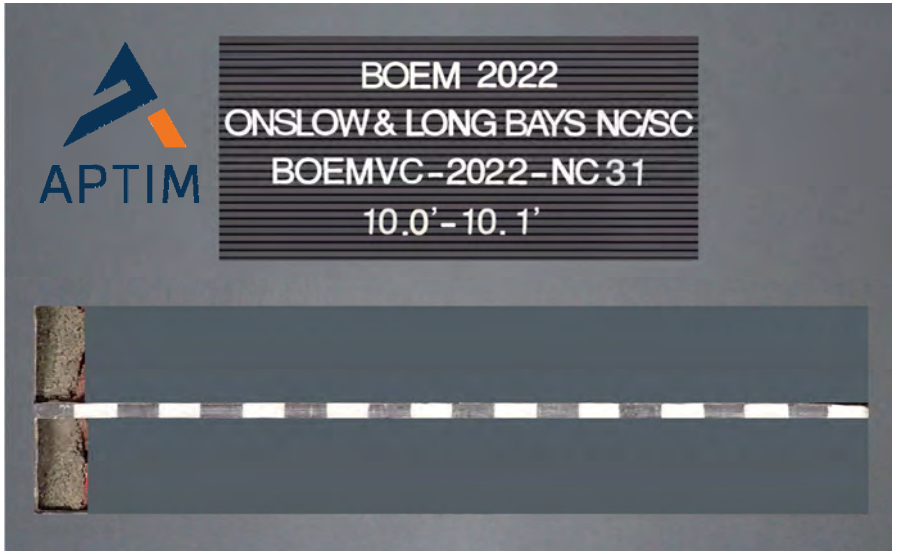

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 31
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 31
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 31
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 31
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 31
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 31
10.0'-10.1'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC32
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC32
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC32
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC32
6.0'- 8.0'

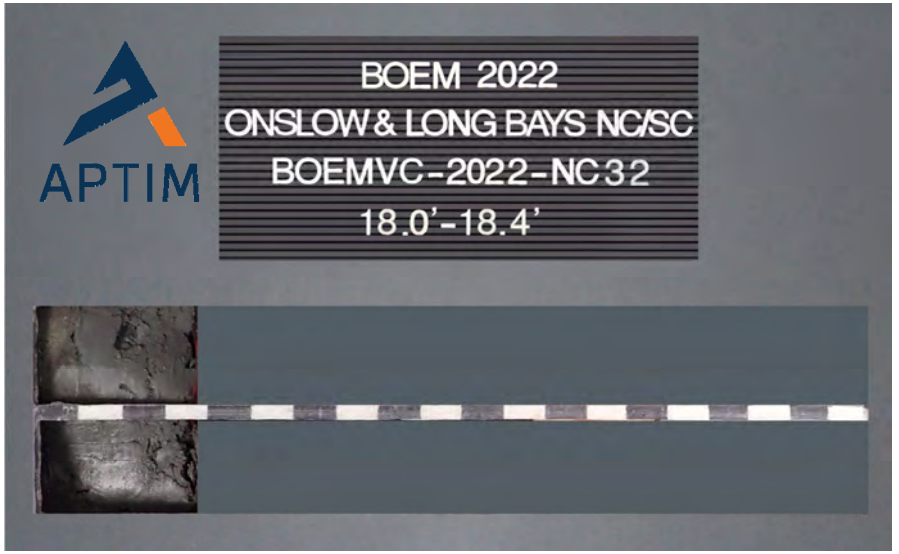

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 32
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 32
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 32
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 32
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC32
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC32
18.0'-18.4'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC33
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC33
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC33
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC33
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 33
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 33
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 33
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 33
14.0'-15.2'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
0.0'- 2.0'

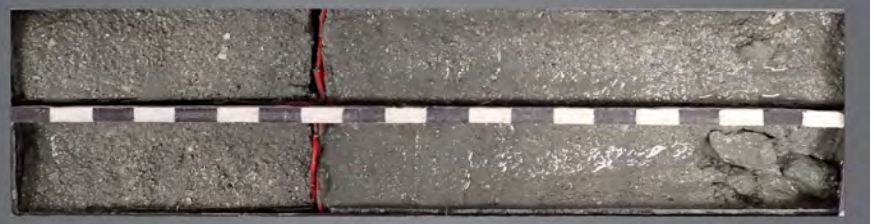

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
8.0'-10.0'

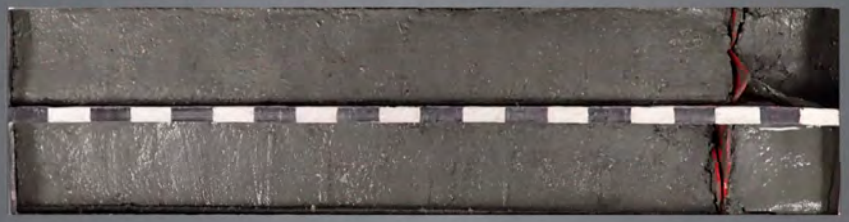


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
12.0'-14.0'



APTIM

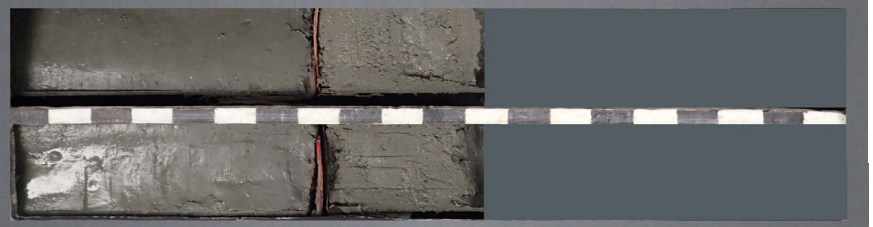
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
14.0'-16.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
16.0'-18.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 34
18.0'-19.2'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
0.0'- 2.0'

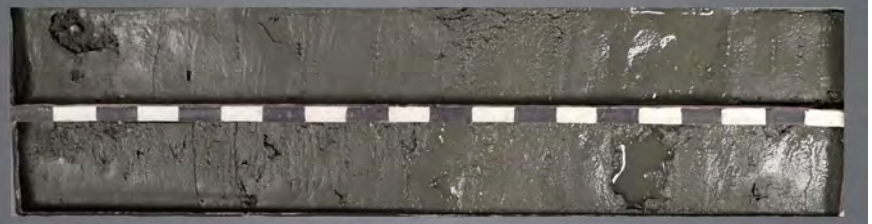

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
8.0'-10.0'

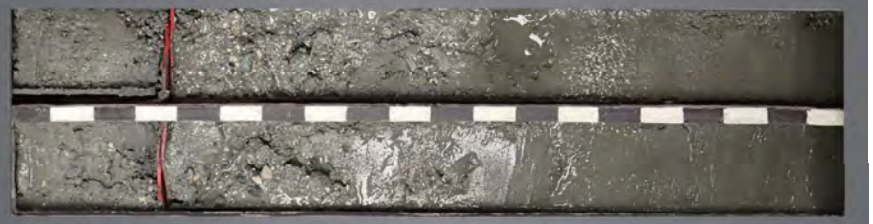


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
10.0'-12.0'

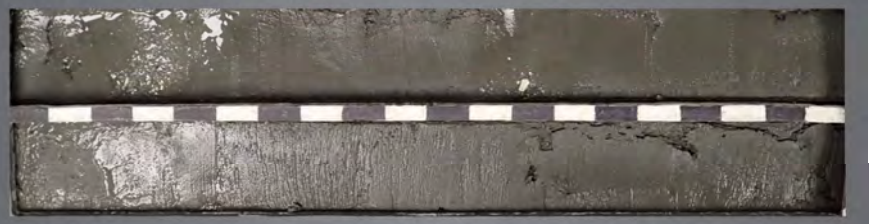
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
12.0'-14.0'

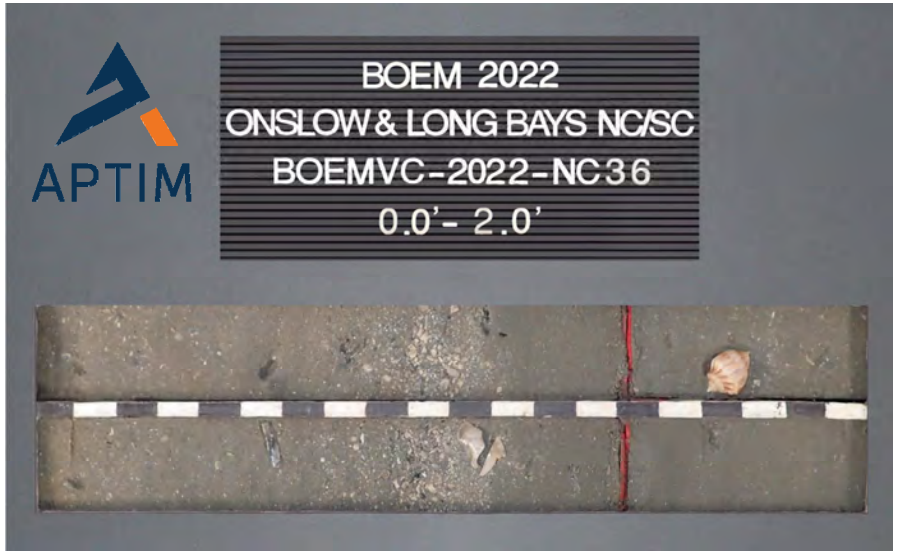


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 5
16.0'-17.6'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC36
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC36
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC36
4.0'- 6.0'

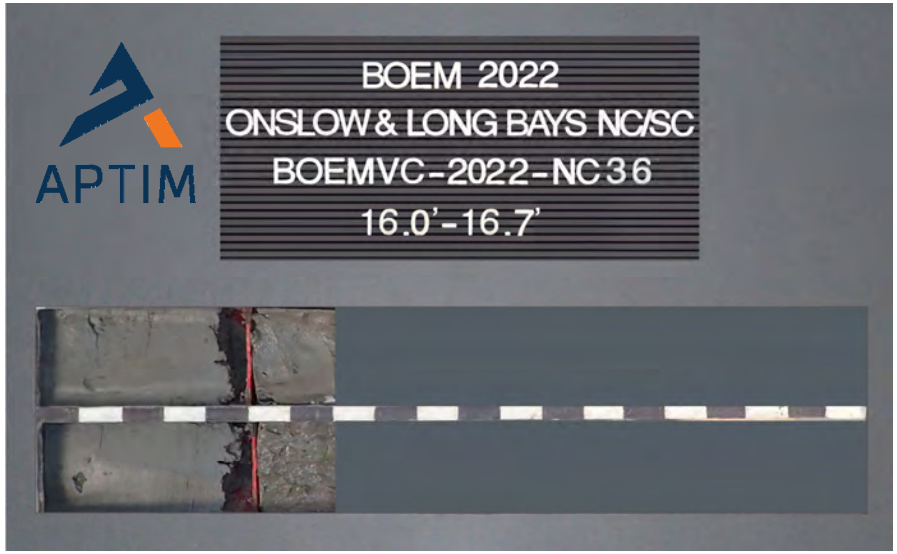

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC36
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 6
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 6
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 6
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 6
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC36
16.0'-16.7'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC37
0.0'- 2.0'

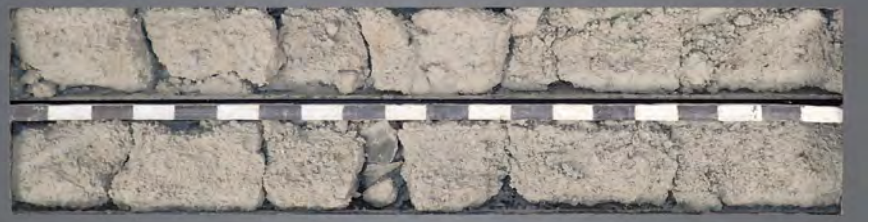

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC37
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC37
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC37
6.0'- 8.0'

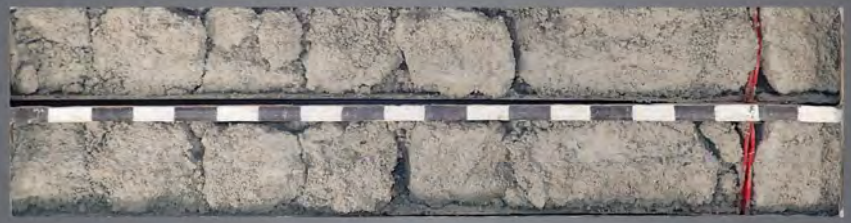
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 7
8.0'-10.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 7
10.0'-12.0'

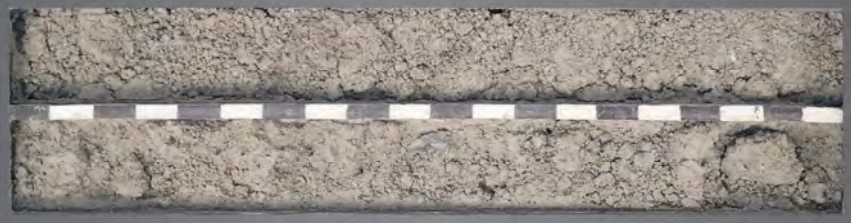


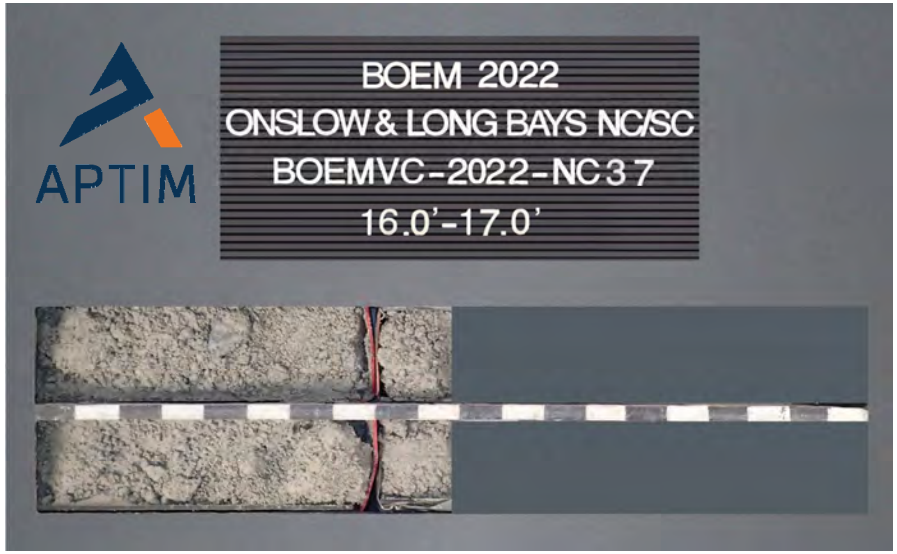
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 7
12.0'-14.0'

APTIM

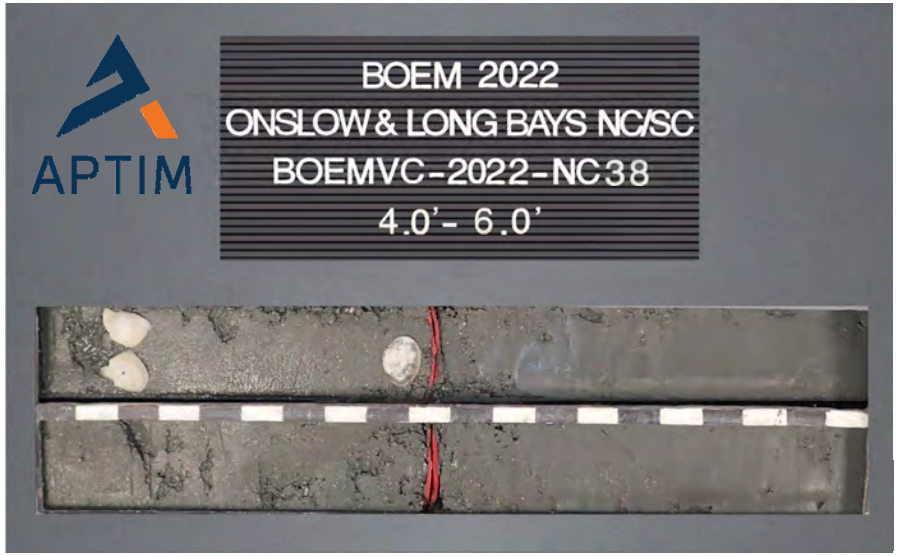
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 7
14.0'-16.0'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 3 7
16.0'-17.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC38
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC38
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC38
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC38
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC38
8.0' - 8.9'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC39
0.0'- 2.0'

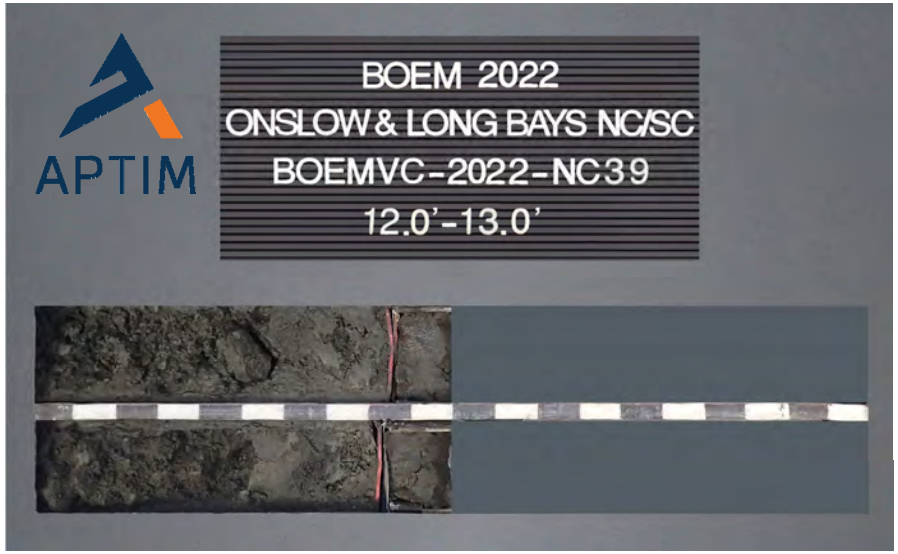

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC39
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC39
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC39
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 39
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 39
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 39
12.0'-13.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC40
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC40
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC40
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC40
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 4 0
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 4 0
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-NC 4 0
12.0'-13.8'

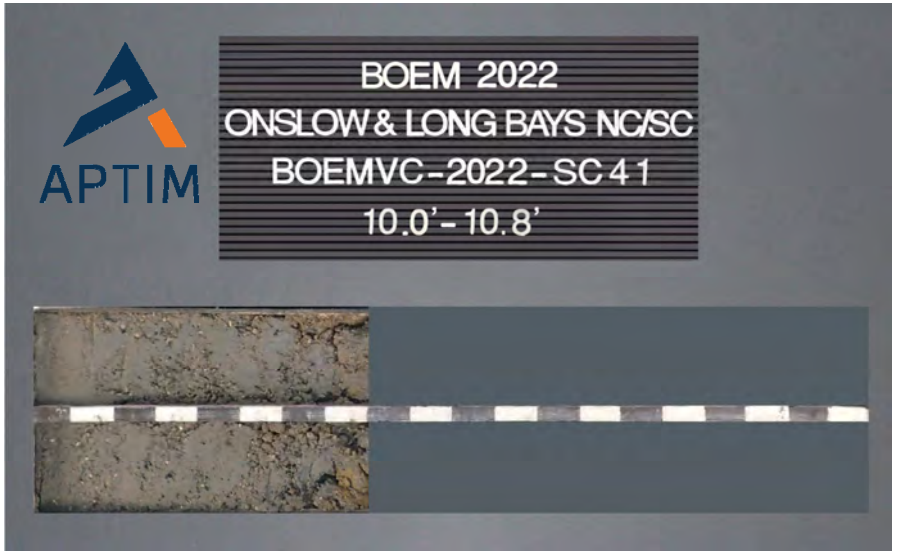

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC41
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC41
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC41
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC41
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC 41
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC 41
10.0'-10.8'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
4.0'- 6.0'

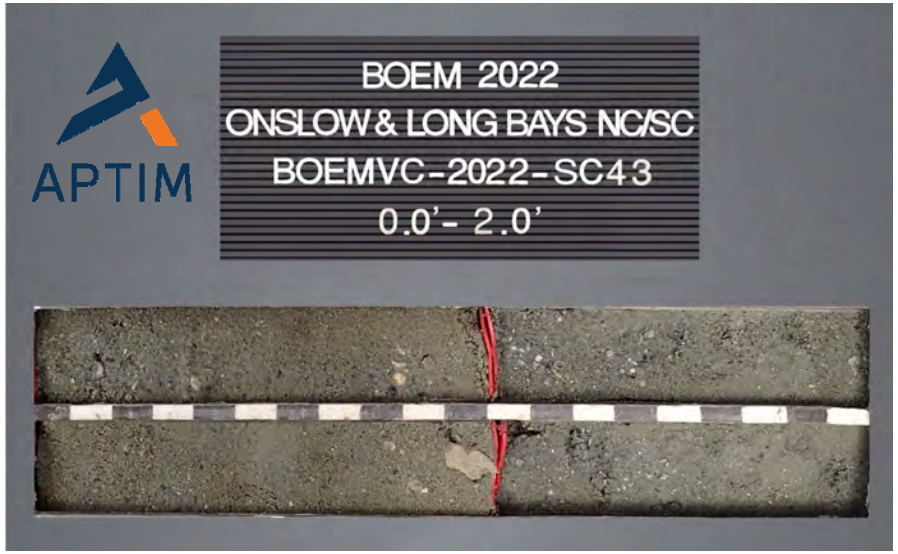

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC42
14.0'-15.9'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC43
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC43
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC43
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC43
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC43
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC43
10.0'-11.7'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
0.0'- 2.0'

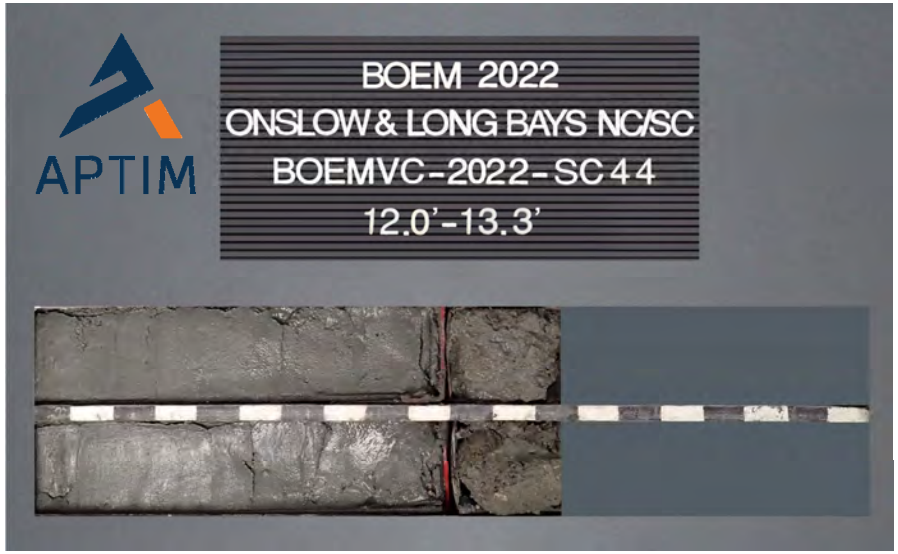

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
6.0'- 8.0'

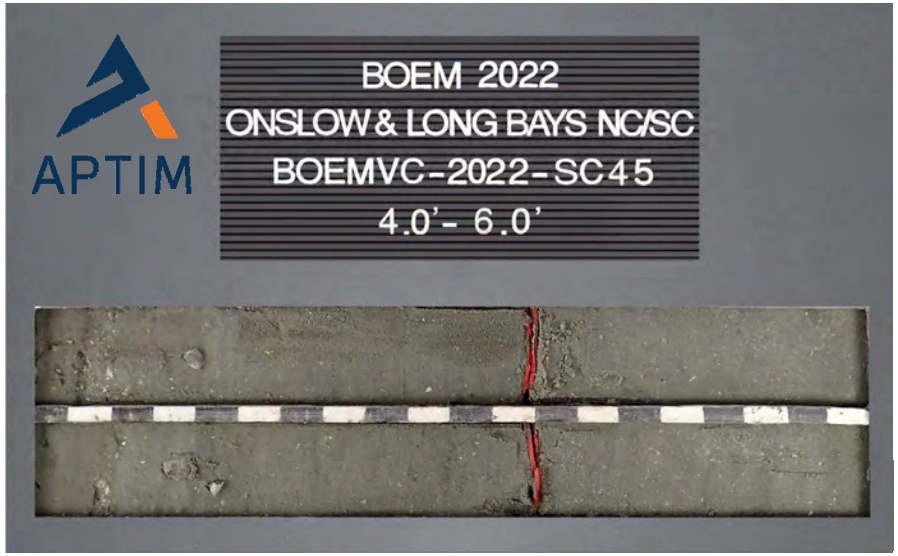

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC44
12.0'-13.3'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
0.0'- 2.0'

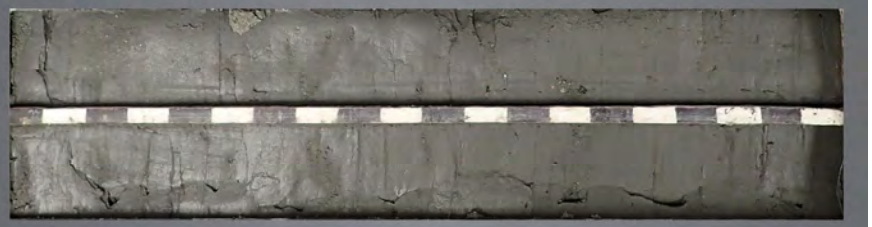

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
6.0'- 8.0'

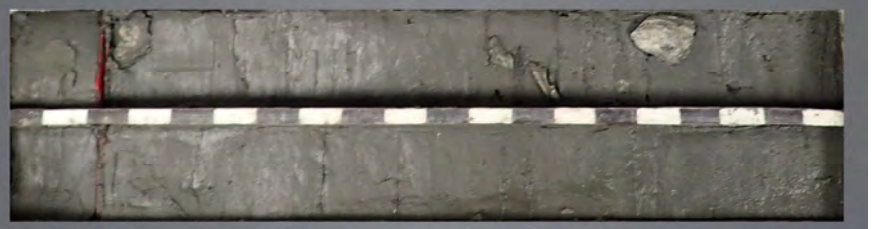
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
8.0'-10.0'



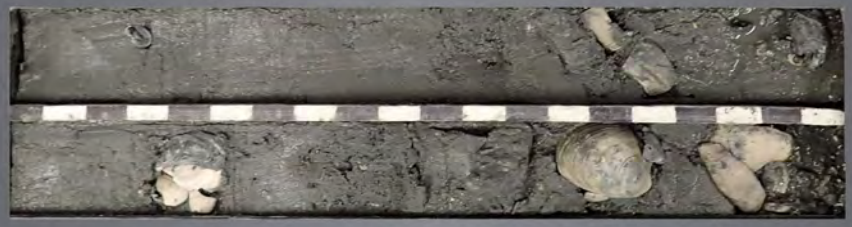
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
10.0'-12.0'



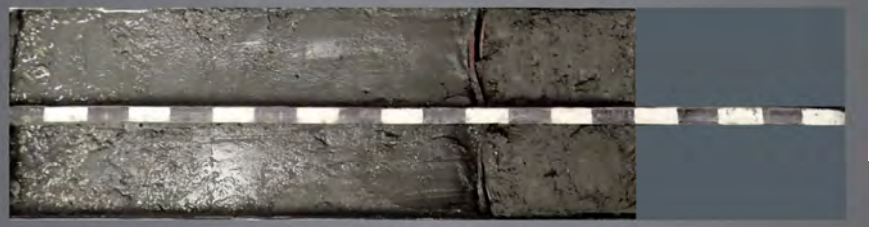
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC45
14.0'-15.5'



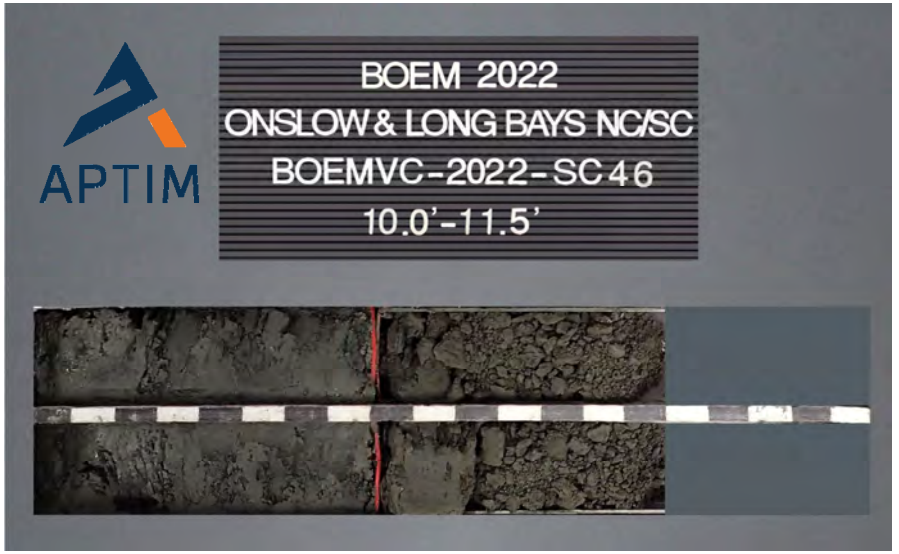

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC46
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC46
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC46
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC46
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC46
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC46
10.0'-11.5'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC47
14.0'-16.0'

APTIM

BOEM 2022

ONSLOW & LONG BAYS NC/SC

BOEMVC-2022-SC 47

16.0'-17.1'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
8.0'-10.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC48
16.0'-17.5'

APTIM

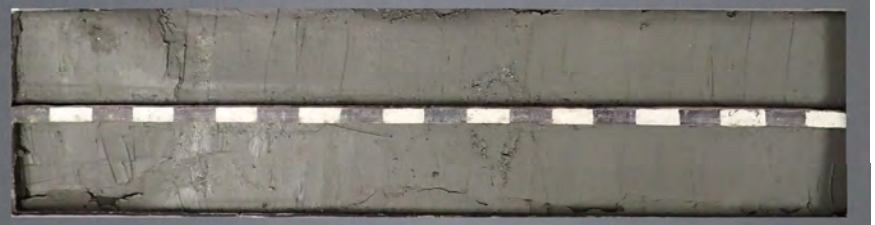
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
4.0'- 6.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC49
16.0'-17.7'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
2.0'- 4.0'

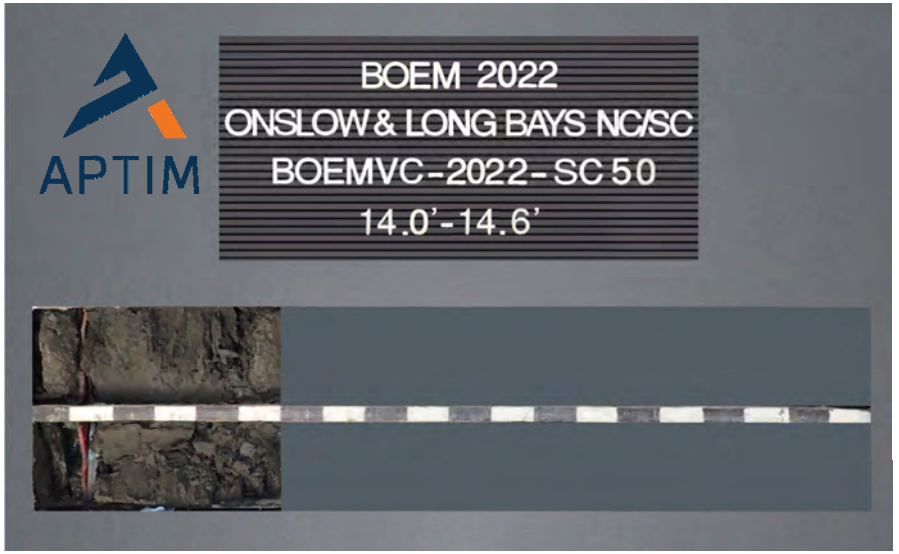

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
12.0'-14.0'

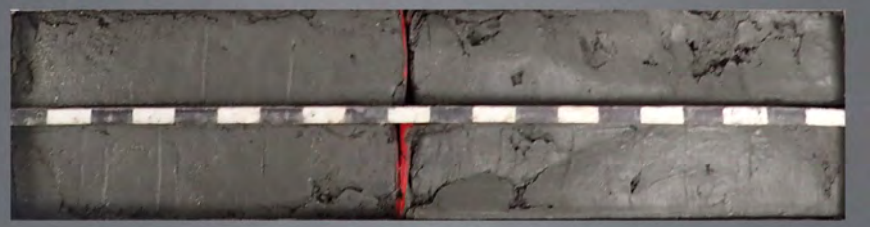

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC50
14.0'-14.6'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC51
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC51
2.0'- 4.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC51
4.0'- 6.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC51
6.0'- 7.8'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
4.0'- 6.0'

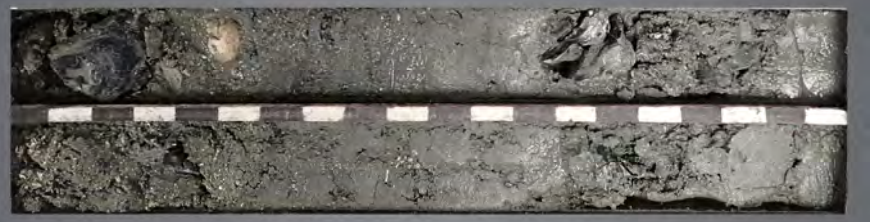

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
8.0'-10.0'

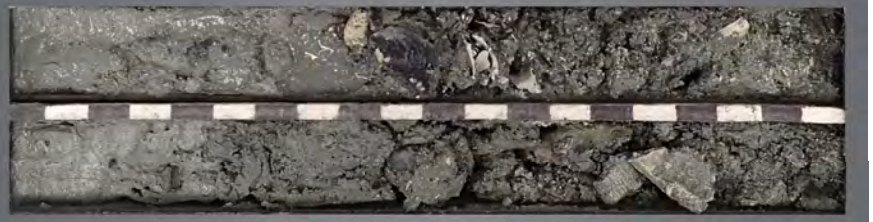
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
10.0'-12.0'



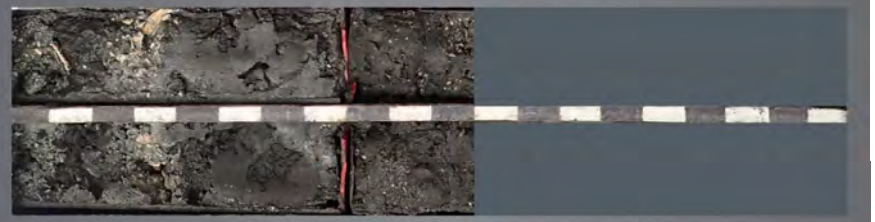
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC52
14.0'-15.1'




APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
6.0'- 8.0'

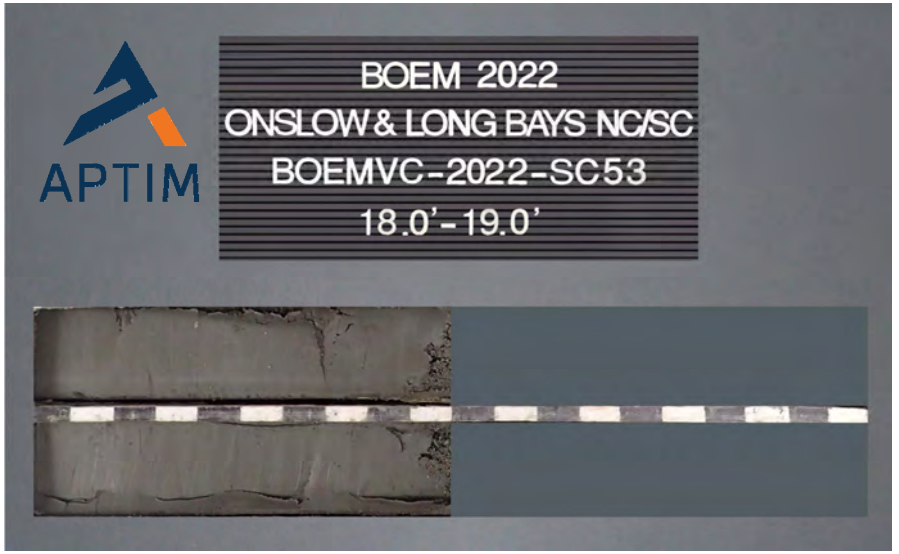

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC53
18.0'-19.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
0.0'- 2.0'

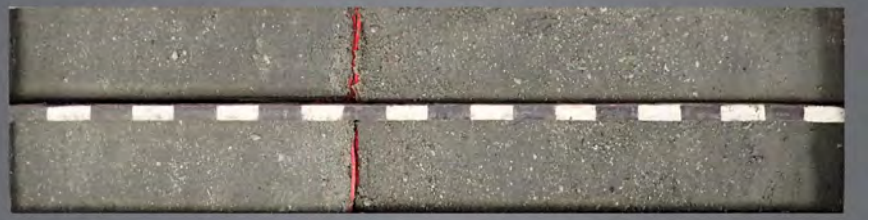

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
6.0'- 8.0'

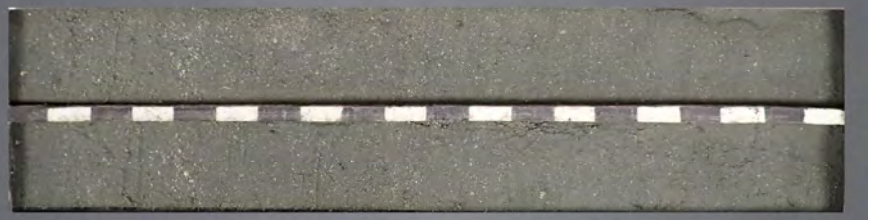
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
8.0'-10.0'



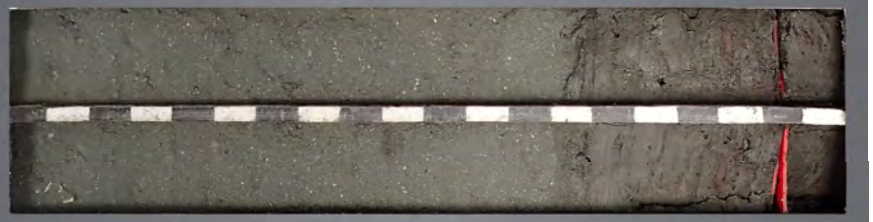
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
10.0'-12.0'



APTIM

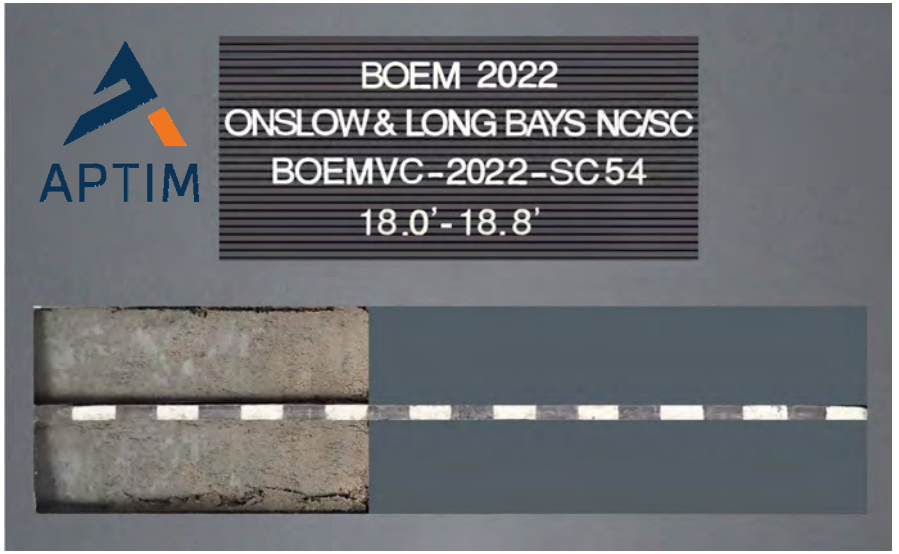
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC54
18.0'-18.8'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
0.0'- 2.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
2.0'- 4.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
4.0'- 6.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC55
14.0'-16.0'

APTIM

BOEM 2022

ONSLOW & LONG BAYS NC/SC

BOEMVC-2022-SC55

16.0'-16.9'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
6.0'- 8.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC56
16.0'-16.7'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
0.0'- 2.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
6.0'- 8.0'

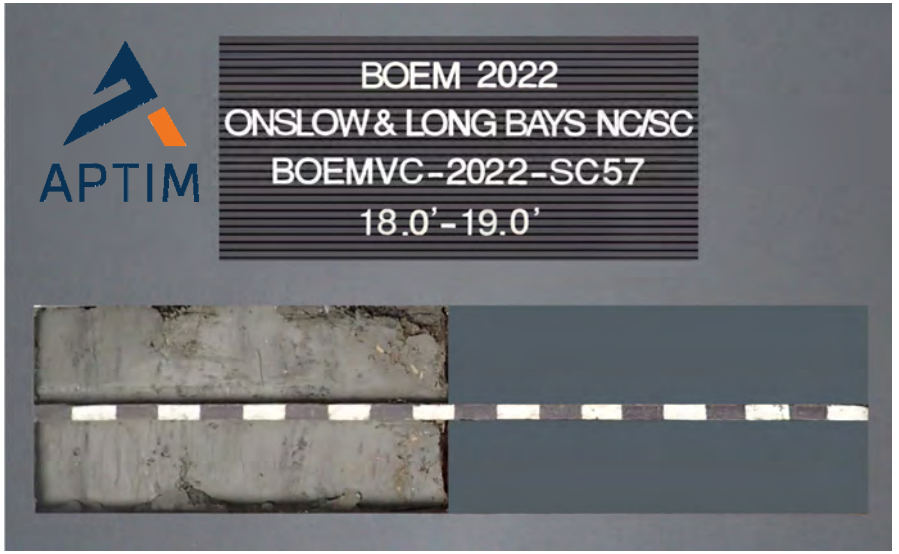

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
8.0'-10.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
10.0'-12.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
12.0'-14.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC57
18.0'-19.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
0.0'- 2.0'

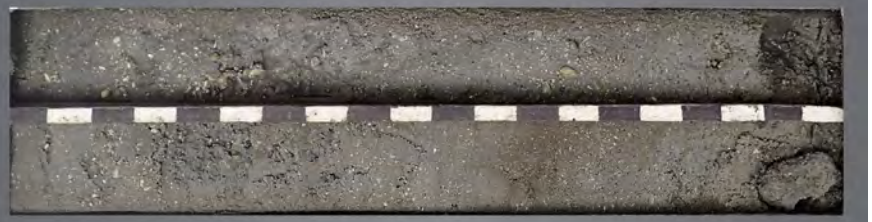

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
8.0'-10.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
10.0'-12.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC58
14.0'-16.0'

APTIM

BOEM 2022

ONSLOW & LONG BAYS NC/SC

BOEMVC-2022-SC58

16.0'-16.9'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
0.0'- 2.0'

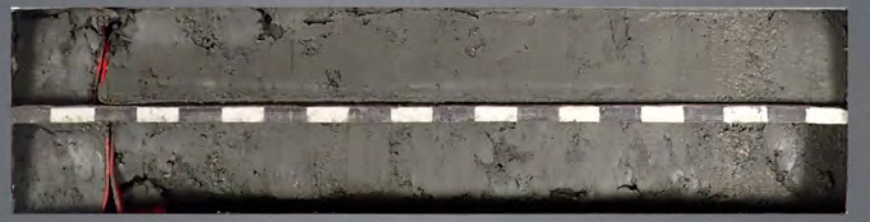

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
6.0'- 8.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
8.0'-10.0'

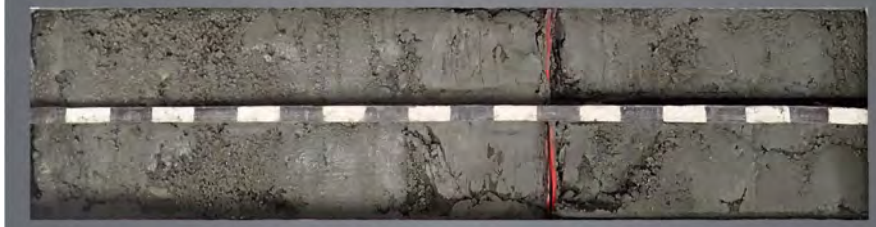


APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
10.0'-12.0'

APTIM

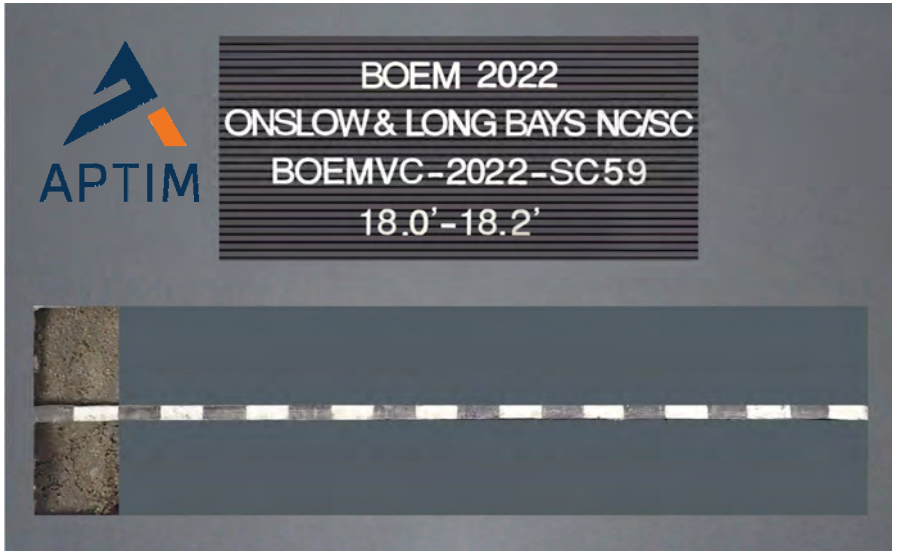
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
12.0'-14.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC59
18.0'-18.2'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
0.0'- 2.0'

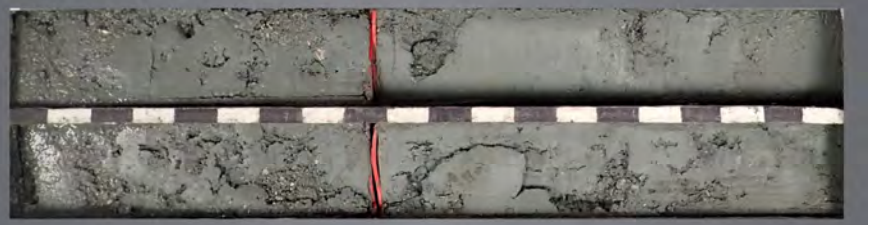

APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
2.0'- 4.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
4.0'- 6.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
6.0'- 8.0'

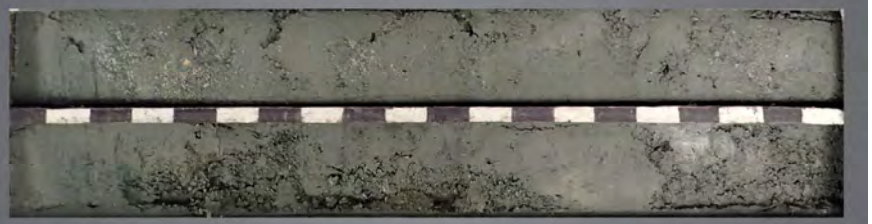
APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
8.0'-10.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
10.0'-12.0'



APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
12.0'-14.0'

APTIM

BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
14.0'-16.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
16.0'-18.0'


APTIM
BOEM 2022
ONSLOW & LONG BAYS NC/SC
BOEMVC-2022-SC60
18.0'-19.3'

APPENDIX
2022 APTIM INDIVIDUAL VIBRACORE GRANULARMETRIC REPORTS

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #1

Analysis Date: 11-21-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-60.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-3/0 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
160.98	142.48	0.01	0.11	#200 - 11.76 #230 - 11.63			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.06	0.66	1.06	0.66
5/16"	-3.00	8.00	1.08	0.67	2.14	1.33
3.5	-2.50	5.66	1.40	0.87	3.54	2.20
4	-2.25	4.76	0.30	0.19	3.84	2.39
5	-2.00	4.00	1.02	0.63	4.86	3.02
7	-1.50	2.83	1.90	1.18	6.76	4.20
10	-1.00	2.00	2.00	1.24	8.76	5.44
14	-0.50	1.41	2.11	1.31	10.87	6.75
18	0.00	1.00	1.60	0.99	12.47	7.74
25	0.50	0.71	1.35	0.84	13.82	8.58
35	1.00	0.50	1.46	0.91	15.28	9.49
45	1.50	0.35	1.81	1.12	17.09	10.61
60	2.00	0.25	4.06	2.52	21.15	13.13
80	2.50	0.18	22.06	13.70	43.21	26.83
120	3.00	0.13	66.25	41.15	109.46	67.98
170	3.50	0.09	29.99	18.63	139.45	86.61
200	3.75	0.07	2.63	1.63	142.08	88.24
230	4.00	0.06	0.21	0.13	142.29	88.37

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.43	3.19	2.78	2.43	2.10	-1.18

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.31	0.20	1.4	-2.59	9.29

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #2

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-61.9 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-5/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
156.63	144.36	0.01	0.01	#200 - 7.93 #230 - 7.87		32	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.74	0.47	0.74	0.47
5/16"	-3.00	8.00	3.75	2.39	4.49	2.86
3.5	-2.50	5.66	3.25	2.07	7.74	4.93
4	-2.25	4.76	1.97	1.26	9.71	6.19
5	-2.00	4.00	3.98	2.54	13.69	8.73
7	-1.50	2.83	7.43	4.74	21.12	13.47
10	-1.00	2.00	6.72	4.29	27.84	17.76
14	-0.50	1.41	5.84	3.73	33.68	21.49
18	0.00	1.00	3.92	2.50	37.60	23.99
25	0.50	0.71	3.06	1.95	40.66	25.94
35	1.00	0.50	2.39	1.53	43.05	27.47
45	1.50	0.35	2.31	1.47	45.36	28.94
60	2.00	0.25	4.15	2.65	49.51	31.59
80	2.50	0.18	21.48	13.71	70.99	45.30
120	3.00	0.13	52.68	33.63	123.67	78.93
170	3.50	0.09	19.07	12.18	142.74	91.11
200	3.75	0.07	1.50	0.96	144.24	92.07
230	4.00	0.06	0.10	0.06	144.34	92.13

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.21	2.94	2.57	0.26	-1.21	-2.49

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.45	0.37	2.01	-1.06	2.63

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #3

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-62.9 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-5/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
165.19	132.90	0.04	0.01	#200 - 20.05 #230 - 19.60			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.02	0.01	0.02	0.01
4	-2.25	4.76	0.32	0.19	0.34	0.20
5	-2.00	4.00	0.26	0.16	0.60	0.36
7	-1.50	2.83	1.03	0.62	1.63	0.98
10	-1.00	2.00	1.34	0.81	2.97	1.79
14	-0.50	1.41	1.56	0.94	4.53	2.73
18	0.00	1.00	1.39	0.84	5.92	3.57
25	0.50	0.71	1.32	0.80	7.24	4.37
35	1.00	0.50	1.20	0.73	8.44	5.10
45	1.50	0.35	1.41	0.85	9.85	5.95
60	2.00	0.25	3.08	1.86	12.93	7.81
80	2.50	0.18	15.16	9.18	28.09	16.99
120	3.00	0.13	65.90	39.89	93.99	56.88
170	3.50	0.09	33.86	20.50	127.85	77.38
200	3.75	0.07	4.25	2.57	132.10	79.95
230	4.00	0.06	0.75	0.45	132.85	80.40

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.44	2.91	2.60	2.45	0.93

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.6	0.16	0.96	-2.89	12.24

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #4

Analysis Date: 11-04-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-65.1 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 10Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
205.07	114.84	0.04	0.01	#200 - 44.35 #230 - 44.05			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4	-4.25	19.03	0.00	0.00	0.00	0.00
5/8	-4.00	16.00	0.00	0.00	0.00	0.00
7/16	-3.50	11.31	0.00	0.00	0.00	0.00
5/16	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.07	0.03	0.07	0.03
4	-2.25	4.76	0.00	0.00	0.07	0.03
5	-2.00	4.00	0.10	0.05	0.17	0.08
7	-1.50	2.83	0.32	0.16	0.49	0.24
10	-1.00	2.00	0.51	0.25	1.00	0.49
14	-0.50	1.41	0.60	0.29	1.60	0.78
18	0.00	1.00	0.57	0.28	2.17	1.06
25	0.50	0.71	0.52	0.25	2.69	1.31
35	1.00	0.50	0.61	0.30	3.30	1.61
45	1.50	0.35	0.68	0.33	3.98	1.94
60	2.00	0.25	1.28	0.62	5.26	2.56
80	2.50	0.18	6.53	3.18	11.79	5.74
120	3.00	0.13	56.75	27.67	68.54	33.41
170	3.50	0.09	38.05	18.55	106.59	51.96
200	3.75	0.07	7.57	3.69	114.16	55.65
230	4.00	0.06	0.61	0.30	114.77	55.95

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			3.45	2.85	2.69	2.38

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.84	0.14	0.7	-3.69	21.62

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #5

Analysis Date: 11-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-70.3 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
136.78	115.95	0.05	0.00	#200 - 15.75 #230 - 15.25			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4	-4.25	19.03	0.00	0.00	0.00	0.00
5/8	-4.00	16.00	0.00	0.00	0.00	0.00
7/16	-3.50	11.31	0.00	0.00	0.00	0.00
5/16	-3.00	8.00	0.28	0.20	0.28	0.20
3.5	-2.50	5.66	0.14	0.10	0.42	0.30
4	-2.25	4.76	0.15	0.11	0.57	0.41
5	-2.00	4.00	0.02	0.01	0.59	0.42
7	-1.50	2.83	0.26	0.19	0.85	0.61
10	-1.00	2.00	0.31	0.23	1.16	0.84
14	-0.50	1.41	0.48	0.35	1.64	1.19
18	0.00	1.00	0.53	0.39	2.17	1.58
25	0.50	0.71	0.76	0.56	2.93	2.14
35	1.00	0.50	1.09	0.80	4.02	2.94
45	1.50	0.35	2.10	1.54	6.12	4.48
60	2.00	0.25	4.70	3.44	10.82	7.92
80	2.50	0.18	8.06	5.89	18.88	13.81
120	3.00	0.13	37.80	27.64	56.68	41.45
170	3.50	0.09	53.40	39.04	110.08	80.49
200	3.75	0.07	5.14	3.76	115.22	84.25
230	4.00	0.06	0.68	0.50	115.90	84.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.73	3.43	3.11	2.70	2.54	1.58

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.81	0.14	0.82	-3.46	19.66

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #6

Analysis Date: 11-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-74.7 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - N-2.5/0 Dry - N-4/0 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
134.91	130.34	0.04	0.04	#200 - 3.52 #230 - 3.44			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.42	0.31	0.42	0.31
3.5	-2.50	5.66	0.86	0.64	1.28	0.95
4	-2.25	4.76	0.44	0.33	1.72	1.28
5	-2.00	4.00	0.36	0.27	2.08	1.55
7	-1.50	2.83	1.51	1.12	3.59	2.67
10	-1.00	2.00	1.85	1.37	5.44	4.04
14	-0.50	1.41	3.43	2.54	8.87	6.58
18	0.00	1.00	4.36	3.23	13.23	9.81
25	0.50	0.71	6.12	4.54	19.35	14.35
35	1.00	0.50	10.00	7.41	29.35	21.76
45	1.50	0.35	19.94	14.78	49.29	36.54
60	2.00	0.25	31.32	23.22	80.61	59.76
80	2.50	0.18	23.12	17.14	103.73	76.90
120	3.00	0.13	15.24	11.30	118.97	88.20
170	3.50	0.09	9.75	7.23	128.72	95.43
200	3.75	0.07	1.42	1.05	130.14	96.48
230	4.00	0.06	0.11	0.08	130.25	96.56

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.47	2.81	2.44	1.79	1.11	0.61	-0.81

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.58	0.33	1.2	-1.15	4.86

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #7

Analysis Date: 11-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-76.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - N-3/0 Dry - N-5/0 Washed - N-5/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.66	112.31	0.03	0.06	#200 - 3.95 #230 - 3.83			40

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	6.98	5.98	6.98	5.98
5/16"	-3.00	8.00	1.54	1.32	8.52	7.30
3.5	-2.50	5.66	3.43	2.94	11.95	10.24
4	-2.25	4.76	1.35	1.16	13.30	11.40
5	-2.00	4.00	1.13	0.97	14.43	12.37
7	-1.50	2.83	2.99	2.56	17.42	14.93
10	-1.00	2.00	3.56	3.05	20.98	17.98
14	-0.50	1.41	4.75	4.07	25.73	22.05
18	0.00	1.00	4.31	3.69	30.04	25.74
25	0.50	0.71	4.34	3.72	34.38	29.46
35	1.00	0.50	5.20	4.46	39.58	33.92
45	1.50	0.35	8.72	7.47	48.30	41.39
60	2.00	0.25	14.22	12.19	62.52	53.58
80	2.50	0.18	21.02	18.02	83.54	71.60
120	3.00	0.13	23.15	19.84	106.69	91.44
170	3.50	0.09	4.77	4.09	111.46	95.53
200	3.75	0.07	0.61	0.52	112.07	96.05
230	4.00	0.06	0.14	0.12	112.21	96.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.44	2.81	2.59	1.85	-0.10	-1.32	-3.62

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.98	0.51	2.04	-1.05	2.92

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-01 #8

Analysis Date: 11-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,444	299,756	North Carolina State Plane	-77.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - N-4/0 Dry - N-5/0 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
141.40	135.93	0.04	0.09	#200 - 4.12 #230 - 3.99			20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	3.07	2.17	3.07	2.17
3.5	-2.50	5.66	1.67	1.18	4.74	3.35
4	-2.25	4.76	0.77	0.54	5.51	3.89
5	-2.00	4.00	0.94	0.66	6.45	4.55
7	-1.50	2.83	1.18	0.83	7.63	5.38
10	-1.00	2.00	1.68	1.19	9.31	6.57
14	-0.50	1.41	2.05	1.45	11.36	8.02
18	0.00	1.00	1.99	1.41	13.35	9.43
25	0.50	0.71	2.45	1.73	15.80	11.16
35	1.00	0.50	2.85	2.02	18.65	13.18
45	1.50	0.35	4.00	2.83	22.65	16.01
60	2.00	0.25	6.76	4.78	29.41	20.79
80	2.50	0.18	25.52	18.05	54.93	38.84
120	3.00	0.13	70.78	50.06	125.71	88.90
170	3.50	0.09	9.34	6.61	135.05	95.51
200	3.75	0.07	0.53	0.37	135.58	95.88
230	4.00	0.06	0.18	0.13	135.76	96.01

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.46	2.95	2.86	2.61	2.12	1.50	-1.73

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.06	0.24	1.45	-2.33	7.75

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-02 #1

Analysis Date: 11-04-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,858	274,067	North Carolina State Plane	-69.2 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 10Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
125.97	114.46	0.04	0.05	#200 - 9.60 #230 - 9.21		8	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.96	0.76	0.96	0.76
25	0.50	0.71	0.60	0.48	1.56	1.24
35	1.00	0.50	1.29	1.02	2.85	2.26
45	1.50	0.35	2.67	2.12	5.52	4.38
60	2.00	0.25	6.13	4.87	11.65	9.25
80	2.50	0.18	25.38	20.15	37.03	29.40
120	3.00	0.13	48.52	38.52	85.55	67.92
170	3.50	0.09	24.90	19.77	110.45	87.69
200	3.75	0.07	3.42	2.71	113.87	90.40
230	4.00	0.06	0.49	0.39	114.36	90.79

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.41	3.18	2.77	2.39	2.17	1.56

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.63	0.16	0.62	-1.54	7.35

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-02 #2

Analysis Date: 11-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,858	274,067	North Carolina State Plane	-72.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 10Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
151.31	146.65	0.01	0.04	#200 - 3.16 #230 - 3.12		8	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.17	0.11	0.17	0.11
10	-1.00	2.00	0.21	0.14	0.38	0.25
14	-0.50	1.41	0.89	0.59	1.27	0.84
18	0.00	1.00	1.36	0.90	2.63	1.74
25	0.50	0.71	2.62	1.73	5.25	3.47
35	1.00	0.50	6.55	4.33	11.80	7.80
45	1.50	0.35	13.89	9.18	25.69	16.98
60	2.00	0.25	28.47	18.82	54.16	35.80
80	2.50	0.18	49.52	32.73	103.68	68.53
120	3.00	0.13	37.19	24.58	140.87	93.11
170	3.50	0.09	5.28	3.49	146.15	96.60
200	3.75	0.07	0.37	0.24	146.52	96.84
230	4.00	0.06	0.06	0.04	146.58	96.88

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.27	2.81	2.63	2.22	1.71	1.45	0.68

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.07	0.24	0.73	-1.24	5.53

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-02 #3

Analysis Date: 11-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,858	274,067	North Carolina State Plane	-74.9 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
162.93	146.53	0.01	0.07	#200 - 10.27 #230 - 10.15		7	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.37	0.23	0.37	0.23
4	-2.25	4.76	0.28	0.17	0.65	0.40
5	-2.00	4.00	0.37	0.23	1.02	0.63
7	-1.50	2.83	0.82	0.50	1.84	1.13
10	-1.00	2.00	1.17	0.72	3.01	1.85
14	-0.50	1.41	1.55	0.95	4.56	2.80
18	0.00	1.00	1.91	1.17	6.47	3.97
25	0.50	0.71	3.07	1.88	9.54	5.85
35	1.00	0.50	5.05	3.10	14.59	8.95
45	1.50	0.35	6.23	3.82	20.82	12.77
60	2.00	0.25	11.21	6.88	32.03	19.65
80	2.50	0.18	42.42	26.04	74.45	45.69
120	3.00	0.13	57.63	35.37	132.08	81.06
170	3.50	0.09	13.11	8.05	145.19	89.11
200	3.75	0.07	1.01	0.62	146.20	89.73
230	4.00	0.06	0.20	0.12	146.40	89.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.18	2.91	2.56	2.10	1.73	0.27

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.23	0.21	0.97	-2.2	8.86

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-02 #4

Analysis Date: 11-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,858	274,067	North Carolina State Plane	-76.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10Y-4/1 Dry - 10Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
128.55	122.85	0.02	0.12	#200 - 4.62 #230 - 4.59		39	40

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	1.13	0.88	1.13	0.88
7/16"	-3.50	11.31	0.00	0.00	1.13	0.88
5/16"	-3.00	8.00	2.43	1.89	3.56	2.77
3.5	-2.50	5.66	3.13	2.43	6.69	5.20
4	-2.25	4.76	1.50	1.17	8.19	6.37
5	-2.00	4.00	2.34	1.82	10.53	8.19
7	-1.50	2.83	5.39	4.19	15.92	12.38
10	-1.00	2.00	7.41	5.76	23.33	18.14
14	-0.50	1.41	9.08	7.06	32.41	25.20
18	0.00	1.00	9.09	7.07	41.50	32.27
25	0.50	0.71	10.98	8.54	52.48	40.81
35	1.00	0.50	16.81	13.08	69.29	53.89
45	1.50	0.35	16.59	12.91	85.88	66.80
60	2.00	0.25	16.46	12.80	102.34	79.60
80	2.50	0.18	13.18	10.25	115.52	89.85
120	3.00	0.13	5.57	4.33	121.09	94.18
170	3.50	0.09	1.38	1.07	122.47	95.25
200	3.75	0.07	0.17	0.13	122.64	95.38
230	4.00	0.06	0.04	0.03	122.68	95.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.38	2.21	1.82	0.85	-0.51	-1.19	-2.54

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.47	0.72	1.58	-0.64	2.82

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-02 #5

Analysis Date: 11-23-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,858	274,067	North Carolina State Plane	-76.9 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10YR-4/2 Dry - 10YR-5/2 Washed - 10YR-5/3	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
135.91	133.03	0.04	0.10	#200 - 2.29 #230 - 2.25		44	55

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	2.14	1.57	2.14	1.57
7/16"	-3.50	11.31	0.00	0.00	2.14	1.57
5/16"	-3.00	8.00	2.92	2.15	5.06	3.72
3.5	-2.50	5.66	3.32	2.44	8.38	6.16
4	-2.25	4.76	1.45	1.07	9.83	7.23
5	-2.00	4.00	2.15	1.58	11.98	8.81
7	-1.50	2.83	5.02	3.69	17.00	12.50
10	-1.00	2.00	8.22	6.05	25.22	18.55
14	-0.50	1.41	9.94	7.31	35.16	25.86
18	0.00	1.00	9.34	6.87	44.50	32.73
25	0.50	0.71	11.86	8.73	56.36	41.46
35	1.00	0.50	16.88	12.42	73.24	53.88
45	1.50	0.35	18.37	13.52	91.61	67.40
60	2.00	0.25	18.72	13.77	110.33	81.17
80	2.50	0.18	15.28	11.24	125.61	92.41
120	3.00	0.13	5.83	4.29	131.44	96.70
170	3.50	0.09	1.24	0.91	132.68	97.61
200	3.75	0.07	0.13	0.10	132.81	97.71
230	4.00	0.06	0.05	0.04	132.86	97.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.80	2.13	1.78	0.84	-0.56	-1.21	-2.74

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.47	0.72	1.62	-0.74	2.99

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-02 #6

Analysis Date: 11-23-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,718,858	274,067	North Carolina State Plane	-78.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
134.37	132.39	0.01	0.04	#200 - 1.55 #230 - 1.52		29	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.06	0.04	0.06	0.04
5	-2.00	4.00	0.61	0.45	0.67	0.49
7	-1.50	2.83	2.35	1.75	3.02	2.24
10	-1.00	2.00	4.86	3.62	7.88	5.86
14	-0.50	1.41	6.51	4.84	14.39	10.70
18	0.00	1.00	7.90	5.88	22.29	16.58
25	0.50	0.71	8.62	6.42	30.91	23.00
35	1.00	0.50	15.68	11.67	46.59	34.67
45	1.50	0.35	21.38	15.91	67.97	50.58
60	2.00	0.25	24.37	18.14	92.34	68.72
80	2.50	0.18	28.98	21.57	121.32	90.29
120	3.00	0.13	8.67	6.45	129.99	96.74
170	3.50	0.09	2.09	1.56	132.08	98.30
200	3.75	0.07	0.20	0.15	132.28	98.45
230	4.00	0.06	0.04	0.03	132.32	98.48

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.87	2.35	2.15	1.48	0.59	-0.05	-1.12

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.22	0.43	1.17	-0.75	2.95

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #1

Analysis Date: 11-04-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-64.9 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 10Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
154.84	139.53	0.03	0.04	#200 - 10.36 #230 - 9.94		20	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.78	0.50	0.78	0.50
5/16"	-3.00	8.00	0.71	0.46	1.49	0.96
3.5	-2.50	5.66	0.50	0.32	1.99	1.28
4	-2.25	4.76	0.04	0.03	2.03	1.31
5	-2.00	4.00	0.04	0.03	2.07	1.34
7	-1.50	2.83	0.64	0.41	2.71	1.75
10	-1.00	2.00	0.90	0.58	3.61	2.33
14	-0.50	1.41	1.14	0.74	4.75	3.07
18	0.00	1.00	1.16	0.75	5.91	3.82
25	0.50	0.71	1.50	0.97	7.41	4.79
35	1.00	0.50	2.72	1.76	10.13	6.55
45	1.50	0.35	6.20	4.00	16.33	10.55
60	2.00	0.25	11.02	7.12	27.35	17.67
80	2.50	0.18	27.40	17.70	54.75	35.37
120	3.00	0.13	50.96	32.91	105.71	68.28
170	3.50	0.09	29.86	19.28	135.57	87.56
200	3.75	0.07	3.22	2.08	138.79	89.64
230	4.00	0.06	0.65	0.42	139.44	90.06

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.41	3.17	2.72	2.21	1.88	0.56

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.38	0.19	1.11	-2.81	13.29

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #2

Analysis Date: 11-23-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-68.2 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-2.5/0 Dry - 10Y-3/1 Washed - 10Y-5/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
123.89	117.17	0.01	0.14	#200 - 5.63 #230 - 5.55		49	40

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	4.06	3.28	4.06	3.28
5/16"	-3.00	8.00	1.78	1.44	5.84	4.72
3.5	-2.50	5.66	1.16	0.94	7.00	5.66
4	-2.25	4.76	0.73	0.59	7.73	6.25
5	-2.00	4.00	0.42	0.34	8.15	6.59
7	-1.50	2.83	1.73	1.40	9.88	7.99
10	-1.00	2.00	2.76	2.23	12.64	10.22
14	-0.50	1.41	4.04	3.26	16.68	13.48
18	0.00	1.00	9.34	7.54	26.02	21.02
25	0.50	0.71	8.24	6.65	34.26	27.67
35	1.00	0.50	8.39	6.77	42.65	34.44
45	1.50	0.35	7.08	5.71	49.73	40.15
60	2.00	0.25	13.85	11.18	63.58	51.33
80	2.50	0.18	26.09	21.06	89.67	72.39
120	3.00	0.13	20.23	16.33	109.90	88.72
170	3.50	0.09	6.14	4.96	116.04	93.68
200	3.75	0.07	0.85	0.69	116.89	94.37
230	4.00	0.06	0.10	0.08	116.99	94.45

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.86	2.58	1.94	0.30	-0.33	-2.85

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.2	0.44	1.74	-1.21	3.91

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #3

Analysis Date: 11-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-69.4 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
165.53	142.25	0.13	0.05	#200 - 14.27 #230 - 14.20			15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	2.22	1.34	2.22	1.34
7/16"	-3.50	11.31	2.10	1.27	4.32	2.61
5/16"	-3.00	8.00	3.67	2.22	7.99	4.83
3.5	-2.50	5.66	2.36	1.43	10.35	6.26
4	-2.25	4.76	1.84	1.11	12.19	7.37
5	-2.00	4.00	1.97	1.19	14.16	8.56
7	-1.50	2.83	4.44	2.68	18.60	11.24
10	-1.00	2.00	4.08	2.46	22.68	13.70
14	-0.50	1.41	4.79	2.89	27.47	16.59
18	0.00	1.00	4.21	2.54	31.68	19.13
25	0.50	0.71	6.01	3.63	37.69	22.76
35	1.00	0.50	7.30	4.41	44.99	27.17
45	1.50	0.35	13.35	8.07	58.34	35.24
60	2.00	0.25	19.71	11.91	78.05	47.15
80	2.50	0.18	27.28	16.48	105.33	63.63
120	3.00	0.13	29.81	18.01	135.14	81.64
170	3.50	0.09	5.99	3.62	141.13	85.26
200	3.75	0.07	0.78	0.47	141.91	85.73
230	4.00	0.06	0.12	0.07	142.03	85.80

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.33	2.82	2.09	0.75	-0.60	-2.94

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.15	0.45	1.88	-1.21	3.5

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #4

Analysis Date: 11-23-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-70.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
179.57	152.86	0.03	0.16	#200 - 15.22 #230 - 15.06			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.43	0.24	0.43	0.24
5/16"	-3.00	8.00	0.60	0.33	1.03	0.57
3.5	-2.50	5.66	3.83	2.13	4.86	2.70
4	-2.25	4.76	1.50	0.84	6.36	3.54
5	-2.00	4.00	3.69	2.05	10.05	5.59
7	-1.50	2.83	5.07	2.82	15.12	8.41
10	-1.00	2.00	6.01	3.35	21.13	11.76
14	-0.50	1.41	5.17	2.88	26.30	14.64
18	0.00	1.00	6.70	3.73	33.00	18.37
25	0.50	0.71	10.24	5.70	43.24	24.07
35	1.00	0.50	7.81	4.35	51.05	28.42
45	1.50	0.35	17.64	9.82	68.69	38.24
60	2.00	0.25	19.45	10.83	88.14	49.07
80	2.50	0.18	29.08	16.19	117.22	65.26
120	3.00	0.13	24.81	13.82	142.03	79.08
170	3.50	0.09	7.63	4.25	149.66	83.33
200	3.75	0.07	2.61	1.45	152.27	84.78
230	4.00	0.06	0.28	0.16	152.55	84.94

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.62	2.85	2.03	0.61	-0.32	-2.07

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.22	0.43	1.65	-0.91	2.94

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #5

Analysis Date: 11-14-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-72.3 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 10Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
181.01	159.81	0.04	0.02	#200 - 11.84 #230 - 11.75			4

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.12	0.07	0.12	0.07
3.5	-2.50	5.66	1.55	0.86	1.67	0.93
4	-2.25	4.76	1.11	0.61	2.78	1.54
5	-2.00	4.00	0.94	0.52	3.72	2.06
7	-1.50	2.83	4.17	2.30	7.89	4.36
10	-1.00	2.00	5.18	2.86	13.07	7.22
14	-0.50	1.41	6.28	3.47	19.35	10.69
18	0.00	1.00	5.26	2.91	24.61	13.60
25	0.50	0.71	5.64	3.12	30.25	16.72
35	1.00	0.50	7.85	4.34	38.10	21.06
45	1.50	0.35	15.92	8.80	54.02	29.86
60	2.00	0.25	26.29	14.52	80.31	44.38
80	2.50	0.18	38.79	21.43	119.10	65.81
120	3.00	0.13	35.68	19.71	154.78	85.52
170	3.50	0.09	4.15	2.29	158.93	87.81
200	3.75	0.07	0.64	0.35	159.57	88.16
230	4.00	0.06	0.16	0.09	159.73	88.25

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.96	2.73	2.13	1.22	0.38	-1.39

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.54	0.34	1.37	-1.27	3.9

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #6

Analysis Date: 11-14-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-76.8 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-5/0 Dry - N-6/0 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
156.44	133.69	0.13	0.01	#200 - 14.70 #230 - 14.62			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
1"	-4.50	22.63	0.00	0.00	0.00	0.00
3/4"	-4.25	19.03	9.95	6.36	9.95	6.36
5/8"	-4.00	16.00	0.00	0.00	9.95	6.36
7/16"	-3.50	11.31	6.71	4.29	16.66	10.65
5/16"	-3.00	8.00	4.24	2.71	20.90	13.36
3.5	-2.50	5.66	5.91	3.78	26.81	17.14
4	-2.25	4.76	2.78	1.78	29.59	18.92
5	-2.00	4.00	3.71	2.37	33.30	21.29
7	-1.50	2.83	9.02	5.77	42.32	27.06
10	-1.00	2.00	10.39	6.64	52.71	33.70
14	-0.50	1.41	9.18	5.87	61.89	39.57
18	0.00	1.00	6.03	3.85	67.92	43.42
25	0.50	0.71	5.14	3.29	73.06	46.71
35	1.00	0.50	5.80	3.71	78.86	50.42
45	1.50	0.35	7.62	4.87	86.48	55.29
60	2.00	0.25	11.65	7.45	98.13	62.74
80	2.50	0.18	17.76	11.35	115.89	74.09
120	3.00	0.13	12.46	7.96	128.35	82.05
170	3.50	0.09	4.41	2.82	132.76	84.87
200	3.75	0.07	0.67	0.43	133.43	85.30
230	4.00	0.06	0.12	0.08	133.55	85.38

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.35	2.56	0.94	-1.68	-2.65	-4.11

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	-0.18	1.13	2.36	-0.27	1.81

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #7

Analysis Date: 11-14-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-79.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SC	Wet - 10Y-4/1 Dry - 10Y-6/1 Washed - 10Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
152.71	138.02	0.23	0.07	#200 - 9.90 #230 - 9.83			70

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	6.88	4.51	6.88	4.51
7/16"	-3.50	11.31	19.11	12.51	25.99	17.02
5/16"	-3.00	8.00	12.73	8.34	38.72	25.36
3.5	-2.50	5.66	9.02	5.91	47.74	31.27
4	-2.25	4.76	5.14	3.37	52.88	34.64
5	-2.00	4.00	4.81	3.15	57.69	37.79
7	-1.50	2.83	13.14	8.60	70.83	46.39
10	-1.00	2.00	10.46	6.85	81.29	53.24
14	-0.50	1.41	11.38	7.45	92.67	60.69
18	0.00	1.00	7.79	5.10	100.46	65.79
25	0.50	0.71	6.36	4.16	106.82	69.95
35	1.00	0.50	5.25	3.44	112.07	73.39
45	1.50	0.35	5.11	3.35	117.18	76.74
60	2.00	0.25	7.29	4.77	124.47	81.51
80	2.50	0.18	7.37	4.83	131.84	86.34
120	3.00	0.13	4.21	2.76	136.05	89.10
170	3.50	0.09	1.25	0.82	137.30	89.92
200	3.75	0.07	0.27	0.18	137.57	90.10
230	4.00	0.06	0.11	0.07	137.68	90.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.26	1.24	-1.24	-3.02	-3.54	-3.98

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	-1.28	2.43	2.08	0.44	2.08

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-03 #8

Analysis Date: 11-23-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,681,476	293,102	North Carolina State Plane	-80.0 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - N-5/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
186.18	128.10	0.04	0.12	#200 - 31.35 #230 - 31.33			25

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	6.83	3.67	6.83	3.67
3.5	-2.50	5.66	10.03	5.39	16.86	9.06
4	-2.25	4.76	5.36	2.88	22.22	11.94
5	-2.00	4.00	5.69	3.06	27.91	15.00
7	-1.50	2.83	14.25	7.65	42.16	22.65
10	-1.00	2.00	13.61	7.31	55.77	29.96
14	-0.50	1.41	11.14	5.98	66.91	35.94
18	0.00	1.00	6.79	3.65	73.70	39.59
25	0.50	0.71	6.53	3.51	80.23	43.10
35	1.00	0.50	8.20	4.40	88.43	47.50
45	1.50	0.35	10.26	5.51	98.69	53.01
60	2.00	0.25	11.91	6.40	110.60	59.41
80	2.50	0.18	12.08	6.49	122.68	65.90
120	3.00	0.13	3.75	2.01	126.43	67.91
170	3.50	0.09	1.17	0.63	127.60	68.54
200	3.75	0.07	0.21	0.11	127.81	68.65
230	4.00	0.06	0.03	0.02	127.84	68.67

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			1.23	-1.34	-1.93	-2.88

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-0.34	1.27	1.82	0.14	1.77

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-04 #1

Analysis Date: 11-23-22

Analyzed By: KG

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,621,214	284,398	North Carolina State Plane	-67.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-5/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
154.88	149.95	0.00	0.06	#200 - 3.28 #230 - 3.25		27	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.72	0.46	0.72	0.46
4	-2.25	4.76	0.26	0.17	0.98	0.63
5	-2.00	4.00	0.26	0.17	1.24	0.80
7	-1.50	2.83	0.61	0.39	1.85	1.19
10	-1.00	2.00	1.20	0.77	3.05	1.96
14	-0.50	1.41	2.87	1.85	5.92	3.81
18	0.00	1.00	7.02	4.53	12.94	8.34
25	0.50	0.71	20.10	12.98	33.04	21.32
35	1.00	0.50	37.20	24.02	70.24	45.34
45	1.50	0.35	29.59	19.11	99.83	64.45
60	2.00	0.25	29.83	19.26	129.66	83.71
80	2.50	0.18	12.79	8.26	142.45	91.97
120	3.00	0.13	5.39	3.48	147.84	95.45
170	3.50	0.09	1.68	1.08	149.52	96.53
200	3.75	0.07	0.29	0.19	149.81	96.72
230	4.00	0.06	0.05	0.03	149.86	96.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.94	2.02	1.77	1.12	0.58	0.30	-0.37

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.09	0.47	0.91	-0.53	4.67

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-04 #2

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,621,214	284,398	North Carolina State Plane	-69.7 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
200.23	178.32	0.05	0.00	#200 - 11.19 #230 - 10.98			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.04	0.02	0.04	0.02
5	-2.00	4.00	0.00	0.00	0.04	0.02
7	-1.50	2.83	0.23	0.11	0.27	0.13
10	-1.00	2.00	0.53	0.26	0.80	0.39
14	-0.50	1.41	1.85	0.92	2.65	1.31
18	0.00	1.00	5.21	2.60	7.86	3.91
25	0.50	0.71	16.52	8.25	24.38	12.16
35	1.00	0.50	26.44	13.20	50.82	25.36
45	1.50	0.35	21.46	10.72	72.28	36.08
60	2.00	0.25	25.38	12.68	97.66	48.76
80	2.50	0.18	30.66	15.31	128.32	64.07
120	3.00	0.13	30.31	15.14	158.63	79.21
170	3.50	0.09	16.67	8.33	175.30	87.54
200	3.75	0.07	2.55	1.27	177.85	88.81
230	4.00	0.06	0.42	0.21	178.27	89.02

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.29	2.86	2.04	0.99	0.65	0.07

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.73	0.30	1.05	-0.29	2.36

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-04 #3

Analysis Date: 11-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,621,214	284,398	North Carolina State Plane	-72.4 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
181.31	156.15	0.06	0.04	#200 - 14.56 #230 - 13.96			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.09	0.05	0.09	0.05
7	-1.50	2.83	0.08	0.04	0.17	0.09
10	-1.00	2.00	0.16	0.09	0.33	0.18
14	-0.50	1.41	0.46	0.25	0.79	0.43
18	0.00	1.00	0.81	0.45	1.60	0.88
25	0.50	0.71	1.51	0.83	3.11	1.71
35	1.00	0.50	2.67	1.47	5.78	3.18
45	1.50	0.35	2.70	1.49	8.48	4.67
60	2.00	0.25	5.10	2.81	13.58	7.48
80	2.50	0.18	20.98	11.57	34.56	19.05
120	3.00	0.13	68.01	37.51	102.57	56.56
170	3.50	0.09	46.12	25.44	148.69	82.00
200	3.75	0.07	6.23	3.44	154.92	85.44
230	4.00	0.06	1.09	0.60	156.01	86.04

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.65	3.36	2.91	2.58	2.37	1.56

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.72	0.15	0.69	-2.26	10.9

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-04 #4

Analysis Date: 11-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,621,214	284,398	North Carolina State Plane	-76.4 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 5Y-2.5/1 Dry - 5Y-4/1 Washed - 5Y-5/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
166.65	124.78	0.01	0.04	#200 - 25.44 #230 - 25.16			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.27	0.16	0.27	0.16
3.5	-2.50	5.66	0.09	0.05	0.36	0.21
4	-2.25	4.76	0.19	0.11	0.55	0.32
5	-2.00	4.00	0.31	0.19	0.86	0.51
7	-1.50	2.83	0.75	0.45	1.61	0.96
10	-1.00	2.00	0.45	0.27	2.06	1.23
14	-0.50	1.41	0.41	0.25	2.47	1.48
18	0.00	1.00	0.38	0.23	2.85	1.71
25	0.50	0.71	0.68	0.41	3.53	2.12
35	1.00	0.50	3.33	2.00	6.86	4.12
45	1.50	0.35	11.23	6.74	18.09	10.86
60	2.00	0.25	26.61	15.97	44.70	26.83
80	2.50	0.18	43.95	26.37	88.65	53.20
120	3.00	0.13	25.14	15.09	113.79	68.29
170	3.50	0.09	6.50	3.90	120.29	72.19
200	3.75	0.07	3.95	2.37	124.24	74.56
230	4.00	0.06	0.47	0.28	124.71	74.84

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			2.44	1.94	1.66	1.07

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.12	0.23	0.86	-2.02	11.71

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-04 #5

Analysis Date: 11-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,621,214	284,398	North Carolina State Plane	-80.4 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-5/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
132.09	125.46	0.14	0.17	#200 - 5.35 #230 - 5.30			60

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.13	0.86	1.13	0.86
4	-2.25	4.76	1.03	0.78	2.16	1.64
5	-2.00	4.00	2.31	1.75	4.47	3.39
7	-1.50	2.83	9.20	6.96	13.67	10.35
10	-1.00	2.00	19.36	14.66	33.03	25.01
14	-0.50	1.41	27.00	20.44	60.03	45.45
18	0.00	1.00	20.35	15.41	80.38	60.86
25	0.50	0.71	14.53	11.00	94.91	71.86
35	1.00	0.50	10.28	7.78	105.19	79.64
45	1.50	0.35	6.70	5.07	111.89	84.71
60	2.00	0.25	5.83	4.41	117.72	89.12
80	2.50	0.18	4.31	3.26	122.03	92.38
120	3.00	0.13	1.98	1.50	124.01	93.88
170	3.50	0.09	0.77	0.58	124.78	94.46
200	3.75	0.07	0.25	0.19	125.03	94.65
230	4.00	0.06	0.07	0.05	125.10	94.70

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	1.43	0.70	-0.35	-1.00	-1.31	-1.88

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-0.22	1.16	1.19	0.67	3.17

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-05 #1

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,475,048	234,784	North Carolina State Plane	-51.9 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.71	72.64	0.02	0.00	#200 - 21.20 #230 - 20.83			7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	2.13	2.32	2.13	2.32
4	-2.25	4.76	0.45	0.49	2.58	2.81
5	-2.00	4.00	0.35	0.38	2.93	3.19
7	-1.50	2.83	0.90	0.98	3.83	4.17
10	-1.00	2.00	0.81	0.88	4.64	5.05
14	-0.50	1.41	0.63	0.69	5.27	5.74
18	0.00	1.00	0.56	0.61	5.83	6.35
25	0.50	0.71	0.62	0.68	6.45	7.03
35	1.00	0.50	0.59	0.64	7.04	7.67
45	1.50	0.35	0.47	0.51	7.51	8.18
60	2.00	0.25	0.95	1.04	8.46	9.22
80	2.50	0.18	4.43	4.83	12.89	14.05
120	3.00	0.13	36.21	39.48	49.10	53.53
170	3.50	0.09	20.36	22.20	69.46	75.73
200	3.75	0.07	2.82	3.07	72.28	78.80
230	4.00	0.06	0.34	0.37	72.62	79.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.48	2.96	2.64	2.52	-1.03

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.47	0.18	1.39	-2.7	9.5

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-05 #2

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,475,048	234,784	North Carolina State Plane	-52.5 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 5Y-5/1 Dry - 5Y-7/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.68	87.97	0.14	0.13	#200 - 8.40 #230 - 8.32		61	60

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.39	0.41	0.39	0.41
4	-2.25	4.76	0.44	0.46	0.83	0.87
5	-2.00	4.00	0.84	0.88	1.67	1.75
7	-1.50	2.83	5.21	5.45	6.88	7.20
10	-1.00	2.00	11.44	11.96	18.32	19.16
14	-0.50	1.41	17.30	18.08	35.62	37.24
18	0.00	1.00	13.13	13.72	48.75	50.96
25	0.50	0.71	8.98	9.39	57.73	60.35
35	1.00	0.50	5.89	6.16	63.62	66.51
45	1.50	0.35	4.69	4.90	68.31	71.41
60	2.00	0.25	4.77	4.99	73.08	76.40
80	2.50	0.18	5.33	5.57	78.41	81.97
120	3.00	0.13	5.82	6.08	84.23	88.05
170	3.50	0.09	2.92	3.05	87.15	91.10
200	3.75	0.07	0.48	0.50	87.63	91.60
230	4.00	0.06	0.08	0.08	87.71	91.68

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.67	1.86	-0.03	-0.84	-1.13	-1.70

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.19	0.88	1.45	0.59	2.36

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-05 #3

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,475,048	234,784	North Carolina State Plane	-54.9 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 5Y-6/2 Dry - 5Y-7/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.08	87.37	0.09	0.12	#200 - 8.40 #230 - 8.32		30	20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	3.56	3.74	3.56	3.74
5/16"	-3.00	8.00	1.04	1.09	4.60	4.83
3.5	-2.50	5.66	0.89	0.94	5.49	5.77
4	-2.25	4.76	1.02	1.07	6.51	6.84
5	-2.00	4.00	1.41	1.48	7.92	8.32
7	-1.50	2.83	3.74	3.93	11.66	12.25
10	-1.00	2.00	3.44	3.62	15.10	15.87
14	-0.50	1.41	3.41	3.59	18.51	19.46
18	0.00	1.00	2.65	2.79	21.16	22.25
25	0.50	0.71	2.84	2.99	24.00	25.24
35	1.00	0.50	3.77	3.97	27.77	29.21
45	1.50	0.35	5.02	5.28	32.79	34.49
60	2.00	0.25	8.07	8.49	40.86	42.98
80	2.50	0.18	22.05	23.19	62.91	66.17
120	3.00	0.13	21.26	22.36	84.17	88.53
170	3.50	0.09	2.59	2.72	86.76	91.25
200	3.75	0.07	0.33	0.35	87.09	91.60
230	4.00	0.06	0.08	0.08	87.17	91.68

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.90	2.70	2.15	0.46	-0.98	-2.91

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.18	0.44	1.91	-1.18	3.25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-05 #4

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,475,048	234,784	North Carolina State Plane	-59.1 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-6/1 Dry - 5Y-7/1 Washed - 5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
97.86	87.44	0.05	0.06	#200 - 10.86 #230 - 10.77			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.20	0.20	0.20	0.20
5	-2.00	4.00	0.00	0.00	0.20	0.20
7	-1.50	2.83	0.34	0.35	0.54	0.55
10	-1.00	2.00	0.44	0.45	0.98	1.00
14	-0.50	1.41	0.63	0.64	1.61	1.64
18	0.00	1.00	0.62	0.63	2.23	2.27
25	0.50	0.71	0.99	1.01	3.22	3.28
35	1.00	0.50	1.76	1.80	4.98	5.08
45	1.50	0.35	3.21	3.28	8.19	8.36
60	2.00	0.25	7.56	7.73	15.75	16.09
80	2.50	0.18	26.24	26.81	41.99	42.90
120	3.00	0.13	40.66	41.55	82.65	84.45
170	3.50	0.09	4.28	4.37	86.93	88.82
200	3.75	0.07	0.31	0.32	87.24	89.14
230	4.00	0.06	0.09	0.09	87.33	89.23

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.99	2.89	2.59	2.17	1.99	0.98

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.32	0.20	0.78	-2.6	12.23

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-05 #5

Analysis Date: 11-29-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,475,048	234,784	North Carolina State Plane	-65.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-6/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
92.83	82.03	0.04	0.13	#200 - 11.89 #230 - 11.83			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.47	0.51	0.47	0.51
4	-2.25	4.76	0.30	0.32	0.77	0.83
5	-2.00	4.00	0.51	0.55	1.28	1.38
7	-1.50	2.83	0.24	0.26	1.52	1.64
10	-1.00	2.00	0.31	0.33	1.83	1.97
14	-0.50	1.41	0.45	0.48	2.28	2.45
18	0.00	1.00	0.42	0.45	2.70	2.90
25	0.50	0.71	0.97	1.04	3.67	3.94
35	1.00	0.50	1.74	1.87	5.41	5.81
45	1.50	0.35	3.14	3.38	8.55	9.19
60	2.00	0.25	7.17	7.72	15.72	16.91
80	2.50	0.18	26.25	28.28	41.97	45.19
120	3.00	0.13	35.18	37.90	77.15	83.09
170	3.50	0.09	4.34	4.68	81.49	87.77
200	3.75	0.07	0.32	0.34	81.81	88.11
230	4.00	0.06	0.06	0.06	81.87	88.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.10	2.89	2.56	2.14	1.94	0.78

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.26	0.21	0.92	-2.98	14.19

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-05 #6

Analysis Date: 11-29-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,475,048	234,784	North Carolina State Plane	-68.3 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-6/3 Dry - 2.5Y-8/3 Washed - 2.5Y-8/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.30	103.93	0.28	0.13	#200 - 11.21 #230 - 11.01			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	9.14	7.86	9.14	7.86
7/16"	-3.50	11.31	8.75	7.52	17.89	15.38
5/16"	-3.00	8.00	4.05	3.48	21.94	18.86
3.5	-2.50	5.66	2.93	2.52	24.87	21.38
4	-2.25	4.76	1.42	1.22	26.29	22.60
5	-2.00	4.00	2.05	1.76	28.34	24.36
7	-1.50	2.83	2.25	1.93	30.59	26.29
10	-1.00	2.00	3.47	2.98	34.06	29.27
14	-0.50	1.41	4.38	3.77	38.44	33.04
18	0.00	1.00	4.43	3.81	42.87	36.85
25	0.50	0.71	5.96	5.12	48.83	41.97
35	1.00	0.50	6.50	5.59	55.33	47.56
45	1.50	0.35	7.29	6.27	62.62	53.83
60	2.00	0.25	10.71	9.21	73.33	63.04
80	2.50	0.18	13.91	11.96	87.24	75.00
120	3.00	0.13	12.07	10.38	99.31	85.38
170	3.50	0.09	3.15	2.71	102.46	88.09
200	3.75	0.07	0.81	0.70	103.27	88.79
230	4.00	0.06	0.23	0.20	103.50	88.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.93	2.50	1.19	-1.83	-3.41	-4.09

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.01	0.99	2.47	-0.47	1.77

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-06 #1

Analysis Date: 11-29-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,482,826	229,322	North Carolina State Plane	-54.7 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-4/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
92.81	84.38	0.02	0.00	#200 - 9.44 #230 - 9.12		7	3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.03	0.03	0.03
10	-1.00	2.00	0.04	0.04	0.07	0.07
14	-0.50	1.41	0.03	0.03	0.10	0.10
18	0.00	1.00	0.04	0.04	0.14	0.14
25	0.50	0.71	0.05	0.05	0.19	0.19
35	1.00	0.50	0.11	0.12	0.30	0.31
45	1.50	0.35	0.29	0.31	0.59	0.62
60	2.00	0.25	0.99	1.07	1.58	1.69
80	2.50	0.18	5.88	6.34	7.46	8.03
120	3.00	0.13	53.43	57.57	60.89	65.60
170	3.50	0.09	21.49	23.15	82.38	88.75
200	3.75	0.07	1.68	1.81	84.06	90.56
230	4.00	0.06	0.30	0.32	84.36	90.88

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.40	3.20	2.86	2.65	2.57	2.26

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.84	0.14	0.38	-2.36	24.15

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-06 #2

Analysis Date: 11-29-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,482,826	229,322	North Carolina State Plane	-57.7 NAVD 88

USCS:	Munsell:	Comments:
SP-SC	Wet - N-3/0 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.25	83.38	0.02	0.04	#200 - 11.70 #230 - 11.58			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.18	0.19	0.18	0.19
3.5	-2.50	5.66	0.13	0.14	0.31	0.33
4	-2.25	4.76	0.17	0.18	0.48	0.51
5	-2.00	4.00	0.00	0.00	0.48	0.51
7	-1.50	2.83	0.44	0.47	0.92	0.98
10	-1.00	2.00	0.28	0.30	1.20	1.28
14	-0.50	1.41	0.23	0.24	1.43	1.52
18	0.00	1.00	0.17	0.18	1.60	1.70
25	0.50	0.71	0.27	0.29	1.87	1.99
35	1.00	0.50	0.55	0.58	2.42	2.57
45	1.50	0.35	1.79	1.90	4.21	4.47
60	2.00	0.25	6.83	7.25	11.04	11.72
80	2.50	0.18	27.30	28.97	38.34	40.69
120	3.00	0.13	35.82	38.01	74.16	78.70
170	3.50	0.09	8.48	9.00	82.64	87.70
200	3.75	0.07	0.57	0.60	83.21	88.30
230	4.00	0.06	0.11	0.12	83.32	88.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.29	2.95	2.62	2.23	2.07	1.54

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.42	0.19	0.76	-3.55	21.95

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-06 #3

Analysis Date: 12-01-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,482,826	229,322	North Carolina State Plane	-59.5 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 5Y-5/1 Dry - 2.5Y-7/2 Washed - 2.5Y-8/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.88	84.06	0.02	0.04	#200 - 11.59 #230 - 11.48			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.48	0.51	0.48	0.51
3.5	-2.50	5.66	0.59	0.62	1.07	1.13
4	-2.25	4.76	0.05	0.05	1.12	1.18
5	-2.00	4.00	0.41	0.43	1.53	1.61
7	-1.50	2.83	0.64	0.67	2.17	2.28
10	-1.00	2.00	0.53	0.56	2.70	2.84
14	-0.50	1.41	0.73	0.77	3.43	3.61
18	0.00	1.00	0.60	0.63	4.03	4.24
25	0.50	0.71	0.63	0.66	4.66	4.90
35	1.00	0.50	0.85	0.90	5.51	5.80
45	1.50	0.35	2.13	2.24	7.64	8.04
60	2.00	0.25	8.88	9.36	16.52	17.40
80	2.50	0.18	27.25	28.72	43.77	46.12
120	3.00	0.13	32.52	34.27	76.29	80.39
170	3.50	0.09	7.20	7.59	83.49	87.98
200	3.75	0.07	0.41	0.43	83.90	88.41
230	4.00	0.06	0.10	0.11	84.00	88.52

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.24	2.92	2.56	2.13	1.93	0.56

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.24	0.21	1.04	-3.01	13.64

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-06 #4

Analysis Date: 12-02-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,482,826	229,322	North Carolina State Plane	-63.7 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 2.5Y-5/1 Dry - 2.5Y-7/3 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
97.29	84.97	0.02	0.05	#200 - 12.82 #230 - 12.73			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.51	1.55	1.51	1.55
5/16"	-3.00	8.00	0.00	0.00	1.51	1.55
3.5	-2.50	5.66	0.00	0.00	1.51	1.55
4	-2.25	4.76	0.22	0.23	1.73	1.78
5	-2.00	4.00	0.00	0.00	1.73	1.78
7	-1.50	2.83	0.21	0.22	1.94	2.00
10	-1.00	2.00	0.32	0.33	2.26	2.33
14	-0.50	1.41	0.27	0.28	2.53	2.61
18	0.00	1.00	0.27	0.28	2.80	2.89
25	0.50	0.71	0.51	0.52	3.31	3.41
35	1.00	0.50	1.41	1.45	4.72	4.86
45	1.50	0.35	4.97	5.11	9.69	9.97
60	2.00	0.25	10.67	10.97	20.36	20.94
80	2.50	0.18	27.82	28.59	48.18	49.53
120	3.00	0.13	29.26	30.08	77.44	79.61
170	3.50	0.09	6.88	7.07	84.32	86.68
200	3.75	0.07	0.49	0.50	84.81	87.18
230	4.00	0.06	0.09	0.09	84.90	87.27

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.31	2.92	2.51	2.07	1.77	1.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.2	0.22	1.08	-3.52	18.76

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-06 #5

Analysis Date: 12-02-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,482,826	229,322	North Carolina State Plane	-67.7 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 2.5Y-5/3 Dry - 2.5Y-7/3 Washed - 2.5Y-7/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.01	82.41	0.11	0.17	#200 - 13.64 #230 - 13.53			7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.34	1.41	1.34	1.41
4	-2.25	4.76	0.60	0.63	1.94	2.04
5	-2.00	4.00	0.42	0.44	2.36	2.48
7	-1.50	2.83	0.67	0.71	3.03	3.19
10	-1.00	2.00	0.81	0.85	3.84	4.04
14	-0.50	1.41	1.10	1.16	4.94	5.20
18	0.00	1.00	1.09	1.15	6.03	6.35
25	0.50	0.71	2.08	2.19	8.11	8.54
35	1.00	0.50	2.71	2.85	10.82	11.39
45	1.50	0.35	6.02	6.34	16.84	17.73
60	2.00	0.25	16.12	16.97	32.96	34.70
80	2.50	0.18	28.75	30.26	61.71	64.96
120	3.00	0.13	16.89	17.78	78.60	82.74
170	3.50	0.09	3.07	3.23	81.67	85.97
200	3.75	0.07	0.37	0.39	82.04	86.36
230	4.00	0.06	0.10	0.11	82.14	86.47

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.20	2.78	2.25	1.71	1.36	-0.59

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.85	0.28	1.16	-2.12	7.97

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-07 #1

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,483,283	214,361	North Carolina State Plane	-60.7 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-3/0 Dry - N-5/0 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
99.16	93.14	0.13	0.00	#200 - 6.27 #230 - 6.21		45	55

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	2.76	2.78	2.76	2.78
7/16"	-3.50	11.31	2.06	2.08	4.82	4.86
5/16"	-3.00	8.00	3.79	3.82	8.61	8.68
3.5	-2.50	5.66	3.94	3.97	12.55	12.65
4	-2.25	4.76	3.65	3.68	16.20	16.33
5	-2.00	4.00	1.69	1.70	17.89	18.03
7	-1.50	2.83	4.90	4.94	22.79	22.97
10	-1.00	2.00	3.87	3.90	26.66	26.87
14	-0.50	1.41	4.66	4.70	31.32	31.57
18	0.00	1.00	3.49	3.52	34.81	35.09
25	0.50	0.71	4.55	4.59	39.36	39.68
35	1.00	0.50	5.58	5.63	44.94	45.31
45	1.50	0.35	7.46	7.52	52.40	52.83
60	2.00	0.25	10.64	10.73	63.04	63.56
80	2.50	0.18	15.37	15.50	78.41	79.06
120	3.00	0.13	12.49	12.60	90.90	91.66
170	3.50	0.09	1.81	1.83	92.71	93.49
200	3.75	0.07	0.24	0.24	92.95	93.73
230	4.00	0.06	0.06	0.06	93.01	93.79

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.70	2.37	1.31	-1.24	-2.27	-3.48

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.4	0.76	2.14	-0.59	2.05

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-07 #2

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,483,283	214,361	North Carolina State Plane	-62.1 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-4/0 Dry - N-5/0 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.45	85.55	0.06	0.06	#200 - 13.25 #230 - 13.22			45

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.61	0.62	0.61	0.62
3.5	-2.50	5.66	0.47	0.48	1.08	1.10
4	-2.25	4.76	0.19	0.19	1.27	1.29
5	-2.00	4.00	0.96	0.98	2.23	2.27
7	-1.50	2.83	1.40	1.42	3.63	3.69
10	-1.00	2.00	1.90	1.93	5.53	5.62
14	-0.50	1.41	2.36	2.40	7.89	8.02
18	0.00	1.00	2.36	2.40	10.25	10.42
25	0.50	0.71	4.10	4.16	14.35	14.58
35	1.00	0.50	8.13	8.26	22.48	22.84
45	1.50	0.35	12.77	12.97	35.25	35.81
60	2.00	0.25	16.02	16.27	51.27	52.08
80	2.50	0.18	17.53	17.81	68.80	69.89
120	3.00	0.13	15.02	15.26	83.82	85.15
170	3.50	0.09	1.42	1.44	85.24	86.59
200	3.75	0.07	0.16	0.16	85.40	86.75
230	4.00	0.06	0.03	0.03	85.43	86.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.96	2.67	1.94	1.08	0.59	-1.16

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.45	0.37	1.27	-1.33	4.76

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-07 #3

Analysis Date: 11-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,483,283	214,361	North Carolina State Plane	-63.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-4/0 Dry - 2.5Y-6/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.87	85.53	0.28	0.12	#200 - 12.22 #230 - 12.11			30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	8.50	8.77	8.50	8.77
7/16"	-3.50	11.31	4.40	4.54	12.90	13.31
5/16"	-3.00	8.00	3.18	3.28	16.08	16.59
3.5	-2.50	5.66	4.80	4.96	20.88	21.55
4	-2.25	4.76	2.28	2.35	23.16	23.90
5	-2.00	4.00	2.75	2.84	25.91	26.74
7	-1.50	2.83	3.98	4.11	29.89	30.85
10	-1.00	2.00	3.33	3.44	33.22	34.29
14	-0.50	1.41	3.31	3.42	36.53	37.71
18	0.00	1.00	2.47	2.55	39.00	40.26
25	0.50	0.71	3.57	3.69	42.57	43.95
35	1.00	0.50	4.39	4.53	46.96	48.48
45	1.50	0.35	6.16	6.36	53.12	54.84
60	2.00	0.25	8.52	8.80	61.64	63.64
80	2.50	0.18	12.56	12.97	74.20	76.61
120	3.00	0.13	9.04	9.33	83.24	85.94
170	3.50	0.09	1.51	1.56	84.75	87.50
200	3.75	0.07	0.27	0.28	85.02	87.78
230	4.00	0.06	0.11	0.11	85.13	87.89

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.90	2.44	1.12	-2.15	-3.09	-4.11

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	-0.17	1.13	2.45	-0.32	1.62

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-07 #4

Analysis Date: 11-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,483,283	214,361	North Carolina State Plane	-68.9 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-4/1 Dry - 5Y-6/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
97.29	74.32	0.01	0.00	#200 - 23.70 #230 - 23.63			20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.43	0.44	0.43	0.44
4	-2.25	4.76	0.14	0.14	0.57	0.58
5	-2.00	4.00	0.28	0.29	0.85	0.87
7	-1.50	2.83	0.98	1.01	1.83	1.88
10	-1.00	2.00	1.16	1.19	2.99	3.07
14	-0.50	1.41	1.10	1.13	4.09	4.20
18	0.00	1.00	1.04	1.07	5.13	5.27
25	0.50	0.71	1.75	1.80	6.88	7.07
35	1.00	0.50	3.04	3.12	9.92	10.19
45	1.50	0.35	4.44	4.56	14.36	14.75
60	2.00	0.25	6.88	7.07	21.24	21.82
80	2.50	0.18	29.27	30.09	50.51	51.91
120	3.00	0.13	21.33	21.92	71.84	73.83
170	3.50	0.09	2.12	2.18	73.96	76.01
200	3.75	0.07	0.28	0.29	74.24	76.30
230	4.00	0.06	0.07	0.07	74.31	76.37

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.27	2.47	2.05	1.59	-0.13

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.97	0.26	1.09	-2.08	7.53

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-07 #5

Analysis Date: 11-28-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,483,283	214,361	North Carolina State Plane	-75.9 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-4/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.16	65.38	0.01	0.00	#200 - 30.61 #230 - 30.57			7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.21	0.22	0.21	0.22
5	-2.00	4.00	0.00	0.00	0.21	0.22
7	-1.50	2.83	0.37	0.39	0.58	0.61
10	-1.00	2.00	0.64	0.68	1.22	1.29
14	-0.50	1.41	0.79	0.84	2.01	2.13
18	0.00	1.00	0.42	0.45	2.43	2.58
25	0.50	0.71	0.90	0.96	3.33	3.54
35	1.00	0.50	1.44	1.53	4.77	5.07
45	1.50	0.35	2.16	2.29	6.93	7.36
60	2.00	0.25	3.97	4.22	10.90	11.58
80	2.50	0.18	32.70	34.73	43.60	46.31
120	3.00	0.13	19.46	20.67	63.06	66.98
170	3.50	0.09	1.99	2.11	65.05	69.09
200	3.75	0.07	0.28	0.30	65.33	69.39
230	4.00	0.06	0.04	0.04	65.37	69.43

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			2.59	2.19	2.06	0.98

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.19	0.22	0.83	-2.68	11.82

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-08 #1

Analysis Date: 11-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,473,161	214,174	North Carolina State Plane	-58.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10Y-4/1 Dry - 2.5Y-5/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
93.55	91.10	0.02	0.11	#200 - 2.83 #230 - 2.76		7	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.67	0.72	0.67	0.72
3.5	-2.50	5.66	0.60	0.64	1.27	1.36
4	-2.25	4.76	0.11	0.12	1.38	1.48
5	-2.00	4.00	0.38	0.41	1.76	1.89
7	-1.50	2.83	0.50	0.53	2.26	2.42
10	-1.00	2.00	0.36	0.38	2.62	2.80
14	-0.50	1.41	0.36	0.38	2.98	3.18
18	0.00	1.00	0.39	0.42	3.37	3.60
25	0.50	0.71	0.49	0.52	3.86	4.12
35	1.00	0.50	0.94	1.00	4.80	5.12
45	1.50	0.35	1.73	1.85	6.53	6.97
60	2.00	0.25	5.27	5.63	11.80	12.60
80	2.50	0.18	30.55	32.66	42.35	45.26
120	3.00	0.13	43.56	46.56	85.91	91.82
170	3.50	0.09	4.75	5.08	90.66	96.90
200	3.75	0.07	0.25	0.27	90.91	97.17
230	4.00	0.06	0.07	0.07	90.98	97.24

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.31	2.92	2.82	2.55	2.19	2.05	0.94

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.32	0.20	0.97	-3.68	18.54

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-09 #1

Analysis Date: 12-05-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,466,902	218,615	North Carolina State Plane	-54.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-3/0 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.52	84.28	0.11	0.02	#200 - 11.91 #230 - 11.88			35

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.83	0.87	0.83	0.87
4	-2.25	4.76	0.54	0.57	1.37	1.44
5	-2.00	4.00	0.40	0.42	1.77	1.86
7	-1.50	2.83	2.17	2.27	3.94	4.13
10	-1.00	2.00	2.68	2.81	6.62	6.94
14	-0.50	1.41	4.12	4.31	10.74	11.25
18	0.00	1.00	4.60	4.82	15.34	16.07
25	0.50	0.71	5.25	5.50	20.59	21.57
35	1.00	0.50	6.17	6.46	26.76	28.03
45	1.50	0.35	7.64	8.00	34.40	36.03
60	2.00	0.25	10.03	10.50	44.43	46.53
80	2.50	0.18	20.16	21.11	64.59	67.64
120	3.00	0.13	17.21	18.02	81.80	85.66
170	3.50	0.09	2.13	2.23	83.93	87.89
200	3.75	0.07	0.19	0.20	84.12	88.09
230	4.00	0.06	0.03	0.03	84.15	88.12

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.95	2.70	2.08	0.77	-0.01	-1.35

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.4	0.38	1.4	-0.97	3.1

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-09 #2

Analysis Date: 12-08-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,466,902	218,615	North Carolina State Plane	-57.1 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-3/0 Dry - N-5/0 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
90.90	73.80	0.20	0.21	#200 - 19.35 #230 - 19.24			55

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	5.67	6.24	5.67	6.24
5/16"	-3.00	8.00	2.03	2.23	7.70	8.47
3.5	-2.50	5.66	2.33	2.56	10.03	11.03
4	-2.25	4.76	0.76	0.84	10.79	11.87
5	-2.00	4.00	1.38	1.52	12.17	13.39
7	-1.50	2.83	2.83	3.11	15.00	16.50
10	-1.00	2.00	2.86	3.15	17.86	19.65
14	-0.50	1.41	3.45	3.80	21.31	23.45
18	0.00	1.00	3.43	3.77	24.74	27.22
25	0.50	0.71	4.83	5.31	29.57	32.53
35	1.00	0.50	6.18	6.80	35.75	39.33
45	1.50	0.35	6.99	7.69	42.74	47.02
60	2.00	0.25	8.03	8.83	50.77	55.85
80	2.50	0.18	10.48	11.53	61.25	67.38
120	3.00	0.13	10.46	11.51	71.71	78.89
170	3.50	0.09	1.42	1.56	73.13	80.45
200	3.75	0.07	0.18	0.20	73.31	80.65
230	4.00	0.06	0.10	0.11	73.41	80.76

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		2.83	1.67	-0.29	-1.58	-3.65

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.49	0.71	2.08	-0.72	2.34

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-09 #3

Analysis Date: 12-08-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,466,902	218,615	North Carolina State Plane	-60.3 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-3/0 Dry - N-5/0 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
98.01	79.59	0.08	0.16	#200 - 19.11 #230 - 19.04			20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.20	0.20	0.20	0.20
3.5	-2.50	5.66	1.96	2.00	2.16	2.20
4	-2.25	4.76	0.34	0.35	2.50	2.55
5	-2.00	4.00	0.44	0.45	2.94	3.00
7	-1.50	2.83	1.48	1.51	4.42	4.51
10	-1.00	2.00	1.24	1.27	5.66	5.78
14	-0.50	1.41	1.75	1.79	7.41	7.57
18	0.00	1.00	1.56	1.59	8.97	9.16
25	0.50	0.71	2.56	2.61	11.53	11.77
35	1.00	0.50	4.33	4.42	15.86	16.19
45	1.50	0.35	7.50	7.65	23.36	23.84
60	2.00	0.25	11.12	11.35	34.48	35.19
80	2.50	0.18	20.60	21.02	55.08	56.21
120	3.00	0.13	21.80	22.24	76.88	78.45
170	3.50	0.09	2.18	2.22	79.06	80.67
200	3.75	0.07	0.22	0.22	79.28	80.89
230	4.00	0.06	0.07	0.07	79.35	80.96

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		2.92	2.35	1.55	0.98	-1.31

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.68	0.31	1.37	-1.68	5.44

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-09 #4

Analysis Date: 12-05-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,466,902	218,615	North Carolina State Plane	-66.1 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.44	83.00	0.02	0.00	#200 - 12.21 #230 - 12.11			7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.15	0.16	0.15	0.16
5	-2.00	4.00	0.12	0.13	0.27	0.29
7	-1.50	2.83	0.13	0.14	0.40	0.43
10	-1.00	2.00	0.32	0.34	0.72	0.77
14	-0.50	1.41	0.49	0.52	1.21	1.29
18	0.00	1.00	0.25	0.26	1.46	1.55
25	0.50	0.71	0.48	0.51	1.94	2.06
35	1.00	0.50	1.20	1.27	3.14	3.33
45	1.50	0.35	2.49	2.64	5.63	5.97
60	2.00	0.25	5.20	5.51	10.83	11.48
80	2.50	0.18	21.78	23.06	32.61	34.54
120	3.00	0.13	46.31	49.04	78.92	83.58
170	3.50	0.09	3.71	3.93	82.63	87.51
200	3.75	0.07	0.26	0.28	82.89	87.79
230	4.00	0.06	0.09	0.10	82.98	87.89

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.05	2.91	2.66	2.29	2.10	1.32

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.43	0.19	0.69	-3.16	17.2

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-09 #5

Analysis Date: 12-05-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,466,902	218,615	North Carolina State Plane	-71.8 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-4/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
92.06	81.57	0.02	0.03	#200 - 11.54 #230 - 11.44			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.03	0.03	0.03	0.03
5	-2.00	4.00	0.03	0.03	0.06	0.06
7	-1.50	2.83	0.19	0.21	0.25	0.27
10	-1.00	2.00	0.24	0.26	0.49	0.53
14	-0.50	1.41	0.37	0.40	0.86	0.93
18	0.00	1.00	0.25	0.27	1.11	1.20
25	0.50	0.71	0.26	0.28	1.37	1.48
35	1.00	0.50	0.65	0.71	2.02	2.19
45	1.50	0.35	1.81	1.97	3.83	4.16
60	2.00	0.25	3.16	3.43	6.99	7.59
80	2.50	0.18	19.43	21.11	26.42	28.70
120	3.00	0.13	47.64	51.75	74.06	80.45
170	3.50	0.09	6.93	7.53	80.99	87.98
200	3.75	0.07	0.44	0.48	81.43	88.46
230	4.00	0.06	0.09	0.10	81.52	88.56

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.24	2.95	2.71	2.41	2.20	1.62

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.53	0.17	0.61	-3.29	19.59

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-10 #1

Analysis Date: 12-12-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,463,015	198,943	North Carolina State Plane	-65.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10Y-4/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.56	92.37	0.01	0.03	#200 - 2.36 #230 - 2.35		6	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.31	0.33	0.31	0.33
4	-2.25	4.76	0.06	0.06	0.37	0.39
5	-2.00	4.00	0.34	0.36	0.71	0.75
7	-1.50	2.83	0.47	0.50	1.18	1.25
10	-1.00	2.00	0.42	0.44	1.60	1.69
14	-0.50	1.41	0.43	0.45	2.03	2.14
18	0.00	1.00	0.48	0.51	2.51	2.65
25	0.50	0.71	0.61	0.65	3.12	3.30
35	1.00	0.50	2.21	2.34	5.33	5.64
45	1.50	0.35	5.14	5.44	10.47	11.08
60	2.00	0.25	17.95	18.98	28.42	30.06
80	2.50	0.18	45.91	48.55	74.33	78.61
120	3.00	0.13	15.51	16.40	89.84	95.01
170	3.50	0.09	2.35	2.49	92.19	97.50
200	3.75	0.07	0.13	0.14	92.32	97.64
230	4.00	0.06	0.01	0.01	92.33	97.65

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.00	2.66	2.46	2.21	1.87	1.63	0.86

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.06	0.24	0.77	-2.88	15.34

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-10 #2

Analysis Date: 12-08-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,463,015	198,943	North Carolina State Plane	-69.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
89.15	79.79	0.00	0.04	#200 - 10.68 #230 - 10.55			20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.11	0.12	0.11	0.12
4	-2.25	4.76	0.26	0.29	0.37	0.41
5	-2.00	4.00	0.01	0.01	0.38	0.42
7	-1.50	2.83	0.24	0.27	0.62	0.69
10	-1.00	2.00	0.59	0.66	1.21	1.35
14	-0.50	1.41	0.63	0.71	1.84	2.06
18	0.00	1.00	0.79	0.89	2.63	2.95
25	0.50	0.71	1.02	1.14	3.65	4.09
35	1.00	0.50	1.42	1.59	5.07	5.68
45	1.50	0.35	2.00	2.24	7.07	7.92
60	2.00	0.25	4.24	4.76	11.31	12.68
80	2.50	0.18	14.94	16.76	26.25	29.44
120	3.00	0.13	44.77	50.22	71.02	79.66
170	3.50	0.09	8.13	9.12	79.15	88.78
200	3.75	0.07	0.48	0.54	79.63	89.32
230	4.00	0.06	0.12	0.13	79.75	89.45

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.24	2.95	2.70	2.37	2.10	0.79

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.43	0.19	0.86	-2.85	12.92

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-10 #3

Analysis Date: 12-08-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,463,015	198,943	North Carolina State Plane	-72.8 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-3/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.35	80.50	0.02	0.04	#200 - 12.07 #230 - 11.93			20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.10	0.11	0.10	0.11
7	-1.50	2.83	0.18	0.20	0.28	0.31
10	-1.00	2.00	0.49	0.54	0.77	0.85
14	-0.50	1.41	0.77	0.84	1.54	1.69
18	0.00	1.00	1.11	1.22	2.65	2.91
25	0.50	0.71	1.57	1.72	4.22	4.63
35	1.00	0.50	2.88	3.15	7.10	7.78
45	1.50	0.35	4.08	4.47	11.18	12.25
60	2.00	0.25	6.66	7.29	17.84	19.54
80	2.50	0.18	18.44	20.19	36.28	39.73
120	3.00	0.13	30.78	33.69	67.06	73.42
170	3.50	0.09	12.21	13.37	79.27	86.79
200	3.75	0.07	1.04	1.14	80.31	87.93
230	4.00	0.06	0.13	0.14	80.44	88.07

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.40	3.06	2.65	2.14	1.76	0.56

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.33	0.20	0.9	-1.76	6.79

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-10 #4

Analysis Date: 12-08-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,463,015	198,943	North Carolina State Plane	-76.6 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.23	89.95	0.00	0.04	#200 - 4.73 #230 - 4.59			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.02	0.02	0.02	0.02
18	0.00	1.00	0.01	0.01	0.03	0.03
25	0.50	0.71	0.03	0.03	0.06	0.06
35	1.00	0.50	0.09	0.10	0.15	0.16
45	1.50	0.35	0.27	0.29	0.42	0.45
60	2.00	0.25	2.19	2.32	2.61	2.77
80	2.50	0.18	37.22	39.50	39.83	42.27
120	3.00	0.13	42.18	44.76	82.01	87.03
170	3.50	0.09	7.25	7.69	89.26	94.72
200	3.75	0.07	0.52	0.55	89.78	95.27
230	4.00	0.06	0.13	0.14	89.91	95.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.63	2.97	2.87	2.59	2.28	2.17	2.03

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.56	0.17	0.37	-0.24	6.02

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-11 #1

Analysis Date: 12-08-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,458,567	205,890	North Carolina State Plane	-59.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - N-4/0 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
94.34	92.34	0.01	0.02	#200 - 2.24 #230 - 2.17		6	7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.25	0.26	0.25	0.26
4	-2.25	4.76	0.04	0.04	0.29	0.30
5	-2.00	4.00	0.02	0.02	0.31	0.32
7	-1.50	2.83	0.27	0.29	0.58	0.61
10	-1.00	2.00	0.39	0.41	0.97	1.02
14	-0.50	1.41	0.45	0.48	1.42	1.50
18	0.00	1.00	0.40	0.42	1.82	1.92
25	0.50	0.71	0.73	0.77	2.55	2.69
35	1.00	0.50	2.07	2.19	4.62	4.88
45	1.50	0.35	5.82	6.17	10.44	11.05
60	2.00	0.25	12.43	13.18	22.87	24.23
80	2.50	0.18	33.00	34.98	55.87	59.21
120	3.00	0.13	32.33	34.27	88.20	93.48
170	3.50	0.09	3.81	4.04	92.01	97.52
200	3.75	0.07	0.23	0.24	92.24	97.76
230	4.00	0.06	0.07	0.07	92.31	97.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.19	2.86	2.73	2.37	2.01	1.69	1.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.22	0.21	0.75	-2.47	13.16

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-11 #2

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,458,567	205,890	North Carolina State Plane	-63.8 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - N-3/0 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
88.78	79.60	0.01	0.00	#200 - 10.79 #230 - 10.35			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.02	0.02	0.02	0.02
10	-1.00	2.00	0.02	0.02	0.04	0.04
14	-0.50	1.41	0.01	0.01	0.05	0.05
18	0.00	1.00	0.04	0.05	0.09	0.10
25	0.50	0.71	0.08	0.09	0.17	0.19
35	1.00	0.50	0.25	0.28	0.42	0.47
45	1.50	0.35	0.56	0.63	0.98	1.10
60	2.00	0.25	1.49	1.68	2.47	2.78
80	2.50	0.18	3.87	4.36	6.34	7.14
120	3.00	0.13	39.58	44.58	45.92	51.72
170	3.50	0.09	31.42	35.39	77.34	87.11
200	3.75	0.07	1.86	2.10	79.20	89.21
230	4.00	0.06	0.39	0.44	79.59	89.65

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.46	3.33	2.98	2.70	2.60	2.25

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.91	0.13	0.42	-2.16	15.48

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-11 #3

Analysis Date: 12-12-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,458,567	205,890	North Carolina State Plane	-71.1 NAVD 88

USCS:	Munsell:	Comments:
SP-SC	Wet - 10Y-4/1 Dry - 10Y-5/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
89.21	80.19	0.03	0.01	#200 - 10.60 #230 - 10.19			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.01	0.01	0.01	0.01
18	0.00	1.00	0.00	0.00	0.01	0.01
25	0.50	0.71	0.02	0.02	0.03	0.03
35	1.00	0.50	0.03	0.03	0.06	0.06
45	1.50	0.35	0.04	0.04	0.10	0.10
60	2.00	0.25	0.19	0.21	0.29	0.31
80	2.50	0.18	2.76	3.09	3.05	3.40
120	3.00	0.13	47.90	53.69	50.95	57.09
170	3.50	0.09	26.49	29.69	77.44	86.78
200	3.75	0.07	2.34	2.62	79.78	89.40
230	4.00	0.06	0.37	0.41	80.15	89.81

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.45	3.30	2.93	2.70	2.62	2.51

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.92	0.13	0.31	-0.3	7.87

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-11 #4

Analysis Date: 12-12-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,458,567	205,890	North Carolina State Plane	-75.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.39	92.72	0.03	0.09	#200 - 2.96 #230 - 2.93			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.02	0.02	0.02	0.02
7	-1.50	2.83	0.00	0.00	0.02	0.02
10	-1.00	2.00	0.03	0.03	0.05	0.05
14	-0.50	1.41	0.01	0.01	0.06	0.06
18	0.00	1.00	0.02	0.02	0.08	0.08
25	0.50	0.71	0.06	0.06	0.14	0.14
35	1.00	0.50	0.17	0.18	0.31	0.32
45	1.50	0.35	0.46	0.48	0.77	0.80
60	2.00	0.25	3.88	4.07	4.65	4.87
80	2.50	0.18	39.71	41.63	44.36	46.50
120	3.00	0.13	43.94	46.06	88.30	92.56
170	3.50	0.09	4.05	4.25	92.35	96.81
200	3.75	0.07	0.22	0.23	92.57	97.04
230	4.00	0.06	0.03	0.03	92.60	97.07

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.29	2.91	2.81	2.54	2.24	2.13	2.00

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.5	0.18	0.37	-1.36	14.38

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-12 #1

Analysis Date: 12-13-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,454,726	212,442	North Carolina State Plane	-55.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
97.73	95.11	0.02	0.05	#200 - 2.78 #230 - 2.77		8	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.46	0.47	0.46	0.47
4	-2.25	4.76	0.16	0.16	0.62	0.63
5	-2.00	4.00	0.33	0.34	0.95	0.97
7	-1.50	2.83	0.54	0.55	1.49	1.52
10	-1.00	2.00	0.46	0.47	1.95	1.99
14	-0.50	1.41	0.60	0.61	2.55	2.60
18	0.00	1.00	0.59	0.60	3.14	3.20
25	0.50	0.71	1.41	1.44	4.55	4.64
35	1.00	0.50	9.36	9.58	13.91	14.22
45	1.50	0.35	21.73	22.23	35.64	36.45
60	2.00	0.25	23.18	23.72	58.82	60.17
80	2.50	0.18	22.53	23.05	81.35	83.22
120	3.00	0.13	12.04	12.32	93.39	95.54
170	3.50	0.09	1.55	1.59	94.94	97.13
200	3.75	0.07	0.09	0.09	95.03	97.22
230	4.00	0.06	0.01	0.01	95.04	97.23

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.53	2.32	1.79	1.24	1.04	0.52

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.68	0.31	0.88	-1.62	8.42

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-12 #2

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,454,726	212,442	North Carolina State Plane	-59.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.52	91.88	0.02	0.04	#200 - 4.95 #230 - 4.88		24	25

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.60	0.62	0.60	0.62
3.5	-2.50	5.66	0.55	0.57	1.15	1.19
4	-2.25	4.76	0.15	0.16	1.30	1.35
5	-2.00	4.00	0.63	0.65	1.93	2.00
7	-1.50	2.83	1.00	1.04	2.93	3.04
10	-1.00	2.00	1.78	1.84	4.71	4.88
14	-0.50	1.41	2.78	2.88	7.49	7.76
18	0.00	1.00	2.85	2.95	10.34	10.71
25	0.50	0.71	4.30	4.46	14.64	15.17
35	1.00	0.50	7.55	7.82	22.19	22.99
45	1.50	0.35	12.05	12.48	34.24	35.47
60	2.00	0.25	17.15	17.77	51.39	53.24
80	2.50	0.18	19.36	20.06	70.75	73.30
120	3.00	0.13	16.66	17.26	87.41	90.56
170	3.50	0.09	3.94	4.08	91.35	94.64
200	3.75	0.07	0.40	0.41	91.75	95.05
230	4.00	0.06	0.07	0.07	91.82	95.12

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.72	2.81	2.55	1.91	1.08	0.55	-0.98

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.57	0.34	1.25	-1.31	4.86

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-12 #3

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,454,726	212,442	North Carolina State Plane	-65.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SC	Wet - 10Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.27	82.96	0.01	0.02	#200 - 9.27 #230 - 9.15		13	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.42	0.46	0.42	0.46
4	-2.25	4.76	0.22	0.24	0.64	0.70
5	-2.00	4.00	0.33	0.36	0.97	1.06
7	-1.50	2.83	0.34	0.37	1.31	1.43
10	-1.00	2.00	0.88	0.96	2.19	2.39
14	-0.50	1.41	1.23	1.35	3.42	3.74
18	0.00	1.00	1.70	1.86	5.12	5.60
25	0.50	0.71	2.40	2.63	7.52	8.23
35	1.00	0.50	3.32	3.64	10.84	11.87
45	1.50	0.35	5.48	6.00	16.32	17.87
60	2.00	0.25	14.33	15.70	30.65	33.57
80	2.50	0.18	12.61	13.82	43.26	47.39
120	3.00	0.13	29.44	32.26	72.70	79.65
170	3.50	0.09	9.35	10.24	82.05	89.89
200	3.75	0.07	0.77	0.84	82.82	90.73
230	4.00	0.06	0.11	0.12	82.93	90.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.21	2.93	2.54	1.73	1.34	-0.16

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.08	0.24	1.11	-1.7	6.41

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-12 #4

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,454,726	212,442	North Carolina State Plane	-68.6 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.84	94.51	0.01	0.08	#200 - 2.55 #230 - 2.49		9	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.35	0.36	0.35	0.36
3.5	-2.50	5.66	0.08	0.08	0.43	0.44
4	-2.25	4.76	0.18	0.19	0.61	0.63
5	-2.00	4.00	0.19	0.20	0.80	0.83
7	-1.50	2.83	0.19	0.20	0.99	1.03
10	-1.00	2.00	0.41	0.42	1.40	1.45
14	-0.50	1.41	0.89	0.92	2.29	2.37
18	0.00	1.00	1.46	1.51	3.75	3.88
25	0.50	0.71	2.77	2.86	6.52	6.74
35	1.00	0.50	6.55	6.76	13.07	13.50
45	1.50	0.35	11.57	11.95	24.64	25.45
60	2.00	0.25	35.42	36.58	60.06	62.03
80	2.50	0.18	14.96	15.45	75.02	77.48
120	3.00	0.13	15.00	15.49	90.02	92.97
170	3.50	0.09	4.09	4.22	94.11	97.19
200	3.75	0.07	0.25	0.26	94.36	97.45
230	4.00	0.06	0.06	0.06	94.42	97.51

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.24	2.71	2.42	1.84	1.48	1.10	0.20

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.77	0.29	0.91	-1.53	8.26

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-13 #1

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,585	216,526	North Carolina State Plane	-54.4 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-4/1 Dry - 10Y-5/1 Washed - 10Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.71	106.97	0.01	0.07	#200 - 6.92 #230 - 6.82		6	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.07	0.06	0.07	0.06
7	-1.50	2.83	0.03	0.03	0.10	0.09
10	-1.00	2.00	0.07	0.06	0.17	0.15
14	-0.50	1.41	0.06	0.05	0.23	0.20
18	0.00	1.00	0.15	0.13	0.38	0.33
25	0.50	0.71	0.32	0.28	0.70	0.61
35	1.00	0.50	0.56	0.49	1.26	1.10
45	1.50	0.35	0.73	0.64	1.99	1.74
60	2.00	0.25	1.56	1.36	3.55	3.10
80	2.50	0.18	6.62	5.77	10.17	8.87
120	3.00	0.13	84.33	73.52	94.50	82.39
170	3.50	0.09	11.84	10.32	106.34	92.71
200	3.75	0.07	0.43	0.37	106.77	93.08
230	4.00	0.06	0.11	0.10	106.88	93.18

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.08	2.95	2.78	2.61	2.55	2.16

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.72	0.15	0.41	-4.48	38.45

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-13 #2

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,585	216,526	North Carolina State Plane	-55.8 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
119.71	108.29	0.01	0.07	#200 - 9.75 #230 - 9.62		7	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.15	0.13	0.15	0.13
4	-2.25	4.76	0.00	0.00	0.15	0.13
5	-2.00	4.00	0.03	0.03	0.18	0.16
7	-1.50	2.83	0.07	0.06	0.25	0.22
10	-1.00	2.00	0.13	0.11	0.38	0.33
14	-0.50	1.41	0.10	0.08	0.48	0.41
18	0.00	1.00	0.17	0.14	0.65	0.55
25	0.50	0.71	0.35	0.29	1.00	0.84
35	1.00	0.50	0.51	0.43	1.51	1.27
45	1.50	0.35	0.75	0.63	2.26	1.90
60	2.00	0.25	1.50	1.25	3.76	3.15
80	2.50	0.18	8.42	7.03	12.18	10.18
120	3.00	0.13	74.70	62.40	86.88	72.58
170	3.50	0.09	20.32	16.97	107.20	89.55
200	3.75	0.07	0.84	0.70	108.04	90.25
230	4.00	0.06	0.16	0.13	108.20	90.38

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.34	3.07	2.82	2.62	2.55	2.13

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.75	0.15	0.5	-4.69	40.81

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-13 #3

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,585	216,526	North Carolina State Plane	-59.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 10Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
157.76	132.60	0.03	0.03	#200 - 16.63 #230 - 16.00			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.14	0.09	0.14	0.09
5	-2.00	4.00	0.01	0.01	0.15	0.10
7	-1.50	2.83	0.17	0.11	0.32	0.21
10	-1.00	2.00	0.19	0.12	0.51	0.33
14	-0.50	1.41	0.26	0.16	0.77	0.49
18	0.00	1.00	0.23	0.15	1.00	0.64
25	0.50	0.71	0.39	0.25	1.39	0.89
35	1.00	0.50	0.54	0.34	1.93	1.23
45	1.50	0.35	1.31	0.83	3.24	2.06
60	2.00	0.25	5.52	3.50	8.76	5.56
80	2.50	0.18	7.27	4.61	16.03	10.17
120	3.00	0.13	64.43	40.84	80.46	51.01
170	3.50	0.09	47.08	29.84	127.54	80.85
200	3.75	0.07	3.98	2.52	131.52	83.37
230	4.00	0.06	1.00	0.63	132.52	84.00

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	4.00	3.40	2.99	2.68	2.57	1.92

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.83	0.14	0.59	-3.27	22.16

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-13 #4

Analysis Date: 12-12-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,585	216,526	North Carolina State Plane	-65.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
102.54	98.96	0.01	0.06	#200 - 3.61 #230 - 3.56			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.24	0.23	0.24	0.23
4	-2.25	4.76	0.00	0.00	0.24	0.23
5	-2.00	4.00	0.43	0.42	0.67	0.65
7	-1.50	2.83	0.50	0.49	1.17	1.14
10	-1.00	2.00	0.41	0.40	1.58	1.54
14	-0.50	1.41	0.58	0.57	2.16	2.11
18	0.00	1.00	0.39	0.38	2.55	2.49
25	0.50	0.71	0.58	0.57	3.13	3.06
35	1.00	0.50	1.15	1.12	4.28	4.18
45	1.50	0.35	6.68	6.51	10.96	10.69
60	2.00	0.25	32.29	31.49	43.25	42.18
80	2.50	0.18	30.11	29.36	73.36	71.54
120	3.00	0.13	18.09	17.64	91.45	89.18
170	3.50	0.09	6.80	6.63	98.25	95.81
200	3.75	0.07	0.59	0.58	98.84	96.39
230	4.00	0.06	0.05	0.05	98.89	96.44

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.44	2.85	2.60	2.13	1.73	1.58	1.06

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.07	0.24	0.8	-2.15	12.14

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-13 #5

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,585	216,526	North Carolina State Plane	-68.6 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.66	104.75	0.01	0.04	#200 - 2.87 #230 - 2.75			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.79	0.73	0.79	0.73
4	-2.25	4.76	0.15	0.14	0.94	0.87
5	-2.00	4.00	0.45	0.42	1.39	1.29
7	-1.50	2.83	0.50	0.46	1.89	1.75
10	-1.00	2.00	0.45	0.42	2.34	2.17
14	-0.50	1.41	0.54	0.50	2.88	2.67
18	0.00	1.00	0.39	0.36	3.27	3.03
25	0.50	0.71	0.66	0.61	3.93	3.64
35	1.00	0.50	1.14	1.06	5.07	4.70
45	1.50	0.35	7.90	7.34	12.97	12.04
60	2.00	0.25	39.40	36.60	52.37	48.64
80	2.50	0.18	29.80	27.68	82.17	76.32
120	3.00	0.13	16.71	15.52	98.88	91.84
170	3.50	0.09	5.24	4.87	104.12	96.71
200	3.75	0.07	0.45	0.42	104.57	97.13
230	4.00	0.06	0.13	0.12	104.70	97.25

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.75	2.48	2.02	1.68	1.55	1.02

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.97	0.26	0.86	-2.52	13.68

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-13 #6

Analysis Date: 12-13-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,585	216,526	North Carolina State Plane	-71.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.67	107.66	0.03	0.06	#200 - 3.73 #230 - 3.69			15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.17	1.05	1.17	1.05
4	-2.25	4.76	0.44	0.39	1.61	1.44
5	-2.00	4.00	0.42	0.38	2.03	1.82
7	-1.50	2.83	1.78	1.59	3.81	3.41
10	-1.00	2.00	2.50	2.24	6.31	5.65
14	-0.50	1.41	4.46	3.99	10.77	9.64
18	0.00	1.00	5.46	4.89	16.23	14.53
25	0.50	0.71	6.64	5.95	22.87	20.48
35	1.00	0.50	10.14	9.08	33.01	29.56
45	1.50	0.35	19.92	17.84	52.93	47.40
60	2.00	0.25	25.60	22.92	78.53	70.32
80	2.50	0.18	14.88	13.32	93.41	83.64
120	3.00	0.13	9.50	8.51	102.91	92.15
170	3.50	0.09	4.12	3.69	107.03	95.84
200	3.75	0.07	0.48	0.43	107.51	96.27
230	4.00	0.06	0.05	0.04	107.56	96.31

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.39	2.52	2.18	1.56	0.75	0.12	-1.15

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.28	0.41	1.23	-0.93	3.87

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-14 #1

Analysis Date: 12-13-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,244	206,728	North Carolina State Plane	-61.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
146.43	140.78	0.04	0.02	#200 - 3.95 #230 - 3.90		32	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	5.00	3.41	5.00	3.41
5/16"	-3.00	8.00	7.35	5.02	12.35	8.43
3.5	-2.50	5.66	9.54	6.52	21.89	14.95
4	-2.25	4.76	3.13	2.14	25.02	17.09
5	-2.00	4.00	3.47	2.37	28.49	19.46
7	-1.50	2.83	5.78	3.95	34.27	23.41
10	-1.00	2.00	3.23	2.21	37.50	25.62
14	-0.50	1.41	2.20	1.50	39.70	27.12
18	0.00	1.00	1.60	1.09	41.30	28.21
25	0.50	0.71	1.60	1.09	42.90	29.30
35	1.00	0.50	2.26	1.54	45.16	30.84
45	1.50	0.35	3.70	2.53	48.86	33.37
60	2.00	0.25	7.90	5.40	56.76	38.77
80	2.50	0.18	19.94	13.62	76.70	52.39
120	3.00	0.13	51.10	34.90	127.80	87.29
170	3.50	0.09	12.19	8.32	139.99	95.61
200	3.75	0.07	0.64	0.44	140.63	96.05
230	4.00	0.06	0.08	0.05	140.71	96.10

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.46	2.95	2.82	2.41	-1.14	-2.38	-3.34

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.05	0.48	2.35	-0.91	2.14

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-14 #2

Analysis Date: 12-13-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,244	206,728	North Carolina State Plane	-61.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
102.56	98.75	0.03	0.05	#200 - 3.86 #230 - 3.78		7	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.20	0.20	0.20	0.20
4	-2.25	4.76	0.00	0.00	0.20	0.20
5	-2.00	4.00	0.07	0.07	0.27	0.27
7	-1.50	2.83	0.37	0.36	0.64	0.63
10	-1.00	2.00	0.26	0.25	0.90	0.88
14	-0.50	1.41	0.27	0.26	1.17	1.14
18	0.00	1.00	0.38	0.37	1.55	1.51
25	0.50	0.71	0.47	0.46	2.02	1.97
35	1.00	0.50	1.10	1.07	3.12	3.04
45	1.50	0.35	3.63	3.54	6.75	6.58
60	2.00	0.25	13.41	13.08	20.16	19.66
80	2.50	0.18	34.63	33.77	54.79	53.43
120	3.00	0.13	36.56	35.65	91.35	89.08
170	3.50	0.09	6.79	6.62	98.14	95.70
200	3.75	0.07	0.45	0.44	98.59	96.14
230	4.00	0.06	0.08	0.08	98.67	96.22

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.45	2.93	2.80	2.45	2.08	1.86	1.28

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.33	0.20	0.7	-2.68	16.06

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-14 #3

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,244	206,728	North Carolina State Plane	-62.7 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.88	109.92	0.03	0.03	#200 - 9.24 #230 - 9.14		7	3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.22	0.18	0.22	0.18
4	-2.25	4.76	0.18	0.15	0.40	0.33
5	-2.00	4.00	0.10	0.08	0.50	0.41
7	-1.50	2.83	0.24	0.20	0.74	0.61
10	-1.00	2.00	0.32	0.26	1.06	0.87
14	-0.50	1.41	0.46	0.38	1.52	1.25
18	0.00	1.00	0.54	0.45	2.06	1.70
25	0.50	0.71	1.10	0.91	3.16	2.61
35	1.00	0.50	1.71	1.41	4.87	4.02
45	1.50	0.35	3.41	2.82	8.28	6.84
60	2.00	0.25	10.74	8.88	19.02	15.72
80	2.50	0.18	21.95	18.16	40.97	33.88
120	3.00	0.13	55.58	45.98	96.55	79.86
170	3.50	0.09	12.39	10.25	108.94	90.11
200	3.75	0.07	0.79	0.65	109.73	90.76
230	4.00	0.06	0.12	0.10	109.85	90.86

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.20	2.95	2.68	2.26	2.01	1.17

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.44	0.18	0.77	-2.77	14.66

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-14 #4

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,244	206,728	North Carolina State Plane	-66.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.86	103.98	0.01	0.05	#200 - 3.70 #230 - 3.64		7	3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.07	0.06	0.07	0.06
5	-2.00	4.00	0.14	0.13	0.21	0.19
7	-1.50	2.83	0.32	0.30	0.53	0.49
10	-1.00	2.00	0.36	0.33	0.89	0.82
14	-0.50	1.41	0.40	0.37	1.29	1.19
18	0.00	1.00	0.40	0.37	1.69	1.56
25	0.50	0.71	0.67	0.62	2.36	2.18
35	1.00	0.50	1.63	1.51	3.99	3.69
45	1.50	0.35	4.86	4.51	8.85	8.20
60	2.00	0.25	16.38	15.19	25.23	23.39
80	2.50	0.18	40.39	37.45	65.62	60.84
120	3.00	0.13	31.97	29.64	97.59	90.48
170	3.50	0.09	5.83	5.41	103.42	95.89
200	3.75	0.07	0.44	0.41	103.86	96.30
230	4.00	0.06	0.06	0.06	103.92	96.36

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.42	2.89	2.74	2.36	2.02	1.76	1.15

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.25	0.21	0.69	-2.26	12.59

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-14 #5

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,244	206,728	North Carolina State Plane	-70.8 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-4/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.54	107.72	0.00	0.02	#200 - 6.09 #230 - 5.97		3	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.03	0.03	0.03	0.03
7	-1.50	2.83	0.00	0.00	0.03	0.03
10	-1.00	2.00	0.00	0.00	0.03	0.03
14	-0.50	1.41	0.00	0.00	0.03	0.03
18	0.00	1.00	0.02	0.02	0.05	0.05
25	0.50	0.71	0.01	0.01	0.06	0.06
35	1.00	0.50	0.04	0.03	0.10	0.09
45	1.50	0.35	0.15	0.13	0.25	0.22
60	2.00	0.25	2.69	2.35	2.94	2.57
80	2.50	0.18	36.53	31.89	39.47	34.46
120	3.00	0.13	60.69	52.99	100.16	87.45
170	3.50	0.09	6.94	6.06	107.10	93.51
200	3.75	0.07	0.46	0.40	107.56	93.91
230	4.00	0.06	0.14	0.12	107.70	94.03

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.97	2.88	2.65	2.35	2.21	2.04

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.59	0.17	0.34	-0.97	14.29

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-14 #6

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,452,244	206,728	North Carolina State Plane	-76.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
105.81	100.94	0.00	0.02	#200 - 4.70 #230 - 4.61		3	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.04	0.04	0.04	0.04
5	-2.00	4.00	0.00	0.00	0.04	0.04
7	-1.50	2.83	0.01	0.01	0.05	0.05
10	-1.00	2.00	0.00	0.00	0.05	0.05
14	-0.50	1.41	0.01	0.01	0.06	0.06
18	0.00	1.00	0.00	0.00	0.06	0.06
25	0.50	0.71	0.02	0.02	0.08	0.08
35	1.00	0.50	0.03	0.03	0.11	0.11
45	1.50	0.35	0.11	0.10	0.22	0.21
60	2.00	0.25	2.02	1.91	2.24	2.12
80	2.50	0.18	37.69	35.62	39.93	37.74
120	3.00	0.13	51.98	49.13	91.91	86.87
170	3.50	0.09	8.34	7.88	100.25	94.75
200	3.75	0.07	0.58	0.55	100.83	95.30
230	4.00	0.06	0.09	0.09	100.92	95.39

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.61	2.97	2.88	2.62	2.32	2.19	2.04

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.59	0.17	0.36	-1.22	19.85

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-15 #1

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,437,974	203,649	North Carolina State Plane	-52.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-3/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
142.31	140.42	0.01	0.07	#200 - 1.43 #230 - 1.41		17	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.66	0.46	0.66	0.46
5/16"	-3.00	8.00	1.38	0.97	2.04	1.43
3.5	-2.50	5.66	0.96	0.67	3.00	2.10
4	-2.25	4.76	0.31	0.22	3.31	2.32
5	-2.00	4.00	0.38	0.27	3.69	2.59
7	-1.50	2.83	0.72	0.51	4.41	3.10
10	-1.00	2.00	0.94	0.66	5.35	3.76
14	-0.50	1.41	1.11	0.78	6.46	4.54
18	0.00	1.00	1.60	1.12	8.06	5.66
25	0.50	0.71	4.84	3.40	12.90	9.06
35	1.00	0.50	19.82	13.93	32.72	22.99
45	1.50	0.35	41.61	29.24	74.33	52.23
60	2.00	0.25	37.40	26.28	111.73	78.51
80	2.50	0.18	19.03	13.37	130.76	91.88
120	3.00	0.13	8.57	6.02	139.33	97.90
170	3.50	0.09	0.90	0.63	140.23	98.53
200	3.75	0.07	0.05	0.04	140.28	98.57
230	4.00	0.06	0.03	0.02	140.31	98.59

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.76	2.21	1.93	1.46	1.03	0.75	-0.29

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.34	0.40	1.03	-2.18	10.45

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-15 #2

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,437,974	203,649	North Carolina State Plane	-54.5 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
129.11	97.94	0.02	0.02	#200 - 24.32 #230 - 24.17			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.58	0.45	0.58	0.45
3.5	-2.50	5.66	0.76	0.59	1.34	1.04
4	-2.25	4.76	0.30	0.23	1.64	1.27
5	-2.00	4.00	0.66	0.51	2.30	1.78
7	-1.50	2.83	1.25	0.97	3.55	2.75
10	-1.00	2.00	1.17	0.91	4.72	3.66
14	-0.50	1.41	1.09	0.84	5.81	4.50
18	0.00	1.00	0.88	0.68	6.69	5.18
25	0.50	0.71	1.25	0.97	7.94	6.15
35	1.00	0.50	2.19	1.70	10.13	7.85
45	1.50	0.35	3.72	2.88	13.85	10.73
60	2.00	0.25	6.00	4.65	19.85	15.38
80	2.50	0.18	20.49	15.87	40.34	31.25
120	3.00	0.13	46.51	36.02	86.85	67.27
170	3.50	0.09	9.91	7.68	96.76	74.95
200	3.75	0.07	0.94	0.73	97.70	75.68
230	4.00	0.06	0.20	0.15	97.90	75.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.52	2.76	2.30	2.02	-0.13

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.21	0.22	1.21	-2.5	9.39

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-15 #3

Analysis Date: 12-13-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,437,974	203,649	North Carolina State Plane	-57.9 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
156.57	119.88	0.05	0.04	#200 - 23.78 #230 - 23.51			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.42	0.27	0.42	0.27
3.5	-2.50	5.66	0.44	0.28	0.86	0.55
4	-2.25	4.76	0.35	0.22	1.21	0.77
5	-2.00	4.00	0.79	0.50	2.00	1.27
7	-1.50	2.83	1.28	0.82	3.28	2.09
10	-1.00	2.00	1.70	1.09	4.98	3.18
14	-0.50	1.41	1.87	1.19	6.85	4.37
18	0.00	1.00	1.63	1.04	8.48	5.41
25	0.50	0.71	2.48	1.58	10.96	6.99
35	1.00	0.50	3.98	2.54	14.94	9.53
45	1.50	0.35	6.24	3.99	21.18	13.52
60	2.00	0.25	10.36	6.62	31.54	20.14
80	2.50	0.18	20.60	13.16	52.14	33.30
120	3.00	0.13	45.50	29.06	97.64	62.36
170	3.50	0.09	20.05	12.81	117.69	75.17
200	3.75	0.07	1.65	1.05	119.34	76.22
230	4.00	0.06	0.42	0.27	119.76	76.49

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.49	2.79	2.18	1.69	-0.20

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.19	0.22	1.22	-2.01	7.22

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-15 #4

Analysis Date: 12-14-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,437,974	203,649	North Carolina State Plane	-63.2 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 5Y-5/2 Dry - 5Y-6/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
142.39	110.59	0.14	0.06	#200 - 22.79 #230 - 22.47			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	2.40	1.69	2.40	1.69
5/16"	-3.00	8.00	0.00	0.00	2.40	1.69
3.5	-2.50	5.66	0.00	0.00	2.40	1.69
4	-2.25	4.76	0.00	0.00	2.40	1.69
5	-2.00	4.00	0.00	0.00	2.40	1.69
7	-1.50	2.83	0.18	0.13	2.58	1.82
10	-1.00	2.00	0.54	0.38	3.12	2.20
14	-0.50	1.41	0.93	0.65	4.05	2.85
18	0.00	1.00	1.34	0.94	5.39	3.79
25	0.50	0.71	2.01	1.41	7.40	5.20
35	1.00	0.50	2.36	1.66	9.76	6.86
45	1.50	0.35	2.49	1.75	12.25	8.61
60	2.00	0.25	3.74	2.63	15.99	11.24
80	2.50	0.18	12.88	9.05	28.87	20.29
120	3.00	0.13	50.18	35.24	79.05	55.53
170	3.50	0.09	28.06	19.71	107.11	75.24
200	3.75	0.07	2.80	1.97	109.91	77.21
230	4.00	0.06	0.45	0.32	110.36	77.53

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.49	2.92	2.57	2.26	0.43

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.46	0.18	1.25	-3.21	14.87

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-16 #1

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,457,246	193,514	North Carolina State Plane	-65.4 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
93.65	83.74	0.06	0.05	#200 - 10.85 #230 - 10.69			15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.39	0.42	0.39	0.42
5/16"	-3.00	8.00	0.85	0.91	1.24	1.33
3.5	-2.50	5.66	0.63	0.67	1.87	2.00
4	-2.25	4.76	0.61	0.65	2.48	2.65
5	-2.00	4.00	1.42	1.52	3.90	4.17
7	-1.50	2.83	2.67	2.85	6.57	7.02
10	-1.00	2.00	2.64	2.82	9.21	9.84
14	-0.50	1.41	2.60	2.78	11.81	12.62
18	0.00	1.00	1.73	1.85	13.54	14.47
25	0.50	0.71	2.24	2.39	15.78	16.86
35	1.00	0.50	2.63	2.81	18.41	19.67
45	1.50	0.35	3.43	3.66	21.84	23.33
60	2.00	0.25	6.10	6.51	27.94	29.84
80	2.50	0.18	16.63	17.76	44.57	47.60
120	3.00	0.13	34.48	36.82	79.05	84.42
170	3.50	0.09	4.09	4.37	83.14	88.79
200	3.75	0.07	0.34	0.36	83.48	89.15
230	4.00	0.06	0.15	0.16	83.63	89.31

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.99	2.87	2.53	1.63	0.32	-1.85

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.72	0.30	1.6	-1.54	4.34

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-16 #2

Analysis Date: 12-14-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,457,246	193,514	North Carolina State Plane	-71.1 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 10Y-4/1 Dry - 10Y-5/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
92.25	82.60	0.00	0.01	#200 - 10.52 #230 - 10.48			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.20	0.22	0.20	0.22
4	-2.25	4.76	0.08	0.09	0.28	0.31
5	-2.00	4.00	0.07	0.08	0.35	0.39
7	-1.50	2.83	0.15	0.16	0.50	0.55
10	-1.00	2.00	0.63	0.68	1.13	1.23
14	-0.50	1.41	0.46	0.50	1.59	1.73
18	0.00	1.00	0.39	0.42	1.98	2.15
25	0.50	0.71	0.49	0.53	2.47	2.68
35	1.00	0.50	0.77	0.83	3.24	3.51
45	1.50	0.35	1.36	1.47	4.60	4.98
60	2.00	0.25	2.93	3.18	7.53	8.16
80	2.50	0.18	26.92	29.18	34.45	37.34
120	3.00	0.13	43.36	47.00	77.81	84.34
170	3.50	0.09	4.54	4.92	82.35	89.26
200	3.75	0.07	0.20	0.22	82.55	89.48
230	4.00	0.06	0.04	0.04	82.59	89.52

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.00	2.90	2.63	2.29	2.13	1.50

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.43	0.19	0.73	-3.62	20.2

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-16 #3

Analysis Date: 12-14-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,457,246	193,514	North Carolina State Plane	-80.1 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 5Y-4/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
92.85	78.42	0.04	0.06	#200 - 15.98 #230 - 15.65			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.08	0.09	0.08	0.09
7	-1.50	2.83	0.15	0.16	0.23	0.25
10	-1.00	2.00	0.07	0.08	0.30	0.33
14	-0.50	1.41	0.14	0.15	0.44	0.48
18	0.00	1.00	0.07	0.08	0.51	0.56
25	0.50	0.71	0.13	0.14	0.64	0.70
35	1.00	0.50	0.48	0.52	1.12	1.22
45	1.50	0.35	1.36	1.46	2.48	2.68
60	2.00	0.25	3.12	3.36	5.60	6.04
80	2.50	0.18	15.25	16.42	20.85	22.46
120	3.00	0.13	40.30	43.40	61.15	65.86
170	3.50	0.09	15.58	16.78	76.73	82.64
200	3.75	0.07	1.28	1.38	78.01	84.02
230	4.00	0.06	0.31	0.33	78.32	84.35

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.75	3.27	2.82	2.53	2.30	1.85

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.66	0.16	0.57	-2.75	19.04

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-17 #1

Analysis Date: 12-14-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,447,124	195,190	North Carolina State Plane	-54.3 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-3/0 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
92.56	88.07	0.01	0.10	#200 - 5.01 #230 - 4.97		28	35

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.72	1.86	1.72	1.86
5/16"	-3.00	8.00	1.95	2.11	3.67	3.97
3.5	-2.50	5.66	1.63	1.76	5.30	5.73
4	-2.25	4.76	0.15	0.16	5.45	5.89
5	-2.00	4.00	0.55	0.59	6.00	6.48
7	-1.50	2.83	1.54	1.66	7.54	8.14
10	-1.00	2.00	1.39	1.50	8.93	9.64
14	-0.50	1.41	1.98	2.14	10.91	11.78
18	0.00	1.00	2.53	2.73	13.44	14.51
25	0.50	0.71	3.55	3.84	16.99	18.35
35	1.00	0.50	4.21	4.55	21.20	22.90
45	1.50	0.35	4.98	5.38	26.18	28.28
60	2.00	0.25	10.80	11.67	36.98	39.95
80	2.50	0.18	33.29	35.97	70.27	75.92
120	3.00	0.13	15.48	16.72	85.75	92.64
170	3.50	0.09	2.00	2.16	87.75	94.80
200	3.75	0.07	0.18	0.19	87.93	94.99
230	4.00	0.06	0.04	0.04	87.97	95.03

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.81	2.74	2.49	2.14	1.20	0.19	-2.71

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.46	0.36	1.63	-1.73	5.26

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-17 #2

Analysis Date: 12-14-22

Analyzed By: BF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,447,124	195,190	North Carolina State Plane	-58.4 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-3/0 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
89.72	70.25	0.03	0.16	#200 - 21.95 #230 - 21.89			15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.87	2.08	1.87	2.08
3.5	-2.50	5.66	0.00	0.00	1.87	2.08
4	-2.25	4.76	0.22	0.25	2.09	2.33
5	-2.00	4.00	0.42	0.47	2.51	2.80
7	-1.50	2.83	0.78	0.87	3.29	3.67
10	-1.00	2.00	0.91	1.01	4.20	4.68
14	-0.50	1.41	1.06	1.18	5.26	5.86
18	0.00	1.00	1.31	1.46	6.57	7.32
25	0.50	0.71	2.54	2.83	9.11	10.15
35	1.00	0.50	4.33	4.83	13.44	14.98
45	1.50	0.35	6.32	7.04	19.76	22.02
60	2.00	0.25	10.46	11.66	30.22	33.68
80	2.50	0.18	19.97	22.26	50.19	55.94
120	3.00	0.13	16.84	18.77	67.03	74.71
170	3.50	0.09	2.73	3.04	69.76	77.75
200	3.75	0.07	0.27	0.30	70.03	78.05
230	4.00	0.06	0.05	0.06	70.08	78.11

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.05	2.37	1.63	1.07	-0.86

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.72	0.30	1.35	-1.92	6.89

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-17 #3

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,447,124	195,190	North Carolina State Plane	-64.3 NAVD 88

USCS:	Munsell:	Comments:
SP-SC	Wet - 2.5Y-5/1 Dry - 5Y-4/2 Washed - 5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
91.42	80.99	0.01	0.03	#200 - 11.49 #230 - 11.45			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.17	0.19	0.17	0.19
4	-2.25	4.76	0.00	0.00	0.17	0.19
5	-2.00	4.00	0.00	0.00	0.17	0.19
7	-1.50	2.83	0.30	0.33	0.47	0.52
10	-1.00	2.00	0.20	0.22	0.67	0.74
14	-0.50	1.41	0.25	0.27	0.92	1.01
18	0.00	1.00	0.39	0.43	1.31	1.44
25	0.50	0.71	0.61	0.67	1.92	2.11
35	1.00	0.50	1.27	1.39	3.19	3.50
45	1.50	0.35	2.90	3.17	6.09	6.67
60	2.00	0.25	7.65	8.37	13.74	15.04
80	2.50	0.18	51.28	56.09	65.02	71.13
120	3.00	0.13	13.52	14.79	78.54	85.92
170	3.50	0.09	2.07	2.26	80.61	88.18
200	3.75	0.07	0.30	0.33	80.91	88.51
230	4.00	0.06	0.04	0.04	80.95	88.55

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.94	2.63	2.31	2.09	2.01	1.24

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.19	0.22	0.63	-3.17	20.08

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-17 #4

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,447,124	195,190	North Carolina State Plane	-67.8 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 2.5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
97.20	85.58	0.02	0.11	#200 - 12.12 #230 - 12.08			7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.88	0.91	0.88	0.91
5	-2.00	4.00	0.09	0.09	0.97	1.00
7	-1.50	2.83	0.49	0.50	1.46	1.50
10	-1.00	2.00	0.43	0.44	1.89	1.94
14	-0.50	1.41	0.96	0.99	2.85	2.93
18	0.00	1.00	1.57	1.62	4.42	4.55
25	0.50	0.71	2.64	2.72	7.06	7.27
35	1.00	0.50	5.83	6.00	12.89	13.27
45	1.50	0.35	14.76	15.19	27.65	28.46
60	2.00	0.25	17.59	18.10	45.24	46.56
80	2.50	0.18	27.87	28.67	73.11	75.23
120	3.00	0.13	10.90	11.21	84.01	86.44
170	3.50	0.09	1.23	1.27	85.24	87.71
200	3.75	0.07	0.17	0.17	85.41	87.88
230	4.00	0.06	0.04	0.04	85.45	87.92

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.89	2.50	2.06	1.39	1.09	0.08

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.72	0.30	0.94	-1.65	7.14

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-18 #1

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,446,698	191,413	North Carolina State Plane	-59.1 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
123.97	116.64	0.13	0.11	#200 - 6.22 #230 - 6.15		45	45

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	6.04	4.87	6.04	4.87
5/16"	-3.00	8.00	4.77	3.85	10.81	8.72
3.5	-2.50	5.66	2.79	2.25	13.60	10.97
4	-2.25	4.76	2.42	1.95	16.02	12.92
5	-2.00	4.00	2.17	1.75	18.19	14.67
7	-1.50	2.83	3.35	2.70	21.54	17.37
10	-1.00	2.00	4.01	3.23	25.55	20.60
14	-0.50	1.41	5.27	4.25	30.82	24.85
18	0.00	1.00	5.07	4.09	35.89	28.94
25	0.50	0.71	6.48	5.23	42.37	34.17
35	1.00	0.50	10.35	8.35	52.72	42.52
45	1.50	0.35	11.37	9.17	64.09	51.69
60	2.00	0.25	13.90	11.21	77.99	62.90
80	2.50	0.18	21.52	17.36	99.51	80.26
120	3.00	0.13	14.56	11.74	114.07	92.00
170	3.50	0.09	1.89	1.52	115.96	93.52
200	3.75	0.07	0.32	0.26	116.28	93.78
230	4.00	0.06	0.09	0.07	116.37	93.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.66	2.35	1.41	-0.48	-1.75	-3.48

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.62	0.65	2	-0.83	2.52

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-18 #2

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,446,698	191,413	North Carolina State Plane	-61.2 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
123.69	111.89	0.02	0.05	#200 - 9.67 #230 - 9.62		37	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.87	0.70	0.87	0.70
5/16"	-3.00	8.00	2.58	2.09	3.45	2.79
3.5	-2.50	5.66	1.22	0.99	4.67	3.78
4	-2.25	4.76	0.69	0.56	5.36	4.34
5	-2.00	4.00	0.29	0.23	5.65	4.57
7	-1.50	2.83	1.55	1.25	7.20	5.82
10	-1.00	2.00	2.04	1.65	9.24	7.47
14	-0.50	1.41	2.60	2.10	11.84	9.57
18	0.00	1.00	3.44	2.78	15.28	12.35
25	0.50	0.71	5.93	4.79	21.21	17.14
35	1.00	0.50	8.50	6.87	29.71	24.01
45	1.50	0.35	11.21	9.06	40.92	33.07
60	2.00	0.25	16.05	12.98	56.97	46.05
80	2.50	0.18	28.89	23.36	85.86	69.41
120	3.00	0.13	22.64	18.30	108.50	87.71
170	3.50	0.09	2.90	2.34	111.40	90.05
200	3.75	0.07	0.35	0.28	111.75	90.33
230	4.00	0.06	0.06	0.05	111.81	90.38

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.90	2.65	2.08	1.05	0.38	-1.83

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.46	0.36	1.5	-1.59	5.25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-18 #3

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,446,698	191,413	North Carolina State Plane	-66.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
138.52	114.46	0.02	0.04	#200 - 17.51 #230 - 17.42			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.22	0.16	0.22	0.16
4	-2.25	4.76	0.35	0.25	0.57	0.41
5	-2.00	4.00	0.38	0.27	0.95	0.68
7	-1.50	2.83	0.87	0.63	1.82	1.31
10	-1.00	2.00	1.05	0.76	2.87	2.07
14	-0.50	1.41	1.28	0.92	4.15	2.99
18	0.00	1.00	1.30	0.94	5.45	3.93
25	0.50	0.71	1.94	1.40	7.39	5.33
35	1.00	0.50	3.38	2.44	10.77	7.77
45	1.50	0.35	5.40	3.90	16.17	11.67
60	2.00	0.25	8.98	6.48	25.15	18.15
80	2.50	0.18	20.54	14.83	45.69	32.98
120	3.00	0.13	59.68	43.08	105.37	76.06
170	3.50	0.09	8.35	6.03	113.72	82.09
200	3.75	0.07	0.55	0.40	114.27	82.49
230	4.00	0.06	0.12	0.09	114.39	82.58

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		2.99	2.70	2.23	1.83	0.38

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.26	0.21	1	-2.37	9.25

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-18 #4

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,446,698	191,413	North Carolina State Plane	-73.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
119.23	103.03	0.01	0.01	#200 - 13.80 #230 - 13.61			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.03	0.03	0.03	0.03
14	-0.50	1.41	0.06	0.05	0.09	0.08
18	0.00	1.00	0.09	0.08	0.18	0.16
25	0.50	0.71	0.16	0.13	0.34	0.29
35	1.00	0.50	0.35	0.29	0.69	0.58
45	1.50	0.35	0.67	0.56	1.36	1.14
60	2.00	0.25	1.35	1.13	2.71	2.27
80	2.50	0.18	9.08	7.62	11.79	9.89
120	3.00	0.13	71.36	59.85	83.15	69.74
170	3.50	0.09	18.53	15.54	101.68	85.28
200	3.75	0.07	1.10	0.92	102.78	86.20
230	4.00	0.06	0.23	0.19	103.01	86.39

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.46	3.17	2.84	2.63	2.55	2.18

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.77	0.15	0.39	-2.45	19.55

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-19 #1

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,442,223	179,544	North Carolina State Plane	-61.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.54	114.36	0.02	0.09	#200 - 2.00 #230 - 1.97		19	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	4.11	3.53	4.11	3.53
3.5	-2.50	5.66	1.31	1.12	5.42	4.65
4	-2.25	4.76	0.49	0.42	5.91	5.07
5	-2.00	4.00	0.72	0.62	6.63	5.69
7	-1.50	2.83	1.25	1.07	7.88	6.76
10	-1.00	2.00	1.79	1.54	9.67	8.30
14	-0.50	1.41	2.18	1.87	11.85	10.17
18	0.00	1.00	1.97	1.69	13.82	11.86
25	0.50	0.71	3.13	2.69	16.95	14.55
35	1.00	0.50	5.65	4.85	22.60	19.40
45	1.50	0.35	8.52	7.31	31.12	26.71
60	2.00	0.25	14.21	12.19	45.33	38.90
80	2.50	0.18	33.65	28.87	78.98	67.77
120	3.00	0.13	30.77	26.40	109.75	94.17
170	3.50	0.09	4.22	3.62	113.97	97.79
200	3.75	0.07	0.24	0.21	114.21	98.00
230	4.00	0.06	0.03	0.03	114.24	98.03

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.11	2.81	2.64	2.19	1.38	0.65	-2.29

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.66	0.32	1.52	-1.87	5.94

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-19 #2

Analysis Date: 12-14-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,442,223	179,544	North Carolina State Plane	-63.4 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
102.23	93.65	0.03	0.06	#200 - 8.81 #230 - 8.46		9	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.11	0.11	0.12	0.12
18	0.00	1.00	0.09	0.09	0.21	0.21
25	0.50	0.71	0.19	0.19	0.40	0.40
35	1.00	0.50	0.54	0.53	0.94	0.93
45	1.50	0.35	0.84	0.82	1.78	1.75
60	2.00	0.25	2.05	2.01	3.83	3.76
80	2.50	0.18	9.22	9.02	13.05	12.78
120	3.00	0.13	56.85	55.61	69.90	68.39
170	3.50	0.09	21.73	21.26	91.63	89.65
200	3.75	0.07	1.57	1.54	93.20	91.19
230	4.00	0.06	0.36	0.35	93.56	91.54

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.37	3.16	2.83	2.61	2.53	2.07

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.78	0.15	0.45	-2.15	14.09

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-19 #3

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,442,223	179,544	North Carolina State Plane	-68.4 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-4/0 Dry - N-5/0 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
128.92	112.98	0.02	0.02	#200 - 12.70 #230 - 12.38			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.03	0.02	0.03	0.02
14	-0.50	1.41	0.02	0.02	0.05	0.04
18	0.00	1.00	0.01	0.01	0.06	0.05
25	0.50	0.71	0.04	0.03	0.10	0.08
35	1.00	0.50	0.04	0.03	0.14	0.11
45	1.50	0.35	0.13	0.10	0.27	0.21
60	2.00	0.25	0.69	0.54	0.96	0.75
80	2.50	0.18	7.13	5.53	8.09	6.28
120	3.00	0.13	69.25	53.72	77.34	60.00
170	3.50	0.09	32.28	25.04	109.62	85.04
200	3.75	0.07	2.91	2.26	112.53	87.30
230	4.00	0.06	0.41	0.32	112.94	87.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.48	3.30	2.91	2.67	2.59	2.38

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.88	0.14	0.34	-1.05	13.99

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-19 #4

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,442,223	179,544	North Carolina State Plane	-72.4 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-4/0 Dry - 5Y-6/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.66	99.49	0.04	0.02	#200 - 15.54 #230 - 14.77			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.04	0.03	0.04	0.03
25	0.50	0.71	0.01	0.01	0.05	0.04
35	1.00	0.50	0.06	0.05	0.11	0.09
45	1.50	0.35	0.08	0.07	0.19	0.16
60	2.00	0.25	0.37	0.32	0.56	0.48
80	2.50	0.18	4.24	3.63	4.80	4.11
120	3.00	0.13	59.68	51.16	64.48	55.27
170	3.50	0.09	30.70	26.32	95.18	81.59
200	3.75	0.07	3.35	2.87	98.53	84.46
230	4.00	0.06	0.90	0.77	99.43	85.23

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.71	3.37	2.95	2.70	2.62	2.51

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.92	0.13	0.33	-0.38	8.32

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-19 #5

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,442,223	179,544	North Carolina State Plane	-77.4 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
126.35	106.36	0.05	0.10	#200 - 16.67 #230 - 15.96			3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.21	0.17	0.21	0.17
7	-1.50	2.83	0.05	0.04	0.26	0.21
10	-1.00	2.00	0.07	0.06	0.33	0.27
14	-0.50	1.41	0.09	0.07	0.42	0.34
18	0.00	1.00	0.06	0.05	0.48	0.39
25	0.50	0.71	0.27	0.21	0.75	0.60
35	1.00	0.50	0.94	0.74	1.69	1.34
45	1.50	0.35	2.10	1.66	3.79	3.00
60	2.00	0.25	3.75	2.97	7.54	5.97
80	2.50	0.18	4.80	3.80	12.34	9.77
120	3.00	0.13	55.02	43.55	67.36	53.32
170	3.50	0.09	34.41	27.23	101.77	80.55
200	3.75	0.07	3.51	2.78	105.28	83.33
230	4.00	0.06	0.90	0.71	106.18	84.04

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.99	3.40	2.96	2.67	2.57	1.84

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.82	0.14	0.58	-2.96	19.67

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-20 #1

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,432,531	188,316	North Carolina State Plane	-56.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.19	115.25	0.01	0.09	#200 - 1.78 #230 - 1.75		22	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.87	0.74	0.87	0.74
5/16"	-3.00	8.00	1.21	1.03	2.08	1.77
3.5	-2.50	5.66	1.45	1.24	3.53	3.01
4	-2.25	4.76	0.82	0.70	4.35	3.71
5	-2.00	4.00	1.04	0.89	5.39	4.60
7	-1.50	2.83	2.45	2.09	7.84	6.69
10	-1.00	2.00	2.92	2.49	10.76	9.18
14	-0.50	1.41	2.88	2.46	13.64	11.64
18	0.00	1.00	2.30	1.96	15.94	13.60
25	0.50	0.71	3.83	3.27	19.77	16.87
35	1.00	0.50	9.24	7.88	29.01	24.75
45	1.50	0.35	12.46	10.63	41.47	35.38
60	2.00	0.25	21.02	17.94	62.49	53.32
80	2.50	0.18	34.18	29.17	96.67	82.49
120	3.00	0.13	16.12	13.76	112.79	96.25
170	3.50	0.09	2.14	1.83	114.93	98.08
200	3.75	0.07	0.16	0.14	115.09	98.22
230	4.00	0.06	0.04	0.03	115.13	98.25

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.95	2.55	2.37	1.91	1.01	0.37	-1.90

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.42	0.37	1.44	-1.6	5.2

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-20 #2

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,432,531	188,316	North Carolina State Plane	-62.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
95.44	72.07	0.02	0.07	#200 - 25.36 #230 - 24.60			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.01	0.01	0.01	0.01
14	-0.50	1.41	0.01	0.01	0.02	0.02
18	0.00	1.00	0.02	0.02	0.04	0.04
25	0.50	0.71	0.05	0.05	0.09	0.09
35	1.00	0.50	0.19	0.20	0.28	0.29
45	1.50	0.35	0.27	0.28	0.55	0.57
60	2.00	0.25	0.51	0.53	1.06	1.10
80	2.50	0.18	2.52	2.64	3.58	3.74
120	3.00	0.13	34.72	36.38	38.30	40.12
170	3.50	0.09	27.43	28.74	65.73	68.86
200	3.75	0.07	5.52	5.78	71.25	74.64
230	4.00	0.06	0.73	0.76	71.98	75.40

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.87	3.17	2.79	2.67	2.52

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.98	0.13	0.4	-1.37	11.33

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-20 #3

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,432,531	188,316	North Carolina State Plane	-67.6 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 10YR-5/1 Washed - 10YR-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
132.23	108.14	0.11	0.01	#200 - 19.84 #230 - 18.30			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.00	0.00	0.00	0.00
18	0.00	1.00	0.02	0.02	0.02	0.02
25	0.50	0.71	0.01	0.01	0.03	0.03
35	1.00	0.50	0.06	0.05	0.09	0.08
45	1.50	0.35	0.09	0.07	0.18	0.15
60	2.00	0.25	0.19	0.14	0.37	0.29
80	2.50	0.18	1.66	1.26	2.03	1.55
120	3.00	0.13	48.04	36.33	50.07	37.88
170	3.50	0.09	47.58	35.98	97.65	73.86
200	3.75	0.07	8.33	6.30	105.98	80.16
230	4.00	0.06	2.04	1.54	108.02	81.70

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.55	3.17	2.82	2.70	2.55

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	3.05	0.12	0.34	-0.35	6.16

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-21 #1

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,428,519	194,339	North Carolina State Plane	-60.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.43	108.62	0.01	0.05	#200 - 6.84 #230 - 6.76		12	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.17	0.15	0.17	0.15
4	-2.25	4.76	0.39	0.33	0.56	0.48
5	-2.00	4.00	0.45	0.39	1.01	0.87
7	-1.50	2.83	1.50	1.29	2.51	2.16
10	-1.00	2.00	1.75	1.50	4.26	3.66
14	-0.50	1.41	1.84	1.58	6.10	5.24
18	0.00	1.00	1.23	1.06	7.33	6.30
25	0.50	0.71	1.26	1.08	8.59	7.38
35	1.00	0.50	1.30	1.12	9.89	8.50
45	1.50	0.35	1.54	1.32	11.43	9.82
60	2.00	0.25	5.60	4.81	17.03	14.63
80	2.50	0.18	28.57	24.54	45.60	39.17
120	3.00	0.13	53.86	46.26	99.46	85.43
170	3.50	0.09	8.60	7.39	108.06	92.82
200	3.75	0.07	0.40	0.34	108.46	93.16
230	4.00	0.06	0.09	0.08	108.55	93.24

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.98	2.89	2.62	2.21	2.03	-0.58

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.27	0.21	1.07	-2.57	9.49

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-21 #2

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,428,519	194,339	North Carolina State Plane	-64.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.12	109.50	0.01	0.06	#200 - 4.20 #230 - 4.11		12	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.76	0.67	0.76	0.67
4	-2.25	4.76	0.15	0.13	0.91	0.80
5	-2.00	4.00	0.76	0.67	1.67	1.47
7	-1.50	2.83	1.67	1.46	3.34	2.93
10	-1.00	2.00	1.57	1.38	4.91	4.31
14	-0.50	1.41	1.72	1.51	6.63	5.82
18	0.00	1.00	1.33	1.17	7.96	6.99
25	0.50	0.71	1.31	1.15	9.27	8.14
35	1.00	0.50	1.33	1.17	10.60	9.31
45	1.50	0.35	1.60	1.40	12.20	10.71
60	2.00	0.25	5.65	4.95	17.85	15.66
80	2.50	0.18	26.24	22.99	44.09	38.65
120	3.00	0.13	57.68	50.54	101.77	89.19
170	3.50	0.09	7.17	6.28	108.94	95.47
200	3.75	0.07	0.38	0.33	109.32	95.80
230	4.00	0.06	0.10	0.09	109.42	95.89

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.46	2.95	2.86	2.61	2.20	2.01	-0.77

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.24	0.21	1.13	-2.6	9.48

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-21 #3

Analysis Date: 12-15-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,428,519	194,339	North Carolina State Plane	-71.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.17	107.08	0.00	0.02	#200 - 1.99 #230 - 1.94		32	50

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.56	0.51	0.56	0.51
4	-2.25	4.76	1.11	1.02	1.67	1.53
5	-2.00	4.00	2.94	2.69	4.61	4.22
7	-1.50	2.83	7.41	6.79	12.02	11.01
10	-1.00	2.00	6.28	5.75	18.30	16.76
14	-0.50	1.41	6.12	5.61	24.42	22.37
18	0.00	1.00	3.30	3.02	27.72	25.39
25	0.50	0.71	2.41	2.21	30.13	27.60
35	1.00	0.50	1.67	1.53	31.80	29.13
45	1.50	0.35	1.73	1.58	33.53	30.71
60	2.00	0.25	5.02	4.60	38.55	35.31
80	2.50	0.18	25.75	23.59	64.30	58.90
120	3.00	0.13	36.54	33.47	100.84	92.37
170	3.50	0.09	5.81	5.32	106.65	97.69
200	3.75	0.07	0.35	0.32	107.00	98.01
230	4.00	0.06	0.06	0.05	107.06	98.06

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.25	2.87	2.74	2.31	-0.06	-1.07	-1.94

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.45	0.37	1.75	-0.97	2.34

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-22 #1

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,395,561	136,504	North Carolina State Plane	-52.1 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
124.35	120.79	0.01	0.00	#200 - 2.92 #230 - 2.88		10	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.05	0.04	0.05	0.04
7	-1.50	2.83	0.14	0.11	0.19	0.15
10	-1.00	2.00	0.41	0.33	0.60	0.48
14	-0.50	1.41	0.69	0.55	1.29	1.03
18	0.00	1.00	1.29	1.04	2.58	2.07
25	0.50	0.71	2.51	2.02	5.09	4.09
35	1.00	0.50	4.89	3.93	9.98	8.02
45	1.50	0.35	7.16	5.76	17.14	13.78
60	2.00	0.25	18.23	14.66	35.37	28.44
80	2.50	0.18	44.38	35.69	79.75	64.13
120	3.00	0.13	33.68	27.08	113.43	91.21
170	3.50	0.09	7.03	5.65	120.46	96.86
200	3.75	0.07	0.27	0.22	120.73	97.08
230	4.00	0.06	0.05	0.04	120.78	97.12

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.87	2.70	2.30	1.88	1.58	0.62

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.15	0.23	0.76	-1.54	6.6

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-22 #2

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,395,561	136,504	North Carolina State Plane	-56.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
113.26	111.32	0.01	0.04	#200 - 1.79 #230 - 1.75		11	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.12	0.11	0.12	0.11
4	-2.25	4.76	0.63	0.56	0.75	0.67
5	-2.00	4.00	0.11	0.10	0.86	0.77
7	-1.50	2.83	0.52	0.46	1.38	1.23
10	-1.00	2.00	1.11	0.98	2.49	2.21
14	-0.50	1.41	2.70	2.38	5.19	4.59
18	0.00	1.00	3.58	3.16	8.77	7.75
25	0.50	0.71	4.80	4.24	13.57	11.99
35	1.00	0.50	5.71	5.04	19.28	17.03
45	1.50	0.35	6.94	6.13	26.22	23.16
60	2.00	0.25	15.27	13.48	41.49	36.64
80	2.50	0.18	37.58	33.18	79.07	69.82
120	3.00	0.13	27.02	23.86	106.09	93.68
170	3.50	0.09	4.85	4.28	110.94	97.96
200	3.75	0.07	0.28	0.25	111.22	98.21
230	4.00	0.06	0.04	0.04	111.26	98.25

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.15	2.80	2.61	2.20	1.57	0.90	-0.44

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.88	0.27	1.07	-1.53	5.31

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-22 #3

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,395,561	136,504	North Carolina State Plane	-62.1 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-4/0 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.54	86.16	0.04	0.12	#200 - 20.87 #230 - 20.78			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.05	0.05	0.05	0.05
5	-2.00	4.00	0.09	0.08	0.14	0.13
7	-1.50	2.83	0.19	0.18	0.33	0.31
10	-1.00	2.00	0.30	0.28	0.63	0.59
14	-0.50	1.41	0.95	0.88	1.58	1.47
18	0.00	1.00	0.99	0.91	2.57	2.38
25	0.50	0.71	1.64	1.51	4.21	3.89
35	1.00	0.50	2.38	2.19	6.59	6.08
45	1.50	0.35	2.42	2.23	9.01	8.31
60	2.00	0.25	6.68	6.15	15.69	14.46
80	2.50	0.18	34.66	31.93	50.35	46.39
120	3.00	0.13	31.00	28.56	81.35	74.95
170	3.50	0.09	4.07	3.75	85.42	78.70
200	3.75	0.07	0.47	0.43	85.89	79.13
230	4.00	0.06	0.10	0.09	85.99	79.22

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.01	2.56	2.17	2.02	0.75

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.25	0.21	0.79	-2.23	9.55

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-22 #4

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,395,561	136,504	North Carolina State Plane	-66.3 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-4/0 Dry - 5Y-5/2 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
115.92	98.41	0.03	0.03	#200 - 15.31 #230 - 15.17			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.19	0.16	0.19	0.16
4	-2.25	4.76	0.00	0.00	0.19	0.16
5	-2.00	4.00	0.05	0.04	0.24	0.20
7	-1.50	2.83	0.38	0.33	0.62	0.53
10	-1.00	2.00	0.34	0.29	0.96	0.82
14	-0.50	1.41	0.47	0.41	1.43	1.23
18	0.00	1.00	0.67	0.58	2.10	1.81
25	0.50	0.71	0.84	0.72	2.94	2.53
35	1.00	0.50	1.31	1.13	4.25	3.66
45	1.50	0.35	2.77	2.39	7.02	6.05
60	2.00	0.25	10.25	8.84	17.27	14.89
80	2.50	0.18	42.67	36.81	59.94	51.70
120	3.00	0.13	32.09	27.68	92.03	79.38
170	3.50	0.09	5.32	4.59	97.35	83.97
200	3.75	0.07	0.83	0.72	98.18	84.69
230	4.00	0.06	0.16	0.14	98.34	84.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.51	2.92	2.48	2.14	2.02	1.28

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.29	0.20	0.72	-2.7	15.07

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-23 #1

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,370,588	134,171	North Carolina State Plane	-51.4 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-6/1 Dry - 2.5Y-7/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.93	92.96	0.03	0.07	#200 - 14.28 #230 - 13.96			15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.04	0.04	0.04	0.04
10	-1.00	2.00	0.21	0.19	0.25	0.23
14	-0.50	1.41	0.82	0.76	1.07	0.99
18	0.00	1.00	1.81	1.68	2.88	2.67
25	0.50	0.71	3.81	3.53	6.69	6.20
35	1.00	0.50	9.27	8.59	15.96	14.79
45	1.50	0.35	16.24	15.05	32.20	29.84
60	2.00	0.25	22.20	20.57	54.40	50.41
80	2.50	0.18	16.91	15.67	71.31	66.08
120	3.00	0.13	13.92	12.90	85.23	78.98
170	3.50	0.09	6.15	5.70	91.38	84.68
200	3.75	0.07	1.12	1.04	92.50	85.72
230	4.00	0.06	0.35	0.32	92.85	86.04

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.44	2.85	1.99	1.34	1.04	0.33

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.8	0.29	0.89	-0.35	3.13

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-23 #2

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,370,588	134,171	North Carolina State Plane	-52.1 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-5/1 Dry - 2.5Y-5/2 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
127.57	120.15	0.02	0.01	#200 - 5.93 #230 - 5.85		22	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	1.62	1.27	1.62	1.27
7/16"	-3.50	11.31	0.00	0.00	1.62	1.27
5/16"	-3.00	8.00	1.01	0.79	2.63	2.06
3.5	-2.50	5.66	0.76	0.60	3.39	2.66
4	-2.25	4.76	1.15	0.90	4.54	3.56
5	-2.00	4.00	2.03	1.59	6.57	5.15
7	-1.50	2.83	5.41	4.24	11.98	9.39
10	-1.00	2.00	6.41	5.02	18.39	14.41
14	-0.50	1.41	10.82	8.48	29.21	22.89
18	0.00	1.00	17.90	14.03	47.11	36.92
25	0.50	0.71	21.39	16.77	68.50	53.69
35	1.00	0.50	20.96	16.43	89.46	70.12
45	1.50	0.35	12.52	9.81	101.98	79.93
60	2.00	0.25	7.55	5.92	109.53	85.85
80	2.50	0.18	4.33	3.39	113.86	89.24
120	3.00	0.13	3.93	3.08	117.79	92.32
170	3.50	0.09	1.85	1.45	119.64	93.77
200	3.75	0.07	0.38	0.30	120.02	94.07
230	4.00	0.06	0.10	0.08	120.12	94.15

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	1.84	1.25	0.39	-0.42	-0.91	-2.02

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.24	0.85	1.35	-0.38	3.84

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-24 #1

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,373,560	129,256	North Carolina State Plane	-51.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-4/0 Dry - 5Y-5/1 Washed - N-6/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.91	103.34	0.01	0.01	#200 - 6.06 #230 - 5.99		20	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.10	0.09	0.10	0.09
7	-1.50	2.83	0.36	0.33	0.46	0.42
10	-1.00	2.00	0.58	0.53	1.04	0.95
14	-0.50	1.41	1.23	1.12	2.27	2.07
18	0.00	1.00	1.63	1.48	3.90	3.55
25	0.50	0.71	2.39	2.17	6.29	5.72
35	1.00	0.50	4.04	3.68	10.33	9.40
45	1.50	0.35	6.24	5.68	16.57	15.08
60	2.00	0.25	12.54	11.41	29.11	26.49
80	2.50	0.18	27.99	25.47	57.10	51.96
120	3.00	0.13	32.87	29.91	89.97	81.87
170	3.50	0.09	12.71	11.56	102.68	93.43
200	3.75	0.07	0.56	0.51	103.24	93.94
230	4.00	0.06	0.08	0.07	103.32	94.01

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.09	2.89	2.46	1.93	1.54	0.33

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.2	0.22	0.91	-1.59	6.1

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-24 #2

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,373,560	129,256	North Carolina State Plane	-53.0 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - N-3/0 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
130.77	113.01	0.04	0.18	#200 - 13.80 #230 - 13.77			30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	2.40	1.84	2.40	1.84
5/16"	-3.00	8.00	8.78	6.71	11.18	8.55
3.5	-2.50	5.66	7.48	5.72	18.66	14.27
4	-2.25	4.76	2.82	2.16	21.48	16.43
5	-2.00	4.00	2.27	1.74	23.75	18.17
7	-1.50	2.83	8.09	6.19	31.84	24.36
10	-1.00	2.00	8.61	6.58	40.45	30.94
14	-0.50	1.41	6.63	5.07	47.08	36.01
18	0.00	1.00	3.14	2.40	50.22	38.41
25	0.50	0.71	3.18	2.43	53.40	40.84
35	1.00	0.50	3.71	2.84	57.11	43.68
45	1.50	0.35	5.41	4.14	62.52	47.82
60	2.00	0.25	10.95	8.37	73.47	56.19
80	2.50	0.18	21.85	16.71	95.32	72.90
120	3.00	0.13	12.42	9.50	107.74	82.40
170	3.50	0.09	4.56	3.49	112.30	85.89
200	3.75	0.07	0.40	0.31	112.70	86.20
230	4.00	0.06	0.04	0.03	112.74	86.23

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.23	2.61	1.63	-1.45	-2.30	-3.26

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	0.26	0.84	2.2	-0.31	1.61

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-24 #3

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,373,560	129,256	North Carolina State Plane	-55.3 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 5Y-6/1 Dry - 5Y-7/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
195.33	126.39	0.06	0.02	#200 - 35.41 #230 - 35.34			8

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.03	0.02	0.03	0.02
10	-1.00	2.00	0.15	0.08	0.18	0.10
14	-0.50	1.41	0.22	0.11	0.40	0.21
18	0.00	1.00	0.18	0.09	0.58	0.30
25	0.50	0.71	0.25	0.13	0.83	0.43
35	1.00	0.50	1.10	0.56	1.93	0.99
45	1.50	0.35	8.18	4.19	10.11	5.18
60	2.00	0.25	34.29	17.55	44.40	22.73
80	2.50	0.18	60.48	30.96	104.88	53.69
120	3.00	0.13	15.55	7.96	120.43	61.65
170	3.50	0.09	4.73	2.42	125.16	64.07
200	3.75	0.07	1.01	0.52	126.17	64.59
230	4.00	0.06	0.13	0.07	126.30	64.66

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			2.44	2.04	1.81	1.48

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.13	0.23	0.52	-0.7	7.97

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-24 #4

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,373,560	129,256	North Carolina State Plane	-61.7 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 5Y-4/1 Dry - 5Y-5/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.01	79.70	0.01	0.02	#200 - 31.92 #230 - 31.89			0

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.00	0.00	0.00	0.00
14	-0.50	1.41	0.03	0.03	0.03	0.03
18	0.00	1.00	0.09	0.08	0.12	0.11
25	0.50	0.71	0.10	0.09	0.22	0.20
35	1.00	0.50	0.22	0.19	0.44	0.39
45	1.50	0.35	1.01	0.86	1.45	1.25
60	2.00	0.25	14.12	12.07	15.57	13.32
80	2.50	0.18	51.38	43.91	66.95	57.23
120	3.00	0.13	9.93	8.49	76.88	65.72
170	3.50	0.09	2.25	1.92	79.13	67.64
200	3.75	0.07	0.51	0.44	79.64	68.08
230	4.00	0.06	0.03	0.03	79.67	68.11

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
			2.42	2.13	2.03	1.66

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.24	0.21	0.39	-0.25	8.47

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-25 #1

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,370,213	121,590	North Carolina State Plane	-48.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
104.99	102.90	0.02	0.00	#200 - 2.06 #230 - 2.00		19	20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.20	0.19	0.20	0.19
4	-2.25	4.76	0.06	0.06	0.26	0.25
5	-2.00	4.00	0.19	0.18	0.45	0.43
7	-1.50	2.83	0.85	0.81	1.30	1.24
10	-1.00	2.00	1.26	1.20	2.56	2.44
14	-0.50	1.41	1.82	1.73	4.38	4.17
18	0.00	1.00	2.33	2.22	6.71	6.39
25	0.50	0.71	4.22	4.02	10.93	10.41
35	1.00	0.50	7.01	6.68	17.94	17.09
45	1.50	0.35	9.76	9.30	27.70	26.39
60	2.00	0.25	18.04	17.18	45.74	43.57
80	2.50	0.18	32.09	30.56	77.83	74.13
120	3.00	0.13	20.45	19.48	98.28	93.61
170	3.50	0.09	4.29	4.09	102.57	97.70
200	3.75	0.07	0.25	0.24	102.82	97.94
230	4.00	0.06	0.06	0.06	102.88	98.00

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.17	2.75	2.52	2.11	1.43	0.92	-0.31

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.82	0.28	1.02	-1.41	5.28

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-25 #2

Analysis Date: 12-02-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,370,213	121,590	North Carolina State Plane	-53.2 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - N-4/0 Dry - 5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
115.73	108.90	0.01	0.07	#200 - 6.05 #230 - 5.98		18	12

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.23	0.20	0.23	0.20
4	-2.25	4.76	0.21	0.18	0.44	0.38
5	-2.00	4.00	0.18	0.16	0.62	0.54
7	-1.50	2.83	0.31	0.27	0.93	0.81
10	-1.00	2.00	0.48	0.41	1.41	1.22
14	-0.50	1.41	0.80	0.69	2.21	1.91
18	0.00	1.00	0.91	0.79	3.12	2.70
25	0.50	0.71	1.60	1.38	4.72	4.08
35	1.00	0.50	2.34	2.02	7.06	6.10
45	1.50	0.35	3.68	3.18	10.74	9.28
60	2.00	0.25	12.30	10.63	23.04	19.91
80	2.50	0.18	37.21	32.15	60.25	52.06
120	3.00	0.13	34.99	30.23	95.24	82.29
170	3.50	0.09	12.81	11.07	108.05	93.36
200	3.75	0.07	0.68	0.59	108.73	93.95
230	4.00	0.06	0.08	0.07	108.81	94.02

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.08	2.88	2.47	2.08	1.82	0.73

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.29	0.20	0.85	-2.34	11.27

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-25 #3

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,370,213	121,590	North Carolina State Plane	-63.4 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 10Y-5/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.07	82.75	0.05	0.02	#200 - 23.96 #230 - 23.50			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.32	0.30	0.32	0.30
4	-2.25	4.76	0.00	0.00	0.32	0.30
5	-2.00	4.00	0.57	0.53	0.89	0.83
7	-1.50	2.83	0.08	0.07	0.97	0.90
10	-1.00	2.00	0.41	0.38	1.38	1.28
14	-0.50	1.41	0.45	0.42	1.83	1.70
18	0.00	1.00	0.40	0.37	2.23	2.07
25	0.50	0.71	0.92	0.85	3.15	2.92
35	1.00	0.50	1.43	1.32	4.58	4.24
45	1.50	0.35	2.69	2.49	7.27	6.73
60	2.00	0.25	6.78	6.27	14.05	13.00
80	2.50	0.18	18.55	17.16	32.60	30.16
120	3.00	0.13	27.07	25.05	59.67	55.21
170	3.50	0.09	19.40	17.95	79.07	73.16
200	3.75	0.07	3.11	2.88	82.18	76.04
230	4.00	0.06	0.50	0.46	82.68	76.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.66	2.90	2.35	2.09	1.15

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.49	0.18	0.93	-2.46	11.84

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-26 #1

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,388,233	117,699	North Carolina State Plane	-53.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
122.14	119.62	0.02	0.00	#200 - 2.15 #230 - 2.09		12	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.93	0.76	0.93	0.76
5/16"	-3.00	8.00	0.00	0.00	0.93	0.76
3.5	-2.50	5.66	0.05	0.04	0.98	0.80
4	-2.25	4.76	0.00	0.00	0.98	0.80
5	-2.00	4.00	0.00	0.00	0.98	0.80
7	-1.50	2.83	0.29	0.24	1.27	1.04
10	-1.00	2.00	0.53	0.43	1.80	1.47
14	-0.50	1.41	0.75	0.61	2.55	2.08
18	0.00	1.00	0.95	0.78	3.50	2.86
25	0.50	0.71	1.99	1.63	5.49	4.49
35	1.00	0.50	4.30	3.52	9.79	8.01
45	1.50	0.35	6.31	5.17	16.10	13.18
60	2.00	0.25	16.91	13.84	33.01	27.02
80	2.50	0.18	44.41	36.36	77.42	63.38
120	3.00	0.13	37.14	30.41	114.56	93.79
170	3.50	0.09	4.72	3.86	119.28	97.65
200	3.75	0.07	0.25	0.20	119.53	97.85
230	4.00	0.06	0.07	0.06	119.60	97.91

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.16	2.84	2.69	2.32	1.93	1.60	0.57

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.13	0.23	0.91	-3.02	17.04

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-26 #2

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,388,233	117,699	North Carolina State Plane	-55.8 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-3/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
96.55	78.26	0.01	0.06	#200 - 19.15 #230 - 19.03			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.41	0.42	0.41	0.42
3.5	-2.50	5.66	0.31	0.32	0.72	0.74
4	-2.25	4.76	0.03	0.03	0.75	0.77
5	-2.00	4.00	0.14	0.15	0.89	0.92
7	-1.50	2.83	0.37	0.38	1.26	1.30
10	-1.00	2.00	0.81	0.84	2.07	2.14
14	-0.50	1.41	0.47	0.49	2.54	2.63
18	0.00	1.00	0.16	0.17	2.70	2.80
25	0.50	0.71	0.94	0.97	3.64	3.77
35	1.00	0.50	1.63	1.69	5.27	5.46
45	1.50	0.35	2.56	2.65	7.83	8.11
60	2.00	0.25	7.13	7.38	14.96	15.49
80	2.50	0.18	23.77	24.62	38.73	40.11
120	3.00	0.13	31.41	32.53	70.14	72.64
170	3.50	0.09	7.26	7.52	77.40	80.16
200	3.75	0.07	0.67	0.69	78.07	80.85
230	4.00	0.06	0.12	0.12	78.19	80.97

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.16	2.65	2.19	2.01	0.86

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.29	0.20	0.97	-2.93	14.18

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-26 #3

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,388,233	117,699	North Carolina State Plane	-65.9 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
154.78	129.71	0.01	0.01	#200 - 16.29 #230 - 16.22			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.17	0.11	0.17	0.11
5	-2.00	4.00	0.17	0.11	0.34	0.22
7	-1.50	2.83	0.87	0.56	1.21	0.78
10	-1.00	2.00	1.01	0.65	2.22	1.43
14	-0.50	1.41	1.29	0.83	3.51	2.26
18	0.00	1.00	1.25	0.81	4.76	3.07
25	0.50	0.71	1.63	1.05	6.39	4.12
35	1.00	0.50	3.43	2.22	9.82	6.34
45	1.50	0.35	11.53	7.45	21.35	13.79
60	2.00	0.25	39.81	25.72	61.16	39.51
80	2.50	0.18	52.88	34.16	114.04	73.67
120	3.00	0.13	13.64	8.81	127.68	82.48
170	3.50	0.09	1.52	0.98	129.20	83.46
200	3.75	0.07	0.38	0.25	129.58	83.71
230	4.00	0.06	0.11	0.07	129.69	83.78

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		2.58	2.15	1.72	1.54	0.70

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.89	0.27	0.77	-2.19	10.31

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-27 #1

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,386,130	113,092	North Carolina State Plane	-66.7 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 2.5Y-6/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.02	105.66	0.07	0.19	#200 - 6.00 #230 - 5.93		45	40

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.16	0.14	0.16	0.14
14	-0.50	1.41	1.02	0.91	1.18	1.05
18	0.00	1.00	4.53	4.04	5.71	5.09
25	0.50	0.71	6.51	5.81	12.22	10.90
35	1.00	0.50	10.46	9.34	22.68	20.24
45	1.50	0.35	15.50	13.84	38.18	34.08
60	2.00	0.25	31.09	27.75	69.27	61.83
80	2.50	0.18	28.96	25.85	98.23	87.68
120	3.00	0.13	5.35	4.78	103.58	92.46
170	3.50	0.09	1.42	1.27	105.00	93.73
200	3.75	0.07	0.30	0.27	105.30	94.00
230	4.00	0.06	0.08	0.07	105.38	94.07

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.43	2.25	1.79	1.17	0.77	-0.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.59	0.33	0.81	-0.71	3.34

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-27 #2

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,386,130	113,092	North Carolina State Plane	-70.1 NAVD 88

USCS:	Munsell:	Comments:
SW-SC	Wet - N-4/0 Dry - 2.5Y-6/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
103.02	95.41	0.24	0.22	#200 - 7.94 #230 - 7.83		47	55

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.77	1.72	1.77	1.72
4	-2.25	4.76	0.81	0.79	2.58	2.51
5	-2.00	4.00	1.70	1.65	4.28	4.16
7	-1.50	2.83	4.18	4.06	8.46	8.22
10	-1.00	2.00	3.65	3.54	12.11	11.76
14	-0.50	1.41	3.75	3.64	15.86	15.40
18	0.00	1.00	3.37	3.27	19.23	18.67
25	0.50	0.71	5.78	5.61	25.01	24.28
35	1.00	0.50	7.23	7.02	32.24	31.30
45	1.50	0.35	10.59	10.28	42.83	41.58
60	2.00	0.25	21.14	20.52	63.97	62.10
80	2.50	0.18	22.31	21.66	86.28	83.76
120	3.00	0.13	5.99	5.81	92.27	89.57
170	3.50	0.09	2.06	2.00	94.33	91.57
200	3.75	0.07	0.50	0.49	94.83	92.06
230	4.00	0.06	0.11	0.11	94.94	92.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.52	2.30	1.71	0.55	-0.41	-1.90

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.12	0.46	1.45	-0.99	3.13

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-27 #3

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,386,130	113,092	North Carolina State Plane	-78.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-6/1 Dry - 2.5Y-7/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.52	104.10	0.03	0.00	#200 - 11.55 #230 - 11.46			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.15	0.98	1.15	0.98
4	-2.25	4.76	0.94	0.80	2.09	1.78
5	-2.00	4.00	0.24	0.20	2.33	1.98
7	-1.50	2.83	1.08	0.92	3.41	2.90
10	-1.00	2.00	1.13	0.96	4.54	3.86
14	-0.50	1.41	1.07	0.91	5.61	4.77
18	0.00	1.00	1.04	0.88	6.65	5.65
25	0.50	0.71	1.89	1.61	8.54	7.26
35	1.00	0.50	4.60	3.91	13.14	11.17
45	1.50	0.35	10.57	8.99	23.71	20.16
60	2.00	0.25	28.67	24.40	52.38	44.56
80	2.50	0.18	35.63	30.32	88.01	74.88
120	3.00	0.13	11.20	9.53	99.21	84.41
170	3.50	0.09	3.84	3.27	103.05	87.68
200	3.75	0.07	0.91	0.77	103.96	88.45
230	4.00	0.06	0.11	0.09	104.07	88.54

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.98	2.51	2.09	1.60	1.27	-0.37

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.77	0.29	1.08	-2.07	8.47

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-28 #1

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,378,984	105,212	North Carolina State Plane	-52.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
118.08	115.24	0.00	0.08	#200 - 2.55 #230 - 2.50		9	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.36	0.30	0.36	0.30
10	-1.00	2.00	0.33	0.28	0.69	0.58
14	-0.50	1.41	0.43	0.36	1.12	0.94
18	0.00	1.00	0.63	0.53	1.75	1.47
25	0.50	0.71	1.20	1.02	2.95	2.49
35	1.00	0.50	3.32	2.81	6.27	5.30
45	1.50	0.35	6.38	5.40	12.65	10.70
60	2.00	0.25	15.20	12.87	27.85	23.57
80	2.50	0.18	40.89	34.63	68.74	58.20
120	3.00	0.13	40.96	34.69	109.70	92.89
170	3.50	0.09	5.16	4.37	114.86	97.26
200	3.75	0.07	0.23	0.19	115.09	97.45
230	4.00	0.06	0.06	0.05	115.15	97.50

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.24	2.87	2.74	2.38	2.02	1.71	0.95

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.24	0.21	0.7	-1.93	9.22

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-28 #2

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,378,984	105,212	North Carolina State Plane	-56.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
119.49	115.80	0.02	0.07	#200 - 3.21 #230 - 3.15		11	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.32	0.27	0.32	0.27
4	-2.25	4.76	0.33	0.28	0.65	0.55
5	-2.00	4.00	0.13	0.11	0.78	0.66
7	-1.50	2.83	0.39	0.33	1.17	0.99
10	-1.00	2.00	0.52	0.44	1.69	1.43
14	-0.50	1.41	1.19	1.00	2.88	2.43
18	0.00	1.00	2.09	1.75	4.97	4.18
25	0.50	0.71	4.53	3.79	9.50	7.97
35	1.00	0.50	8.24	6.90	17.74	14.87
45	1.50	0.35	7.54	6.31	25.28	21.18
60	2.00	0.25	9.91	8.29	35.19	29.47
80	2.50	0.18	24.63	20.61	59.82	50.08
120	3.00	0.13	46.98	39.32	106.80	89.40
170	3.50	0.09	8.47	7.09	115.27	96.49
200	3.75	0.07	0.36	0.30	115.63	96.79
230	4.00	0.06	0.07	0.06	115.70	96.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.39	2.93	2.82	2.50	1.73	1.09	0.11

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.1	0.23	1.01	-1.65	6.16

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-28 #3

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,378,984	105,212	North Carolina State Plane	-62.3 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.94	108.29	0.02	0.08	#200 - 5.95 #230 - 5.89		17	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	2.29	1.99	2.29	1.99
5/16"	-3.00	8.00	0.00	0.00	2.29	1.99
3.5	-2.50	5.66	0.00	0.00	2.29	1.99
4	-2.25	4.76	0.46	0.40	2.75	2.39
5	-2.00	4.00	0.00	0.00	2.75	2.39
7	-1.50	2.83	0.95	0.83	3.70	3.22
10	-1.00	2.00	1.90	1.65	5.60	4.87
14	-0.50	1.41	5.98	5.20	11.58	10.07
18	0.00	1.00	9.77	8.50	21.35	18.57
25	0.50	0.71	16.35	14.22	37.70	32.79
35	1.00	0.50	15.28	13.29	52.98	46.08
45	1.50	0.35	10.25	8.92	63.23	55.00
60	2.00	0.25	9.30	8.09	72.53	63.09
80	2.50	0.18	13.53	11.77	86.06	74.86
120	3.00	0.13	17.79	15.48	103.85	90.34
170	3.50	0.09	3.87	3.37	107.72	93.71
200	3.75	0.07	0.39	0.34	108.11	94.05
230	4.00	0.06	0.07	0.06	108.18	94.11

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.80	2.50	1.22	0.23	-0.15	-0.99

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.09	0.47	1.43	-0.77	4.02

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-28 #4

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,378,984	105,212	North Carolina State Plane	-64.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-7/2 Dry - 2.5Y-7/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.27	99.59	0.16	0.25	#200 - 11.03 #230 - 10.90			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.38	1.24	1.38	1.24
5/16"	-3.00	8.00	0.45	0.40	1.83	1.64
3.5	-2.50	5.66	0.95	0.85	2.78	2.49
4	-2.25	4.76	0.59	0.53	3.37	3.02
5	-2.00	4.00	0.70	0.63	4.07	3.65
7	-1.50	2.83	1.95	1.75	6.02	5.40
10	-1.00	2.00	1.65	1.48	7.67	6.88
14	-0.50	1.41	2.79	2.51	10.46	9.39
18	0.00	1.00	3.43	3.08	13.89	12.47
25	0.50	0.71	4.77	4.29	18.66	16.76
35	1.00	0.50	5.03	4.52	23.69	21.28
45	1.50	0.35	6.74	6.06	30.43	27.34
60	2.00	0.25	10.56	9.49	40.99	36.83
80	2.50	0.18	33.34	29.96	74.33	66.79
120	3.00	0.13	21.51	19.33	95.84	86.12
170	3.50	0.09	2.56	2.30	98.40	88.42
200	3.75	0.07	0.61	0.55	99.01	88.97
230	4.00	0.06	0.14	0.13	99.15	89.10

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.95	2.71	2.22	1.31	0.41	-1.61

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.58	0.33	1.47	-1.65	5.4

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-28 #5

Analysis Date: 12-21-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,378,984	105,212	North Carolina State Plane	-66.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-5/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.54	98.45	0.06	0.11	#200 - 11.20 #230 - 11.10			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.43	0.39	0.43	0.39
7	-1.50	2.83	1.27	1.15	1.70	1.54
10	-1.00	2.00	1.84	1.66	3.54	3.20
14	-0.50	1.41	2.91	2.63	6.45	5.83
18	0.00	1.00	3.62	3.27	10.07	9.10
25	0.50	0.71	4.73	4.28	14.80	13.38
35	1.00	0.50	5.88	5.32	20.68	18.70
45	1.50	0.35	7.69	6.96	28.37	25.66
60	2.00	0.25	11.71	10.59	40.08	36.25
80	2.50	0.18	31.17	28.20	71.25	64.45
120	3.00	0.13	23.08	20.88	94.33	85.33
170	3.50	0.09	3.15	2.85	97.48	88.18
200	3.75	0.07	0.68	0.62	98.16	88.80
230	4.00	0.06	0.11	0.10	98.27	88.90

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.97	2.75	2.24	1.45	0.75	-0.66

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.77	0.29	1.15	-1.27	4.07

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-29 #1

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,269,332	-48,426	North Carolina State Plane	-60.4 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
117.66	115.44	0.01	0.11	#200 - 2.11 #230 - 2.01		4	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.17	0.14	0.17	0.14
4	-2.25	4.76	0.15	0.13	0.32	0.27
5	-2.00	4.00	0.03	0.03	0.35	0.30
7	-1.50	2.83	0.14	0.12	0.49	0.42
10	-1.00	2.00	0.11	0.09	0.60	0.51
14	-0.50	1.41	0.21	0.18	0.81	0.69
18	0.00	1.00	0.60	0.51	1.41	1.20
25	0.50	0.71	1.68	1.43	3.09	2.63
35	1.00	0.50	5.63	4.78	8.72	7.41
45	1.50	0.35	10.46	8.89	19.18	16.30
60	2.00	0.25	15.95	13.56	35.13	29.86
80	2.50	0.18	32.69	27.78	67.82	57.64
120	3.00	0.13	39.95	33.95	107.77	91.59
170	3.50	0.09	6.86	5.83	114.63	97.42
200	3.75	0.07	0.55	0.47	115.18	97.89
230	4.00	0.06	0.12	0.10	115.30	97.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.29	2.89	2.76	2.36	1.82	1.48	0.75

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.19	0.22	0.77	-1.61	8.14

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-29 #2

Analysis Date: 12-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,269,332	-48,426	North Carolina State Plane	-61.4 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-6/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.91	107.19	0.01	0.08	#200 - 1.70 #230 - 1.67		5	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.63	0.58	0.63	0.58
4	-2.25	4.76	0.33	0.30	0.96	0.88
5	-2.00	4.00	0.13	0.12	1.09	1.00
7	-1.50	2.83	0.45	0.41	1.54	1.41
10	-1.00	2.00	0.65	0.60	2.19	2.01
14	-0.50	1.41	3.13	2.87	5.32	4.88
18	0.00	1.00	6.05	5.56	11.37	10.44
25	0.50	0.71	11.85	10.88	23.22	21.32
35	1.00	0.50	18.90	17.35	42.12	38.67
45	1.50	0.35	20.80	19.10	62.92	57.77
60	2.00	0.25	16.29	14.96	79.21	72.73
80	2.50	0.18	11.35	10.42	90.56	83.15
120	3.00	0.13	14.04	12.89	104.60	96.04
170	3.50	0.09	2.26	2.08	106.86	98.12
200	3.75	0.07	0.20	0.18	107.06	98.30
230	4.00	0.06	0.03	0.03	107.09	98.33

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.96	2.53	2.11	1.30	0.61	0.26	-0.49

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.27	0.41	1.08	-0.5	3.64

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-29 #3

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,269,332	-48,426	North Carolina State Plane	-63.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-5/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.07	104.56	0.02	0.03	#200 - 4.36 #230 - 4.17		7	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.04	0.04	0.04	0.04
4	-2.25	4.76	0.13	0.12	0.17	0.16
5	-2.00	4.00	0.15	0.14	0.32	0.30
7	-1.50	2.83	0.61	0.56	0.93	0.86
10	-1.00	2.00	0.75	0.69	1.68	1.55
14	-0.50	1.41	0.91	0.83	2.59	2.38
18	0.00	1.00	1.51	1.38	4.10	3.76
25	0.50	0.71	3.39	3.11	7.49	6.87
35	1.00	0.50	8.10	7.43	15.59	14.30
45	1.50	0.35	12.25	11.23	27.84	25.53
60	2.00	0.25	12.31	11.29	40.15	36.82
80	2.50	0.18	17.29	15.85	57.44	52.67
120	3.00	0.13	36.71	33.66	94.15	86.33
170	3.50	0.09	9.56	8.77	103.71	95.10
200	3.75	0.07	0.59	0.54	104.30	95.64
230	4.00	0.06	0.21	0.19	104.51	95.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.49	2.97	2.83	2.42	1.48	1.08	0.20

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.05	0.24	1.01	-1.26	4.87

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-29 #4

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,269,332	-48,426	North Carolina State Plane	-65.1 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - N-3/0 Dry - 5Y-4/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
115.54	89.33	0.03	0.13	#200 - 23.80 #230 - 22.85			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.04	0.03	0.04	0.03
7	-1.50	2.83	0.14	0.12	0.18	0.15
10	-1.00	2.00	0.12	0.10	0.30	0.25
14	-0.50	1.41	0.19	0.16	0.49	0.41
18	0.00	1.00	0.25	0.22	0.74	0.63
25	0.50	0.71	0.83	0.72	1.57	1.35
35	1.00	0.50	2.51	2.17	4.08	3.52
45	1.50	0.35	4.64	4.02	8.72	7.54
60	2.00	0.25	5.76	4.99	14.48	12.53
80	2.50	0.18	11.89	10.29	26.37	22.82
120	3.00	0.13	24.81	21.47	51.18	44.29
170	3.50	0.09	30.30	26.22	81.48	70.51
200	3.75	0.07	6.57	5.69	88.05	76.20
230	4.00	0.06	1.10	0.95	89.15	77.15

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.70	3.11	2.55	2.17	1.18

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.68	0.16	0.81	-1.57	6.49

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-29 #5

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,269,332	-48,426	North Carolina State Plane	-66.6 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-3/0 Dry - 2.5Y-4/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
116.47	104.53	0.01	0.09	#200 - 10.50 #230 - 10.34			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.23	0.20	0.23	0.20
3.5	-2.50	5.66	0.00	0.00	0.23	0.20
4	-2.25	4.76	0.00	0.00	0.23	0.20
5	-2.00	4.00	0.00	0.00	0.23	0.20
7	-1.50	2.83	0.17	0.15	0.40	0.35
10	-1.00	2.00	0.40	0.34	0.80	0.69
14	-0.50	1.41	1.64	1.41	2.44	2.10
18	0.00	1.00	4.53	3.89	6.97	5.99
25	0.50	0.71	14.17	12.17	21.14	18.16
35	1.00	0.50	23.92	20.54	45.06	38.70
45	1.50	0.35	20.66	17.74	65.72	56.44
60	2.00	0.25	15.14	13.00	80.86	69.44
80	2.50	0.18	7.79	6.69	88.65	76.13
120	3.00	0.13	5.67	4.87	94.32	81.00
170	3.50	0.09	8.02	6.89	102.34	87.89
200	3.75	0.07	1.88	1.61	104.22	89.50
230	4.00	0.06	0.19	0.16	104.41	89.66

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.22	2.42	1.32	0.67	0.41	-0.13

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.31	0.40	1.04	0.2	3.36

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-29 #6

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,269,332	-48,426	North Carolina State Plane	-70.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.93	111.21	0.01	0.00	#200 - 1.54 #230 - 1.53			1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.04	0.04	0.04	0.04
14	-0.50	1.41	0.12	0.11	0.16	0.15
18	0.00	1.00	0.92	0.81	1.08	0.96
25	0.50	0.71	6.28	5.56	7.36	6.52
35	1.00	0.50	22.86	20.24	30.22	26.76
45	1.50	0.35	38.23	33.85	68.45	60.61
60	2.00	0.25	29.20	25.86	97.65	86.47
80	2.50	0.18	10.72	9.49	108.37	95.96
120	3.00	0.13	2.45	2.17	110.82	98.13
170	3.50	0.09	0.33	0.29	111.15	98.42
200	3.75	0.07	0.04	0.04	111.19	98.46
230	4.00	0.06	0.01	0.01	111.20	98.47

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.45	1.95	1.78	1.34	0.96	0.73	0.36

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.34	0.40	0.59	0.05	3.32

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-30 #1

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,279,392	-39,673	North Carolina State Plane	-60.9 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-4/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
104.26	101.31	0.02	0.09	#200 - 3.06 #230 - 2.92		5	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.31	0.30	0.31	0.30
3.5	-2.50	5.66	0.47	0.45	0.78	0.75
4	-2.25	4.76	0.06	0.06	0.84	0.81
5	-2.00	4.00	0.07	0.07	0.91	0.88
7	-1.50	2.83	0.11	0.11	1.02	0.99
10	-1.00	2.00	0.30	0.29	1.32	1.28
14	-0.50	1.41	0.49	0.47	1.81	1.75
18	0.00	1.00	1.54	1.48	3.35	3.23
25	0.50	0.71	2.62	2.51	5.97	5.74
35	1.00	0.50	3.03	2.91	9.00	8.65
45	1.50	0.35	4.75	4.56	13.75	13.21
60	2.00	0.25	13.44	12.89	27.19	26.10
80	2.50	0.18	30.60	29.35	57.79	55.45
120	3.00	0.13	33.95	32.56	91.74	88.01
170	3.50	0.09	8.63	8.28	100.37	96.29
200	3.75	0.07	0.68	0.65	101.05	96.94
230	4.00	0.06	0.15	0.14	101.20	97.08

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.42	2.94	2.80	2.41	1.96	1.61	0.35

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.19	0.22	0.93	-2.31	11.15

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-30 #2

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,279,392	-39,673	North Carolina State Plane	-68.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
118.44	113.44	0.02	0.02	#200 - 4.27 #230 - 4.24		0	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.14	0.12	0.14	0.12
14	-0.50	1.41	1.97	1.66	2.11	1.78
18	0.00	1.00	10.47	8.84	12.58	10.62
25	0.50	0.71	26.59	22.45	39.17	33.07
35	1.00	0.50	40.30	34.03	79.47	67.10
45	1.50	0.35	27.25	23.01	106.72	90.11
60	2.00	0.25	4.43	3.74	111.15	93.85
80	2.50	0.18	0.62	0.52	111.77	94.37
120	3.00	0.13	0.92	0.78	112.69	95.15
170	3.50	0.09	0.52	0.44	113.21	95.59
200	3.75	0.07	0.16	0.14	113.37	95.73
230	4.00	0.06	0.03	0.03	113.40	95.76

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.90	1.37	1.17	0.75	0.32	0.12	-0.32

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.71	0.61	0.62	0.51	5.13

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-31 #1

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,280,303	-22,497	North Carolina State Plane	-56.5 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
105.02	96.33	0.02	0.04	#200 - 8.57 #230 - 8.36		9	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.40	1.33	1.40	1.33
5/16"	-3.00	8.00	0.00	0.00	1.40	1.33
3.5	-2.50	5.66	0.13	0.12	1.53	1.45
4	-2.25	4.76	0.03	0.03	1.56	1.48
5	-2.00	4.00	0.12	0.11	1.68	1.59
7	-1.50	2.83	0.75	0.71	2.43	2.30
10	-1.00	2.00	0.99	0.94	3.42	3.24
14	-0.50	1.41	0.96	0.91	4.38	4.15
18	0.00	1.00	0.59	0.56	4.97	4.71
25	0.50	0.71	0.76	0.72	5.73	5.43
35	1.00	0.50	1.09	1.04	6.82	6.47
45	1.50	0.35	2.47	2.35	9.29	8.82
60	2.00	0.25	7.78	7.41	17.07	16.23
80	2.50	0.18	17.11	16.29	34.18	32.52
120	3.00	0.13	37.59	35.79	71.77	68.31
170	3.50	0.09	22.51	21.43	94.28	89.74
200	3.75	0.07	1.77	1.69	96.05	91.43
230	4.00	0.06	0.22	0.21	96.27	91.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.37	3.16	2.74	2.27	1.98	0.20

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.4	0.19	1.19	-3.06	14.01

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-31 #2

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,280,303	-22,497	North Carolina State Plane	-60.0 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
103.69	97.05	0.02	0.03	#200 - 6.75 #230 - 6.45		4	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.23	0.22	0.23	0.22
4	-2.25	4.76	0.00	0.00	0.23	0.22
5	-2.00	4.00	0.05	0.05	0.28	0.27
7	-1.50	2.83	0.12	0.12	0.40	0.39
10	-1.00	2.00	0.21	0.20	0.61	0.59
14	-0.50	1.41	0.28	0.27	0.89	0.86
18	0.00	1.00	0.41	0.40	1.30	1.26
25	0.50	0.71	0.84	0.81	2.14	2.07
35	1.00	0.50	1.55	1.49	3.69	3.56
45	1.50	0.35	3.06	2.95	6.75	6.51
60	2.00	0.25	8.91	8.59	15.66	15.10
80	2.50	0.18	16.64	16.05	32.30	31.15
120	3.00	0.13	30.58	29.49	62.88	60.64
170	3.50	0.09	31.59	30.47	94.47	91.11
200	3.75	0.07	2.22	2.14	96.69	93.25
230	4.00	0.06	0.31	0.30	97.00	93.55

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.38	3.24	2.82	2.31	2.03	1.24

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.61	0.16	0.79	-2.22	11.55

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-31 #3

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,280,303	-22,497	North Carolina State Plane	-61.6 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/2 Dry - 2.5Y-5/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.47	117.13	0.02	0.02	#200 - 2.91 #230 - 2.82		6	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	2.46	2.04	2.46	2.04
5/16"	-3.00	8.00	0.33	0.27	2.79	2.31
3.5	-2.50	5.66	0.64	0.53	3.43	2.84
4	-2.25	4.76	0.00	0.00	3.43	2.84
5	-2.00	4.00	0.14	0.12	3.57	2.96
7	-1.50	2.83	0.93	0.77	4.50	3.73
10	-1.00	2.00	1.70	1.41	6.20	5.14
14	-0.50	1.41	3.26	2.71	9.46	7.85
18	0.00	1.00	4.49	3.73	13.95	11.58
25	0.50	0.71	7.82	6.49	21.77	18.07
35	1.00	0.50	11.58	9.61	33.35	27.68
45	1.50	0.35	15.90	13.20	49.25	40.88
60	2.00	0.25	23.81	19.76	73.06	60.64
80	2.50	0.18	19.72	16.37	92.78	77.01
120	3.00	0.13	14.97	12.43	107.75	89.44
170	3.50	0.09	8.54	7.09	116.29	96.53
200	3.75	0.07	0.68	0.56	116.97	97.09
230	4.00	0.06	0.11	0.09	117.08	97.18

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.39	2.78	2.44	1.73	0.86	0.34	-1.05

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.44	0.37	1.39	-1.47	6.02

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-31 #4

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,280,303	-22,497	North Carolina State Plane	-62.7 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 10Y-3/1 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.14	103.64	0.01	0.01	#200 - 7.82 #230 - 7.59		3	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.04	0.04	0.04	0.04
7	-1.50	2.83	0.36	0.32	0.40	0.36
10	-1.00	2.00	1.40	1.25	1.80	1.61
14	-0.50	1.41	3.52	3.14	5.32	4.75
18	0.00	1.00	5.79	5.16	11.11	9.91
25	0.50	0.71	8.30	7.40	19.41	17.31
35	1.00	0.50	9.56	8.53	28.97	25.84
45	1.50	0.35	9.37	8.36	38.34	34.20
60	2.00	0.25	13.78	12.29	52.12	46.49
80	2.50	0.18	17.77	15.85	69.89	62.34
120	3.00	0.13	16.96	15.12	86.85	77.46
170	3.50	0.09	14.76	13.16	101.61	90.62
200	3.75	0.07	1.75	1.56	103.36	92.18
230	4.00	0.06	0.26	0.23	103.62	92.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.25	2.92	2.11	0.95	0.41	-0.48

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.74	0.30	1.22	-0.57	2.47

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-32 #1

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,267,415	5,913	North Carolina State Plane	-51.7 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/2 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.04	106.89	0.01	0.05	#200 - 3.04 #230 - 2.91		10	7

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.12	0.11	0.12	0.11
4	-2.25	4.76	0.09	0.08	0.21	0.19
5	-2.00	4.00	0.21	0.19	0.42	0.38
7	-1.50	2.83	0.37	0.34	0.79	0.72
10	-1.00	2.00	0.52	0.47	1.31	1.19
14	-0.50	1.41	0.76	0.69	2.07	1.88
18	0.00	1.00	0.90	0.82	2.97	2.70
25	0.50	0.71	1.22	1.11	4.19	3.81
35	1.00	0.50	2.50	2.27	6.69	6.08
45	1.50	0.35	5.29	4.81	11.98	10.89
60	2.00	0.25	8.70	7.91	20.68	18.80
80	2.50	0.18	24.07	21.87	44.75	40.67
120	3.00	0.13	44.49	40.43	89.24	81.10
170	3.50	0.09	16.05	14.59	105.29	95.69
200	3.75	0.07	1.40	1.27	106.69	96.96
230	4.00	0.06	0.14	0.13	106.83	97.09

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.48	3.10	2.92	2.62	2.14	1.82	0.76

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.39	0.19	0.86	-2.24	10.1

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-32 #2

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,267,415	5,913	North Carolina State Plane	-52.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/1 Dry - 2.5Y-5/2 Washed - 2.5Y-6/2	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.00	109.23	0.01	0.11	#200 - 2.64 #230 - 2.59		44	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.66	0.59	0.66	0.59
7/16"	-3.50	11.31	0.88	0.79	1.54	1.38
5/16"	-3.00	8.00	0.86	0.77	2.40	2.15
3.5	-2.50	5.66	3.09	2.76	5.49	4.91
4	-2.25	4.76	1.09	0.97	6.58	5.88
5	-2.00	4.00	1.29	1.15	7.87	7.03
7	-1.50	2.83	4.25	3.79	12.12	10.82
10	-1.00	2.00	6.79	6.06	18.91	16.88
14	-0.50	1.41	10.36	9.25	29.27	26.13
18	0.00	1.00	10.88	9.71	40.15	35.84
25	0.50	0.71	10.31	9.21	50.46	45.05
35	1.00	0.50	10.59	9.46	61.05	54.51
45	1.50	0.35	8.92	7.96	69.97	62.47
60	2.00	0.25	6.04	5.39	76.01	67.86
80	2.50	0.18	10.36	9.25	86.37	77.11
120	3.00	0.13	16.53	14.76	102.90	91.87
170	3.50	0.09	5.54	4.95	108.44	96.82
200	3.75	0.07	0.60	0.54	109.04	97.36
230	4.00	0.06	0.06	0.05	109.10	97.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.32	2.73	2.39	0.76	-0.56	-1.07	-2.48

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.66	0.63	1.75	-0.36	2.39

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-32 #3

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,267,415	5,913	North Carolina State Plane	-53.4 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.90	97.71	0.01	0.00	#200 - 11.16 #230 - 11.12			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.45	1.32	1.45	1.32
3.5	-2.50	5.66	1.06	0.96	2.51	2.28
4	-2.25	4.76	0.20	0.18	2.71	2.46
5	-2.00	4.00	0.68	0.62	3.39	3.08
7	-1.50	2.83	1.54	1.40	4.93	4.48
10	-1.00	2.00	1.93	1.76	6.86	6.24
14	-0.50	1.41	2.74	2.49	9.60	8.73
18	0.00	1.00	3.01	2.74	12.61	11.47
25	0.50	0.71	3.72	3.38	16.33	14.85
35	1.00	0.50	5.73	5.21	22.06	20.06
45	1.50	0.35	9.68	8.81	31.74	28.87
60	2.00	0.25	11.39	10.36	43.13	39.23
80	2.50	0.18	16.79	15.28	59.92	54.51
120	3.00	0.13	28.59	26.01	88.51	80.52
170	3.50	0.09	8.30	7.55	96.81	88.07
200	3.75	0.07	0.85	0.77	97.66	88.84
230	4.00	0.06	0.04	0.04	97.70	88.88

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.23	2.89	2.35	1.28	0.61	-1.35

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.7	0.31	1.46	-1.46	4.8

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-32 #4

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,267,415	5,913	North Carolina State Plane	-55.4 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.02	102.11	0.01	0.02	#200 - 6.53 #230 - 6.36		18	25

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.45	0.41	0.45	0.41
3.5	-2.50	5.66	0.52	0.48	0.97	0.89
4	-2.25	4.76	0.92	0.84	1.89	1.73
5	-2.00	4.00	0.59	0.54	2.48	2.27
7	-1.50	2.83	0.90	0.83	3.38	3.10
10	-1.00	2.00	1.33	1.22	4.71	4.32
14	-0.50	1.41	1.81	1.66	6.52	5.98
18	0.00	1.00	1.98	1.82	8.50	7.80
25	0.50	0.71	2.96	2.72	11.46	10.52
35	1.00	0.50	6.35	5.82	17.81	16.34
45	1.50	0.35	10.42	9.56	28.23	25.90
60	2.00	0.25	14.48	13.28	42.71	39.18
80	2.50	0.18	18.18	16.68	60.89	55.86
120	3.00	0.13	32.44	29.76	93.33	85.62
170	3.50	0.09	7.73	7.09	101.06	92.71
200	3.75	0.07	0.83	0.76	101.89	93.47
230	4.00	0.06	0.19	0.17	102.08	93.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.97	2.82	2.32	1.45	0.97	-0.80

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.88	0.27	1.25	-1.64	5.93

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-32 #5

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,267,415	5,913	North Carolina State Plane	-58.2 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - 10Y-2.5/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.02	93.75	0.02	0.00	#200 - 16.45 #230 - 16.34			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.16	0.14	0.16	0.14
3.5	-2.50	5.66	1.14	1.02	1.30	1.16
4	-2.25	4.76	0.66	0.59	1.96	1.75
5	-2.00	4.00	0.53	0.47	2.49	2.22
7	-1.50	2.83	1.39	1.24	3.88	3.46
10	-1.00	2.00	1.75	1.56	5.63	5.02
14	-0.50	1.41	3.21	2.87	8.84	7.89
18	0.00	1.00	4.15	3.70	12.99	11.59
25	0.50	0.71	6.04	5.39	19.03	16.98
35	1.00	0.50	10.49	9.36	29.52	26.34
45	1.50	0.35	11.43	10.20	40.95	36.54
60	2.00	0.25	10.15	9.06	51.10	45.60
80	2.50	0.18	8.27	7.38	59.37	52.98
120	3.00	0.13	23.67	21.13	83.04	74.11
170	3.50	0.09	9.80	8.75	92.84	82.86
200	3.75	0.07	0.77	0.69	93.61	83.55
230	4.00	0.06	0.12	0.11	93.73	83.66

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.05	2.30	0.93	0.41	-1.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.56	0.34	1.42	-0.92	3.4

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-32 #6

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,267,415	5,913	North Carolina State Plane	-62.9 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-3/1 Dry - 2.5Y-4/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.29	116.08	0.01	0.00	#200 - 3.54 #230 - 3.52			2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.08	0.07	0.08	0.07
4	-2.25	4.76	0.00	0.00	0.08	0.07
5	-2.00	4.00	0.00	0.00	0.08	0.07
7	-1.50	2.83	0.16	0.13	0.24	0.20
10	-1.00	2.00	0.04	0.03	0.28	0.23
14	-0.50	1.41	0.66	0.55	0.94	0.78
18	0.00	1.00	3.74	3.11	4.68	3.89
25	0.50	0.71	17.17	14.27	21.85	18.16
35	1.00	0.50	36.30	30.18	58.15	48.34
45	1.50	0.35	21.98	18.27	80.13	66.61
60	2.00	0.25	13.74	11.42	93.87	78.03
80	2.50	0.18	9.77	8.12	103.64	86.15
120	3.00	0.13	10.72	8.91	114.36	95.06
170	3.50	0.09	1.54	1.28	115.90	96.34
200	3.75	0.07	0.14	0.12	116.04	96.46
230	4.00	0.06	0.03	0.02	116.07	96.48

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.00	2.37	1.87	1.05	0.61	0.42	0.04

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.19	0.44	0.85	0.39	3.01

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-33 #1

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,259,226	32,144	North Carolina State Plane	-46.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
113.28	110.52	0.01	0.09	#200 - 2.66 #230 - 2.54		7	4

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.13	0.11	0.13	0.11
10	-1.00	2.00	0.26	0.23	0.39	0.34
14	-0.50	1.41	0.61	0.54	1.00	0.88
18	0.00	1.00	0.86	0.76	1.86	1.64
25	0.50	0.71	1.29	1.14	3.15	2.78
35	1.00	0.50	3.08	2.72	6.23	5.50
45	1.50	0.35	6.65	5.87	12.88	11.37
60	2.00	0.25	13.49	11.91	26.37	23.28
80	2.50	0.18	38.54	34.02	64.91	57.30
120	3.00	0.13	38.33	33.84	103.24	91.14
170	3.50	0.09	6.46	5.70	109.70	96.84
200	3.75	0.07	0.57	0.50	110.27	97.34
230	4.00	0.06	0.14	0.12	110.41	97.46

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.89	2.76	2.39	2.03	1.69	0.91

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.26	0.21	0.71	-1.67	7.55

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-33 #2

Analysis Date: 12-20-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,259,226	32,144	North Carolina State Plane	-47.1 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-2.5/1 Dry - 2.5Y-4/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.48	107.42	0.01	0.03	#200 - 2.87 #230 - 2.80		40	30

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.52	0.47	0.52	0.47
5/16"	-3.00	8.00	0.66	0.60	1.18	1.07
3.5	-2.50	5.66	1.08	0.98	2.26	2.05
4	-2.25	4.76	0.89	0.81	3.15	2.86
5	-2.00	4.00	1.57	1.42	4.72	4.28
7	-1.50	2.83	3.88	3.51	8.60	7.79
10	-1.00	2.00	5.30	4.80	13.90	12.59
14	-0.50	1.41	7.56	6.84	21.46	19.43
18	0.00	1.00	7.21	6.53	28.67	25.96
25	0.50	0.71	7.04	6.37	35.71	32.33
35	1.00	0.50	9.07	8.21	44.78	40.54
45	1.50	0.35	11.60	10.50	56.38	51.04
60	2.00	0.25	13.62	12.33	70.00	63.37
80	2.50	0.18	17.66	15.98	87.66	79.35
120	3.00	0.13	15.93	14.42	103.59	93.77
170	3.50	0.09	3.35	3.03	106.94	96.80
200	3.75	0.07	0.36	0.33	107.30	97.13
230	4.00	0.06	0.08	0.07	107.38	97.20

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.20	2.66	2.36	1.45	-0.07	-0.75	-1.90

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.02	0.49	1.57	-0.69	2.67

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-33 #3

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,259,226	32,144	North Carolina State Plane	-54.1 NAVD 88

USCS:	Munsell:	Comments:
SW-SC	Wet - 10Y-3/1 Dry - 2.5Y-5/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.89	95.16	0.01	0.06	#200 - 11.95 #230 - 11.89			8

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.26	0.24	0.26	0.24
4	-2.25	4.76	0.12	0.11	0.38	0.35
5	-2.00	4.00	0.48	0.44	0.86	0.79
7	-1.50	2.83	0.93	0.86	1.79	1.65
10	-1.00	2.00	1.05	0.97	2.84	2.62
14	-0.50	1.41	1.92	1.78	4.76	4.40
18	0.00	1.00	2.68	2.48	7.44	6.88
25	0.50	0.71	3.95	3.66	11.39	10.54
35	1.00	0.50	6.61	6.13	18.00	16.67
45	1.50	0.35	8.83	8.18	26.83	24.85
60	2.00	0.25	22.38	20.74	49.21	45.59
80	2.50	0.18	28.05	26.00	77.26	71.59
120	3.00	0.13	14.15	13.12	91.41	84.71
170	3.50	0.09	3.16	2.93	94.57	87.64
200	3.75	0.07	0.44	0.41	95.01	88.05
230	4.00	0.06	0.07	0.06	95.08	88.11

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.97	2.63	2.08	1.50	0.95	-0.38

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.72	0.30	1.05	-1.42	5.4

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-33 #4

Analysis Date: 12-20-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,259,226	32,144	North Carolina State Plane	-59.5 NAVD 88

USCS:	Munsell:	Comments:
SW-SC	Wet - 10Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
120.99	108.37	0.01	0.07	#200 - 10.51 #230 - 10.49			8

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.86	0.71	0.86	0.71
4	-2.25	4.76	0.23	0.19	1.09	0.90
5	-2.00	4.00	0.59	0.49	1.68	1.39
7	-1.50	2.83	1.11	0.92	2.79	2.31
10	-1.00	2.00	3.17	2.62	5.96	4.93
14	-0.50	1.41	6.74	5.57	12.70	10.50
18	0.00	1.00	14.11	11.66	26.81	22.16
25	0.50	0.71	21.81	18.03	48.62	40.19
35	1.00	0.50	21.74	17.97	70.36	58.16
45	1.50	0.35	15.52	12.83	85.88	70.99
60	2.00	0.25	11.27	9.31	97.15	80.30
80	2.50	0.18	7.21	5.96	104.36	86.26
120	3.00	0.13	2.89	2.39	107.25	88.65
170	3.50	0.09	0.89	0.74	108.14	89.39
200	3.75	0.07	0.12	0.10	108.26	89.49
230	4.00	0.06	0.02	0.02	108.28	89.51

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.31	1.72	0.77	0.08	-0.26	-0.99

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.64	0.64	1.05	-0.19	3.41

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-34 #1

Analysis Date: 12-21-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,243,606	-8,088	North Carolina State Plane	-56.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 10Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.13	103.98	0.01	0.02	#200 - 4.83 #230 - 4.76		4	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.02	0.02	0.02	0.02
7	-1.50	2.83	0.24	0.22	0.26	0.24
10	-1.00	2.00	0.28	0.26	0.54	0.50
14	-0.50	1.41	0.33	0.30	0.87	0.80
18	0.00	1.00	0.41	0.38	1.28	1.18
25	0.50	0.71	0.68	0.62	1.96	1.80
35	1.00	0.50	1.39	1.27	3.35	3.07
45	1.50	0.35	3.44	3.15	6.79	6.22
60	2.00	0.25	10.24	9.38	17.03	15.60
80	2.50	0.18	34.29	31.42	51.32	47.02
120	3.00	0.13	41.94	38.43	93.26	85.45
170	3.50	0.09	9.71	8.90	102.97	94.35
200	3.75	0.07	0.90	0.82	103.87	95.17
230	4.00	0.06	0.08	0.07	103.95	95.24

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.70	2.98	2.86	2.54	2.15	2.01	1.31

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.4	0.19	0.66	-2.14	11.65

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-34 #2

Analysis Date: 12-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,243,606	-8,088	North Carolina State Plane	-63.0 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-3/0 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
100.78	91.89	0.02	0.06	#200 - 8.93 #230 - 8.90			20

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.89	0.88	0.89	0.88
4	-2.25	4.76	0.36	0.36	1.25	1.24
5	-2.00	4.00	0.37	0.37	1.62	1.61
7	-1.50	2.83	1.48	1.47	3.10	3.08
10	-1.00	2.00	2.47	2.45	5.57	5.53
14	-0.50	1.41	3.42	3.39	8.99	8.92
18	0.00	1.00	4.52	4.49	13.51	13.41
25	0.50	0.71	10.41	10.33	23.92	23.74
35	1.00	0.50	12.82	12.72	36.74	36.46
45	1.50	0.35	12.11	12.02	48.85	48.48
60	2.00	0.25	12.51	12.41	61.36	60.89
80	2.50	0.18	17.58	17.44	78.94	78.33
120	3.00	0.13	11.08	10.99	90.02	89.32
170	3.50	0.09	1.56	1.55	91.58	90.87
200	3.75	0.07	0.20	0.20	91.78	91.07
230	4.00	0.06	0.03	0.03	91.81	91.10

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.76	2.40	1.56	0.55	0.13	-1.11

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.22	0.43	1.25	-0.76	3.31

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-35 #1

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,237,214	1,470	North Carolina State Plane	-55.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.84	103.08	0.00	0.02	#200 - 4.53 #230 - 4.43		6	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.23	0.21	0.23	0.21
4	-2.25	4.76	0.32	0.30	0.55	0.51
5	-2.00	4.00	0.09	0.08	0.64	0.59
7	-1.50	2.83	0.46	0.43	1.10	1.02
10	-1.00	2.00	0.56	0.52	1.66	1.54
14	-0.50	1.41	0.69	0.64	2.35	2.18
18	0.00	1.00	0.81	0.75	3.16	2.93
25	0.50	0.71	1.15	1.07	4.31	4.00
35	1.00	0.50	2.50	2.32	6.81	6.32
45	1.50	0.35	7.21	6.69	14.02	13.01
60	2.00	0.25	19.24	17.84	33.26	30.85
80	2.50	0.18	32.57	30.20	65.83	61.05
120	3.00	0.13	29.28	27.15	95.11	88.20
170	3.50	0.09	7.18	6.66	102.29	94.86
200	3.75	0.07	0.66	0.61	102.95	95.47
230	4.00	0.06	0.11	0.10	103.06	95.57

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.56	2.92	2.76	2.32	1.84	1.58	0.72

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.14	0.23	0.86	-2.14	10.42

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-35 #2

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,237,214	1,470	North Carolina State Plane	-65.4 NAVD 88

USCS:	Munsell:	Comments:
SM	Wet - 2.5Y-5/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
99.23	81.88	0.03	0.08	#200 - 17.65 #230 - 17.59			12

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	1.62	1.63	1.62	1.63
4	-2.25	4.76	0.23	0.23	1.85	1.86
5	-2.00	4.00	0.77	0.78	2.62	2.64
7	-1.50	2.83	2.12	2.14	4.74	4.78
10	-1.00	2.00	2.57	2.59	7.31	7.37
14	-0.50	1.41	3.20	3.22	10.51	10.59
18	0.00	1.00	2.45	2.47	12.96	13.06
25	0.50	0.71	3.28	3.31	16.24	16.37
35	1.00	0.50	5.01	5.05	21.25	21.42
45	1.50	0.35	5.82	5.87	27.07	27.29
60	2.00	0.25	9.17	9.24	36.24	36.53
80	2.50	0.18	21.57	21.74	57.81	58.27
120	3.00	0.13	19.07	19.22	76.88	77.49
170	3.50	0.09	4.25	4.28	81.13	81.77
200	3.75	0.07	0.58	0.58	81.71	82.35
230	4.00	0.06	0.06	0.06	81.77	82.41

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		2.94	2.31	1.30	0.44	-1.46

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.57	0.34	1.46	-1.25	3.76

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-36 #1

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,234,971	1,328	North Carolina State Plane	-55.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.46	108.10	0.03	0.01	#200 - 2.22 #230 - 2.17		6	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.39	0.35	0.39	0.35
3.5	-2.50	5.66	0.04	0.04	0.43	0.39
4	-2.25	4.76	0.06	0.05	0.49	0.44
5	-2.00	4.00	0.20	0.18	0.69	0.62
7	-1.50	2.83	0.25	0.23	0.94	0.85
10	-1.00	2.00	0.23	0.21	1.17	1.06
14	-0.50	1.41	0.56	0.51	1.73	1.57
18	0.00	1.00	0.61	0.55	2.34	2.12
25	0.50	0.71	1.27	1.15	3.61	3.27
35	1.00	0.50	2.98	2.70	6.59	5.97
45	1.50	0.35	12.86	11.64	19.45	17.61
60	2.00	0.25	29.10	26.34	48.55	43.95
80	2.50	0.18	36.12	32.70	84.67	76.65
120	3.00	0.13	19.30	17.47	103.97	94.12
170	3.50	0.09	3.68	3.33	107.65	97.45
200	3.75	0.07	0.36	0.33	108.01	97.78
230	4.00	0.06	0.05	0.05	108.06	97.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.13	2.71	2.47	2.09	1.64	1.43	0.82

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.98	0.25	0.79	-2.21	13.28

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-36 #2

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,234,971	1,328	North Carolina State Plane	-57.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.25	103.21	0.01	0.04	#200 - 4.83 #230 - 4.69		4	3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.15	0.14	0.15	0.14
5	-2.00	4.00	0.00	0.00	0.15	0.14
7	-1.50	2.83	0.24	0.22	0.39	0.36
10	-1.00	2.00	0.17	0.16	0.56	0.52
14	-0.50	1.41	0.22	0.20	0.78	0.72
18	0.00	1.00	0.37	0.34	1.15	1.06
25	0.50	0.71	0.68	0.63	1.83	1.69
35	1.00	0.50	1.36	1.26	3.19	2.95
45	1.50	0.35	3.97	3.67	7.16	6.62
60	2.00	0.25	18.04	16.67	25.20	23.29
80	2.50	0.18	37.92	35.03	63.12	58.32
120	3.00	0.13	32.05	29.61	95.17	87.93
170	3.50	0.09	7.06	6.52	102.23	94.45
200	3.75	0.07	0.78	0.72	103.01	95.17
230	4.00	0.06	0.15	0.14	103.16	95.31

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.69	2.93	2.78	2.38	2.02	1.78	1.28

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.29	0.20	0.66	-1.96	12.13

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-36 #3

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,234,971	1,328	North Carolina State Plane	-60.0 NAVD 88

USCS:	Munsell:	Comments:
SC	Wet - N-3/0 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
131.99	110.93	0.03	0.05	#200 - 16.31 #230 - 16.01			10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.09	0.07	0.09	0.07
4	-2.25	4.76	0.22	0.17	0.31	0.24
5	-2.00	4.00	0.18	0.14	0.49	0.38
7	-1.50	2.83	1.32	1.00	1.81	1.38
10	-1.00	2.00	1.64	1.24	3.45	2.62
14	-0.50	1.41	2.39	1.81	5.84	4.43
18	0.00	1.00	2.27	1.72	8.11	6.15
25	0.50	0.71	2.23	1.69	10.34	7.84
35	1.00	0.50	2.44	1.85	12.78	9.69
45	1.50	0.35	3.80	2.88	16.58	12.57
60	2.00	0.25	18.70	14.17	35.28	26.74
80	2.50	0.18	22.17	16.80	57.45	43.54
120	3.00	0.13	27.65	20.95	85.10	64.49
170	3.50	0.09	22.44	17.00	107.54	81.49
200	3.75	0.07	2.90	2.20	110.44	83.69
230	4.00	0.06	0.39	0.30	110.83	83.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
		3.31	2.65	1.94	1.62	-0.33

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.19	0.22	1.15	-1.64	5.81

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-37 #1

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,216,776	492	North Carolina State Plane	-56.5 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-3/1 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
105.87	96.50	0.02	0.01	#200 - 9.04 #230 - 8.88		7	8

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.69	0.65	0.69	0.65
3.5	-2.50	5.66	0.08	0.08	0.77	0.73
4	-2.25	4.76	0.00	0.00	0.77	0.73
5	-2.00	4.00	0.21	0.20	0.98	0.93
7	-1.50	2.83	0.40	0.38	1.38	1.31
10	-1.00	2.00	0.42	0.40	1.80	1.71
14	-0.50	1.41	0.49	0.46	2.29	2.17
18	0.00	1.00	0.48	0.45	2.77	2.62
25	0.50	0.71	0.79	0.75	3.56	3.37
35	1.00	0.50	1.26	1.19	4.82	4.56
45	1.50	0.35	2.07	1.96	6.89	6.52
60	2.00	0.25	4.24	4.00	11.13	10.52
80	2.50	0.18	16.01	15.12	27.14	25.64
120	3.00	0.13	44.22	41.77	71.36	67.41
170	3.50	0.09	23.38	22.08	94.74	89.49
200	3.75	0.07	1.56	1.47	96.30	90.96
230	4.00	0.06	0.17	0.16	96.47	91.12

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.38	3.17	2.79	2.48	2.18	1.11

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.55	0.17	0.93	-3.4	18.01

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-38 #1

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,210,715	6,009	North Carolina State Plane	-56.1 NAVD 88

USCS:	Munsell:	Comments:
SP-SC	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
105.71	96.22	0.02	0.03	#200 - 9.21 #230 - 9.01		6	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.54	0.51	0.54	0.51
4	-2.25	4.76	0.05	0.05	0.59	0.56
5	-2.00	4.00	0.08	0.08	0.67	0.64
7	-1.50	2.83	0.35	0.33	1.02	0.97
10	-1.00	2.00	0.38	0.36	1.40	1.33
14	-0.50	1.41	0.31	0.29	1.71	1.62
18	0.00	1.00	0.43	0.41	2.14	2.03
25	0.50	0.71	0.72	0.68	2.86	2.71
35	1.00	0.50	1.01	0.96	3.87	3.67
45	1.50	0.35	1.48	1.40	5.35	5.07
60	2.00	0.25	2.85	2.70	8.20	7.77
80	2.50	0.18	10.59	10.02	18.79	17.79
120	3.00	0.13	49.02	46.37	67.81	64.16
170	3.50	0.09	26.52	25.09	94.33	89.25
200	3.75	0.07	1.63	1.54	95.96	90.79
230	4.00	0.06	0.21	0.20	96.17	90.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.40	3.22	2.85	2.58	2.41	1.48

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.66	0.16	0.82	-3.61	20.02

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-NC-40 #1

Analysis Date: 12-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,183,146	-7,273	North Carolina State Plane	-58.1 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-3/2 Dry - 5Y-4/2 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.60	99.98	0.01	0.07	#200 - 8.31 #230 - 8.01		5	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.06	0.06	0.06	0.06
5	-2.00	4.00	0.03	0.03	0.09	0.09
7	-1.50	2.83	0.13	0.12	0.22	0.21
10	-1.00	2.00	0.18	0.17	0.40	0.38
14	-0.50	1.41	0.25	0.23	0.65	0.61
18	0.00	1.00	0.26	0.24	0.91	0.85
25	0.50	0.71	0.58	0.53	1.49	1.38
35	1.00	0.50	1.43	1.32	2.92	2.70
45	1.50	0.35	2.42	2.23	5.34	4.93
60	2.00	0.25	6.24	5.75	11.58	10.68
80	2.50	0.18	13.83	12.73	25.41	23.41
120	3.00	0.13	45.24	41.66	70.65	65.07
170	3.50	0.09	26.93	24.80	97.58	89.87
200	3.75	0.07	1.98	1.82	99.56	91.69
230	4.00	0.06	0.33	0.30	99.89	91.99

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.38	3.20	2.82	2.52	2.21	1.51

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.66	0.16	0.68	-2.33	12.35

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-41 #1

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,150,976	-7,045	North Carolina State Plane	-50.8 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-3/2 Dry - 5Y-5/2 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.56	101.19	0.01	0.00	#200 - 6.07 #230 - 5.91		11	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.03	0.03	0.03	0.03
5	-2.00	4.00	0.00	0.00	0.03	0.03
7	-1.50	2.83	0.02	0.02	0.05	0.05
10	-1.00	2.00	0.02	0.02	0.07	0.07
14	-0.50	1.41	0.03	0.03	0.10	0.10
18	0.00	1.00	0.17	0.16	0.27	0.26
25	0.50	0.71	0.57	0.53	0.84	0.79
35	1.00	0.50	2.89	2.69	3.73	3.48
45	1.50	0.35	10.66	9.91	14.39	13.39
60	2.00	0.25	23.34	21.70	37.73	35.09
80	2.50	0.18	23.73	22.06	61.46	57.15
120	3.00	0.13	29.05	27.01	90.51	84.16
170	3.50	0.09	9.72	9.04	100.23	93.20
200	3.75	0.07	0.78	0.73	101.01	93.93
230	4.00	0.06	0.17	0.16	101.18	94.09

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.00	2.83	2.34	1.77	1.56	1.08

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.22	0.21	0.68	-0.51	3.73

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-41 #2

Analysis Date: 12-22-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,150,976	-7,045	North Carolina State Plane	-55.2 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.01	106.18	0.03	0.01	#200 - 4.63 #230 - 4.40		9	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	1.70	1.53	1.70	1.53
5/16"	-3.00	8.00	0.00	0.00	1.70	1.53
3.5	-2.50	5.66	0.06	0.05	1.76	1.58
4	-2.25	4.76	0.40	0.36	2.16	1.94
5	-2.00	4.00	0.16	0.14	2.32	2.08
7	-1.50	2.83	0.11	0.10	2.43	2.18
10	-1.00	2.00	0.23	0.21	2.66	2.39
14	-0.50	1.41	0.27	0.24	2.93	2.63
18	0.00	1.00	0.34	0.31	3.27	2.94
25	0.50	0.71	0.73	0.66	4.00	3.60
35	1.00	0.50	1.45	1.31	5.45	4.91
45	1.50	0.35	2.71	2.44	8.16	7.35
60	2.00	0.25	6.56	5.91	14.72	13.26
80	2.50	0.18	16.63	14.98	31.35	28.24
120	3.00	0.13	52.53	47.32	83.88	75.56
170	3.50	0.09	20.62	18.57	104.50	94.13
200	3.75	0.07	1.38	1.24	105.88	95.37
230	4.00	0.06	0.26	0.23	106.14	95.60

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.68	3.23	2.99	2.73	2.39	2.09	1.02

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.47	0.18	1.09	-3.83	20.55

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-42 #1

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,127,225	-18,129	North Carolina State Plane	-49.8 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-6/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.49	111.03	0.00	0.08	#200 - 1.42 #230 - 1.38		6	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.05	0.93	1.05	0.93
3.5	-2.50	5.66	0.17	0.15	1.22	1.08
4	-2.25	4.76	0.00	0.00	1.22	1.08
5	-2.00	4.00	0.09	0.08	1.31	1.16
7	-1.50	2.83	0.03	0.03	1.34	1.19
10	-1.00	2.00	0.24	0.21	1.58	1.40
14	-0.50	1.41	0.99	0.88	2.57	2.28
18	0.00	1.00	3.18	2.83	5.75	5.11
25	0.50	0.71	6.56	5.83	12.31	10.94
35	1.00	0.50	12.29	10.93	24.60	21.87
45	1.50	0.35	23.44	20.84	48.04	42.71
60	2.00	0.25	29.69	26.39	77.73	69.10
80	2.50	0.18	20.28	18.03	98.01	87.13
120	3.00	0.13	10.23	9.09	108.24	96.22
170	3.50	0.09	2.42	2.15	110.66	98.37
200	3.75	0.07	0.24	0.21	110.90	98.58
230	4.00	0.06	0.04	0.04	110.94	98.62

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.93	2.41	2.16	1.64	1.08	0.73	-0.02

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.52	0.35	0.96	-1.49	8.32

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-42 #2

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,127,225	-18,129	North Carolina State Plane	-53.9 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.87	106.41	0.01	0.04	#200 - 5.09 #230 - 4.92		9	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.07	0.06	0.07	0.06
10	-1.00	2.00	0.22	0.20	0.29	0.26
14	-0.50	1.41	0.34	0.30	0.63	0.56
18	0.00	1.00	0.65	0.58	1.28	1.14
25	0.50	0.71	1.43	1.28	2.71	2.42
35	1.00	0.50	2.78	2.49	5.49	4.91
45	1.50	0.35	6.90	6.17	12.39	11.08
60	2.00	0.25	15.70	14.03	28.09	25.11
80	2.50	0.18	33.29	29.76	61.38	54.87
120	3.00	0.13	30.88	27.60	92.26	82.47
170	3.50	0.09	12.64	11.30	104.90	93.77
200	3.75	0.07	1.27	1.14	106.17	94.91
230	4.00	0.06	0.19	0.17	106.36	95.08

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.88	3.07	2.86	2.42	2.00	1.68	1.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.29	0.20	0.73	-1.2	5.84

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-42 #3

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,127,225	-18,129	North Carolina State Plane	-55.8 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 2.5Y-3/2 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.89	106.75	0.02	0.10	#200 - 7.27 #230 - 7.21		16	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.79	0.69	0.79	0.69
3.5	-2.50	5.66	4.52	3.93	5.31	4.62
4	-2.25	4.76	0.79	0.69	6.10	5.31
5	-2.00	4.00	0.84	0.73	6.94	6.04
7	-1.50	2.83	1.80	1.57	8.74	7.61
10	-1.00	2.00	2.37	2.06	11.11	9.67
14	-0.50	1.41	5.50	4.79	16.61	14.46
18	0.00	1.00	9.36	8.15	25.97	22.61
25	0.50	0.71	13.52	11.77	39.49	34.38
35	1.00	0.50	12.93	11.25	52.42	45.63
45	1.50	0.35	11.94	10.39	64.36	56.02
60	2.00	0.25	12.92	11.25	77.28	67.27
80	2.50	0.18	11.41	9.93	88.69	77.20
120	3.00	0.13	12.71	11.06	101.40	88.26
170	3.50	0.09	4.54	3.95	105.94	92.21
200	3.75	0.07	0.60	0.52	106.54	92.73
230	4.00	0.06	0.07	0.06	106.61	92.79

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.81	2.39	1.21	0.10	-0.41	-2.36

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	0.91	0.53	1.54	-0.63	2.98

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-43 #1

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,148,894	-26,064	North Carolina State Plane	-56.9 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-4/1 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.39	106.92	0.03	0.00	#200 - 1.43 #230 - 1.39		11	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.21	0.19	0.21	0.19
3.5	-2.50	5.66	1.14	1.05	1.35	1.24
4	-2.25	4.76	0.26	0.24	1.61	1.48
5	-2.00	4.00	0.40	0.37	2.01	1.85
7	-1.50	2.83	0.99	0.91	3.00	2.76
10	-1.00	2.00	1.47	1.36	4.47	4.12
14	-0.50	1.41	2.10	1.94	6.57	6.06
18	0.00	1.00	2.45	2.26	9.02	8.32
25	0.50	0.71	4.95	4.57	13.97	12.89
35	1.00	0.50	12.99	11.98	26.96	24.87
45	1.50	0.35	23.19	21.39	50.15	46.26
60	2.00	0.25	27.88	25.72	78.03	71.98
80	2.50	0.18	16.69	15.40	94.72	87.38
120	3.00	0.13	10.46	9.65	105.18	97.03
170	3.50	0.09	1.50	1.38	106.68	98.41
200	3.75	0.07	0.17	0.16	106.85	98.57
230	4.00	0.06	0.04	0.04	106.89	98.61

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.89	2.39	2.10	1.57	1.00	0.63	-0.77

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.4	0.38	1.07	-1.42	6.12

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-43 #2

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,148,894	-26,064	North Carolina State Plane	-59.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-4/2 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.93	105.21	0.01	0.06	#200 - 2.63 #230 - 2.58		11	10

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	1.17	1.08	1.17	1.08
3.5	-2.50	5.66	0.30	0.28	1.47	1.36
4	-2.25	4.76	0.66	0.61	2.13	1.97
5	-2.00	4.00	0.20	0.19	2.33	2.16
7	-1.50	2.83	0.75	0.69	3.08	2.85
10	-1.00	2.00	0.96	0.89	4.04	3.74
14	-0.50	1.41	1.66	1.54	5.70	5.28
18	0.00	1.00	2.28	2.11	7.98	7.39
25	0.50	0.71	4.76	4.41	12.74	11.80
35	1.00	0.50	9.98	9.25	22.72	21.05
45	1.50	0.35	18.63	17.26	41.35	38.31
60	2.00	0.25	25.19	23.34	66.54	61.65
80	2.50	0.18	18.80	17.42	85.34	79.07
120	3.00	0.13	15.26	14.14	100.60	93.21
170	3.50	0.09	4.04	3.74	104.64	96.95
200	3.75	0.07	0.45	0.42	105.09	97.37
230	4.00	0.06	0.05	0.05	105.14	97.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.24	2.67	2.38	1.75	1.11	0.73	-0.59

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.56	0.34	1.15	-1.55	6.74

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-43 #3

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,148,894	-26,064	North Carolina State Plane	-61.7 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.60	101.36	0.01	0.02	#200 - 6.02 #230 - 5.81		5	4

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.11	0.10	0.11	0.10
5	-2.00	4.00	0.03	0.03	0.14	0.13
7	-1.50	2.83	0.04	0.04	0.18	0.17
10	-1.00	2.00	0.16	0.15	0.34	0.32
14	-0.50	1.41	0.34	0.32	0.68	0.64
18	0.00	1.00	0.61	0.57	1.29	1.21
25	0.50	0.71	1.16	1.08	2.45	2.29
35	1.00	0.50	2.55	2.37	5.00	4.66
45	1.50	0.35	4.88	4.54	9.88	9.20
60	2.00	0.25	10.17	9.45	20.05	18.65
80	2.50	0.18	20.22	18.79	40.27	37.44
120	3.00	0.13	46.05	42.80	86.32	80.24
170	3.50	0.09	13.79	12.82	100.11	93.06
200	3.75	0.07	0.99	0.92	101.10	93.98
230	4.00	0.06	0.23	0.21	101.33	94.19

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.15	2.94	2.65	2.17	1.86	1.04

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.43	0.19	0.73	-1.82	8.44

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-44 #1

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,140,131	-30,846	North Carolina State Plane	-55.5 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
113.25	111.27	0.01	0.07	#200 - 1.91 #230 - 1.84		5	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.06	0.05	0.06	0.05
7	-1.50	2.83	0.05	0.04	0.11	0.09
10	-1.00	2.00	0.06	0.05	0.17	0.14
14	-0.50	1.41	0.10	0.09	0.27	0.23
18	0.00	1.00	0.41	0.36	0.68	0.59
25	0.50	0.71	2.09	1.85	2.77	2.44
35	1.00	0.50	5.96	5.26	8.73	7.70
45	1.50	0.35	11.19	9.88	19.92	17.58
60	2.00	0.25	32.21	28.44	52.13	46.02
80	2.50	0.18	35.59	31.43	87.72	77.45
120	3.00	0.13	18.89	16.68	106.61	94.13
170	3.50	0.09	4.06	3.58	110.67	97.71
200	3.75	0.07	0.43	0.38	111.10	98.09
230	4.00	0.06	0.08	0.07	111.18	98.16

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.12	2.70	2.46	2.06	1.63	1.42	0.74

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2	0.25	0.67	-0.73	4.82

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-44 #2

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,140,131	-30,846	North Carolina State Plane	-58.2 NAVD 88

USCS:	Munsell:	Comments:
SW-SC	Wet - 2.5Y-2.5/2 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
107.83	96.74	0.01	0.00	#200 - 10.42 #230 - 10.31			8

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.77	0.71	0.77	0.71
5/16"	-3.00	8.00	0.00	0.00	0.77	0.71
3.5	-2.50	5.66	0.42	0.39	1.19	1.10
4	-2.25	4.76	0.00	0.00	1.19	1.10
5	-2.00	4.00	0.22	0.20	1.41	1.30
7	-1.50	2.83	0.42	0.39	1.83	1.69
10	-1.00	2.00	0.77	0.71	2.60	2.40
14	-0.50	1.41	1.82	1.69	4.42	4.09
18	0.00	1.00	1.76	1.63	6.18	5.72
25	0.50	0.71	1.90	1.76	8.08	7.48
35	1.00	0.50	1.70	1.58	9.78	9.06
45	1.50	0.35	1.91	1.77	11.69	10.83
60	2.00	0.25	7.01	6.50	18.70	17.33
80	2.50	0.18	16.23	15.05	34.93	32.38
120	3.00	0.13	53.29	49.42	88.22	81.80
170	3.50	0.09	7.80	7.23	96.02	89.03
200	3.75	0.07	0.59	0.55	96.61	89.58
230	4.00	0.06	0.12	0.11	96.73	89.69

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.15	2.93	2.68	2.25	1.90	-0.22

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.27	0.21	1.13	-2.78	11.81

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-45 #1

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,133,768	-47,395	North Carolina State Plane	-57.2 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/2 Dry - 5Y-6/2 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.74	107.00	0.00	0.09	#200 - 1.75 #230 - 1.70		3	3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.07	0.06	0.07	0.06
4	-2.25	4.76	0.02	0.02	0.09	0.08
5	-2.00	4.00	0.00	0.00	0.09	0.08
7	-1.50	2.83	0.10	0.09	0.19	0.17
10	-1.00	2.00	0.21	0.19	0.40	0.36
14	-0.50	1.41	0.44	0.40	0.84	0.76
18	0.00	1.00	0.69	0.63	1.53	1.39
25	0.50	0.71	1.39	1.28	2.92	2.67
35	1.00	0.50	3.77	3.47	6.69	6.14
45	1.50	0.35	14.33	13.18	21.02	19.32
60	2.00	0.25	36.24	33.33	57.26	52.65
80	2.50	0.18	27.13	24.95	84.39	77.60
120	3.00	0.13	19.24	17.69	103.63	95.29
170	3.50	0.09	2.90	2.67	106.53	97.96
200	3.75	0.07	0.32	0.29	106.85	98.25
230	4.00	0.06	0.05	0.05	106.90	98.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.99	2.68	2.45	1.96	1.59	1.37	0.84

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.95	0.26	0.69	-1.03	6.81

BOEM_TO1_ONSLOW_AND_LONG_BAYS-NC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-46 #1

Analysis Date: 12-19-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,715,478	661,660	South Carolina State Plane	-53.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-5/2 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.55	110.56	0.02	0.06	#200 - 1.88 #230 - 1.85		6	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.82	0.73	0.82	0.73
5/16"	-3.00	8.00	0.00	0.00	0.82	0.73
3.5	-2.50	5.66	0.40	0.36	1.22	1.09
4	-2.25	4.76	0.07	0.06	1.29	1.15
5	-2.00	4.00	0.11	0.10	1.40	1.25
7	-1.50	2.83	0.34	0.30	1.74	1.55
10	-1.00	2.00	1.07	0.95	2.81	2.50
14	-0.50	1.41	2.98	2.65	5.79	5.15
18	0.00	1.00	4.56	4.05	10.35	9.20
25	0.50	0.71	7.99	7.10	18.34	16.30
35	1.00	0.50	17.41	15.47	35.75	31.77
45	1.50	0.35	18.99	16.87	54.74	48.64
60	2.00	0.25	16.93	15.04	71.67	63.68
80	2.50	0.18	20.52	18.23	92.19	81.91
120	3.00	0.13	14.68	13.04	106.87	94.95
170	3.50	0.09	3.14	2.79	110.01	97.74
200	3.75	0.07	0.43	0.38	110.44	98.12
230	4.00	0.06	0.03	0.03	110.47	98.15

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.01	2.58	2.31	1.55	0.78	0.48	-0.53

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.42	0.37	1.14	-1.11	5.67

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-46 #2

Analysis Date: 12-16-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,715,478	661,660	South Carolina State Plane	-56.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.93	108.50	0.01	0.06	#200 - 2.40 #230 - 2.25		6	1

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.13	0.12	0.13	0.12
7	-1.50	2.83	0.03	0.03	0.16	0.15
10	-1.00	2.00	0.12	0.11	0.28	0.26
14	-0.50	1.41	0.76	0.69	1.04	0.95
18	0.00	1.00	1.85	1.67	2.89	2.62
25	0.50	0.71	3.39	3.06	6.28	5.68
35	1.00	0.50	6.88	6.20	13.16	11.88
45	1.50	0.35	7.95	7.17	21.11	19.05
60	2.00	0.25	14.27	12.86	35.38	31.91
80	2.50	0.18	29.42	26.52	64.80	58.43
120	3.00	0.13	35.43	31.94	100.23	90.37
170	3.50	0.09	7.32	6.60	107.55	96.97
200	3.75	0.07	0.70	0.63	108.25	97.60
230	4.00	0.06	0.17	0.15	108.42	97.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.35	2.90	2.76	2.34	1.73	1.29	0.39

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.12	0.23	0.86	-1.21	4.59

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-47 #1

Analysis Date: 12-19-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,676,128	672,162	South Carolina State Plane	-42.5 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
113.69	111.67	0.01	0.04	#200 - 1.86 #230 - 1.83		10	8

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.41	0.36	0.41	0.36
3.5	-2.50	5.66	0.88	0.77	1.29	1.13
4	-2.25	4.76	0.00	0.00	1.29	1.13
5	-2.00	4.00	0.09	0.08	1.38	1.21
7	-1.50	2.83	0.06	0.05	1.44	1.26
10	-1.00	2.00	0.54	0.47	1.98	1.73
14	-0.50	1.41	2.66	2.34	4.64	4.07
18	0.00	1.00	8.82	7.76	13.46	11.83
25	0.50	0.71	16.96	14.92	30.42	26.75
35	1.00	0.50	16.16	14.21	46.58	40.96
45	1.50	0.35	8.10	7.12	54.68	48.08
60	2.00	0.25	16.22	14.27	70.90	62.35
80	2.50	0.18	21.21	18.66	92.11	81.01
120	3.00	0.13	14.88	13.09	106.99	94.10
170	3.50	0.09	4.23	3.72	111.22	97.82
200	3.75	0.07	0.36	0.32	111.58	98.14
230	4.00	0.06	0.03	0.03	111.61	98.17

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.12	2.61	2.34	1.57	0.44	0.14	-0.44

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.34	0.40	1.18	-0.58	3.43

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-48 #1

Analysis Date: 12-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,679,806	653,296	South Carolina State Plane	-44.4 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-6/2 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
112.95	110.18	0.00	0.11	#200 - 2.58 #230 - 2.54		3	4

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.00	0.00	0.00	0.00
10	-1.00	2.00	0.20	0.18	0.20	0.18
14	-0.50	1.41	0.82	0.73	1.02	0.91
18	0.00	1.00	1.38	1.22	2.40	2.13
25	0.50	0.71	3.15	2.79	5.55	4.92
35	1.00	0.50	8.83	7.82	14.38	12.74
45	1.50	0.35	20.13	17.82	34.51	30.56
60	2.00	0.25	33.26	29.45	67.77	60.01
80	2.50	0.18	29.31	25.95	97.08	85.96
120	3.00	0.13	10.64	9.42	107.72	95.38
170	3.50	0.09	2.02	1.79	109.74	97.17
200	3.75	0.07	0.28	0.25	110.02	97.42
230	4.00	0.06	0.04	0.04	110.06	97.46

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.46	2.29	1.83	1.34	1.09	0.51

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.75	0.30	0.72	-0.67	4.16

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-48 #2

Analysis Date: 12-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,679,806	653,296	South Carolina State Plane	-47.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-4/2 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.90	107.15	0.01	0.15	#200 - 2.70 #230 - 2.63		4	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.13	0.12	0.13	0.12
3.5	-2.50	5.66	0.00	0.00	0.13	0.12
4	-2.25	4.76	0.03	0.03	0.16	0.15
5	-2.00	4.00	0.04	0.04	0.20	0.19
7	-1.50	2.83	0.04	0.04	0.24	0.23
10	-1.00	2.00	0.15	0.14	0.39	0.37
14	-0.50	1.41	0.37	0.34	0.76	0.71
18	0.00	1.00	0.94	0.86	1.70	1.57
25	0.50	0.71	2.07	1.88	3.77	3.45
35	1.00	0.50	5.81	5.29	9.58	8.74
45	1.50	0.35	13.65	12.42	23.23	21.16
60	2.00	0.25	26.24	23.88	49.47	45.04
80	2.50	0.18	34.90	31.76	84.37	76.80
120	3.00	0.13	17.52	15.94	101.89	92.74
170	3.50	0.09	4.38	3.99	106.27	96.73
200	3.75	0.07	0.63	0.57	106.90	97.30
230	4.00	0.06	0.08	0.07	106.98	97.37

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.28	2.73	2.47	2.08	1.58	1.29	0.65

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.96	0.26	0.75	-1.16	7.23

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-50 #1

Analysis Date: 12-22-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,664,253	638,972	South Carolina State Plane	-44.9 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.55	110.85	0.02	0.10	#200 - 3.40 #230 - 3.36		7	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.40	0.35	0.40	0.35
4	-2.25	4.76	0.08	0.07	0.48	0.42
5	-2.00	4.00	0.12	0.10	0.60	0.52
7	-1.50	2.83	0.55	0.48	1.15	1.00
10	-1.00	2.00	0.97	0.85	2.12	1.85
14	-0.50	1.41	2.19	1.91	4.31	3.76
18	0.00	1.00	3.45	3.01	7.76	6.77
25	0.50	0.71	6.66	5.81	14.42	12.58
35	1.00	0.50	9.48	8.28	23.90	20.86
45	1.50	0.35	13.59	11.86	37.49	32.72
60	2.00	0.25	28.82	25.16	66.31	57.88
80	2.50	0.18	28.51	24.89	94.82	82.77
120	3.00	0.13	12.99	11.34	107.81	94.11
170	3.50	0.09	2.58	2.25	110.39	96.36
200	3.75	0.07	0.27	0.24	110.66	96.60
230	4.00	0.06	0.05	0.04	110.71	96.64

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.20	2.55	2.34	1.84	1.17	0.71	-0.29

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.62	0.33	0.98	-1.18	4.97

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-51 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,662,043	636,953	South Carolina State Plane	-45.1 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.43	111.13	0.01	0.00	#200 - 2.91 #230 - 2.89		3	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.00	0.00	0.00	0.00
7	-1.50	2.83	0.29	0.25	0.29	0.25
10	-1.00	2.00	0.86	0.75	1.15	1.00
14	-0.50	1.41	3.56	3.11	4.71	4.11
18	0.00	1.00	7.80	6.82	12.51	10.93
25	0.50	0.71	15.71	13.73	28.22	24.66
35	1.00	0.50	21.40	18.70	49.62	43.36
45	1.50	0.35	20.75	18.13	70.37	61.49
60	2.00	0.25	16.19	14.15	86.56	75.64
80	2.50	0.18	12.63	11.04	99.19	86.68
120	3.00	0.13	9.93	8.68	109.12	95.36
170	3.50	0.09	1.83	1.60	110.95	96.96
200	3.75	0.07	0.15	0.13	111.10	97.09
230	4.00	0.06	0.02	0.02	111.12	97.11

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.38	1.98	1.18	0.51	0.18	-0.43

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.17	0.44	0.98	-0.04	2.54

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-52 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,638,307	616,893	South Carolina State Plane	-34.3 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
99.69	97.25	0.01	0.00	#200 - 2.49 #230 - 2.47		3	3

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.10	0.10	0.10	0.10
7	-1.50	2.83	0.05	0.05	0.15	0.15
10	-1.00	2.00	0.20	0.20	0.35	0.35
14	-0.50	1.41	0.70	0.70	1.05	1.05
18	0.00	1.00	1.65	1.66	2.70	2.71
25	0.50	0.71	4.69	4.70	7.39	7.41
35	1.00	0.50	13.96	14.00	21.35	21.41
45	1.50	0.35	19.78	19.84	41.13	41.25
60	2.00	0.25	27.01	27.09	68.14	68.34
80	2.50	0.18	21.78	21.85	89.92	90.19
120	3.00	0.13	6.04	6.06	95.96	96.25
170	3.50	0.09	1.09	1.09	97.05	97.34
200	3.75	0.07	0.17	0.17	97.22	97.51
230	4.00	0.06	0.02	0.02	97.24	97.53

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.90	2.36	2.15	1.66	1.09	0.81	0.24

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.56	0.34	0.76	-0.58	3.92

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-53 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,655,173	554,510	South Carolina State Plane	-47.0 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.25	108.88	0.01	0.00	#200 - 1.27 #230 - 1.25		5	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.05	0.05	0.05	0.05
5	-2.00	4.00	0.09	0.08	0.14	0.13
7	-1.50	2.83	0.54	0.49	0.68	0.62
10	-1.00	2.00	0.77	0.70	1.45	1.32
14	-0.50	1.41	1.35	1.22	2.80	2.54
18	0.00	1.00	2.62	2.38	5.42	4.92
25	0.50	0.71	5.56	5.04	10.98	9.96
35	1.00	0.50	13.50	12.24	24.48	22.20
45	1.50	0.35	19.32	17.52	43.80	39.72
60	2.00	0.25	24.87	22.56	68.67	62.28
80	2.50	0.18	26.83	24.34	95.50	86.62
120	3.00	0.13	12.09	10.97	107.59	97.59
170	3.50	0.09	1.18	1.07	108.77	98.66
200	3.75	0.07	0.08	0.07	108.85	98.73
230	4.00	0.06	0.02	0.02	108.87	98.75

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.88	2.45	2.26	1.73	1.08	0.75	0.01

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.59	0.33	0.88	-0.92	4.27

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-53 #2

Analysis Date: 12-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,655,173	554,510	South Carolina State Plane	-56.0 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-5/1 Dry - 5Y-6/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
111.92	109.16	0.02	0.11	#200 - 2.67 #230 - 2.58		4	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.05	0.04	0.05	0.04
5	-2.00	4.00	0.04	0.04	0.09	0.08
7	-1.50	2.83	0.21	0.19	0.30	0.27
10	-1.00	2.00	0.12	0.11	0.42	0.38
14	-0.50	1.41	0.29	0.26	0.71	0.64
18	0.00	1.00	0.52	0.46	1.23	1.10
25	0.50	0.71	2.04	1.82	3.27	2.92
35	1.00	0.50	7.91	7.07	11.18	9.99
45	1.50	0.35	16.37	14.63	27.55	24.62
60	2.00	0.25	28.25	25.24	55.80	49.86
80	2.50	0.18	30.28	27.06	86.08	76.92
120	3.00	0.13	19.10	17.07	105.18	93.99
170	3.50	0.09	3.30	2.95	108.48	96.94
200	3.75	0.07	0.44	0.39	108.92	97.33
230	4.00	0.06	0.10	0.09	109.02	97.42

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.17	2.71	2.46	2.00	1.51	1.21	0.65

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.91	0.27	0.73	-0.81	5.12

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-54 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,640,463	573,601	South Carolina State Plane	-44.8 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.32	105.94	0.01	0.00	#200 - 2.32 #230 - 2.21		5	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.01	0.01	0.01	0.01
7	-1.50	2.83	0.12	0.11	0.13	0.12
10	-1.00	2.00	0.24	0.22	0.37	0.34
14	-0.50	1.41	0.31	0.29	0.68	0.63
18	0.00	1.00	0.59	0.54	1.27	1.17
25	0.50	0.71	1.33	1.23	2.60	2.40
35	1.00	0.50	3.02	2.79	5.62	5.19
45	1.50	0.35	4.89	4.51	10.51	9.70
60	2.00	0.25	12.39	11.44	22.90	21.14
80	2.50	0.18	26.56	24.52	49.46	45.66
120	3.00	0.13	48.43	44.71	97.89	90.37
170	3.50	0.09	7.45	6.88	105.34	97.25
200	3.75	0.07	0.47	0.43	105.81	97.68
230	4.00	0.06	0.12	0.11	105.93	97.79

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.34	2.93	2.83	2.55	2.08	1.78	0.97

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.35	0.20	0.7	-1.78	7.87

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-54 #2

Analysis Date: 12-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,640,463	573,601	South Carolina State Plane	-51.3 NAVD 88

USCS:	Munsell:	Comments:
SP-SM	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.79	105.74	0.02	0.11	#200 - 5.00 #230 - 4.68		5	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.06	0.05	0.06	0.05
7	-1.50	2.83	0.22	0.20	0.28	0.25
10	-1.00	2.00	0.19	0.17	0.47	0.42
14	-0.50	1.41	0.19	0.17	0.66	0.59
18	0.00	1.00	0.23	0.21	0.89	0.80
25	0.50	0.71	0.76	0.69	1.65	1.49
35	1.00	0.50	2.01	1.81	3.66	3.30
45	1.50	0.35	3.23	2.92	6.89	6.22
60	2.00	0.25	6.02	5.43	12.91	11.65
80	2.50	0.18	15.88	14.33	28.79	25.98
120	3.00	0.13	61.75	55.74	90.54	81.72
170	3.50	0.09	13.57	12.25	104.11	93.97
200	3.75	0.07	1.14	1.03	105.25	95.00
230	4.00	0.06	0.35	0.32	105.60	95.32

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.75	3.09	2.94	2.72	2.47	2.15	1.29

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.56	0.17	0.65	-2.49	13.1

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-55 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,654,704	588,870	South Carolina State Plane	-50.4 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 5Y-3/1 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
109.37	107.32	0.02	0.00	#200 - 1.92 #230 - 1.90		4	4

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.05	0.05	0.05	0.05
5	-2.00	4.00	0.33	0.30	0.38	0.35
7	-1.50	2.83	0.20	0.18	0.58	0.53
10	-1.00	2.00	0.43	0.39	1.01	0.92
14	-0.50	1.41	1.35	1.23	2.36	2.15
18	0.00	1.00	3.62	3.31	5.98	5.46
25	0.50	0.71	8.61	7.87	14.59	13.33
35	1.00	0.50	16.03	14.66	30.62	27.99
45	1.50	0.35	23.83	21.79	54.45	49.78
60	2.00	0.25	25.68	23.48	80.13	73.26
80	2.50	0.18	14.43	13.19	94.56	86.45
120	3.00	0.13	11.15	10.19	105.71	96.64
170	3.50	0.09	1.44	1.32	107.15	97.96
200	3.75	0.07	0.13	0.12	107.28	98.08
230	4.00	0.06	0.02	0.02	107.30	98.10

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.92	2.41	2.07	1.50	0.90	0.59	-0.07

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.43	0.37	0.89	-0.52	3.73

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-55 #2

Analysis Date: 12-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,654,704	588,870	South Carolina State Plane	-51.9 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
101.70	97.72	0.02	0.08	#200 - 4.14 #230 - 4.02		10	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.40	0.39	0.40	0.39
3.5	-2.50	5.66	0.45	0.44	0.85	0.83
4	-2.25	4.76	0.00	0.00	0.85	0.83
5	-2.00	4.00	0.02	0.02	0.87	0.85
7	-1.50	2.83	0.18	0.18	1.05	1.03
10	-1.00	2.00	0.29	0.29	1.34	1.32
14	-0.50	1.41	0.33	0.32	1.67	1.64
18	0.00	1.00	0.41	0.40	2.08	2.04
25	0.50	0.71	1.02	1.00	3.10	3.04
35	1.00	0.50	1.82	1.79	4.92	4.83
45	1.50	0.35	2.96	2.91	7.88	7.74
60	2.00	0.25	8.22	8.08	16.10	15.82
80	2.50	0.18	19.61	19.28	35.71	35.10
120	3.00	0.13	49.73	48.90	85.44	84.00
170	3.50	0.09	11.37	11.18	96.81	95.18
200	3.75	0.07	0.69	0.68	97.50	95.86
230	4.00	0.06	0.12	0.12	97.62	95.98

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.49	3.00	2.91	2.65	2.24	2.00	1.03

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	2.43	0.19	0.85	-3.29	18.49

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-56 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,662,084	591,669	South Carolina State Plane	-47.1 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 10Y-4/1 Dry - 5Y-5/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.17	108.83	0.01	0.00	#200 - 1.23 #230 - 1.21		5	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.55	0.50	0.55	0.50
3.5	-2.50	5.66	0.00	0.00	0.55	0.50
4	-2.25	4.76	0.00	0.00	0.55	0.50
5	-2.00	4.00	0.11	0.10	0.66	0.60
7	-1.50	2.83	0.33	0.30	0.99	0.90
10	-1.00	2.00	0.61	0.55	1.60	1.45
14	-0.50	1.41	1.64	1.49	3.24	2.94
18	0.00	1.00	3.33	3.02	6.57	5.96
25	0.50	0.71	6.39	5.80	12.96	11.76
35	1.00	0.50	10.45	9.49	23.41	21.25
45	1.50	0.35	14.02	12.73	37.43	33.98
60	2.00	0.25	23.99	21.78	61.42	55.76
80	2.50	0.18	29.08	26.40	90.50	82.16
120	3.00	0.13	16.63	15.09	107.13	97.25
170	3.50	0.09	1.56	1.42	108.69	98.67
200	3.75	0.07	0.11	0.10	108.80	98.77
230	4.00	0.06	0.02	0.02	108.82	98.79

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.93	2.56	2.36	1.87	1.15	0.72	-0.16

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.66	0.32	0.98	-1.34	6.06

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-56 #2

Analysis Date: 12-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,662,084	591,669	South Carolina State Plane	-57.7 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - N-4/0 Dry - 5Y-6/1 Washed - 5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
108.25	102.18	0.01	0.07	#200 - 5.71 #230 - 5.70			5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.50	0.46	0.50	0.46
4	-2.25	4.76	0.33	0.30	0.83	0.76
5	-2.00	4.00	0.21	0.19	1.04	0.95
7	-1.50	2.83	0.64	0.59	1.68	1.54
10	-1.00	2.00	1.08	1.00	2.76	2.54
14	-0.50	1.41	1.60	1.48	4.36	4.02
18	0.00	1.00	3.96	3.66	8.32	7.68
25	0.50	0.71	7.98	7.37	16.30	15.05
35	1.00	0.50	10.36	9.57	26.66	24.62
45	1.50	0.35	12.28	11.34	38.94	35.96
60	2.00	0.25	24.18	22.34	63.12	58.30
80	2.50	0.18	31.72	29.30	94.84	87.60
120	3.00	0.13	6.65	6.14	101.49	93.74
170	3.50	0.09	0.53	0.49	102.02	94.23
200	3.75	0.07	0.06	0.06	102.08	94.29
230	4.00	0.06	0.01	0.01	102.09	94.30

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	2.44	2.28	1.81	1.02	0.55	-0.37

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.49	0.36	1	-1.33	5.17

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-57 #1

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,652,199	601,821	South Carolina State Plane	-47.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 5Y-3/2 Dry - 5Y-5/1 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
118.27	116.91	0.01	0.00	#200 - 1.16 #230 - 1.15		4	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.03	0.03	0.03	0.03
5	-2.00	4.00	0.04	0.03	0.07	0.06
7	-1.50	2.83	0.10	0.08	0.17	0.14
10	-1.00	2.00	0.67	0.57	0.84	0.71
14	-0.50	1.41	2.90	2.45	3.74	3.16
18	0.00	1.00	6.44	5.45	10.18	8.61
25	0.50	0.71	14.83	12.54	25.01	21.15
35	1.00	0.50	24.04	20.33	49.05	41.48
45	1.50	0.35	28.47	24.07	77.52	65.55
60	2.00	0.25	24.11	20.39	101.63	85.94
80	2.50	0.18	9.71	8.21	111.34	94.15
120	3.00	0.13	4.57	3.86	115.91	98.01
170	3.50	0.09	0.90	0.76	116.81	98.77
200	3.75	0.07	0.08	0.07	116.89	98.84
230	4.00	0.06	0.01	0.01	116.90	98.85

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.61	1.95	1.73	1.18	0.59	0.29	-0.33

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	1.13	0.46	0.83	-0.19	3.15

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-57 #2

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,652,199	601,821	South Carolina State Plane	-49.4 NAVD 88

USCS:	Munsell:	Comments:
SW-SM	Wet - 5Y-3/2 Dry - 5Y-4/2 Washed - 5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
115.04	107.76	0.01	0.00	#200 - 6.46 #230 - 6.35		12	5

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.20	0.17	0.20	0.17
4	-2.25	4.76	0.37	0.32	0.57	0.49
5	-2.00	4.00	0.11	0.10	0.68	0.59
7	-1.50	2.83	0.09	0.08	0.77	0.67
10	-1.00	2.00	0.09	0.08	0.86	0.75
14	-0.50	1.41	0.61	0.53	1.47	1.28
18	0.00	1.00	1.05	0.91	2.52	2.19
25	0.50	0.71	2.27	1.97	4.79	4.16
35	1.00	0.50	3.80	3.30	8.59	7.46
45	1.50	0.35	4.69	4.08	13.28	11.54
60	2.00	0.25	6.41	5.57	19.69	17.11
80	2.50	0.18	18.97	16.49	38.66	33.60
120	3.00	0.13	48.17	41.87	86.83	75.47
170	3.50	0.09	19.59	17.03	106.42	92.50
200	3.75	0.07	1.20	1.04	107.62	93.54
230	4.00	0.06	0.13	0.11	107.75	93.65

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
	3.25	2.99	2.70	2.24	1.90	0.63

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.43	0.19	0.89	-2.22	9.85

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-58 #1

Analysis Date: 12-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,623,479	595,569	South Carolina State Plane	-39.7 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - 2.5Y-7/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
114.26	112.42	0.00	0.02	#200 - 1.66 #230 - 1.62		9	4

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.12	0.11	0.12	0.11
4	-2.25	4.76	0.29	0.25	0.41	0.36
5	-2.00	4.00	0.19	0.17	0.60	0.53
7	-1.50	2.83	0.60	0.53	1.20	1.06
10	-1.00	2.00	0.62	0.54	1.82	1.60
14	-0.50	1.41	0.78	0.68	2.60	2.28
18	0.00	1.00	1.06	0.93	3.66	3.21
25	0.50	0.71	1.67	1.46	5.33	4.67
35	1.00	0.50	4.43	3.88	9.76	8.55
45	1.50	0.35	9.19	8.04	18.95	16.59
60	2.00	0.25	19.12	16.73	38.07	33.32
80	2.50	0.18	45.82	40.10	83.89	73.42
120	3.00	0.13	25.42	22.25	109.31	95.67
170	3.50	0.09	2.84	2.49	112.15	98.16
200	3.75	0.07	0.20	0.18	112.35	98.34
230	4.00	0.06	0.05	0.04	112.40	98.38

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
2.98	2.74	2.54	2.21	1.75	1.46	0.54

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.03	0.24	0.84	-2.16	9.94

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-58 #2

Analysis Date: 12-23-22

Analyzed By: SF

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,623,479	595,569	South Carolina State Plane	-45.3 NAVD 88

USCS:	Munsell:	Comments:
SW	Wet - 2.5Y-4/1 Dry - 2.5Y-5/1 Washed - N-7/0	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
110.47	105.90	0.02	0.01	#200 - 4.21 #230 - 4.17		11	15

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.29	0.26	0.29	0.26
4	-2.25	4.76	0.07	0.06	0.36	0.32
5	-2.00	4.00	0.26	0.24	0.62	0.56
7	-1.50	2.83	0.85	0.77	1.47	1.33
10	-1.00	2.00	0.71	0.64	2.18	1.97
14	-0.50	1.41	1.40	1.27	3.58	3.24
18	0.00	1.00	1.67	1.51	5.25	4.75
25	0.50	0.71	2.29	2.07	7.54	6.82
35	1.00	0.50	3.75	3.39	11.29	10.21
45	1.50	0.35	8.22	7.44	19.51	17.65
60	2.00	0.25	24.90	22.54	44.41	40.19
80	2.50	0.18	51.29	46.43	95.70	86.62
120	3.00	0.13	9.09	8.23	104.79	94.85
170	3.50	0.09	0.88	0.80	105.67	95.65
200	3.75	0.07	0.16	0.14	105.83	95.79
230	4.00	0.06	0.04	0.04	105.87	95.83

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.09	2.47	2.37	2.11	1.66	1.39	0.06

Moment	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
Statistics	1.85	0.28	0.86	-2.3	9.75

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

Granularmetric Report

Depths and elevations based on measured values

Project Name: BOEM 2022 Onslow and Long Bays, NC/SC

Sample Name: BOEMVC-2022-SC-60 #1

Analysis Date: 12-23-22

Analyzed By: SP

APTIM
6401 Congress Avenue, Suite 140
Boca Raton, FL 33487
ph (561) 391-8102

Easting (ft):	Northing (ft):	Coordinate System:	Elevation (ft):
2,616,473	602,891	South Carolina State Plane	-34.9 NAVD 88

USCS:	Munsell:	Comments:
SP	Wet - 2.5Y-5/2 Dry - 2.5Y-5/1 Washed - 2.5Y-6/1	

Dry Weight (g):	Wash Weight (g):	Pan Retained (g):	Sieve Loss (%):	Fines (%):	Organics (%):	Carbonates (%):	Shell Hash (%):
104.13	101.32	0.00	0.09	#200 - 2.84 #230 - 2.78		7	2

Sieve Number	Sieve Size (Phi)	Sieve Size (Millimeters)	Grams Retained	% Weight Retained	Cum. Grams Retained	C. % Weight Retained
3/4"	-4.25	19.03	0.00	0.00	0.00	0.00
5/8"	-4.00	16.00	0.00	0.00	0.00	0.00
7/16"	-3.50	11.31	0.00	0.00	0.00	0.00
5/16"	-3.00	8.00	0.00	0.00	0.00	0.00
3.5	-2.50	5.66	0.00	0.00	0.00	0.00
4	-2.25	4.76	0.00	0.00	0.00	0.00
5	-2.00	4.00	0.07	0.07	0.07	0.07
7	-1.50	2.83	0.29	0.28	0.36	0.35
10	-1.00	2.00	0.53	0.51	0.89	0.86
14	-0.50	1.41	0.62	0.60	1.51	1.46
18	0.00	1.00	0.92	0.88	2.43	2.34
25	0.50	0.71	1.39	1.33	3.82	3.67
35	1.00	0.50	2.00	1.92	5.82	5.59
45	1.50	0.35	3.29	3.16	9.11	8.75
60	2.00	0.25	9.82	9.43	18.93	18.18
80	2.50	0.18	42.26	40.58	61.19	58.76
120	3.00	0.13	33.14	31.83	94.33	90.59
170	3.50	0.09	6.57	6.31	100.90	96.90
200	3.75	0.07	0.27	0.26	101.17	97.16
230	4.00	0.06	0.06	0.06	101.23	97.22

Phi 5	Phi 16	Phi 25	Phi 50	Phi 75	Phi 84	Phi 95
3.35	2.90	2.76	2.39	2.08	1.88	0.85

Moment Statistics	Mean Phi	Mean mm	Sorting	Skewness	Kurtosis
	2.27	0.21	0.74	-2.28	10.66

BOEM_TO1_ONSLOW_AND_LONG_BAYS-SC STATE PLANE.GPJ 1/31/23

APPENDIX
2022 APTIM INDIVIDUAL VIBRACORE GRAIN SIZE DISTRIBUTION CURVES/HISTOGRAMS - DIGITAL ONLY

APPENDIX
2022 APTIM VIBRACORE
CARBONATE ANALYSIS REPORT

APTIM

BOEM 2022 Onslow & Long Bays NC/SC

Carbonate Report (Vibracore Samples)

Sample ID	Dish Weight	Dish + Dry	Dish + End	Dry Weight	Post Reaction Weight	% Terrigenous	% Carbonate
BOEMVC-2022-NC-01 S#2	178.49	322.78	276.58	144.29	98.09	68%	32%
BOEMVC-2022-NC-02 S#1	154.30	268.40	259.13	114.10	104.83	92%	8%
BOEMVC-2022-NC-02 S#2	154.53	300.99	288.79	146.46	134.26	92%	8%
BOEMVC-2022-NC-02 S#3	169.83	316.04	305.94	146.21	136.11	93%	7%
BOEMVC-2022-NC-02 S#4	157.25	279.89	231.59	122.64	74.34	61%	39%
BOEMVC-2022-NC-02 S#5	150.60	283.47	224.69	132.87	74.09	56%	44%
BOEMVC-2022-NC-02 S#6	155.25	287.51	249.78	132.26	94.53	71%	29%
BOEMVC-2022-NC-03 S#1	154.97	294.30	265.94	139.33	110.97	80%	20%
BOEMVC-2022-NC-03 S#2	153.13	270.08	213.05	116.95	59.92	51%	49%
BOEMVC-2022-NC-04 S#1	153.64	303.44	263.46	149.80	109.82	73%	27%
BOEMVC-2022-NC-05 S#2	174.57	262.35	208.72	87.78	34.15	39%	61%
BOEMVC-2022-NC-05 S#3	153.09	240.28	213.82	87.19	60.73	70%	30%
BOEMVC-2022-NC-06 S#1	174.96	259.26	253.13	84.30	78.17	93%	7%
BOEMVC-2022-NC-07 S#1	154.14	247.23	205.35	93.09	51.21	55%	45%
BOEMVC-2022-NC-08 S#1	172.40	263.26	256.57	90.86	84.17	93%	7%
BOEMVC-2022-NC-10 S#1	166.99	259.24	253.57	92.25	86.58	94%	6%
BOEMVC-2022-NC-11 S#1	148.28	240.50	235.15	92.22	86.87	94%	6%
BOEMVC-2022-NC-12 S#1	162.94	257.85	250.31	94.91	87.37	92%	8%
BOEMVC-2022-NC-12 S#2	150.00	241.72	220.13	91.72	70.13	76%	24%
BOEMVC-2022-NC-12 S#3	170.86	253.52	242.61	82.66	71.75	87%	13%
BOEMVC-2022-NC-12 S#4	157.00	251.22	242.53	94.22	85.53	91%	9%
BOEMVC-2022-NC-13 S#1	152.36	259.20	253.23	106.84	100.87	94%	6%
BOEMVC-2022-NC-13 S#2	170.70	278.79	271.50	108.09	100.80	93%	7%
BOEMVC-2022-NC-14 S#1	161.33	301.99	256.96	140.66	95.63	68%	32%
BOEMVC-2022-NC-14 S#2	168.15	266.68	260.18	98.53	92.03	93%	7%
BOEMVC-2022-NC-14 S#3	156.17	265.90	257.90	109.73	101.73	93%	7%
BOEMVC-2022-NC-14 S#4	168.67	272.43	265.65	103.76	96.98	93%	7%
BOEMVC-2022-NC-14 S#5	154.10	261.69	258.02	107.59	103.92	97%	3%
BOEMVC-2022-NC-14 S#6	153.76	254.50	251.72	100.74	97.96	97%	3%
BOEMVC-2022-NC-15 S#1	157.23	297.43	274.10	140.20	116.87	83%	17%
BOEMVC-2022-NC-17 S#1	157.80	245.73	221.08	87.93	63.28	72%	28%
BOEMVC-2022-NC-18 S#1	157.42	273.83	221.75	116.41	64.33	55%	45%
BOEMVC-2022-NC-18 S#2	150.85	262.54	220.80	111.69	69.95	63%	37%
BOEMVC-2022-NC-19 S#1	152.47	266.44	244.51	113.97	92.04	81%	19%
BOEMVC-2022-NC-19 S#2	166.79	260.11	251.97	93.32	85.18	91%	9%
BOEMVC-2022-NC-20 S#1	158.02	273.05	247.73	115.03	89.71	78%	22%
BOEMVC-2022-NC-21 S#1	154.28	262.62	249.96	108.34	95.68	88%	12%
BOEMVC-2022-NC-21 S#2	166.20	275.43	261.88	109.23	95.68	88%	12%
BOEMVC-2022-NC-21 S#3	146.54	253.39	219.35	106.85	72.81	68%	32%
BOEMVC-2022-NC-22 S#1	155.41	276.10	263.67	120.69	108.26	90%	10%
BOEMVC-2022-NC-22 S#2	152.00	262.96	251.20	110.96	99.20	89%	11%
BOEMVC-2022-NC-23 S#2	156.09	276.12	249.85	120.03	93.76	78%	22%
BOEMVC-2022-NC-24 S#1	155.00	258.19	237.70	103.19	82.70	80%	20%
BOEMVC-2022-NC-25 S#1	154.97	257.72	238.10	102.75	83.13	81%	19%
BOEMVC-2022-NC-25 S#2	154.04	262.67	243.42	108.63	89.38	82%	18%
BOEMVC-2022-NC-26 S#1	156.62	276.09	262.14	119.47	105.52	88%	12%

Sample ID	Dish Weight	Dish + Dry	Dish + End	Dry Weight	Post Reaction Weight	% Terrigenous	% Carbonate
BOEMVC-2022-NC-27 S#1	163.82	269.17	221.66	105.35	57.84	55%	45%
BOEMVC-2022-NC-27 S#2	146.57	241.64	196.78	95.07	50.21	53%	47%
BOEMVC-2022-NC-28 S#1	154.46	269.35	258.89	114.89	104.43	91%	9%
BOEMVC-2022-NC-28 S#2	165.36	280.81	267.84	115.45	102.48	89%	11%
BOEMVC-2022-NC-28 S#3	158.17	266.14	247.32	107.97	89.15	83%	17%
BOEMVC-2022-NC-29 S#1	156.99	271.96	267.83	114.97	110.84	96%	4%
BOEMVC-2022-NC-29 S#2	153.43	260.27	255.04	106.84	101.61	95%	5%
BOEMVC-2022-NC-29 S#3	155.97	260.29	253.42	104.32	97.45	93%	7%
BOEMVC-2022-NC-30 S#1	145.74	246.65	242.06	100.91	96.32	95%	5%
BOEMVC-2022-NC-30 S#2	154.17	267.43	266.87	113.26	112.70	100%	0%
BOEMVC-2022-NC-31 S#1	158.67	254.76	246.59	96.09	87.92	91%	9%
BOEMVC-2022-NC-31 S#2	176.27	273.12	269.01	96.85	92.74	96%	4%
BOEMVC-2022-NC-31 S#3	144.62	261.59	254.76	116.97	110.14	94%	6%
BOEMVC-2022-NC-31 S#4	167.66	271.10	268.45	103.44	100.79	97%	3%
BOEMVC-2022-NC-32 S#1	154.34	260.74	250.49	106.40	96.15	90%	10%
BOEMVC-2022-NC-32 S#2	147.85	256.75	209.12	108.90	61.27	56%	44%
BOEMVC-2022-NC-32 S#4	157.26	258.77	240.32	101.51	83.06	82%	18%
BOEMVC-2022-NC-33 S#1	154.29	264.48	256.51	110.19	102.22	93%	7%
BOEMVC-2022-NC-33 S#2	154.54	261.72	218.35	107.18	63.81	60%	40%
BOEMVC-2022-NC-34 S#1	178.50	281.74	277.86	103.24	99.36	96%	4%
BOEMVC-2022-NC-35 S#1	154.97	257.56	250.90	102.59	95.93	94%	6%
BOEMVC-2022-NC-36 S#1	157.88	265.44	259.14	107.56	101.26	94%	6%
BOEMVC-2022-NC-36 S#2	153.90	256.39	252.73	102.49	98.83	96%	4%
BOEMVC-2022-NC-37 S#1	150.61	246.47	239.34	95.86	88.73	93%	7%
BOEMVC-2022-NC-38 S#1	155.27	250.54	244.60	95.27	89.33	94%	6%
BOEMVC-2022-NC-40 S#1	169.83	268.92	263.57	99.09	93.74	95%	5%
BOEMVC-2022-SC-41 S#1	153.14	253.86	243.07	100.72	89.93	89%	11%
BOEMVC-2022-SC-41 S#2	153.64	259.11	249.83	105.47	96.19	91%	9%
BOEMVC-2022-SC-42 S#1	168.26	278.35	271.27	110.09	103.01	94%	6%
BOEMVC-2022-SC-42 S#2	153.29	259.08	249.84	105.79	96.55	91%	9%
BOEMVC-2022-SC-42 S#3	157.06	263.59	246.28	106.53	89.22	84%	16%
BOEMVC-2022-SC-43 S#1	153.85	260.67	249.28	106.82	95.43	89%	11%
BOEMVC-2022-SC-43 S#2	152.88	257.70	245.80	104.82	92.92	89%	11%
BOEMVC-2022-SC-43 S#3	154.37	255.43	250.76	101.06	96.39	95%	5%
BOEMVC-2022-SC-44 S#1	154.35	265.46	260.26	111.11	105.91	95%	5%
BOEMVC-2022-SC-45 S#1	165.33	272.14	268.95	106.81	103.62	97%	3%
BOEMVC-2022-SC-46 S#1	154.28	264.46	257.93	110.18	103.65	94%	6%
BOEMVC-2022-SC-46 S#2	156.30	263.92	257.76	107.62	101.46	94%	6%
BOEMVC-2022-SC-47 S#1	165.49	276.75	266.18	111.26	100.69	90%	10%
BOEMVC-2022-SC-48 S#1	157.82	267.50	264.37	109.68	106.55	97%	3%
BOEMVC-2022-SC-48 S#2	154.06	260.71	255.94	106.65	101.88	96%	4%
BOEMVC-2022-SC-50 S#1	158.10	268.64	261.00	110.54	102.90	93%	7%
BOEMVC-2022-SC-51 S#1	151.36	262.46	258.69	111.10	107.33	97%	3%
BOEMVC-2022-SC-52 S#1	154.77	251.96	249.32	97.19	94.55	97%	3%
BOEMVC-2022-SC-53 S#1	157.85	266.47	261.01	108.62	103.16	95%	5%
BOEMVC-2022-SC-53 S#2	152.08	260.74	256.74	108.66	104.66	96%	4%
BOEMVC-2022-SC-54 S#1	151.54	257.34	251.58	105.80	100.04	95%	5%
BOEMVC-2022-SC-54 S#2	159.16	264.48	258.96	105.32	99.80	95%	5%
BOEMVC-2022-SC-55 S#1	162.64	269.75	265.17	107.11	102.53	96%	4%

Sample ID	Dish Weight	Dish + Dry	Dish + End	Dry Weight	Post Reaction Weight	% Terrigenous	% Carbonate
BOEMVC-2022-SC-55 S#2	165.55	263.10	253.10	97.55	87.55	90%	10%
BOEMVC-2022-SC-56 S#1	152.33	261.05	255.64	108.72	103.31	95%	5%
BOEMVC-2022-SC-57 S#1	155.41	272.27	268.01	116.86	112.60	96%	4%
BOEMVC-2022-SC-57 S#2	149.74	257.41	244.88	107.67	95.14	88%	12%
BOEMVC-2022-SC-58 S#1	167.16	279.51	269.38	112.35	102.22	91%	9%
BOEMVC-2022-SC-58 S#2	154.92	260.78	249.59	105.86	94.67	89%	11%
BOEMVC-2022-SC-60 S#1	153.08	254.19	247.60	101.11	94.52	93%	7%

APPENDIX
2022 APTIM VIBRACORE MINI VANE
SHEAR TEST RESULTS

APTIM

Mini Vane Shear Test Results

CORE ID	SAMPLE DEPTH (ft)	TORVANE (kg/cm^2)	TORVANE (tsf)	TORVANE (kpa)	DESCRIPTION[1]
BOEMVC-2022-NC-08	7.0	2.0	0.20	196.13	Very Stiff
	12.3	1.3	0.13	122.58	Stiff
BOEMVC-2022-NC-25	13.0	0.7	0.07	68.65	Firm
BOEMVC-2022-NC-32	9.8	0.5	0.05	49.03	Firm
	12.4	1.3	0.13	122.58	Stiff
	14.3	1.0	0.10	98.07	Stiff
	16.0	1.5	0.15	147.10	Stiff
	18.3	1.3	0.13	122.58	Stiff
BOEMVC-2022-NC-35	2.2	1.3	0.13	122.58	Stiff
	6.2	2.0	0.20	196.13	Very Stiff
BOEMVC-2022-NC-36	7.2	0.5	0.05	49.03	Firm
	11.1	1.5	0.15	147.10	Stiff
	16.0	1.5	0.15	147.10	Stiff
BOEMVC-2022-NC37	4.6	2.5	0.26	245.17	Very Stiff
BOEMVC-2022-NC38	7.5	0.8	0.08	73.55	Firm
BOEMVC-2022-NC39	5.0	0.3	0.03	24.52	Soft
BOEMVC-2022-NC40	6.5	1.3	0.13	122.58	Stiff
BOEMVC-2022-SC42	13.5	2.5	0.26	245.17	Very Stiff
BOEMVC-2022-SC43	10.8	3.0	0.31	294.20	Very Stiff
BOEMVC-2022-SC44	8.1	1.0	0.10	98.07	Stiff
BOEMVC-2022-SC45	9.7	1.0	0.10	98.07	Stiff
BOEMVC-2022-SC46	10.4	3.5	0.36	343.23	Hard
BOEMVC-2022-SC47	10.0	1.5	0.15	147.10	Stiff
	15.1	0.0	0.00	0.00	Very Soft
	16.2	4.6	0.47	451.11	Hard
BOEMVC-2022-SC48	10.4	1.8	0.18	171.62	Very Stiff
BOEMVC-2022-SC49	5.6	1.5	0.15	147.10	Stiff
	15.3	3.0	0.31	294.20	Very Stiff
BOEMVC-2022-SC51	4.2	2.0	0.20	196.13	Very Stiff
BOEMVC-2022-SC53	17.9	2.0	0.20	196.13	Very Stiff
BOEMVC-2022-SC54	17.8	2.0	0.20	196.13	Very Stiff
BOEMVC-2022-SC55	7.0	2.3	0.23	220.65	Very Stiff
	14.0	3.3	0.33	318.72	Hard
BOEMVC-2022-SC57	15.0	3.3	0.33	318.72	Hard
BOEMVC-2022-SC58	13.5	1.8	0.18	171.62	Very Stiff
BOEMVC-2022-SC59	14.8	2.0	0.20	196.13	Very Stiff
BOEMVC-2022-SC60	9.2	2.5	0.26	245.17	Very Stiff
	16.2	2.5	0.26	245.17	Very Stiff

[1] *Based on Table 1.6 from Engineering Properties of Soils and Rocks, Fourth Edition by Fred G. Bell*

Appendix H: Penetrometer Logs (Digital only)

Appendix I: Seismic Web Project (Digital only)

Appendix J: Seismic SonarWiz Projects (Digital only)

Appendix K: Processed Data Files (Digital only)

Appendix L: Sidescan SonarWiz Projects (Digital only)

Appendix M: gINT Projects (Digital only)

Appendix N: Field books and geophysical logs (Digital only)

Appendix O: Raw Geophysical Data (Digital only)