



US Army Corps  
Of Engineers  
Wilmington District

# PUBLIC NOTICE

Issue Date: July 27, 2005  
Comment Deadline: August 26, 2005  
Corps Action ID #: 200500935

All interested parties are hereby advised that the Wilmington District, Corps of Engineers (Corps) has received an application for work within jurisdictional waters of the United States. Specific plans and location information are described below and shown on the attached plans. This Public Notice and all attached plans are also available on the Wilmington District Web Site at [www.saw.usace.army.mil/wetlands](http://www.saw.usace.army.mil/wetlands)

**Applicant:** Town of Holden Beach  
110 Rothchild Street  
Holden Beach, North Carolina 28462

**AGENT:** Applied Technology and Management, Inc.  
260 West Coleman Boulevard, Suite A  
Mount Pleasant, North Carolina 29464

## Authority

The Corps will evaluate this application and decide whether to issue, conditionally issue, or deny the proposed work pursuant to applicable procedures of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

## Location

The project site is located at two areas adjacent to the Atlantic Ocean, at Holden Beach, Brunswick County, North Carolina. The Eastern Reach Section will be 5,800 feet long and located near Rothschild Street going east just past the Blockade Runner. The Western Reach Section will be 7,400 feet long and be located near Sailfish Drive. See attached plans and drawings for specifics.

## Existing Site Conditions

### Disposal Site Description:

Holden Beach is a barrier island comprised mostly of unconsolidated sands along the beach. Natural dunes are present along most of the shoreline, with the exception of some regions near Lockwoods Folly Inlet where dunes have been eroded or severely scarped. The dunes are small to moderate in size and are well vegetated. The Town has a sand-

fencing program, which has succeeded in areas with larger berms and available wind-blown sediments.

The Eastern Reach has the highest erosion rates (historically exceeding 5 ft/yr) of the island which are primarily caused by tidal currents, wave focusing, and ebb-flood shoals from the adjacent Lockwoods Folly Inlet. The dry high-tide beach width varies from approximately 0 ft to 20 ft within this reach and some segments of the berm exhibit escarpments between ~0.5 ft to 1 ft high. In some cases, artificial dunes have been built to replenish previous natural dunes eroded or severely scarped. The existing natural dunes on this beach are small, well vegetated with sea grass, and are fronted by sand fencing with limited sources of aeolian sediments (due to the small berm widths). Because of the limited berm widths and small dunes, homes along this reach are highly vulnerable to erosion and storm damage. In addition, because of the small berm widths, there is limited dry high tide beach areas for recreation and sea turtle nesting habitats.

Erosion rates within the Western Reach are moderate compared with the inlet ends of the island (~2-4 ft/yr). The Western Reach has berm widths from ~0 ft to 40 ft. There are several dune ridges along the Western Reach, which are well vegetated. The most seaward toe of dune is threatened by erosion caused by wave runup during high tide events. Sand fencing along this reach is well buried, evidence of historically greater berm widths along this reach relative to the Eastern Reach. However, with the near absence of a dry high tide beach today, some losses of these most seaward dunes and sand fences might occur.

#### **Borrow Site Description:**

The proposed borrow site for this project is a parcel of land located near the intersection of Turkey Trap Road and Stanbury Road (referred to as the Kirby Walter Borrow Site), approximately 3.6 miles from the beach. The majority of the 38-acre site is medium to densely covered with trees and other vegetation. The property is mapped as Leon fine sand (Lo), Mandarin fine sand (Ma), Muckalee loam (Mk), and Kureb fine sandy loam 0-2% slopes (KrB) based on the USDA *Soil Survey of Brunswick County, North Carolina*.

The wetland areas located on the property include several small isolated depressions and a headwater slough that drains to the north off the property. The upland areas located on the property are best described as xeric sandhill scrub. The wetlands at the borrow site have been delineated and the wetland line reviewed and approved by the Corps. There is a representation of this delineation with a 50 feet buffer included in the attachments. The Corps will sign a surveyed plat as soon as it is provided and approved.

#### **Applicant's Stated Purpose**

The town of Holden Beach intends to nourish their island's shoreline to offset long term erosion, protect upland properties from storm damage, provide environmental restoration, and create recreational beach area along two designated reaches totaling about 2.5 miles. The proposed nourishment will be a truck-haul project from an upland borrow site.

Approximately 500,000 cubic yards (cy) of beach quality sediment will be placed between STA 38+00 and STA 96+00, referred to as the Eastern Reach, and between STA 245+00 and STA 319+00, referred to as the Western Reach.

### **Project Description**

The proposed beach nourishment project will be constructed over a two-year period. During the first year, fill will be placed between STA 38+00 and STA 70+00 within the Eastern Reach and STA 245+00 and STA 290+00 within the Western Reach. The following year, the town will place sediment between STA 70+00 and STA 96+00 within the Eastern Reach and STA 290+00 and STA 319+00 within the Western Reach. The Eastern Reach consists of 5,800 feet and the Western Reach consists of 7,400 feet of shoreline.

The proposed borrow site for this project is a sediment source located near the intersection of Turkey Trap Road and Stanbury Road (referred to as the Kirby Walter borrow site), approximately 3.6 miles from the beach. The majority of the 38-acre site is medium to densely covered with trees and other vegetation. In areas of vegetative cover, surficial layers containing organic material, sticks, roots and other debris which will be segregated out and not used for beach nourishment. Only native compatible beach quality sediment will be placed on the beach. In order to avoid impacts to wetland areas no excavation will be performed in highground within 50 feet from the approved wetland line. The Town of Holden Beach has initiated the process of obtaining a mining permit for the proposed borrow site from the North Carolina Division of Land Management. Once obtained the mining permit will be submitted as a supplemental piece of this permit application.

Once the sediment is placed on the beach, it will be graded utilizing conventional earth moving equipment. Equipment will enter the beach through the main public beach access located at 801 Ocean Blvd. West (approximately STA 262+00). Work on the shorefront will be a continuous operation 24 hours per day, 7 days per week. Based on the haul distance between the borrow area and the beach front, it is anticipated that approximately 170 16 CY truckloads of sediment will be conveyed to the beach daily, or 2,720 cy/day. It will require approximately 120 days of construction during the first year and approximately 90 days of construction during the second year to complete the proposed nourishment.

### **Beach Fill Design**

The project design is intended to offset long-term erosion, protect upland properties from storm damage, provide environmental restoration, and create recreational beach area. Fill will be placed approximately between the seaward most +8 ft elevation and the -4.8 ft elevation referenced to the National Geodetic Vertical Datum of 1929 (NGVD29). The selected design includes an approximately 150 ft to 190 ft wide berm at +8 ft NGVD29 and an approximate seaward slope of 1V:10H from berm crest to the fill toe. The fill toe is designed to be located within 3 vertical feet of the -1.8 ft contour, approximately Mean

Low Water (MLW). Between 35 cy and 45 cy of sediment will be placed per linear ft within the reaches. Actual constructed slopes and berm extensions will vary depending on construction methods. After equilibration of the construction profile, this project will increase beach widths approximately 30 ft within the Eastern Reach and approximately 40 ft within the Western Reach.

#### Holden Beach Past Project History

There have been two beach nourishment projects on Holden Beach since 2000: the Wilmington Harbor Deepening (Section 933) project, and a portion of the Town's Phase I Beach Nourishment Project. Both projects were authorized by the USACE and N.C. Division of Coastal Management. In addition, the USACE has placed maintenance dredging material from the Atlantic Intracoastal Waterway (AIWW) along the eastern portion of Holden Beach.

#### Wilmington Harbor Deepening (Section 933) project

Approximately 525,000 cy of beach compatible sediment, dredged in association with the deepening of Wilmington Harbor/Cape Fear River (Corps Section 933 Beach Fill project – Contract DACW54-01-C-0012), was placed on the eastern half of Holden Beach between STA 87+00 and STA 192+00 from December 8, 2001 to February 20, 2002. This project included a 45-foot berm width at 7 ft NGVD29 and total fill volumes of not more than 50 cy/ft. The fill was placed in the nearshore region of the beach but only *seaward* of the pre-project MHW line, which left a variable gap between the dune scarp and the placed fill. The Town of Holden Beach filled portions of this gap through the placement of additional sediments from an upland source during the Town's initial portion of their Phase I Beach Nourishment Project.

#### Maintenance Dredging of the AIWW

As part of the USACE maintenance dredging of the AIWW, approximately 32,000 cubic yards of beach compatible material was placed on the eastern end of Holden Beach (between Stations 20+00 and 30+00) during March and April of 2002.

#### Town of Holden Beach – Phase I

Fill was placed to help maximize the benefits of the 933 Project, by extending the alongshore fill placement limits, filling the profile 'gap' between the dune scarp and the placed fill, and increasing total sediment volumes along the island. During the initial portion of the Town's Phase I project, approximately 141,800 cubic yards of material was placed between March 7 and April 30, 2002 according to the distribution shown in Table 1.

Table 1. Placement Details – Town of Holden Beach Phase I Beach Nourishment Project

Location	Baseline Stations	Pay Volume Quantity (cy)	Shoreline Length (ft)
East Extension	87+00 to 66+00	67,763	2,100
“Gap” Fill (Section 933 fill)	90+00 to 87+00	255	300
	146+00 to 132+50	1,361	1,350
	192+00 to 175+28	6,043	1,672
West Extension	192+00 to 217+00	66,352	2,500

During the initial portion of Phase I, sediment was truck-hauled from the Oyster Harbor upland site directly to the beach to complete the beach and initial gap fill areas. Additionally, sediment from the Seascape upland source was stockpiled in the USACE’s disposal site at the corner of Brunswick Ave and Boyd Street for eventual placement in the remaining gap fill areas during winter 2002/2003 (gap-fill portion of Phase I).

The gap fill portion of the Town’s Phase I Project placed approximately 30,000 cubic yards of sediment from the Boyd Street disposal area into the gaps not filled during the spring 2002 Town project. Gaps were filled between Station 175+00 and 90+00 during the winter of 2002/2003.

During the winter of 2003/2004, part 2 of the Town’s Phase 1 project was completed. This effort included the placement of ~69,175 cy of sediment between stations 46+00 and 68+00, and ~53,490 cy between stations 215+00 and 238+00. The material was truck hauled from the Smith Borrow Area, located within the Lakes at Lockwood development, between December 10, 2003 and April 1, 2004.

### Other Required Authorizations

This notice and all applicable application materials are being forwarded to the appropriate State agencies for review. The Corps will generally not make a final permit decision until the North Carolina Division of Water Quality (NCDWQ) issues, denies, or waives State certification required by Section 401 of the Clean Water Act (PL 92-500). The receipt of the application and this public notice in the NCDWQ Central Office in Raleigh serves as application to the NCDWQ for certification. A waiver will be deemed to occur if the NCDWQ fails to act on this request for certification within sixty days of the date of the receipt of this notice in the NCDWQ Central Office. Additional information regarding the Clean Water Act certification may be reviewed at the NCDWQ Central Office, 401 Oversight and Express Permits Unit, 2321 Crabtree Boulevard, Raleigh, North Carolina 27604-2260. All persons desiring to make comments regarding the application for certification under Section 401 of the Clean Water Act should do so in writing delivered to the North Carolina Division of Water Quality (NCDWQ), 1650 Mail Service Center, Raleigh, North Carolina 27699-1650 Attention: Mr. John Hennessy (NC

Department of Transportation projects) or Ms Cyndi Karoly (all other projects) by August 19, 2005.

The applicant has certified that the proposed work complies with and will be conducted in a manner that is consistent with the approved North Carolina Coastal Zone Management Program. Pursuant to 33 CFR 325.2 (b)(2) the Corps is, by this notice, forwarding this certification to the North Carolina Division of Coastal Management (NCDCM) and requesting its concurrence or objection. Generally, the Corps will not issue a Department of the Army (DA) permit until the NCDCM notifies the Corps that it concurs with the applicant's consistency certification.

### **Essential Fish Habitat**

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The Corps' initial determination is that the proposed project may adversely impact EFH or associated fisheries managed by the South Atlantic or Mid Atlantic Fishery Management Councils or the National Marine Fisheries Service. These impacts to EFH include destruction of habitat at the fill site, siltation plums, erosion and sedimentation issues, time frame work is performed (fish moratoriums) and water quality issues.

### **Cultural Resources**

The Corps has consulted the latest published version of the National Register of Historic Places and is not aware that any registered properties, or properties listed as being eligible for inclusion therein are located within the project area or will be affected by the proposed work. Presently, unknown archeological, scientific, prehistoric, or historical data may be located within the project area and/or could be affected by the proposed work.

### **Endangered Species**

The Corps has reviewed the project area, examined all information provided by the applicant and consulted the latest North Carolina Natural Heritage Database. Based on available information, the Corps has determined there may be species listed as threatened or endangered or their critical habitat formally designated pursuant to the Endangered Species Act of 1973 (ESA) within the project area. A final determination on the effects of the proposed project will be made upon additional review of the project and completion of any necessary biological assessment and/or consultation with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service.

### **Evaluation**

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of

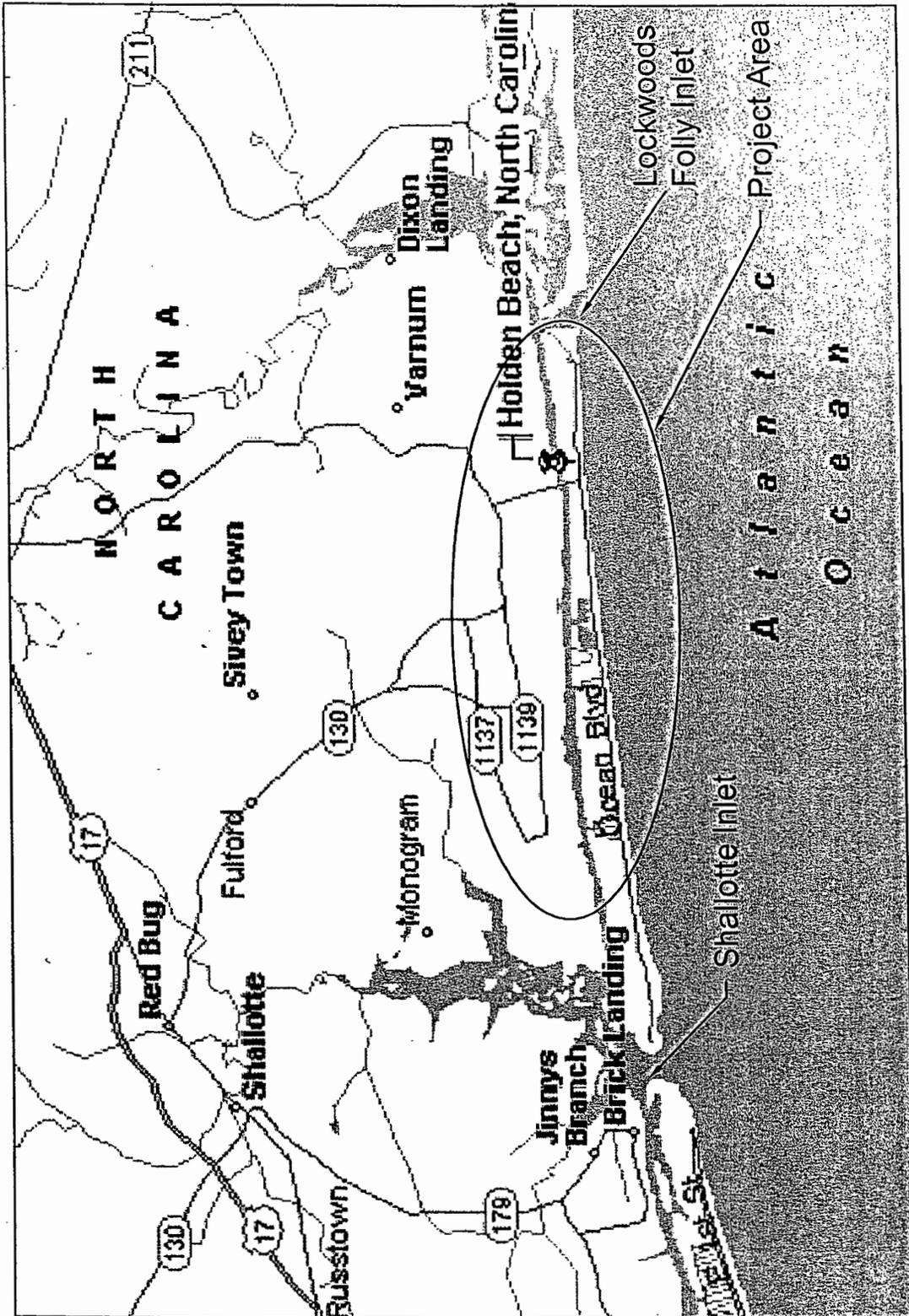
important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values (in accordance with Executive Order 11988), land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people. For activities involving the discharge of dredged or fill materials in waters of the United States, the evaluation of the impact of the activity on the public interest will include application of the Environmental Protection Agency's 404(b)(1) guidelines.

### **Commenting Information**

The Corps is soliciting comments from the public; Federal, State and local agencies and officials; Indian Tribes and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA). Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Requests for a public hearing shall be granted, unless the District Engineer determines that the issues raised are insubstantial or there is otherwise no valid interest to be served by a hearing.

Written comments pertinent to the proposed work, as outlined above, will be received by the Corps of Engineers, Wilmington District, until 5pm, August 26, 2005. Comments should be submitted to Henry Wicker, Project Manager for this project.



APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83

DATE: 06/23/05 SCALE: NTS

LOCATION MAP

TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH

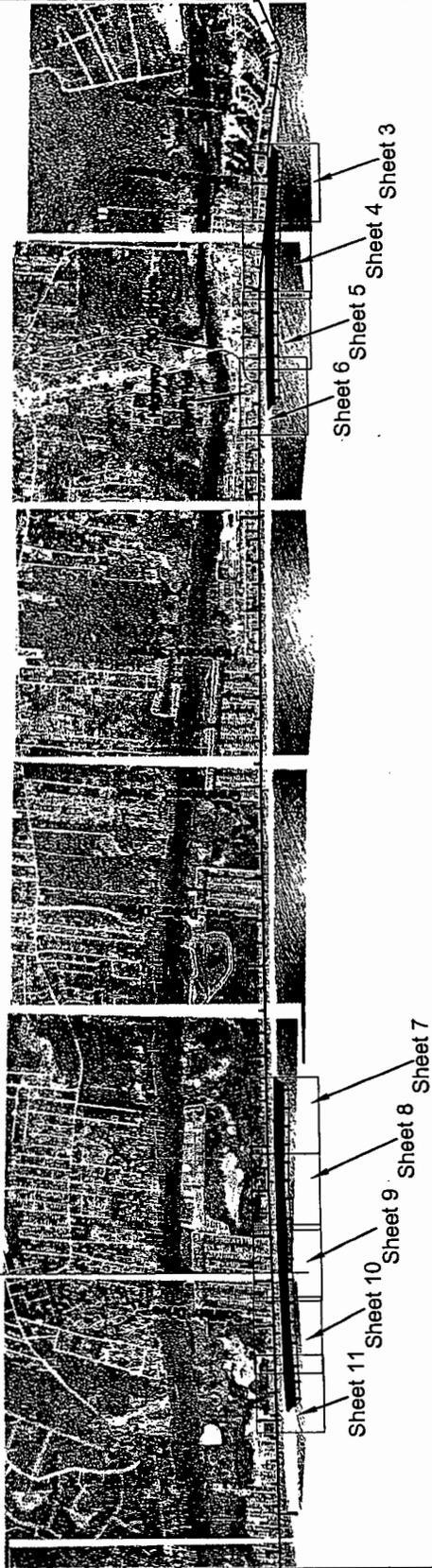
COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA

SHEET 1 OF 14





Sheet 12



Sheet 6 Sheet 5 Sheet 4 Sheet 3

Sheet 11 Sheet 10 Sheet 9 Sheet 8 Sheet 7

APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83

DATE: 06/23/05 SCALE: 1"=4,000'

### PROPOSED PROJECT SHEET INDEX

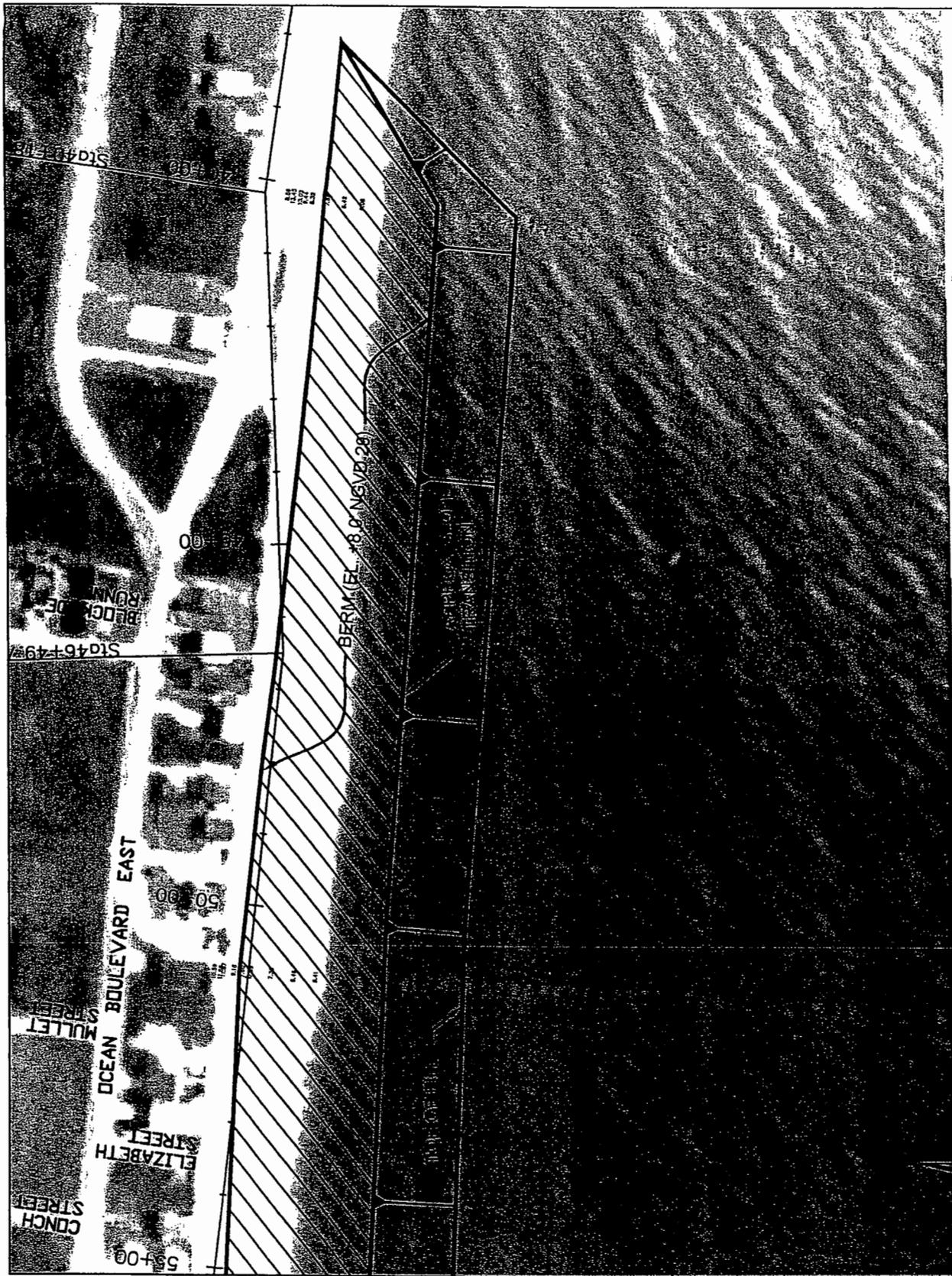
TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH

COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA

SHEET 2 OF 14





-15.00  
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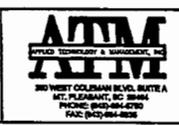
- NOTES:
- 1) HYDROGRAPHIC SURVEY TAKEN BY MCKIM & CREED DEC. 2004.
  - 2) ALL SOUNDINGS ARE MEASURED IN FEET AND REFERENCED TO NGVD 29.

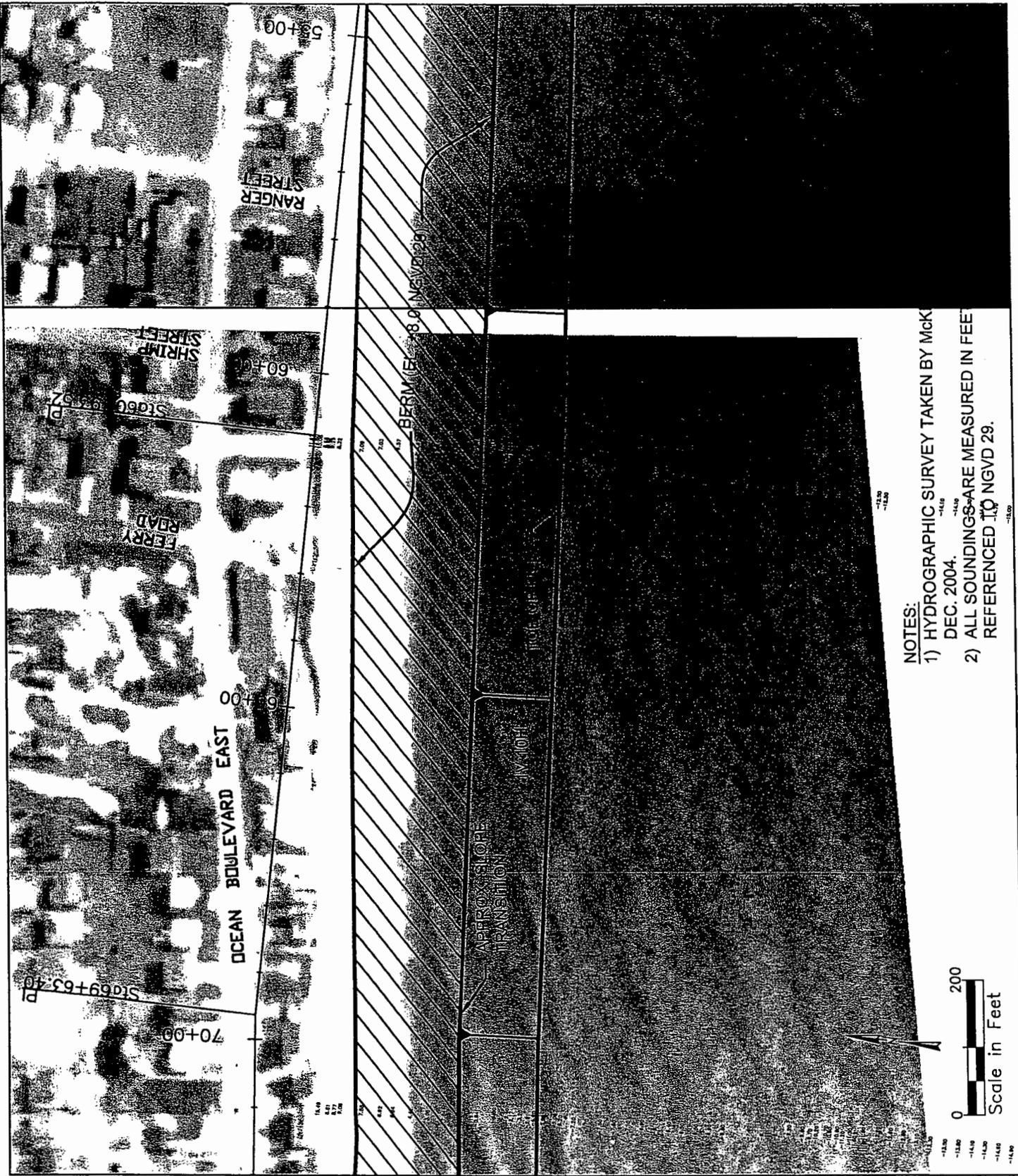


APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83  
 DATE: 06/23/05 SCALE: 1" = 200'

**PLAN VIEW EAST REACH**  
**STA. 38+00—STA. 55+00**  
 TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH  
 COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA  
 SHEET 3 OF 14





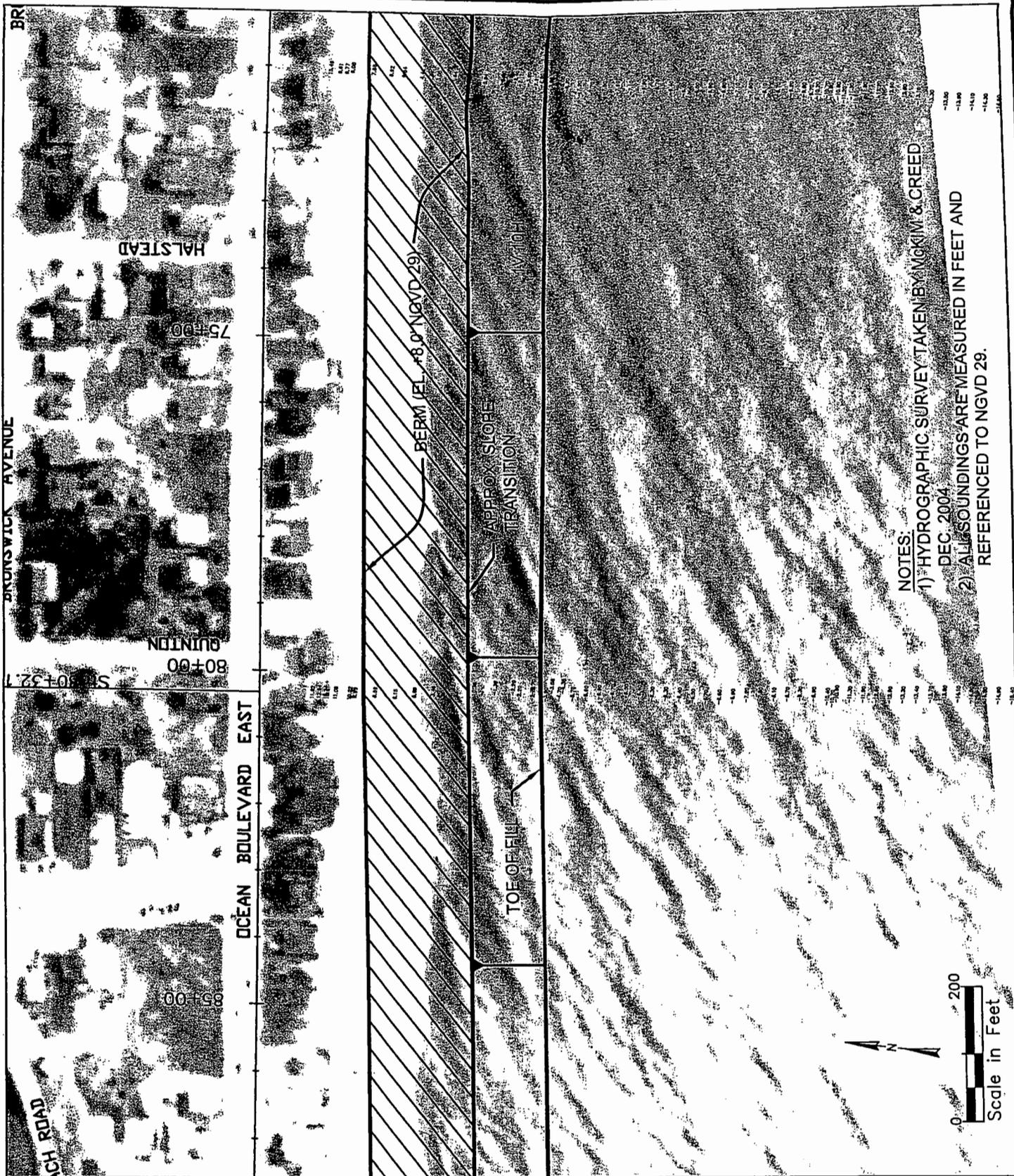
**NOTES:**  
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APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
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 DATE: 06/23/05 SCALE: 1" = 200'

**PLAN VIEW EAST REACH**  
**STA. 55+00—STA. 71+00**  
 TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH  
 COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA  
 SHEET 4 OF 14





APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83

DATE: 06/23/05 SCALE: 1" = 200'

**PLAN VIEW EAST REACH  
 STA. 71+00-STA. 87+00**

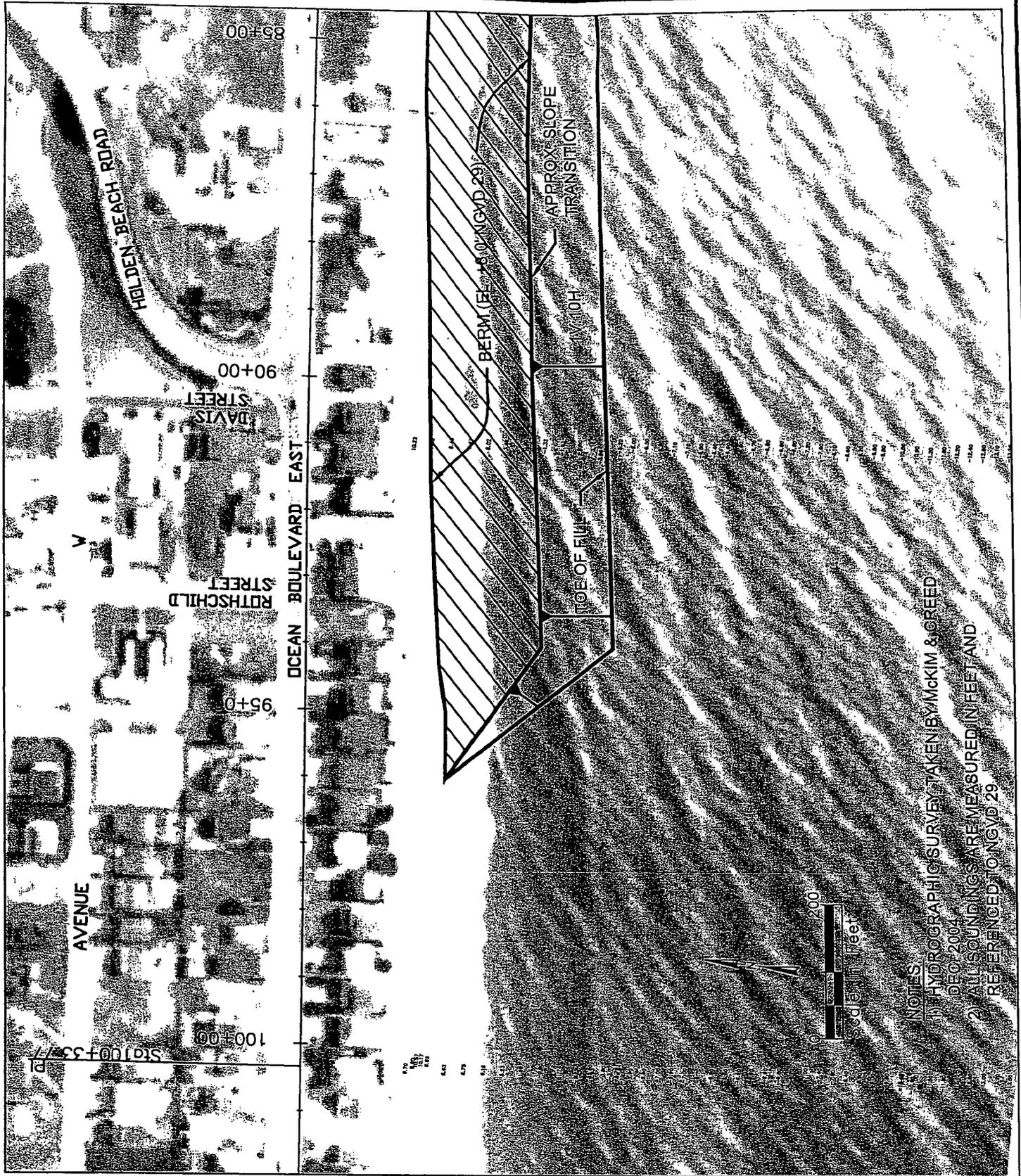
TOWN OF HOLDEN BEACH  
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PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH

COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA

SHEET 5 OF 14



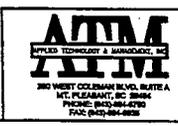


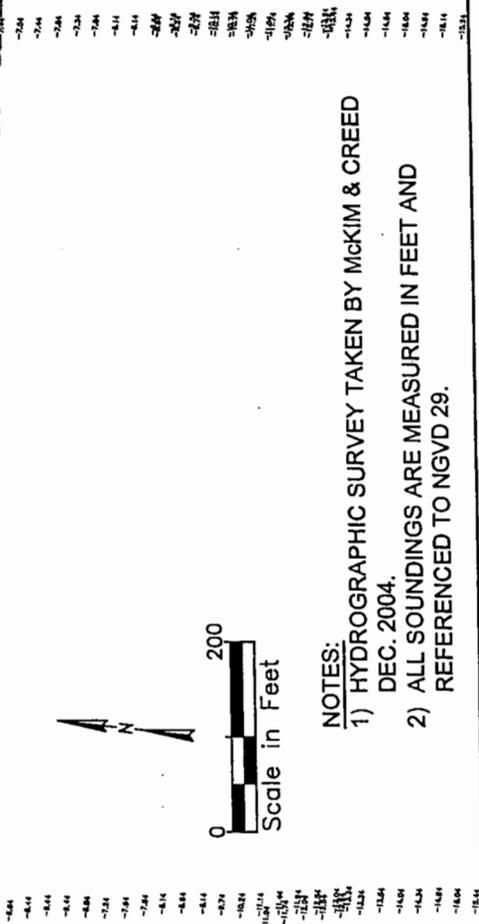
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 1) HYDROGRAPHIC SURVEY TAKEN BY MCKIM & CREED  
 DEC. 2004  
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APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
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 DATE: 06/23/05 SCALE: 1" = 200'

PLAN VIEW EAST REACH  
 STA. 87+00 - STA. 96+00  
 TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH  
 COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA  
 SHEET 6 OF 14





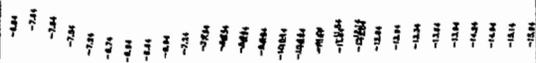
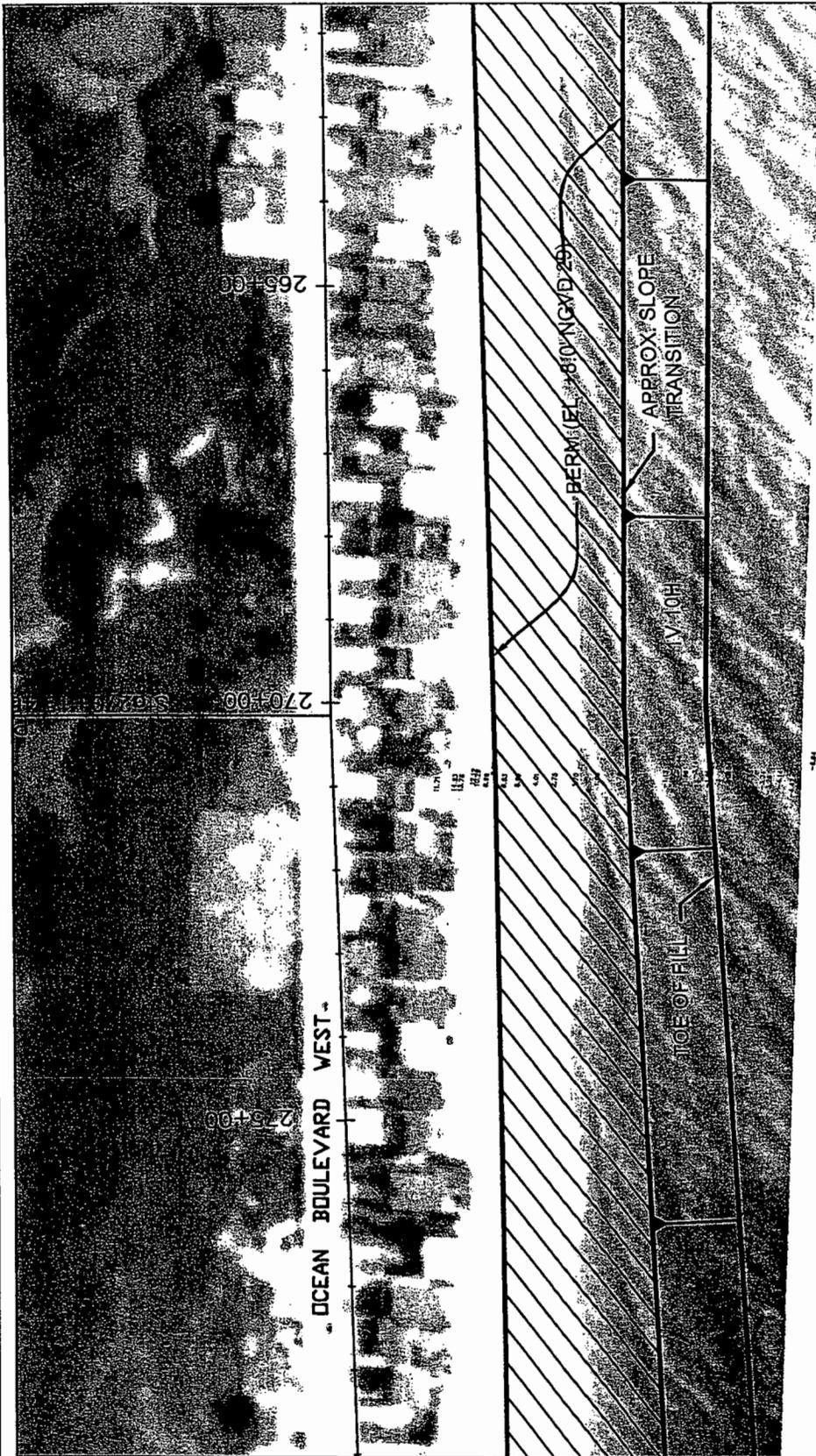
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APPLICATION BY: TOWN OF HOLDEN BEACH  
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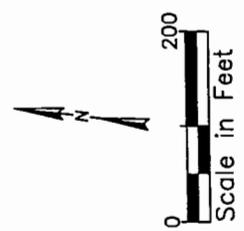
PLAN VIEW WEST REACH  
 STA. 245+00 - STA. 262+00  
 TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH  
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 SHEET 7 OF 14





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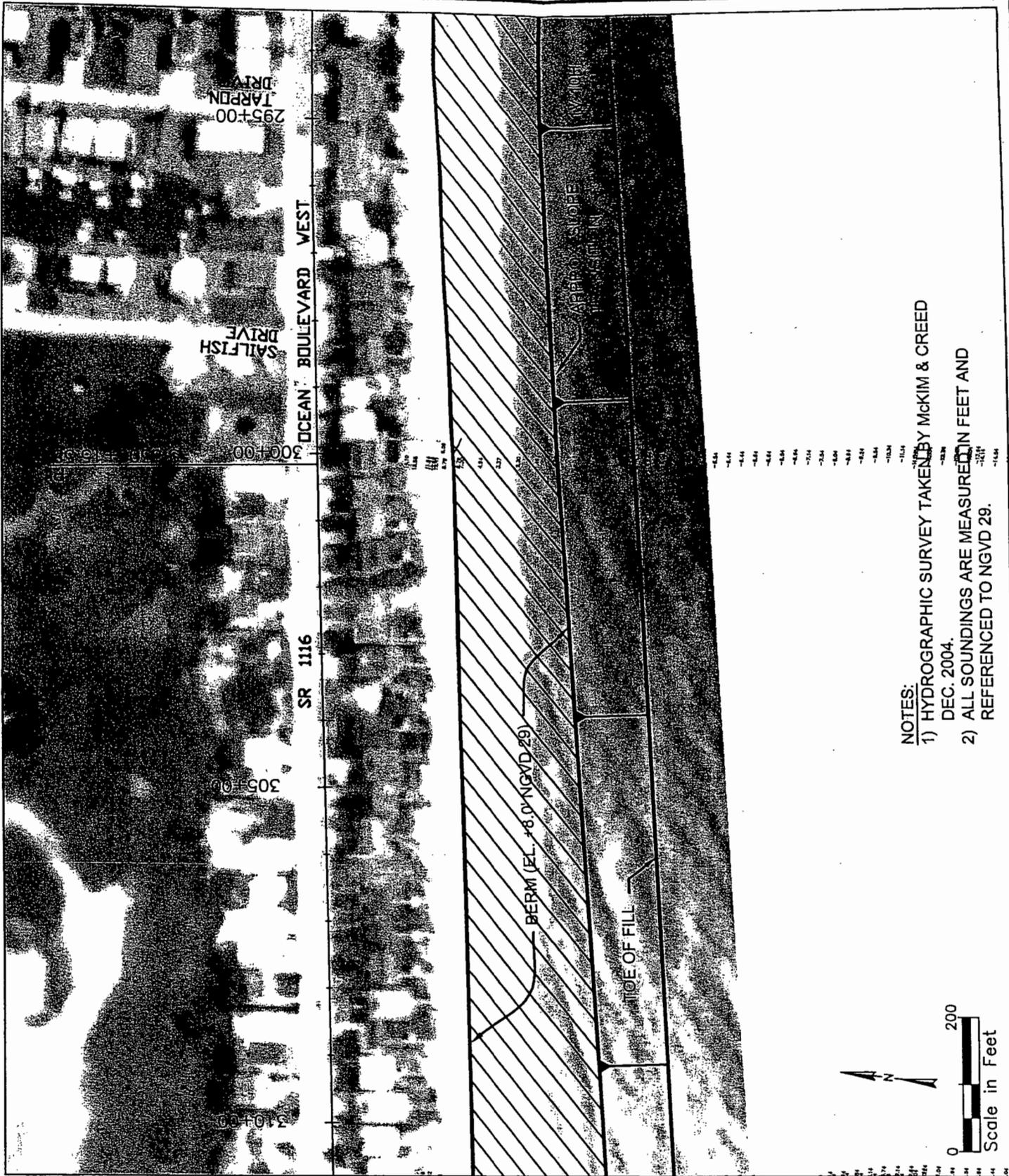
APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83  
 DATE: 06/23/05 SCALE: 1"= 200'

PLAN VIEW WEST REACH  
 STA. 262+00-STA. 278+00  
 TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
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PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH  
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 SHEET 8 OF 14







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APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
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**PLAN VIEW WEST REACH**  
 STA. 294+00—STA. 310+00

TOWN OF HOLDEN BEACH  
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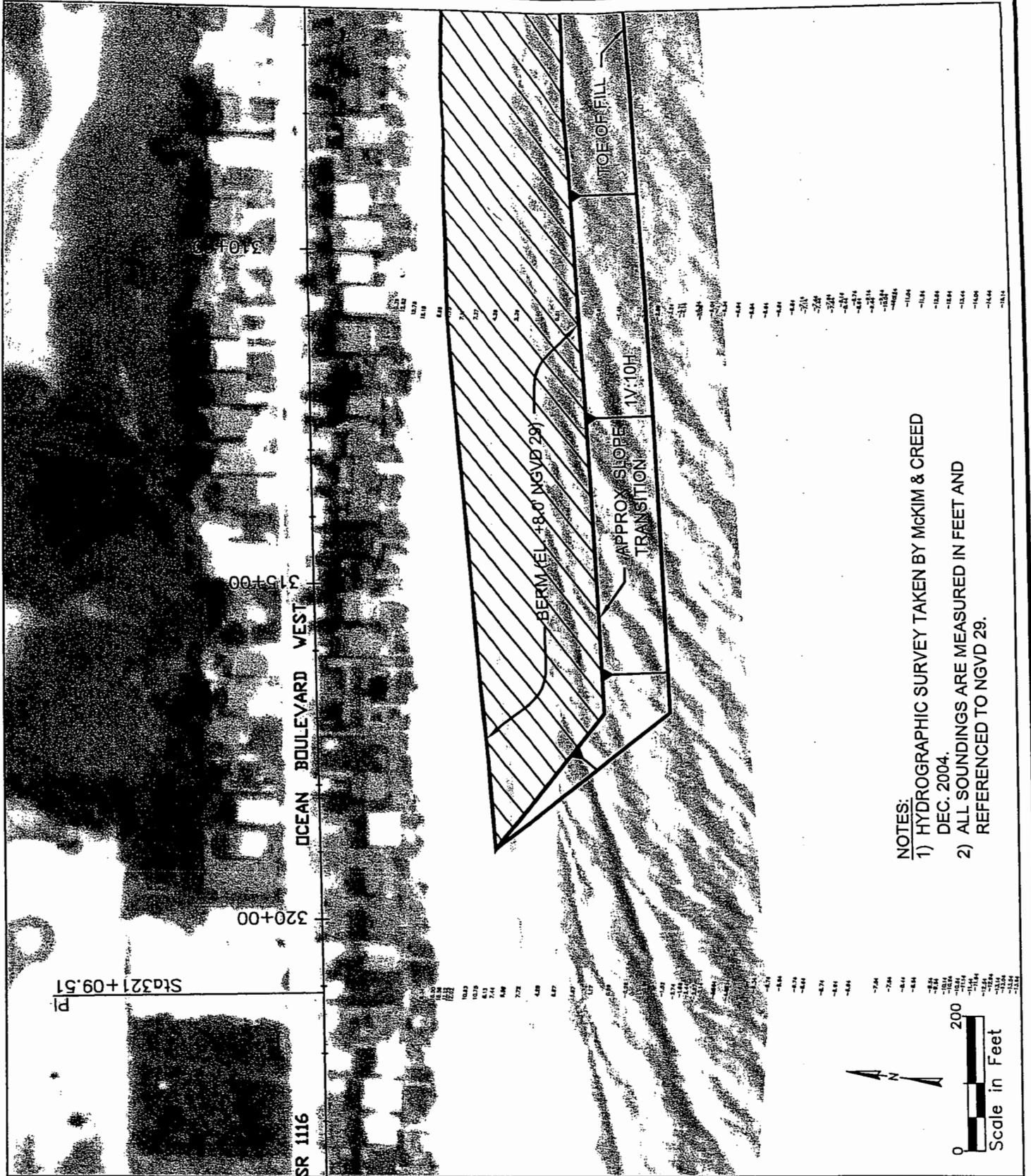
PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH

COUNTY OF: BRUNSWICK  
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DATE: 06/23/05 SCALE: 1" = 200'

SHEET 10 OF 14





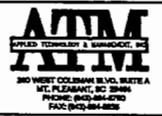
APPLICATION BY: TOWN OF HOLDEN BEACH  
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PLAN VIEW WEST REACH  
 STA. 310+00 - STA. 319+00

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APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83

DATE: 06/23/05 SCALE: 1"=800'

**BORROW SITE**

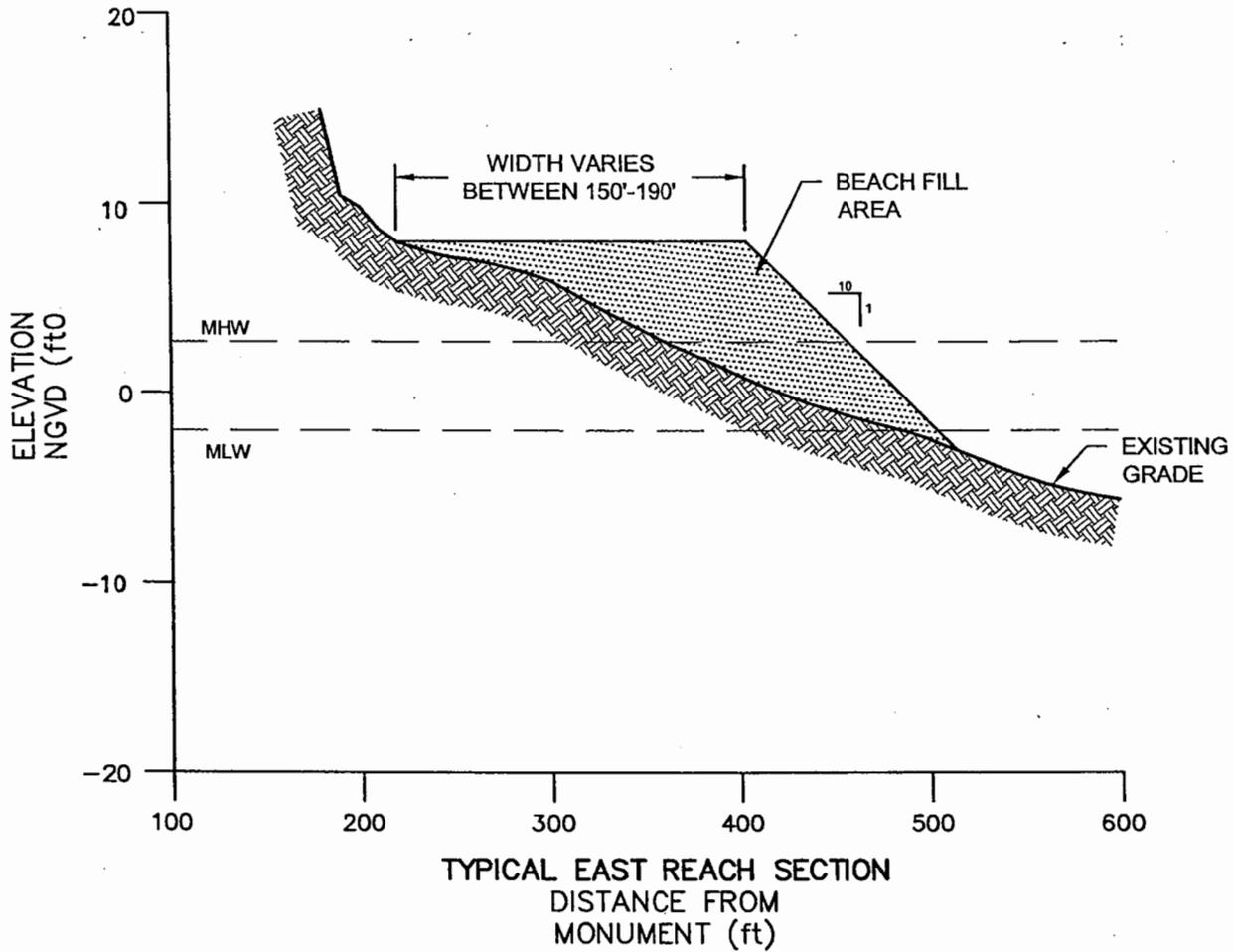
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SHEET 12 OF 14





APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
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DATE: 06/23/05

SCALE:  
 H: 1" = 100'  
 V: 1" = 10'

**TYPICAL SECTION (EAST REACH)**

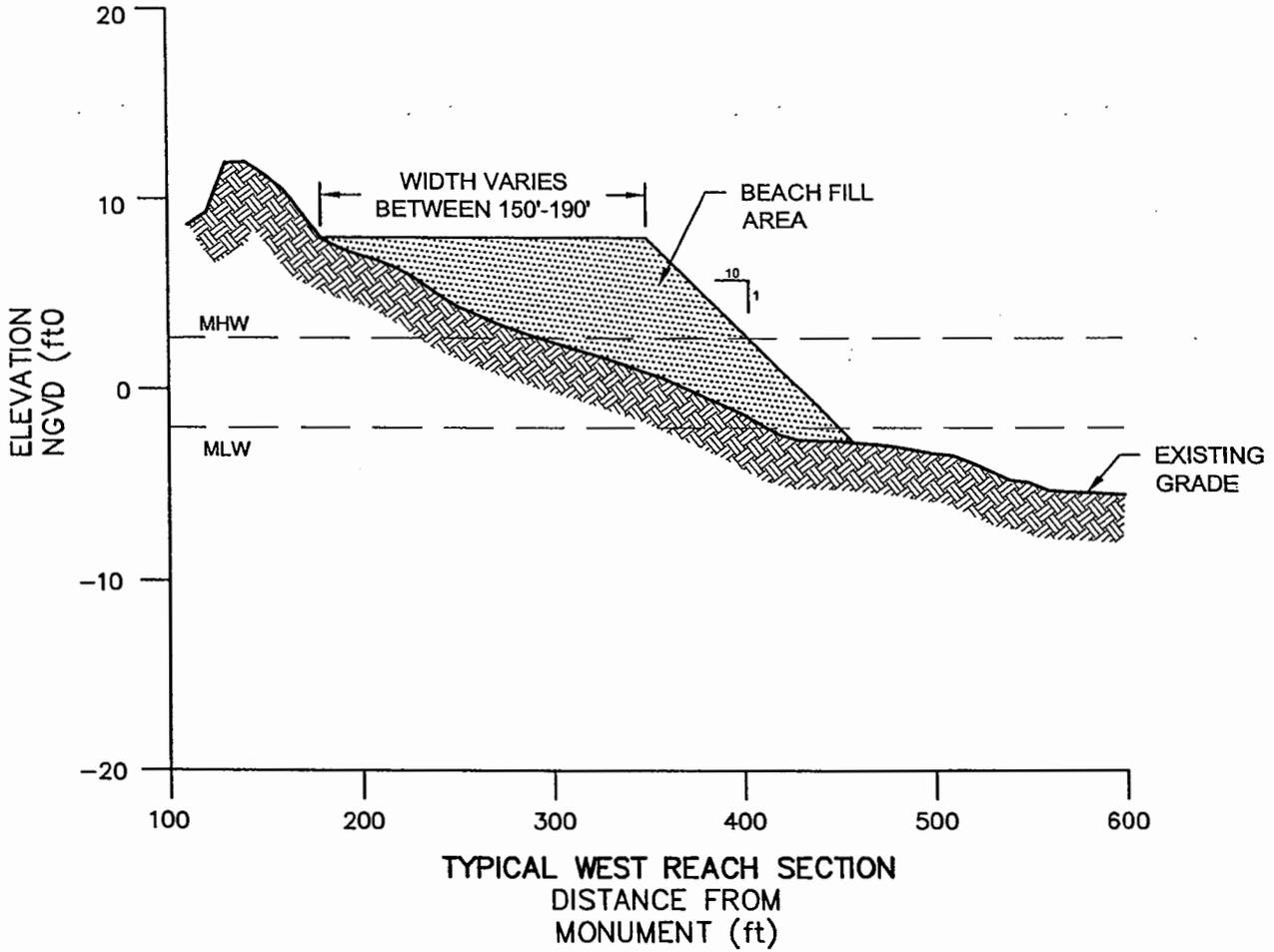
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SHEET 13 OF 14





APPLICATION BY: TOWN OF HOLDEN BEACH  
 VERTICAL DATUM: NGVD 29  
 HORIZONTAL DATUM: NC GRID NAD 83

DATE: 06/23/05

SCALE:  
 H: 1" = 100'  
 V: 1" = 10'

**TYPICAL SECTION (WEST REACH)**

TOWN OF HOLDEN BEACH  
 BRUNSWICK COUNTY  
 110 Rothschild Street  
 Holden Beach, NC 28462

PROPOSED: HOLDEN BEACH NOURISHMENT  
 AT: HOLDEN BEACH

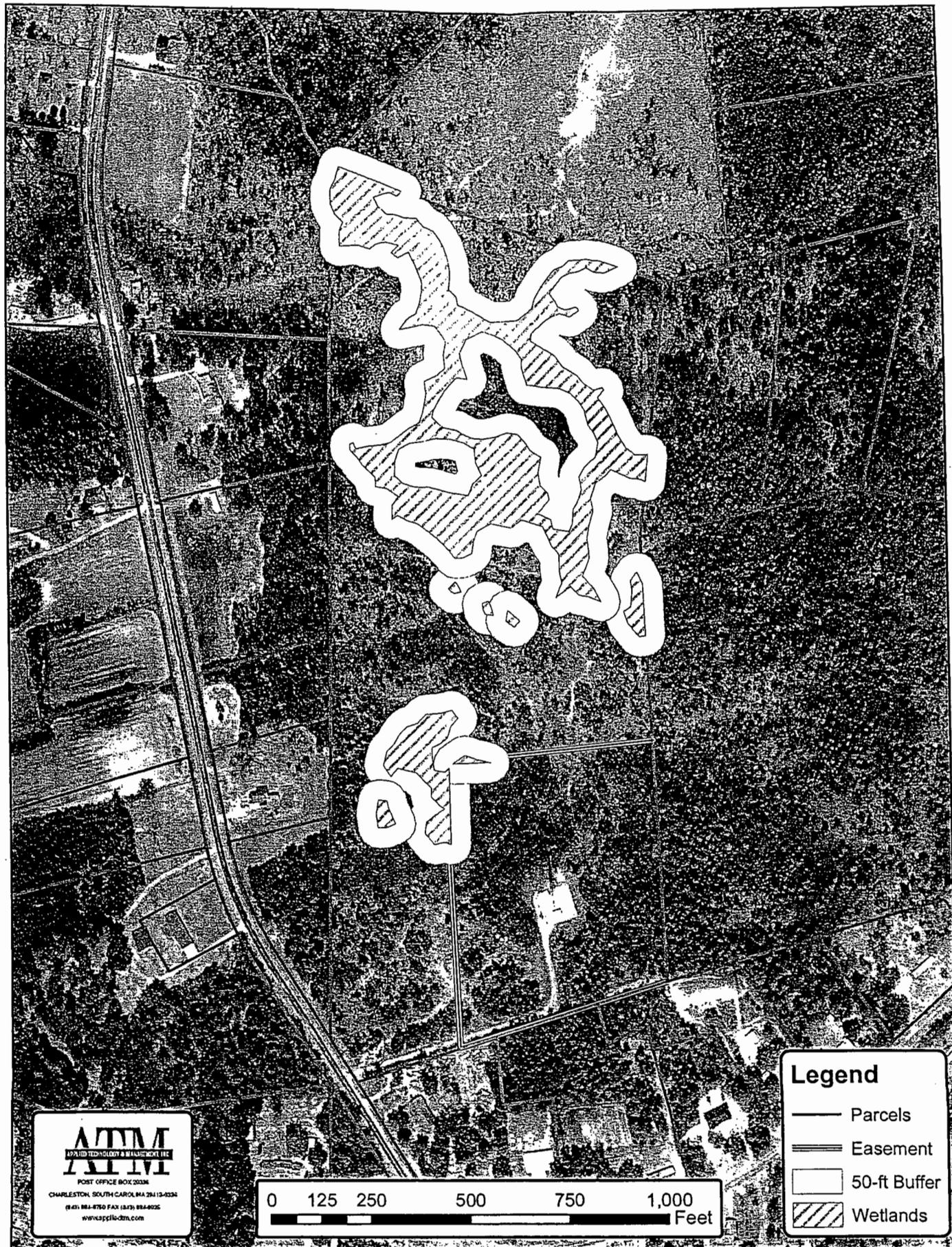
COUNTY OF: BRUNSWICK  
 STATE: NORTH CAROLINA

SHEET 14 OF 14



# PROPOSED HOLDEN BEACH UPLAND BORROW SITE

## Wetland Boundaries and Buffers



**ATM**  
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0 125 250 500 750 1,000 Feet

**Legend**

- Parcels
- Easement
- 50-ft Buffer
- Wetlands

## **Summary of Borrow Site Material Characteristics and Beach Compatibility –Kirby Walter Borrow Site**

In order to determine the compatibility of the Kirby Walter Borrow Site material, ATM contracted with Engineering Consulting Services, Inc. (ECS) to collect 10 soil borings from within the Kirby Walter Borrow Site. The borings began at the natural ground surface and were driven to a depth of approximately 35 ft to 40 ft below grade. Continuous split spoon sampling was conducted at 2 ft intervals. From these 10 borings, 40 composite samples were created and analyzed by ECS according to standard grain size analysis methods.

The soil borings revealed clay lenses throughout the borrow site, varying in thickness between 2 ft and 8 ft. Greater thicknesses were found toward the southwest end of the site. Towards the northeast end, clay lenses were less substantial and mean sediment grain sizes generally increased. The sediment is described as light grey, fine to medium sand toward the northeast portion of the borrow site and brownish grey, fine to medium sand and clayey sand toward the southwest.

Each composite soil sample selected for grain size analysis was tested in accordance with ASTM D-422 "Standard Test Method for Particle Size Analysis of Soils", ASTM D-1140 "Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve". Graduation analysis included the following sieve sizes: 3/4, 3/8, #4, #10, #20, #40, #60, #100, #200. Geotechnical Summary Table 1 shows the USCS soils classification, mean grain size, median grain size, percent fines, and volume of material represented for each composite sample. Percent fines are reflective of the material that passes the #200 sieve. Sediments suitable for the beach nourishment typically are expected to contain less than 10% fines.

The results of the suitability analysis led to a prioritization of the borrow site based on core samples where the areas to the northeast of the borrow site, represented by borings B1 through B6, were preferred over areas to the southwest, represented by borings B7 through B10. When considering the entire borrow site (including all 40 composite samples) the median and mean sediment diameters are 0.23 mm and 0.28 mm, respectively. The percent fines (percent of material passing the #200 sieve) is 9.4%. When considering selected vertical lenses within the preferred region, the median and mean sediment diameters are 0.29 mm and 0.26 mm, respectively. The percent fines reduce to 6.8% for the preferred region. From these selected layers within the preferred region of the borrow site, it is estimated that over 800,000 cy of beach quality sediment is present in the borrow site. Total volume available for excavation and beach nourishment is subject to the final Corps certified wetland boundaries.

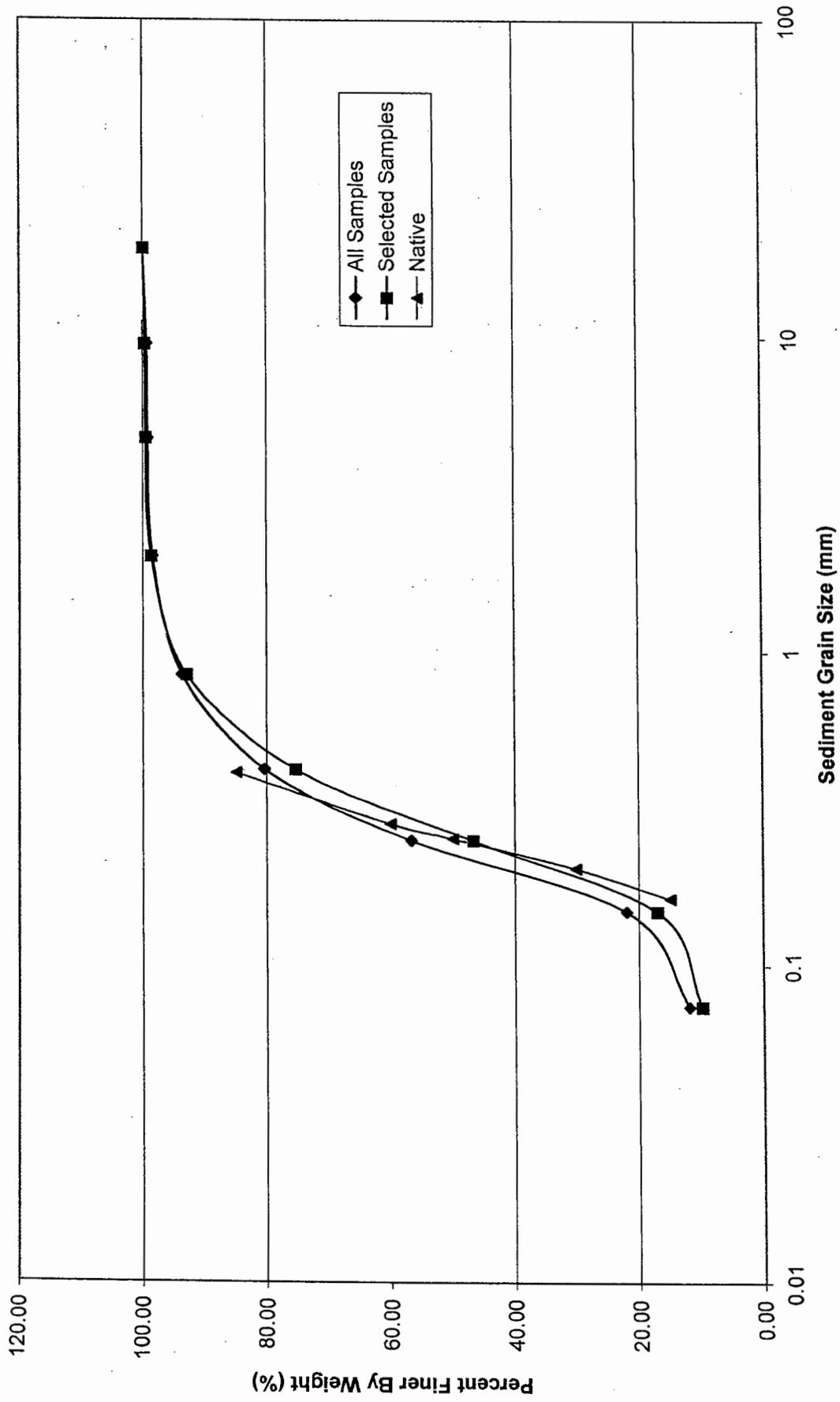
The native beach sediment was investigated by the USACE in October 1998 in Preparation of the Environmental Assessment and General Design Memorandum

for the Section 933 project. The USACE collected sediment samples along four beach profiles within the boundaries of their proposed project. These sediment profiles were collected at 6,000 to 8,000 foot intervals and included 17 samples per profile at specified elevations. The median grain size for the native beach was determined to be 0.27 mm based on analysis of this data. The data indicated that approximately 43% of the material is medium grained sand ranging from 0.13 mm to 0.30 mm in diameter and classified as SP under the unified Soils Classification System (USCS). Figure 1 shows the grain size distribution for the entire Kirby Walter Borrow Site ("All Samples"), selected layers of the preferred areas within the Kirby Walter Borrow Site ("Selected Samples"), and the native beach sediment as measured by the USACE.

Table 1. Geotechnical Summary

Boring ID	Sample ID	Sampling Depth (ft)	Sample Length (ft)	USCS Classification	Mean Diameter (mm)	d50 (mm)	% Pass No. 200 Sieve	Area (acres)	Volume (cy)	Total Volume (cy)	
B-1	B-1A	0 to 4	4	SP-SM	0.19	0.19	7.9%	3.86	24,926	249,262	
	B-1B	4 to 8	4	SM	0.28	0.18	23.9%	3.86	24,926		
	B-1C	8 to 32	24	SP	0.23	0.23	4.8%	3.86	149,557		
	B-1D	32 to 40	8	SP-SC	0.39	0.32	12.1%	3.86	49,852		
B-2	B-2A	0 to 10	10	SP-SC	0.21	0.21	5.4%	3.02	48,692	194,769	
	B-2B	10 to 14	4	SC	0.24	0.20	14.7%	3.02	19,477		
	B-2C	14 to 40	26	SP-SC	0.26	0.29	5.4%	3.02	126,600		
B-3	B-3A	0 to 6	6	SP-SC	0.27	0.26	7.7%	1.51	14,593	87,556	
	B-3B	6 to 10	4	SC	0.34	0.17	33.0%	1.51	9,728		
	B-3C	10 to 28	18	SP-SC	0.23	0.20	5.5%	1.51	43,778		
	B-3D	28 to 36	8	SP	0.36	0.38	1.9%	1.51	19,457		
B-4	B-4A	0 to 6	6	SM	0.26	0.19	21.3%	3.21	31,084	207,226	
	B-4B	6 to 10	4	SC	0.51	0.36	22.9%	3.21	20,723		
	B-4C	10 to 26	16	SP-SC	0.23	0.20	7.4%	3.21	82,890		
	B-4D	26 to 38	12	SP-SC	0.32	0.29	10.7%	3.21	62,168		
	B-4E	38 to 40	2	SC	0.85	0.31	15.0%	3.21	10,361		
B-5	B-5A	0 to 6	6	SM-SC	0.22	0.19	19.2%	2.73	26,454	176,360	
	B-5B	6 to 10	4	SP	0.26	0.31	5.2%	2.73	17,636		
	B-5C	10 to 14	4	SC	0.36	0.22	28.1%	2.73	17,636		
	B-5D	14 to 40	26	SP	0.28	0.31	4.0%	2.73	114,634		
B-6	B-6A	0 to 4	4	SP-SM	0.19	0.20	8.1%	2.80	18,087	180,868	
	B-6B	4 to 14	10	SP-SC	0.23	0.21	8.0%	2.80	45,217		
	B-6C	14 to 16	2	SC	0.43	0.27	31.3%	2.80	9,043		
	B-6D	16 to 40	24	SP	0.26	0.26	3.9%	2.80	108,521		
B-7	B-7A	0 to 8	8	SM	0.22	0.18	17.6%	3.53	45,611	228,055	
	B-7B	8 to 24	16	SP-SC	0.21	0.18	10.1%	3.53	91,222		
	B-7C	24 to 40	16	SP	0.20	0.21	3.8%	3.53	91,222		
B-8	B-8A	0 to 6	6	SP	0.17	0.20	3.2%	3.93	38,069	253,792	
	B-8B	6 to 16	10	SC	0.34	0.13	36.3%	3.93	63,448		
	B-8C	16 to 24	8	SP-SC	0.24	0.22	6.9%	3.93	50,758		
	B-8D	24 to 40	16	SP	0.23	0.22	3.6%	3.93	101,517		
B-9	B-9A	0 to 12	12	SM	0.27	0.22	17.6%	2.91	56,365	189,820	
	B-9B	12 to 18	6	SP-SC	0.31	0.28	7.6%	2.91	28,183		
	B-9C	18 to 26	8	SP-SC	0.22	0.22	7.6%	2.91	37,577		
	B-9D	26 to 40	14	SP	0.22	0.25	3.4%	3.00	67,695		
B-10	B-10A	0 to 8	8	SP	0.18	0.21	1.8%	3.00	38,683	193,414	
	B-10B	8 to 16	8	SC	0.26	0.18	28.3%	3.00	38,683		
	B-10C	16 to 24	8	SP-SC	0.19	0.20	5.8%	3.00	38,683		
	B-10D	24 to 36	12	SP-SC	0.24	0.21	9.1%	3.00	58,024		
	B-10E	36 to 40	4	SP-SC	0.27	0.27	6.0%	3.00	19,341		
USACE	USACE-1			SP	0.26	0.32	0.0%			1,961,121	
	USACE-2			SP	0.30	0.39	0.0%				
	USACE-3			SP	0.62	0.78	0.0%				
					0.28	0.23					
									1,961,121	1,961,121	100.00%

### Sediment Distribution, Kirby Walter Borrow Site



# PROPOSED KIRBY WALTER UPLAND BORROW SITE

## JAN 2005

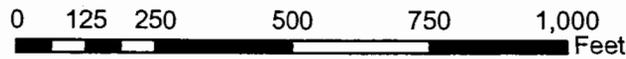


### Legend

- Core Locations
- Parcels
- === Easement

### Contours

- 28
- 29
- 30
- - - 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40
- 41
- 42
- 43
- 44



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