

Sustaining the Nassau County Shoreline through Maintenance Dredging of the Naval Submarine Base Kings Bay Entrance Channel

Jennifer Coor, Ph.D., P.G., Viktoria Bogina, P.E., and Mike Hollingsworth

FSBPA Technical Conference

St. Augustine Beach, FL

February 3, 2022

Team of Professionals Making Tomorrow Better



US Army Corps of Engineers
BUILDING STRONG





Outline

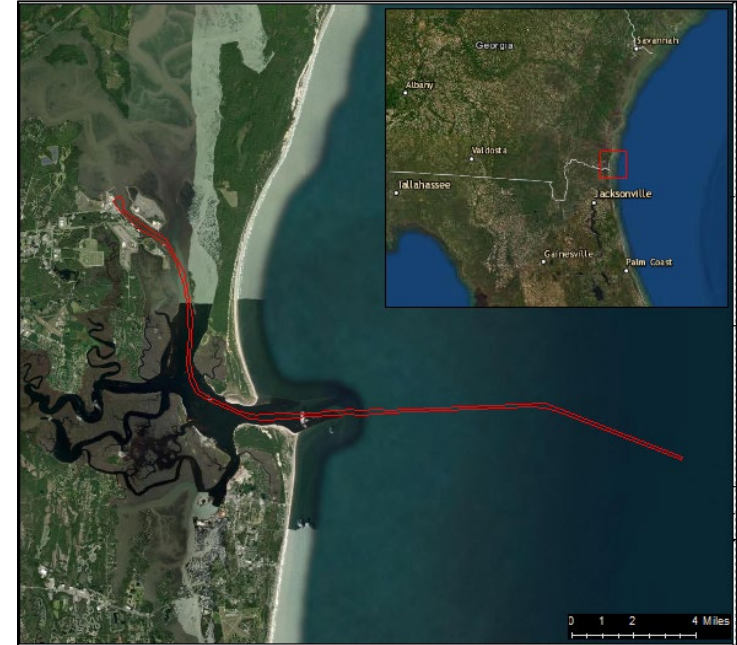


BUILDING STRONG

- Introduction
 - ▶ Project Description
- Design Considerations
- Geotechnical Considerations
- Permitting
 - ▶ State
 - ▶ Federal
- Partnering
- Conclusions



https://www.cnrc.navy.mil/regions/cnrse/installations/navsubbase_kings_bay.html





Introduction



BUILDING STRONG

- Naval Submarine Base Kings Bay
 - ▶ East coast home to submarines
 - ▶ Mission - Provide support to the Fleet, Fighter and Family
 - ▶ Vision - One Team... Enhancing Readiness; Transforming Challenges into Achievements

- Project Description
 - ▶ Kings Bay Entrance Channel (KBEC) requires annual dredging to -49 ft MLLW required + 2 ft Allowable Overdepth (AO), -45 ft MLLW required + 2 ft AO and -44 ft required + 2 ft AO.



Designated Placement of Material



BUILDING STRONG

- 6 Authorized Placement Areas

- Beach: D/A-F (Fort Clinch),
- Nearshore: D/A-N
- Offshore: D/A-O
- D/A-NB (North Beach)
- D/A-SJ* (South Jetty)
- D/A-SB* (South Beach)

**These are not typically utilized*



- Dredged material is placed from designated areas in the channel into various placement locations depending on material type.



U.S. ARMY

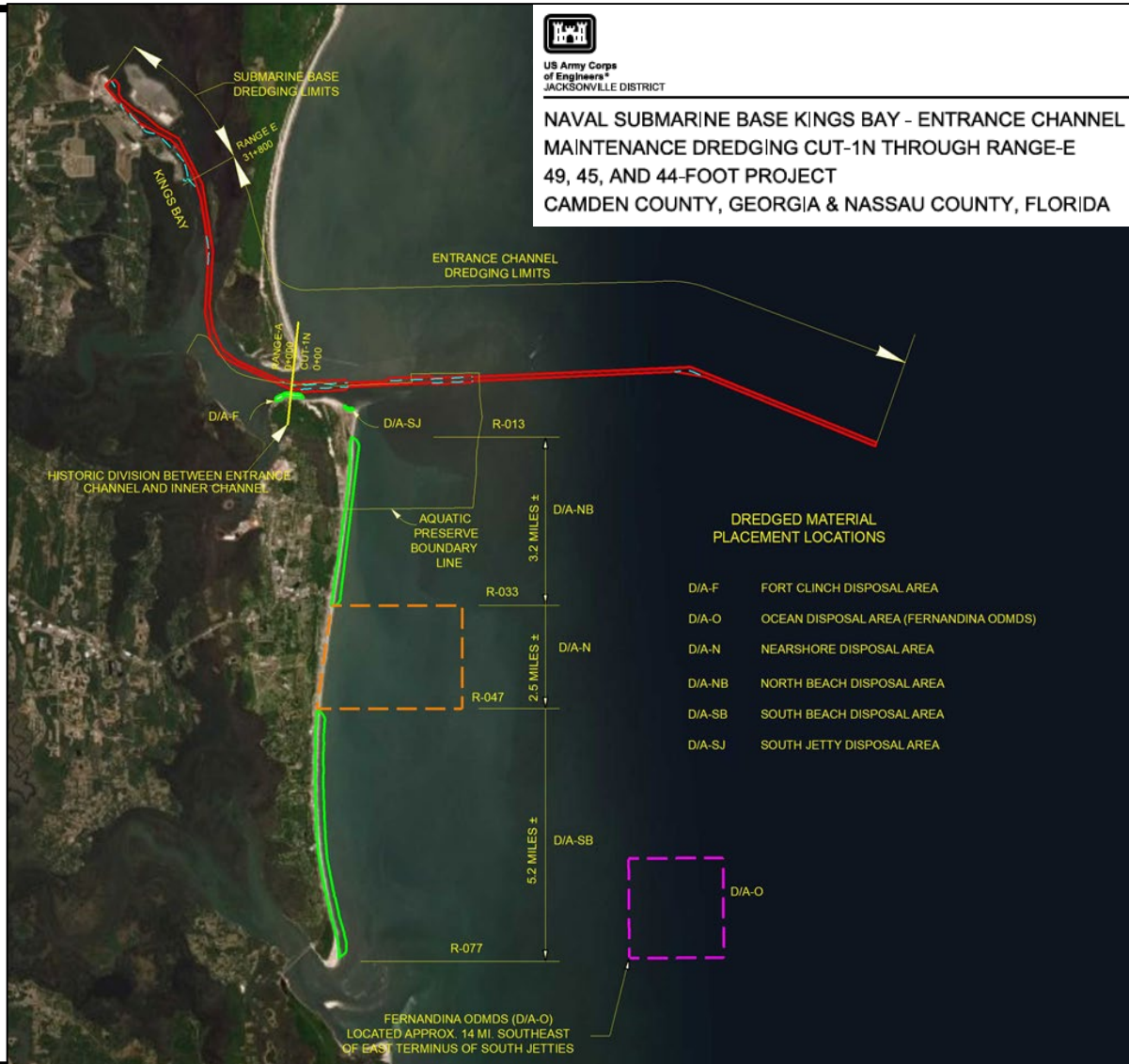


BUILDING STRONG



US Army Corps
of Engineers
JACKSONVILLE DISTRICT

NAVAL SUBMARINE BASE KINGS BAY - ENTRANCE CHANNEL
MAINTENANCE DREDGING CUT-1N THROUGH RANGE-E
49, 45, AND 44-FOOT PROJECT
CAMDEN COUNTY, GEORGIA & NASSAU COUNTY, FLORIDA





Design Considerations



BUILDING STRONG

- Design Considerations

- ▶ Shoaling rates
- ▶ Estimated Toe of Fill (ETOF)
- ▶ Fill density
- ▶ Length of pipeline limitations or required boosters
- ▶ Protection of historical resources



- Mission Considerations

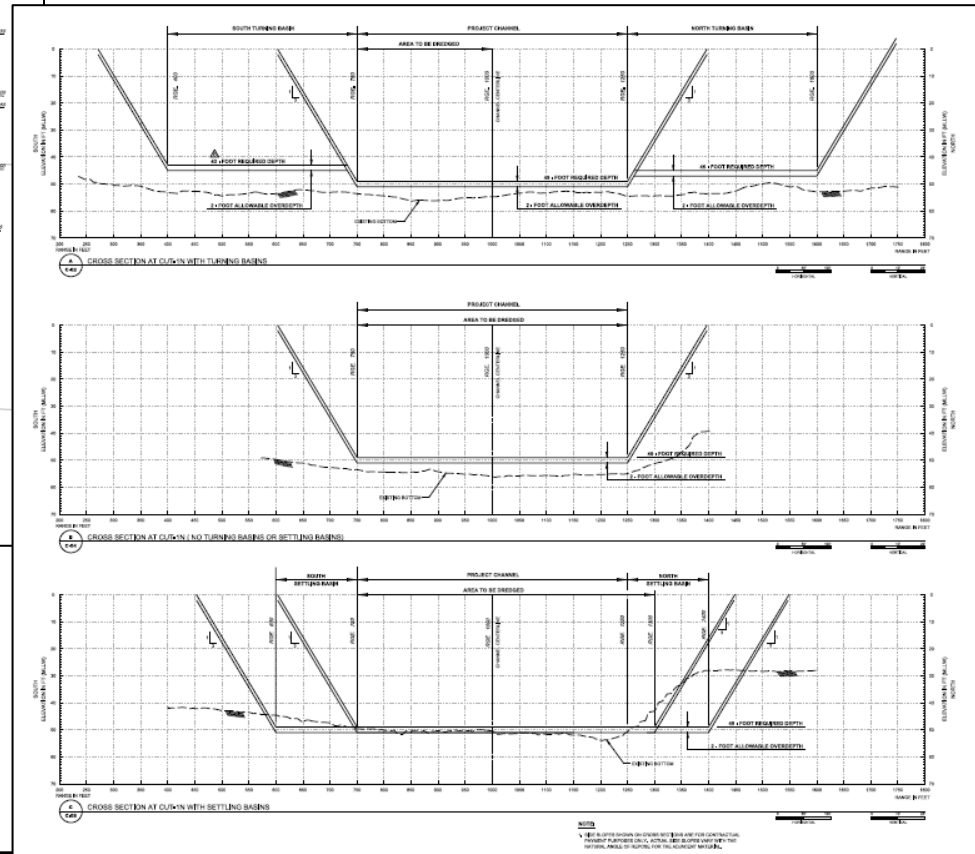
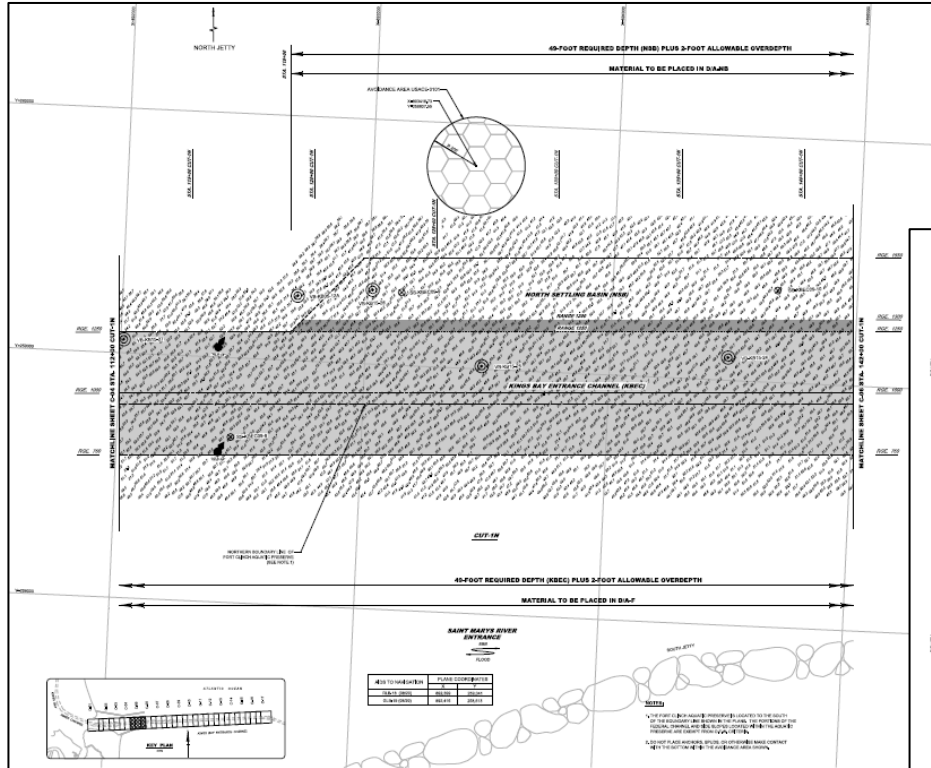
- ▶ Maintaining minimum channel depth for submarines



Dredging Design Templates



BUILDING STRONG



- Typical dredge template includes 1v:3h side slopes. Slopes estimate material sloughing and are not actually dredged
- Shaded areas on the plan drawings indicate areas to be dredged

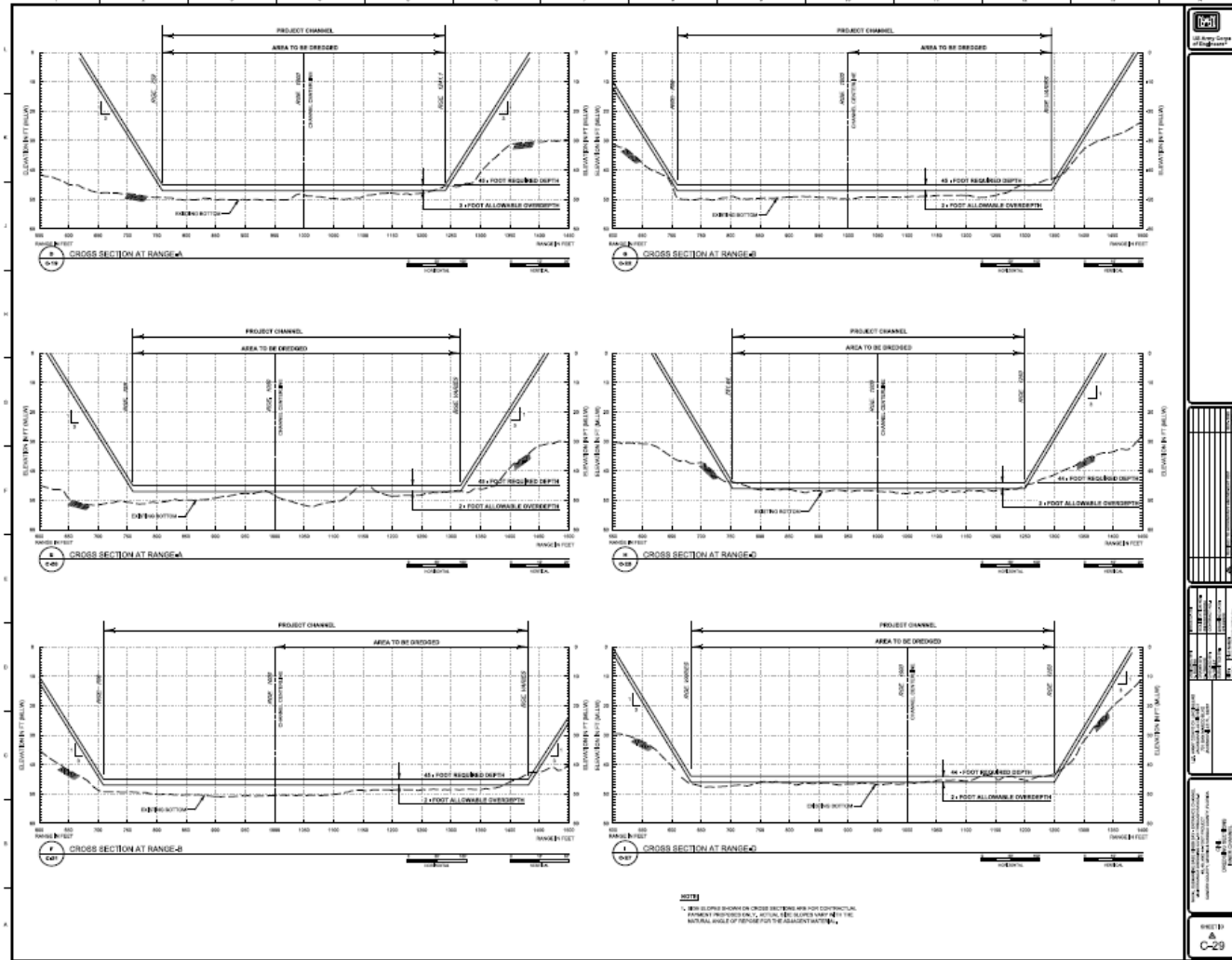


Dredging Design Templates



BUILDING STRONG

- Channel dredge depths become shallower as the channel proceeds from the Atlantic Ocean Cut-1N inland into the Inner Channel Ranges A-E.



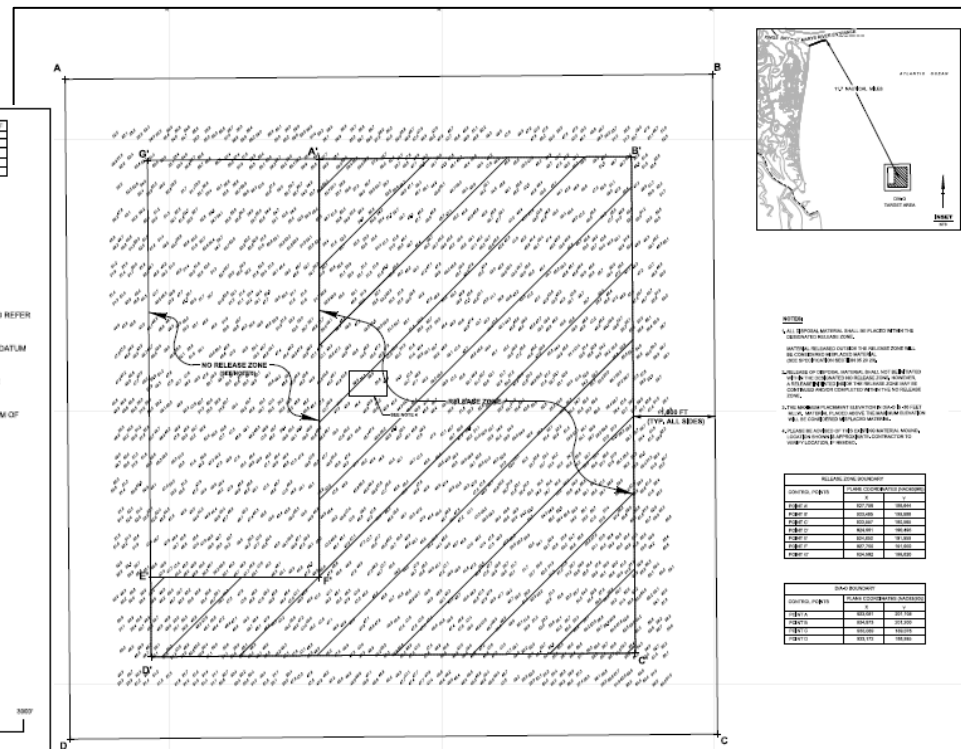
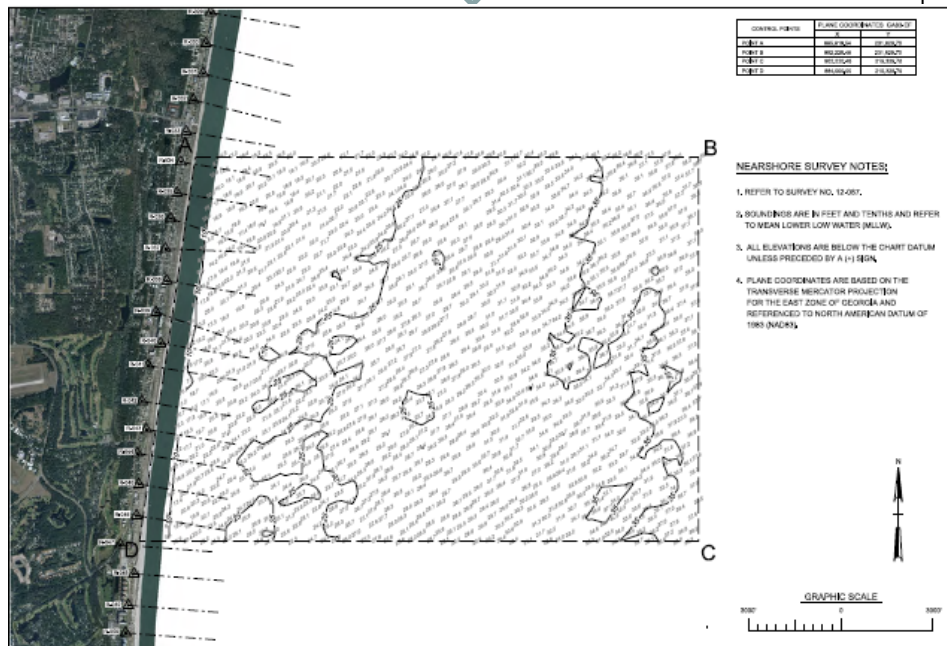


Offshore Disposal Options



BUILDING STRONG

Nearshore Placement



Offshore Placement



U.S. ARMY

Pre- and Post- at Fernandina in 2020



BUILDING STRONG



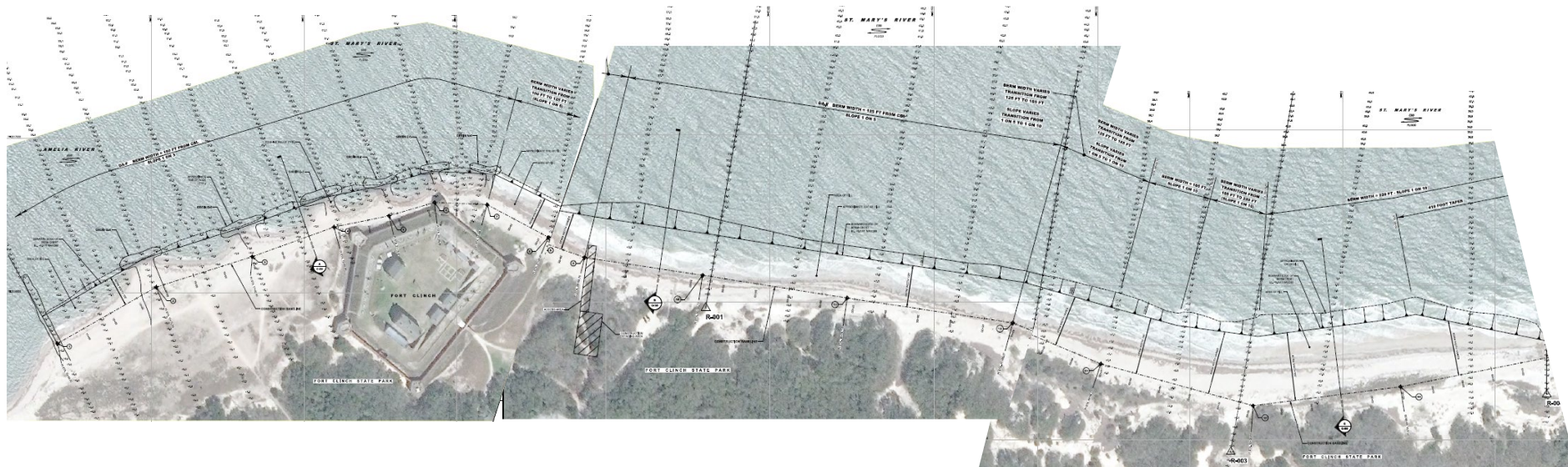


Fort Clinch Template



BUILDING STRONG

The 2021 event placed beach compatible material from 2,200 feet west of FDEP Reference monument R-1 (within the groins) to R-4. Placement at Fort Clinch is completed every other year.



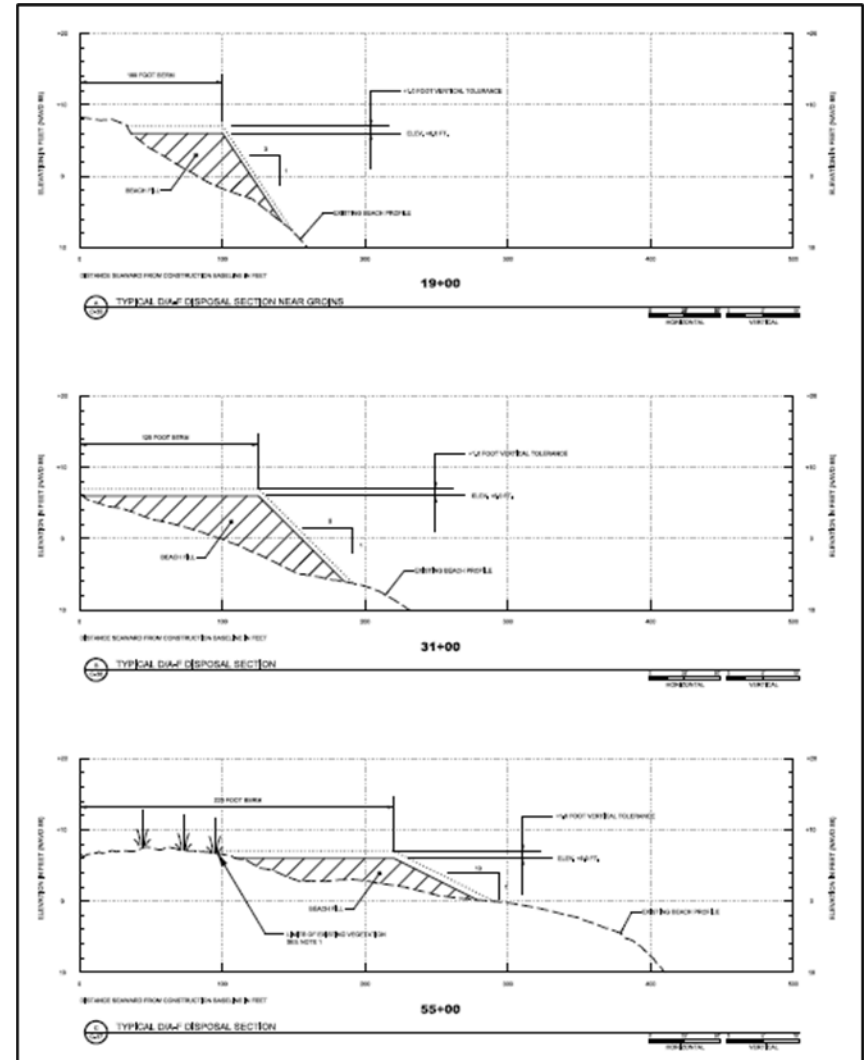


U.S. ARMY

Fort Clinch Template



BUILDING STRONG





Eroded Beach at Ft. Clinch



BUILDING STRONG





Fill Placement



BUILDING STRONG





Filled Template at Ft. Clinch



BUILDING STRONG





Geotechnical Considerations



BUILDING STRONG

- Original channel constructed by the Army from 1955-1958
 - ▶ 200-foot-wide channel was dredged to Cumberland Sound, including two turning basins
 - ▶ Dredged through sand, shell, silt, clay, limestone and sandstone

- Selected as home for Navy submarines in 1979
 - ▶ Channel deepened for submarines

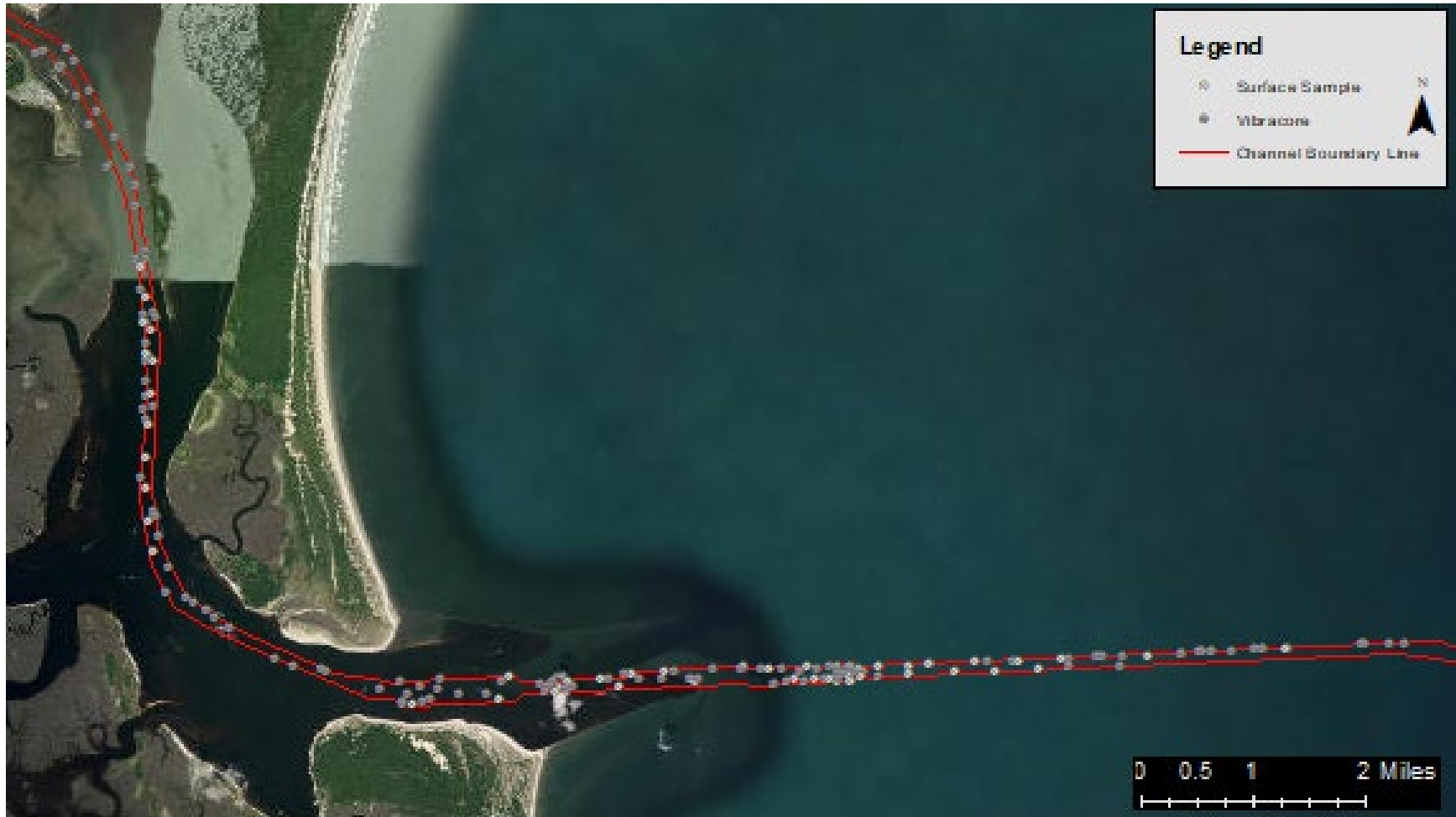
- USACE has conducted multiple subsurface investigations to characterize shoaling material



Previous Investigations



BUILDING STRONG

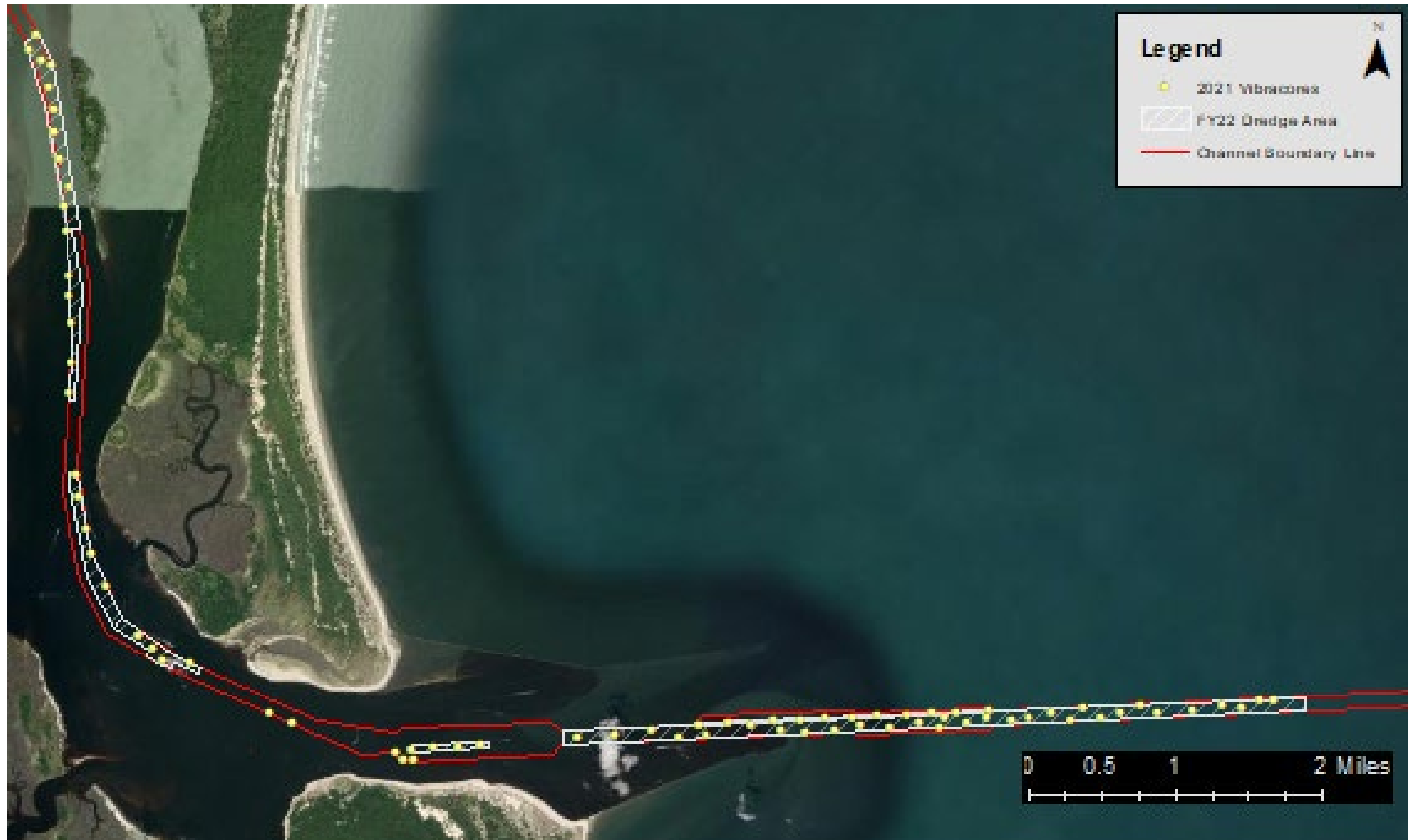




Ongoing Investigations



BUILDING STRONG





U.S. ARMY

KBEC Dredge Cuts



Location	Stations	Approximate Width (feet)	Maximum Depth (MLLW)
Lower Cumberland Sound	15+348.5 to 00+000	500	47 ⁽¹⁾
Cut 1N KBEC	0+00 to 501+23.68	500	51 ⁽²⁾
Cut 2N KBEC	0+00 to 250+00	500	51 ⁽²⁾
North Turning Basin	12+50 to 71+00 of Cut 1-N	320	47 ⁽³⁾
South Turning Basin	12+50 to 71+00 of Cut 1-N	320	47 ⁽³⁾
North Settling Basin	119+00 to 227+50 of Cut 1-N	150 to 300	51 ⁽²⁾
South Settling Basin	176+00 to 227+50 of Cut 1-N	150 to 300	51 ⁽²⁾
Turning Notch 1	20+00 in Cut 1-N to 2+00 in Range A	Varies	47 ⁽³⁾
Turning Notch 2	480+00 in Cut 1-N to 20+00 in Cut 2-N	Varies	51 ⁽²⁾

1. 45 foot required depth, plus 2 foot maximum allowable overdepth.
2. 46 foot required depth, plus 3 foot required overdepth, plus 2 foot maximum allowable overdepth.
3. 42 foot required depth, plus 3 foot required overdepth, plus 2 foot maximum allowable overdepth.





Dredged Materials



BUILDING STRONG

- Character of material in each cut can be variable
 - ▶ Quality of material determines disposal location

<u>STATION</u>	<u>DREDGE DISPOSAL LOCATION</u>
KBIC	
Sta. 37+504 to 19+000	D/A-N, D/A-F, D/A-SJ, D/A-NB,
Sta. 19+000 to 00+000	D/A-N, D/A-F, D/A-SJ, D/A-NB, D/A-O
KBEC - Cut 1N	
Sta. 0+00 to 230+00	D/A-N, D/A-F, D/A-SJ, D/A-NB, D/A-SB, D/A-O
Sta. 230+00 to 350+00	D/A-O
Sta. 350+00 to 501+23.68	D/A-N, D/A-F, D/A-SJ, D/A-NB, D/A-SB, D/A-O
KBEC - Cut 2N	
Sta. 0+00 to 250+00	D/A-O



- Compliance Criteria:

Sediment Parameter	Parameter Definition	Compliance Values
Beach Placement Maximum silt content	Passing #230 sieve	10%
Nearshore Placement Maximum silt content	Passing #230 sieve	20%
Maximum Shell Content ¹	Retained on #4 sieve	15%
Munsell Color Value	Moist Value (chroma = 1)	5 or lighter





Post-Construction Beach



- Post construction sediment reports submitted to FDEP annually to confirm all material placed on the beach complies with the “Sand Rule” (62B-41.007 F.A.C.)
- Over 1.9 million cubic yards of beach compatible O&M dredged material placed at Ft. Clinch and Fernandina Beach since 2015!



Event	Location	Volume	USCS	Mean (mm)	Mean (phi)	Sorting (phi)	%Fines Passing #230	Visual Shell %	Shell % Retained #4	Munsell Color
2015	Ft Clinch	33,480	SP	0.7	0.53	1.46	1.53	39	6.66	2.5Y 7/7
	Fernandina	400,704	SP	0.62	0.78	1.21	0.98	26	5.5	2.5Y 7/5
2016	Fernandina	170,241	SP	0.62	0.78	1.21	0.98	26	5.5	2.5Y 7/5
2017	Ft Clinch	123,400	SP	0.46	1.12	1.31	0.2	21.9	4.6	2.5Y 7/3
	Fernandina	165,000	SP	0.46	1.13	1.36	0.18	22.3	4.27	2.5Y 7/2
2018	Fernandina	70,268	SP	0.52	0.95	1.05	0.29	66	2.28	2.5Y 7/2
2019	Ft Clinch	156,206	SP	0.63	0.85	1.24	0.42	33.2	4.69	2.5Y 7/2
	Fernandina	358,735	SP	0.42	1.32	1.22	0.4	26	2.26	10Y 7/1
2020	Fernandina	206,136	SP	0.7	0.52	1.17	0.63	25.4	2.98	10YR 6/1
2021	Ft Clinch	86,368	SP	0.77	0.37	1.31	0.38	29.3	5.75	10YR 7/1
	Fernandina	129,626	SP	0.49	1.02	1.36	0.31	18.8	3.53	10YR 7/1

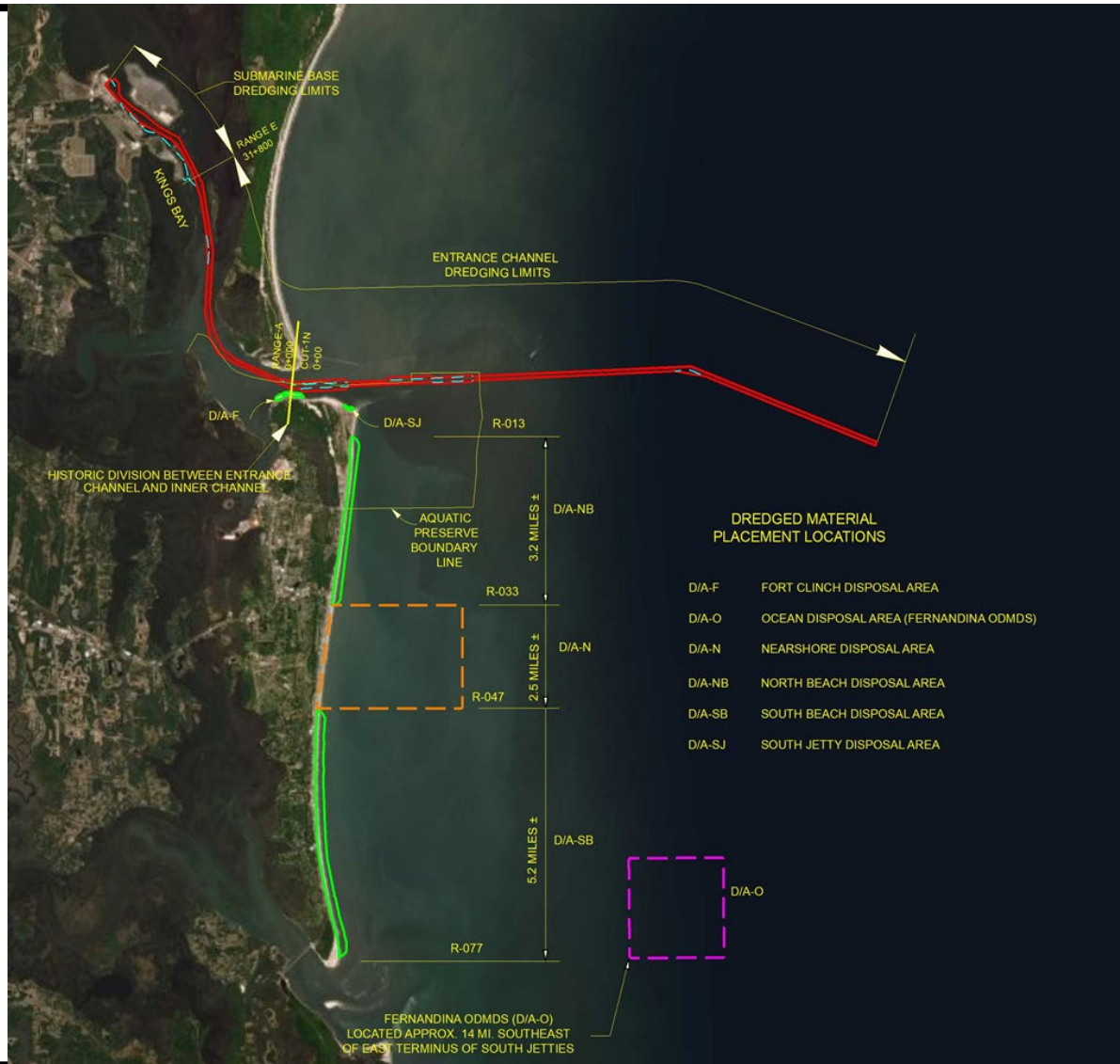


U.S. ARMY

Permitting



BUILDING STRONG





Permitting



BUILDING STRONG

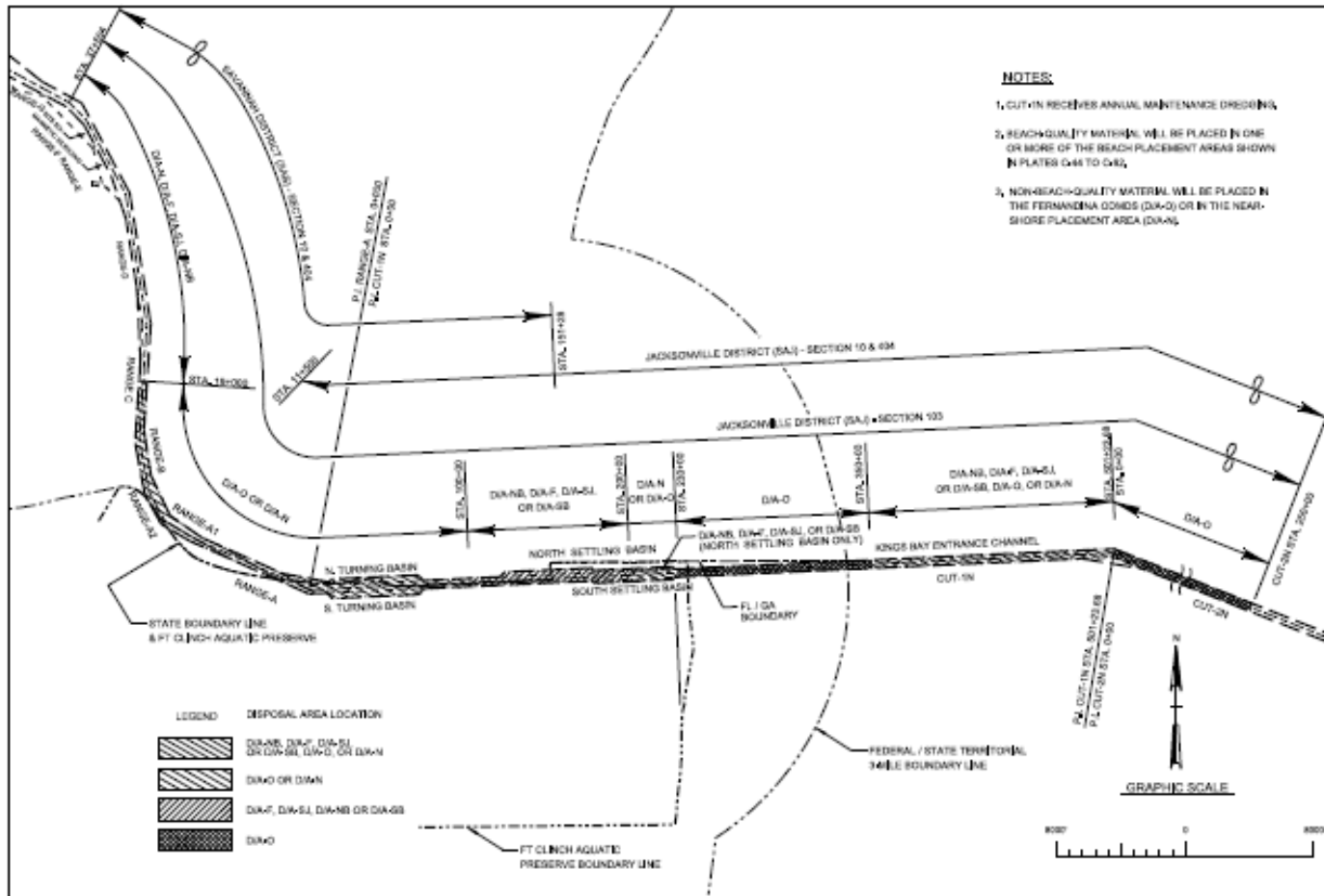
- Florida DEP Joint Coastal Permit No. 0196204-016-JC
- Florida DEP Joint Coastal Permit Mod. No. 0196204-019-JN
- Dept. of the Army Permit No. SAJ-1992-01854; Section 10/404/103
- Dept. of the Army Permit No. SAS-2005-01790, Section 10/404
- Georgia Department of Natural Resources Environmental Protection Division Section 401 Water Quality Certification
- Georgia Department of Natural Resources Coastal Resources Division Federal Consistency Determination Concurrence
- EPA MPRSA Section 103 Concurrence
- Fernandina Beach ODMS Site Management and Monitoring Plan
- Ft. Clinch State Park Use Agreement No. U-0425
- NMFS South Atlantic Regional Biological Opinion (SARBO)
- USFWS Statewide Programmatic Biological Opinion (SPBO)



Permitting



BUILDING STRONG



 US Army Corps of Engineers Jacksonville District	WQC PERMIT PLATE NOT FOR CONSTRUCTION	DATE: 09/2014 DRAWN BY: WAC CHECKED BY: JLP DATE: 09/2014	KINGS BAY, GEORGIA AND FLORIDA MAINTENANCE DREDGING, 46-FOOT PROJECT, ENTRANCE CHANNEL WQC PERMIT PLATE CHANNEL AND DREDGING AREAS	PLATE G-03
	DEPARTMENT OF THE ARMY JACKSONVILLE DISTRICT, CORPS OF ENGINEERS JACKSONVILLE, FLORIDA			



Permitting--Compliance



BUILDING STRONG

Kings Bay Entrance Channel Maintenance Dredging				
Environmental Compliance Matrix				
Agency Notification and Submittal Schedule				
01/13/22				
Author	Hollingsworth and Dauberman			
Spec/Permit Reference	Specification	Deadline	Responsible Entity	Date Provided
Pre-Construction				
DEP GC 2 DEP GC 3 USACE GC2	The Corps shall notify the DEP in writing of any anticipated significant deviation from this authorization prior to implementation so that the Department can determine whether a modification is required.	Immediately and prior to commencement	CESAJ-PD-EQ	
DEP SC 10	Use Agreement must be executed in order for contractors to access Fort Clinch State Park or Park beach.	Prior to Construction	CESAJ-PM-W	Jan 12 2022
103 SC14	Bathymetric Survey of Fernandina Beach ODMS: within 60 days following project completion. Submit to USACE and EPA after construction.	60 days prior to construction	CESAJ-CD-N/ CESAJ-PD-EQ	To be completed after construction
DEP SC 23	Schedule a preconstruction conference and provide written notification of the conference to DEP Bureau of Beaches, JCP Compliance Officer, FWCC, Turtle surveyors, bird monitors, and DEP Northeast District Office (as a courtesy)	21 days prior to commencement (7 days before pre-con)	CESAJ-CD-N	Dec 15 2021
DEP SC 5	Conduct pre-construction conference	14 days prior to commencement	CESAJ-CD-N	Dec 20 2021
DEP GC 10 USACE SC 1 103 SC 2 USACE SAS SC 2	Send Notice of Commencement to: DEP, GADNR, USACE, and EPA.	DEP 48 hours prior to commencement USACE, GADNR, and EPA: 15 days	CESAJ-CD-N	Jan 10 2022
DEP SC 6	Submit turbidity qualifications to DEP (JCP Compliance)	Prior to commencement (see specification)	CESAJ-PD-EQ	

[Matrix](#)

[Contact List](#)

[Compliance Tracking](#)

[Sheet1](#)





Partnering



BUILDING STRONG

- Cooperation between many organizations for dredging and beach placement

- ▶ Federal

- USACE
- US Navy
- NFWS



US Army Corps
of Engineers®
Jacksonville District



- ▶ State

- FDEP
- FWS
- FL Parks
- GA DNR
- Nassau County
- Fernandina Beach



- Project performance and relationship with Nassau County SPP

- ▶ Beneficial use of KBEC material to reduce frequency of SPP construction



Conclusions



BUILDING STRONG

- An average of 1.3 million cubic yards of material removed from KBEC each year
 - ▶ Nearly 2 million cubic yards placed on the beach since 2015
- Placement of dredged material on adjacent eroding shorelines and in the nearshore keeps material in the system (RSM)
 - ▶ Reduces frequency for Nassau County SPP to be constructed
- Dredged material protects Fort Clinch—listed on the National Register of Historic Places



Thank you!



BUILDING STRONG

Questions?



For Additional Information:

Design: viktorija.m.bogina@usace.army.mil

Geotech: jennifer.l.coor@usace.army.mil

Permitting: michael.j.hollingsworth@usace.army.mil