

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

Privacy Act Statement

Authority: 33 USC 401, Section 10: 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routing Uses: Information provided on this form will be used in evaluating this application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPL. COMPLETE
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(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME Village of Bald Head Island Attn. Chris McCall (Village Manager)	8. AUTHORIZED AGENTS NAME AND TITLE (an agent is not required) Christian Preziosi Environmental Consultant Land Management Group, Inc.
6. APPLICANT'S ADDRESS Village of Bald Head Island P.O. Box 3009 Bald Head Island, NC 28461	9. AGENT'S ADDRESS Land Management Group, Inc. 3805 Wrightsville Ave. Suite 15 Wilmington, N.C. 28403
7. APPLICANT'S PHONE NOS. W/AREA CODE a. Business (910) 457-9700 b. Fax (910) 457-6206	10. AGENT'S PHONE NO. W/AREA CODE (910) 452-0001 (phone) (910) 452-0060 (fax)

11. STATEMENT OF AUTHORIZATION

I hereby authorize Land Management Group, Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application. SEE ATTACHED FORM

APPLICANT'S SIGNATURE _____

DATE _____

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE – Frying Pan Shoals Beach Nourishment Project	
13. NAME OF WATERBODY, IF KNOWN (if applicable) Atlantic Ocean and Cape Fear River Entrance	14. PROJECT STREET ADDRESS (if applicable) N/A. Offshore Borrow Site on Frying Pan Shoals, with nourishment along the beachfronts of South Beach and West Beach of Bald Head Island.
15. LOCATION OF PROJECT Brunswick North Carolina COUNTY STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN

17. DIRECTIONS TO THE SITE

Take ferry from Deep Point Marina in Southport to Bald Head Island Marina. Proceed along Bald Head Wynd to

beach accesses along West Beach and South Beach (see vicinity map, Sheet 1 of 9).

18. NATURE OF ACTIVITY (Description of project, include all features) - The project consists of beach nourishment of South Beach and West Beach of Bald Head Island. Beach compatible material to be sourced from identified borrow site on Frying Pan Shoals and piped via hydraulic pipeline to nourishment sites. See attached Project Narrative and Design Drawings (Sheets 1 through 9) provided by project engineer (Olsen Associates, Inc.).

19. PROJECT PURPOSE (Describe the reason or purpose of the project) - The project purpose is to provide a current and future source of beach compatible sand to address documented sand losses between federal disposal events and to ensure adequate beach widths along South Beach and West Beach. The proposed Village-sponsored nourishment is intended to maintain beach resources while concurrently protecting adjacent residential homes, businesses, and infrastructure from the effects of erosion (See attached Project Narrative).

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. REASON(S) FOR DISCHARGE - Beach nourishment (See Project Narrative).

21. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS - Beach compatible sand (estimated 1.872 Mcy for first event) and a total maximum of 8.5 Mcy over long-term use.

22. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED

Up to 21,800 linear feet of shoreline to be nourished. Fill dimensions vary depending upon beach conditions at the time of the activity. No wetlands occur within the project area. An estimated 30 acres of intertidal and shallow subtidal bottom may be affected by the nourishment depending upon beach profiles at the time of the activity (see Sheet 3 of 9).

23. IS ANY PORTION OF THE WORK ALREADY COMPLETE? **No** IF YES, DESCRIBE THE COMPLETED WORK

24. ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, Etc., WHOSE PROPERTY ADJOINS THE WATERBODY
Adjacent property owners notified during initial project (CAMA Permit No. 91-14) and area of nourishment is part of long-term federal disposal project associated with Wilmington Harbor maintenance dredging.

25. LIST OTHER CERTIFICATIONS OR APPROVALS/DENIALS RECEIVED FROM OTHER FEDERAL, STATE, OR LOCAL AGENCIES FOR WORK DESCRIBED IN THIS APPLICATION **N/A**

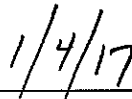
AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
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26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.



SIGNATURE OF APPLICANT

LAND MANAGEMENT GROUP (AGENT)



DATE

18. U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

Frying Pan Shoals Beach Nourishment Project

Bald Head Island, North Carolina

Applicant: Village of Bald Head Island

Project Narrative:

I. Introduction

The south-facing shoreline of Bald Head Island (i.e. South Beach) experiences on-going and chronic erosion resulting in predictable sand losses and shoreline recession. Severe erosion has been chronicled along South Beach (particularly its western reach) since the 1970s. Under the most recent detailed physical monitoring, Olsen Associates, Inc. (2016) reported that the Island's gross volumetric loss (excluding East Beach) over the November 2000 to May 2016 timeframe was approximately 5.733 Mcy (corresponding to an average annualized loss of 371,700 cy). The highest rates of sand loss have occurred principally at the extreme west end of South Beach in the vicinity of the Cape Fear River entrance. This prompted the Village of Bald Head Island (Village) to procure authorizations for, and subsequently construct, a 1,300-lf terminal groin at this location. Construction of the terminal groin structure was completed in December 2015.

While the terminal groin addresses chronic shoreline losses along western South Beach, it has been documented that the terminal groin and existing sand tube groin field are not sufficient, in and of themselves, to prevent or to adequately offset sand losses from South Beach or West Beach. As a result, periodic nourishment through both the federally-sponsored Wilmington Harbor dredge and disposal project and Village-sponsored engineered beach projects are required to mitigate erosion along the entirety of South Beach and West Beach. The threat to existing homes, dunes and infrastructure as a result of the erosion and shoreline recession has prompted the Village to seek longer term beach nourishment options. Predicted sand volume needs for South Beach and West Beach were identified in the terminal groin EIS (for both the terminal groin alternative and non-structural alternatives). Frying Pan Shoals was identified at that time as a long term sand source with the potential to satisfy the sand volume requirements for South Beach and West Beach in the future.

II. Existing Conditions

Bald Head Island is a 3-mile long south-facing barrier island located immediately eastward of the mouth of the Cape Fear River at 33.85°N, 77.9889°W (NAD27). The island forms the southern terminus of the Smith Island complex at Cape Fear Point from which Frying Pan Shoals extend over thirty miles southeastward into the Atlantic Ocean.

Bald Head Island's east and south shorelines (East Beach and South Beach, respectively) front the Atlantic Ocean. The western shoreline (a.k.a. West Beach) is located immediately adjacent to, and fronts, the Cape Fear River entrance. The north side of the island is bounded by the Bald Head Creek estuary. The remainder of Smith Island is composed of interior tidal creeks (including Cape Creek and Deep Creek), associated tidal marsh, Middle Island, and Bluff Island. The mouth of the Cape Fear River (over one mile in width) separates Bald Head Island from the eastern end of Oak Island (or Caswell Beach).

Frying Pan Shoals is a submerged extension of a large-scale cusped foreland (i.e. accretional feature formed by processes of longshore drift and prevailing wind and wave conditions). The shoals extend over thirty miles offshore from the eastern end of Bald Head Island. Evaluations conducted by the USACE as part of the General Reevaluation Report (GRR) for the Brunswick County Beaches Coastal Storm Damage Reduction Project indicate the presence of substantial volumes of "beach-compatible" material within Frying Pan Shoals.

Olsen Associates, Inc. (OA) has identified a viable sand source (i.e. borrow site) along the west side of the shoal approximately 1 mile seaward of the southeastern shoreline of Bald Head Island (Olsen Associates, Inc. 2016). As part of that sand search investigation, Geodynamics performed a hydrographic survey of the area of interest (since NOAA charts are highly inaccurate in this dynamic area). Similarly, Tidewater Atlantic Research, Inc. (TAR) performed two (2) phases of marine cultural resource investigation to discern the location of potential wrecks. The Phase II investigation identified one small buffer area mapped around one cluster of magnetic anomalies recommended to be avoided (TAR 2016). Accordingly, the project design has delineated a 9.73 A Exclusion Zone within the borrow site based upon the T.A.R. findings.

Athena Technologies was retained to obtain multiple VIBRACORES within the proposed area of interest. Those cores have been logged and analyzed for sand quality. OA subsequently completed a summary report of the Sand Search Investigation (Olsen Associates 2016). According to this report, the

grand mean sand content for composite samples from the proposed borrow site was 92.09%, and the percent fines measured over depth (to -25 ft MLW) was low (2% on average). It can be reasonably expected based upon these results and the findings of other geotechnical investigations in similarly occurring, nearby shoal features that depositional sediments above a certain elevation within the defined borrow area will be of beach quality. The continuity of the predicted horizon of sands above either clay or silty sands is highly predictable at this location (Olsen Associates 2016). The permit request will seek authorization to dredge above that horizon.

III. Proposed Work

In order to plan for and address expected sediment deficits over the next several decades, the Village of Bald Head Island has identified an approximate 460-acre sand source site for the acquisition of beach-compatible material suitable for placement along the South and West Beach shorelines. The volume of sand placed for such a project should be sufficient to both address expected sediment losses between federal disposal events, as well as ensure adequate improved beach widths along the entirety of the South Beach shorefront. The proposed borrow source to be permitted is located on the western portion of the Frying Pan Shoals formation approximately 1 mile off the southeast shoreline of Bald Head Island. Sediment identified within the Frying Pan Shoals borrow site will be excavated by cutter suction dredge and pumped by submerged pipeline to the South Beach shoreline. Assuming a neat sand volume to -20 ft NAVD88, the identified borrow site could theoretically yield up to 5.2 Mcy. To an elevation of -25 ft NAVD88, the neat sand volume is estimated to be 8.5 Mcy. It is anticipated that these tentative maximum volumes would be reduced by the inability of any dredge operation to effectively excavate all sediment within a defined contract borrow site. There will also be a small percentage loss of sediment during excavation and placement operations. Within the borrow area there is included a 9.73 A Exclusion Zone intended to avoid impact to potential cultural resources.

The South Beach construction berm will maintain an approximate average elevation of +8 ft. NGVD which is consistent with prior beach disposal berms constructed by the Wilmington District USACOE since 2001. A mild slope in the seaward direction will be introduced into the berm (by grading) to reduce post-placement scarping and enhance post-construction turtle nesting activities. Should dune erosion or benching be evident at the time of construction, up to 5 cy of sand per ft. of shorefront would be mechanically moved and graded to repair the duneline. Any revegetation necessary for dune stabilization would be performed by the Village under separate contract subsequent to fill placement

completion by the dredge contractor. Post-construction beach tilling will be performed based upon consultation with Resource Agencies after each future fill event.

It can be reliably assumed that a 27"-30" cutter suction dredge (Ocean Certified) will be utilized to excavate material from the permitted site. Draft considerations for such plant argue for the inclusion of an excavated access fairway between the -20 ft contour and the westernmost boundary of the borrow site. The creation of an optional fairway will be at the discretion of the dredge contractor. Any material to be removed from a fairway (if constructed) is beach compatible and would be placed within the shorefront beach fill site. The effective width of the fairway would not exceed 400 ft. Its maximum effective area would be 22.5 acres, or less.

Borrow Site Recovery

The selection of the proposed Bald Head Island borrow site capitalized on the findings of hydrographic surveys, geotechnical investigations, and two phases of cultural resource investigation. Of specific interest in the development of the borrow site were the following characteristics:

- reasonable accessibility to Bald Head Island;
- documented strata of high quality beach compatible sediment suitable for meeting both State Standards and post-placement performance criteria acceptable to the Engineer and the project Sponsor;
- desirable constructability characteristics for purposes of sand excavation and beach fill construction by an ocean-certified cutter suction dredge;
- avoidance of cultural resources necessary for operational feasibility, and
- siting of the borrow area in a known dynamic but highly depositional area for purposes of ensuring rapid substrate recovery.

The design depth of the proposed borrow site is such that substrate sediments exposed immediately after project construction will continue to consist of high quality sands. Future sedimentary conditions will therefore initially be influenced by slumping of excavation perimeter side slopes (*i.e.*, sand) and deposition from predictable sediment transport along the marginal shoal feature as presently exists today. Advance quantification of infilling rates are difficult due to equilibration processes between cut and uncut portions of shoal during the first few years following dredging. Physical monitoring of the borrow site recovery is proposed. It is well documented however that the section of shoal in question is naturally depositional both in the modern day and the morphological sense. Regardless of future

realized sediment deposition rates, the probability of sedimentation by similar sandy material (in contrast to fines, organics, clays, etc.) is excellent (McNinch, 2009) and is the principal post-construction borrow site characteristic desired for purposes of rapid recovery of benthic communities (Bergquist, et.al. 2008) and minimization of potential effects to EFH.

IV. Post-Construction Monitoring

The Village as permittee will perform physical monitoring of a dredged borrow site immediately after construction, annually for three (3) years and biennially thereafter. The post-construction bathymetry will be compared annually with subsequent monitoring results to calculate in-filling or “recharge” of the site. The results of the monitoring will be incorporated into the Village’s existing comprehensive Shoreline Monitoring Program and reported annually.

The footprint of each monitoring survey shall include the entire permitted site as well as the actual area of excavation within. Any changes in morphology to the Frying Pan Shoals formation will be evaluated and discussed – as relevant. Changes in bathymetry proximate to any cultural resource buffer will be monitored.

The Village will coordinate with all State and Federal regulatory agencies prior to the initiation of each redundant excavation within the overall permitted area. The strategic design rationale for each excavation will be provided for all subsequent dredging operations or contracts proposed by the Village. The frequency of physical monitoring surveys will be “reset” after each dredging event.

V. Source of Information

Berquist, D.C., S.E. Crowe, M. Levisen and R.F. Van Dolah. 2008. Change and recovery of physical and biological characteristics at beach and borrow areas impacted by the 2005 Folly Beach nourishment project. For Charleston District, US Army Corps of Engineers, Charleston, South Carolina. Final Report by South Carolina Department of Natural Resources.

McNinch, Jesse. 2009. Literature Review of Cuspate Forelands, Implications to Dredging Frying Pan Shoals. Prepared for USACE, unpublished. 64 pp.

Olsen Associates, Inc., 2011. Bald Head Island, NC. Beach Monitoring Program: Monitoring Report No. 9 (May 2010 - May 2011). Report prepared for Village of Bald Head Island. Olsen Associates, Inc. 2618 Herschel St., Jacksonville, FL 32204. 69 pp plus app.

Olsen Associates, Inc., 2016. Frying Pan Shoals Sand Search Investigation. Report prepared for Village of Bald Head Island. Olsen Associates, Inc. 2618 Herschel St., Jacksonville, FL 32204. 38 pp plus app.

Tidewater Atlantic Research (TAR), 2016. Remote-Sensing Reconnaissance Survey at the Location of a Proposed Borrow Site on Frying Pan Shoals Off Bald Head Island, Brunswick County, North Carolina. 17 pp.

ENCL: Permit Sheets 1-9

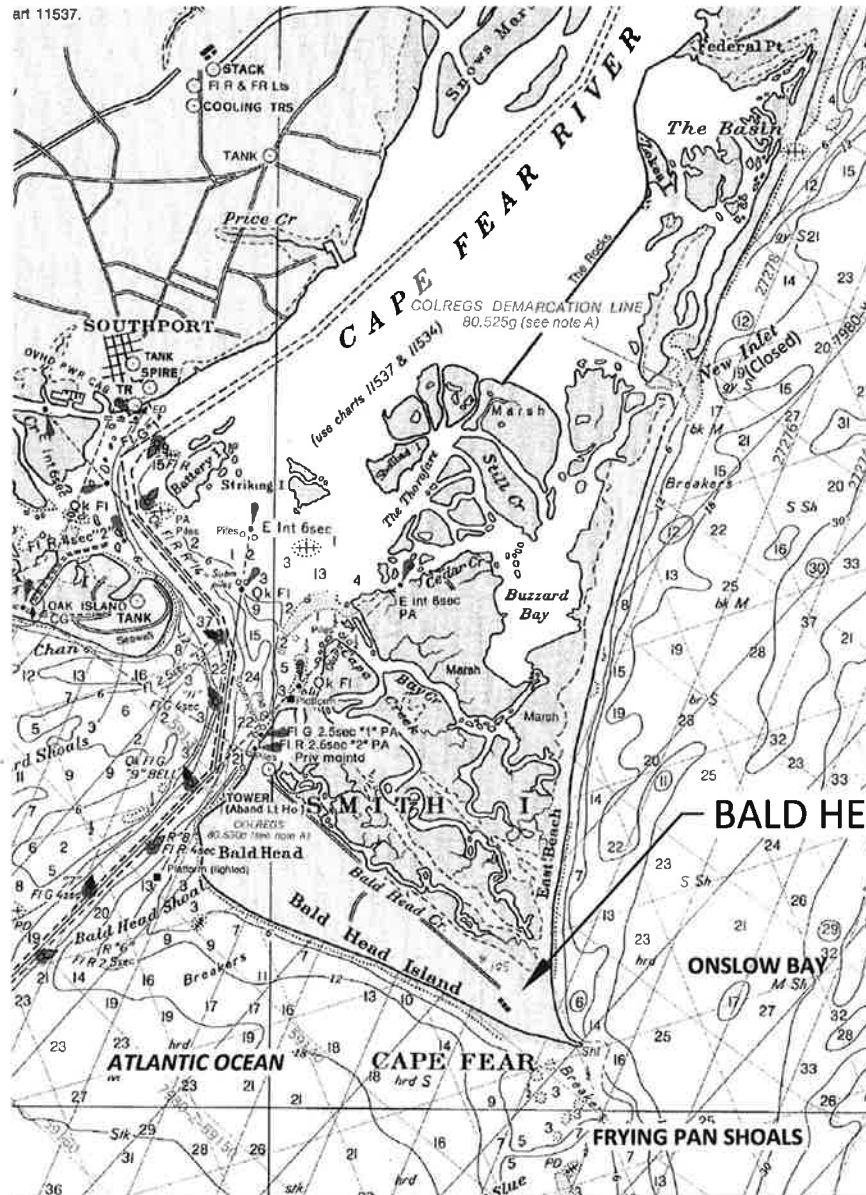
art 11537.



APPLICANT:
VILLAGE OF BALD HEAD ISLAND

ENGINEER:
OLSEN ASSOCIATES, INC.

AGENT:
ERIK J. OLSEN, P.E.



BALD HEAD ISLAND

DATUM: MLLW

NTS



REF: CAMA 91-14
SAW-2012-00040



BRUNSWICK COUNTY, N.C.

SITE

ATLANTIC OCEAN



ERIK J. OLSEN
ENGINEER
2618 Herschel Street
Jacksonville, FL 32204
(904) 387-6114
C-1468

VILLAGE OF BALD HEAD ISLAND
FRYING PAN SHOALS BORROW SITE AND
BEACH RENOURISHMENT

PROJECT LOCATION

DATE	APPROVED	REVISION

12/5/2016

DRAWN BY:
ML

SHEET
1 of 9



1. PROJECT BASELINE UTILIZED FOR ANNUAL BEACH MONITORING BY VILLAGE AND FEDERAL BEACH DISPOSAL PROJECT CONSTRUCTION BY WILMINGTON DISTRICT, USACOE.
2. REF: CAMA 91-14, SAW-2012-00040
3. FILL MAY INCLUDE TAPER PAST STA 218+00



LIMITS OF FUTURE PROJECT RELATED FILL ACTIVITIES BY VILLAGE UTILIZING FRYING PAN SHOALS BORROW SITE

TERMINAL GROIN

OCTOBER 2016 PHOTOGRAPHY



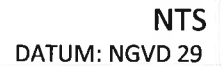
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VILLAGE OF BALD HEAD ISLAND
FRYING PAN SHOALS BORROW SITE AND
BEACH RENOURISHMENT

PROJECT BASELINE AND LIMITS OF FILL

DATE	APPROVED	REVISION	12/5/2016
			DRAWN BY: ML
			SHEET 2 of 9

ATLANTIC OCEAN



MHHW +2.8
MHW +2.5
NAVD +1.1
NGVD(29) 0.0
MLW -1.8
MLLW -2.0

A circular professional engineer seal for Erik J. Olsen, North Carolina. The seal features the text "NORTH CAROLINA" at the top, "PROFESSIONAL" on the left, "ENGINEER" on the right, and "ERIK J. OLSEN" at the bottom. In the center, it says "SEAL" and "15826". A signature is written across the seal.



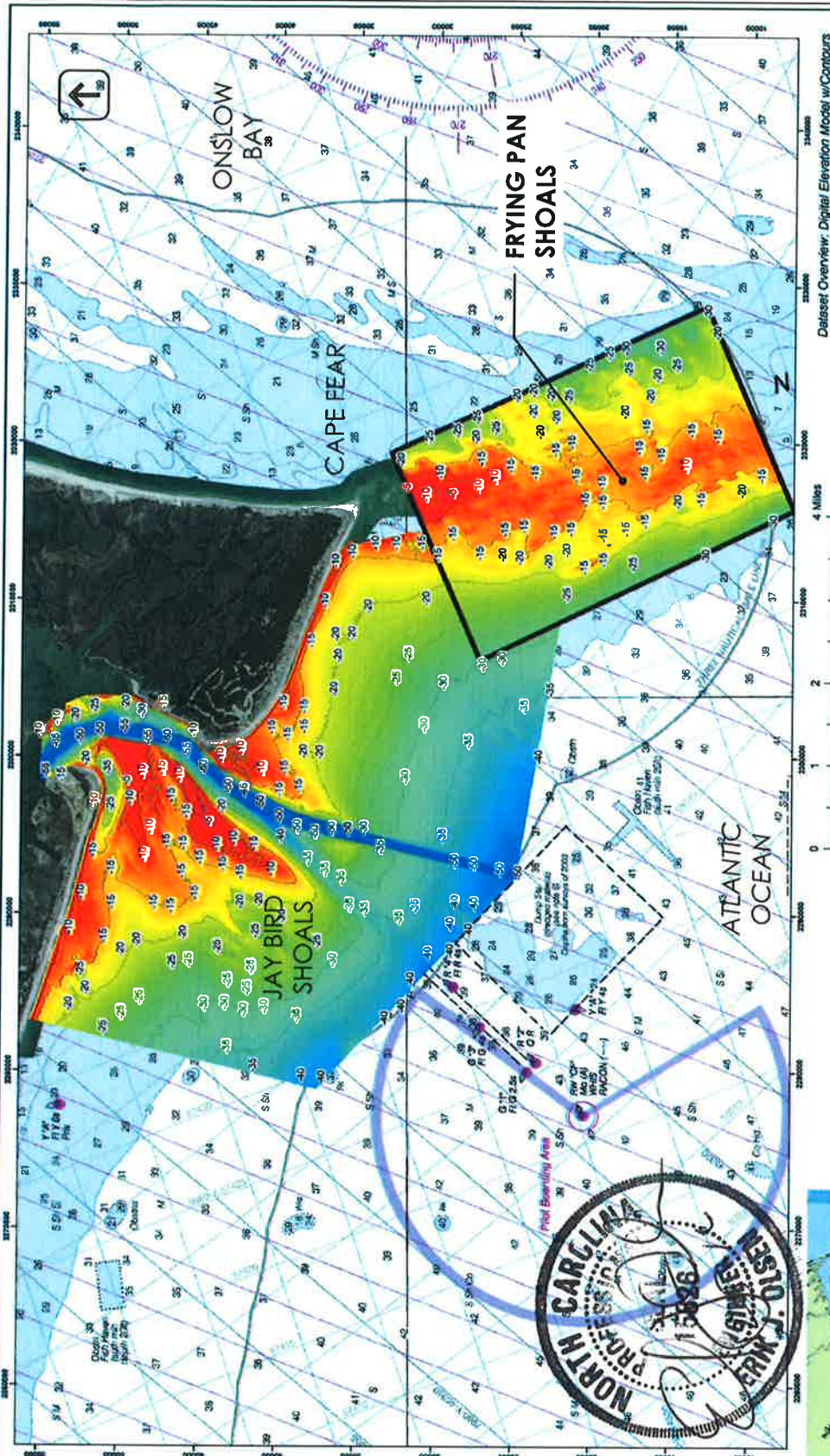
NTS

NOT FOR PURPOSES OF CONSTRUCTION



TYPICAL BEACH FILL SECTIONS

DATE	APPROVED	REVISION	12/5/2016
			DRAWN BY: ML
			SHEET 3 of 9



Dataset Overview: Digital Elevation Model w/Contours

**HYDROGRAPHIC SURVEY OF
FRYING PAN SHOALS,
JULY-AUGUST, 2014**

Survey No. 1
Drawn By: Dave Bornstein
Reviewed By: Chris Freeman
Map No. 5

geodynamics
CORPUS COASTAL CONSULTING AND CLIM



Notes:
Map displays data from two different surveys. The area in the black box is the digital elevation model (150' grid) generated from single-beam data collected in a 1300' spaced grid pattern, collected in July-Aug. 2014. The remaining bathymetry (30' grid) for the entrance of the Cape Fear River, was collected in 2006 using a multibeam echosounder.

Projection: NAD83 NCSF (2011) Zone 2000, NAVD88

Legend:
Elevation (ft. NAVD88)
-4 ft
0
40 ft
8 ft Contours



DEPTHS - NAVD88

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VILLAGE OF BALD HEAD ISLAND
FRYING PAN SHOALS BORROW SITE AND
BEACH RENOURISHMENT
**BALD HEAD ISLAND
MORPHOLOGICAL FEATURES**

DATE APPROVED REVISION

12/5/2016

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ML

SHEET
4 of 9

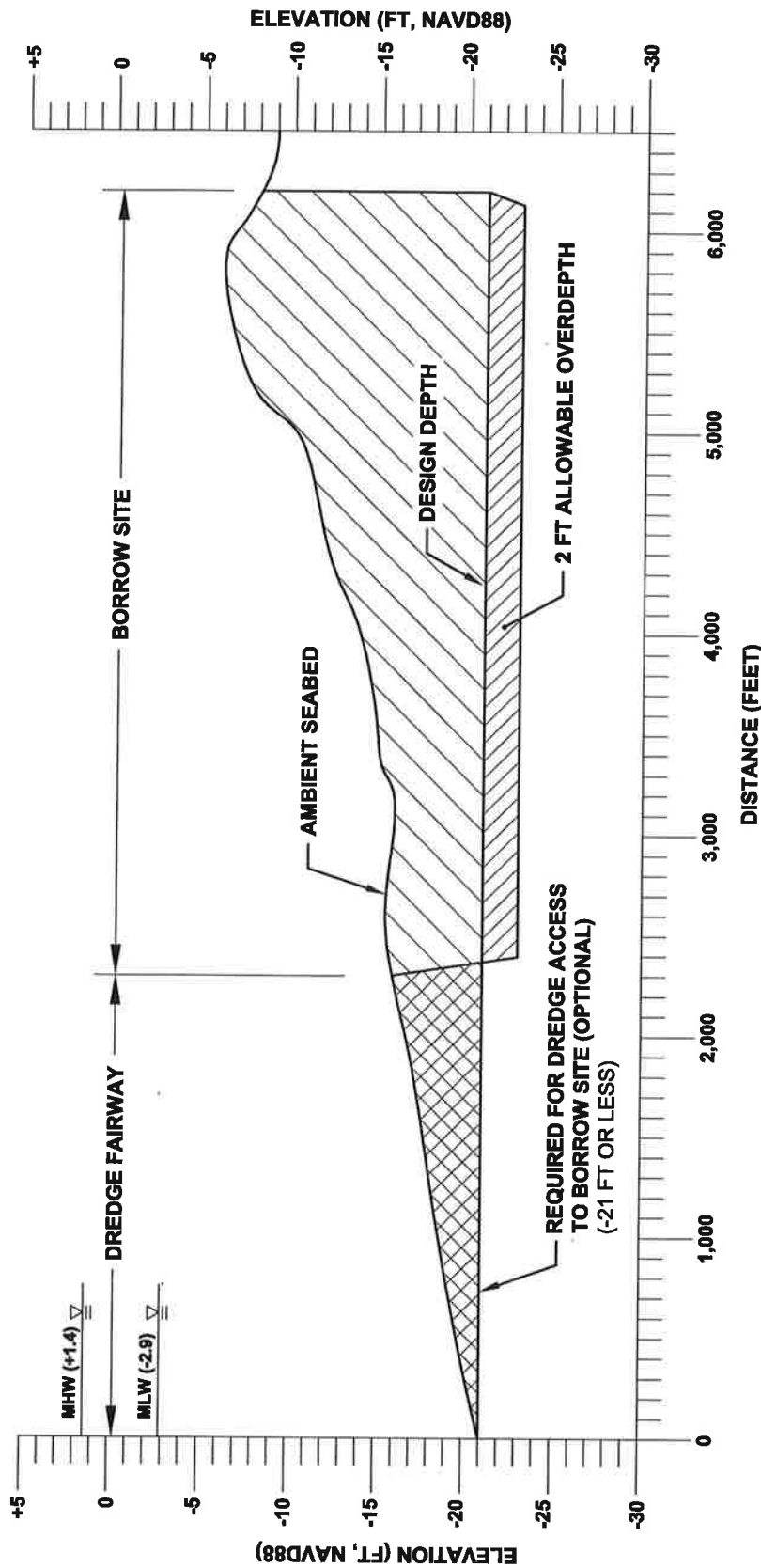
VILLAGE OF BALD HEAD ISLAND
FRYING PAN SHOALS BORROW SITE AND
BEACH RENOURISHMENT

DATE	APPROVED	REVISION	12/5/2016
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			SHEET 7 of 9



BORROW SITE (ABCDEFA) = 460.1 ACRES

WEST → EAST



BORROW SITE
 DESIGN DEPTH -20 FT NGVD (29)
 -21 FT NAVD (88)
 ALLOWABLE OVERDEPTH - 2 FT



SECTION A - A'

VERTICAL EXAGGERATION 88:1

- NOTES:**
1. FAIRWAY FOR SAFE ACCESS/EGRESS TO AND FROM BORROW SITE.
 2. FAIRWAY TO BE CONSTRUCTED (ALL OR PART) BY DREDGE CONTRACTOR - IF NEEDED TO ADDRESS DRAFT REQUIREMENTS OF DREDGE.
 3. FAIRWAY WIDTH NOT TO EXCEED 400 FT.

LOCAL TIDAL DATUMS (FT)

MHHW +2.8
 MHW +2.5
 NAVD(88) +1.1
 NGVD(29) 0.0
 MLW -1.8
 MLLW -2.0

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VILLAGE OF BALD HEAD ISLAND
 FRYING PAN SHOALS BORROW SITE AND
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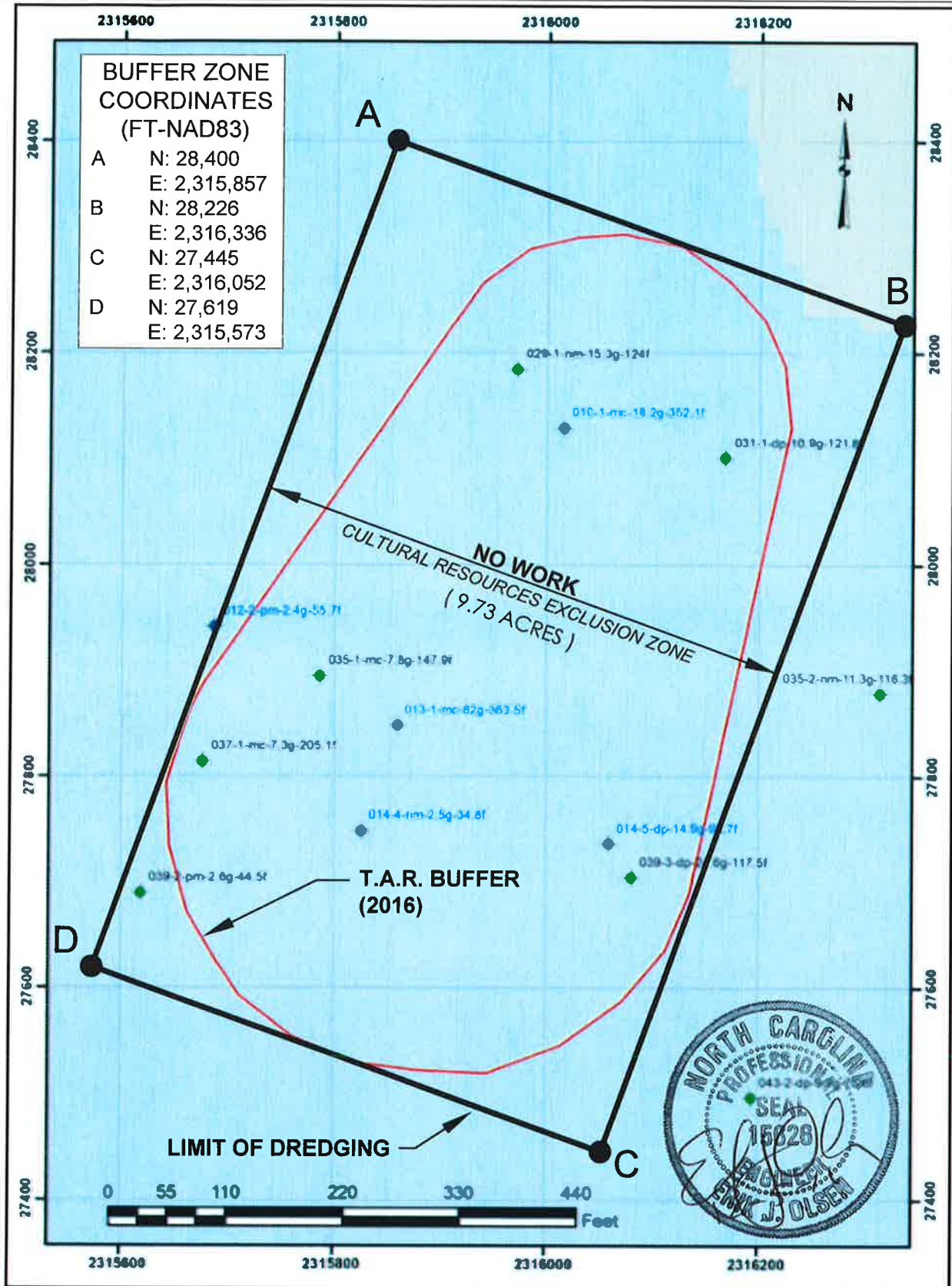
BORROW SITE SECTION A-A'

DATE	APPROVED	REVISION

12/5/2016

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 ML

SHEET
 8 of 9



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VILLAGE OF BALD HEAD ISLAND
FRYING PAN SHOALS BORROW SITE AND
BEACH RENOURISHMENT

CULTURAL RESOURCES EXCLUSION ZONE

DATE	APPROVED	REVISION

12/5/2016

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SHEET
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