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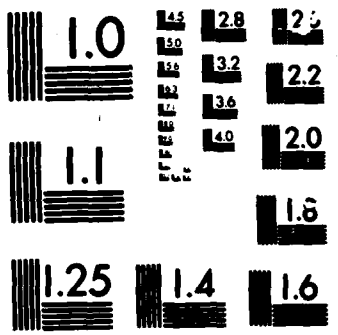
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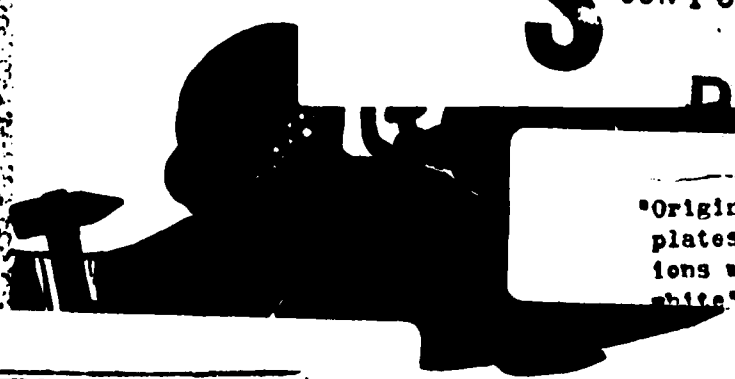
UNDERWATER FACILITIES INSPECTIONS & ASSESSMENTS

DEGAUSSING RANGE NAVAL STATION MAYPORT, FLORIDA

FPO-1-84(10) MARCH 1984

OCEAN ENGINEERING AND CONSTRUCTION PROJECT OFFICE
CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON, D.C. 20374



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UNDERWATER FACILITIES INSPECTION AND ASSESSMENT AT

DEGAUSSING RANGE NAVAL STATION MAYPORT, FLORIDA

FPO-1-84(10) MARCH 1984

PERFORMED FOR:

OCEAN ENGINEERING AND CONSTRUCTION PROJECT OFFICE
CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON, D.C. 20374

UNDER:

CONTRACT N62477-83-C-0369
TASK 1

BY:

COLLINS ENGINEERS, INC.
600 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60606

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19. ABSTRACT (Continue on reverse if necessary & identify by block number)
In December 1983, an underwater inspection was conducted at the Naval Station, Mayport, Florida to assess the condition of the submerged portions of the Degaussing Facility in the St. John's River located near the mouth of the channel. (Con't)

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The facility was inspected by a team of engineers and technician-divers using visual and tactile inspection techniques. The work consisted of an inspection of the channel bottom and soundings in the Degaussing Range area to determine if any of the cables or sensor tubes were exposed.

The underwater inspection and soundings indicated that the cables and sensor tubes were buried beneath the channel bottom and not exposed. The inspection, however, did reveal one polyvinyl chloride (PVC) pipe near the north end of the range that was exposed for approximately two feet above the channel bottom, but there were no exposed cables attached to this pipe.

During the inspection it was found that the Tidal Gauge at the south end of the range had been removed and new timber piles had been driven in order to install a new gauge. The new timber piles were found to be in excellent condition.

EXECUTIVE SUMMARY

In December, 1983, an underwater inspection was conducted at the Naval Station, Mayport, Florida to assess the condition of the submerged portions of the Degaussing Facility in the St. John's River located near the mouth of the channel.

The facility was inspected by a team of engineers and technician-divers using visual and tactile inspection techniques. The work consisted of an inspection of the channel bottom and soundings in the Degaussing Range area to determine if any of the cables or sensor tubes were exposed.

The underwater inspection and soundings indicated that the cables and sensor tubes were buried beneath the channel bottom and not exposed. The inspection, however, did reveal one polyvinyl chloride (PVC) pipe near the north end of the range that was exposed for approximately two feet above the channel bottom, but there were no exposed cables attached to this pipe.

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UNDERWATER FACILITIES

INSPECTION AND ASSESSMENT

AT

NAVAL STATION

MAYPORT, FLORIDA

1. INTRODUCTION

This report consists of the results of a detailed underwater inspection and search performed at the Mayport Naval Degaussing Facility, Naval Station, Mayport, Florida.

The investigation was conducted by Collins Engineers, Inc. for the Ocean Engineering and Construction Project Office (FPO-1) of the Chesapeake Division, Naval Facilities Engineering Command (NAVFACENGCOM) as Task No. 1 of Contract N62477-83-C-0369 as part of NAVFAC's Specialized Inspection Program. The Specialized Inspection Program sponsors task-oriented engineering services for the inspection, analysis, and design and monitoring of repairs for the submerged portions of selected naval waterfront facilities.

1.1 Task Description

The task consisted of furnishing the engineering services necessary to achieve an assessment of the apparent structural condition and repairability of the underwater structural and instrumentation members of the degaussing range, including cable runs and sensor tubes along with the degaussing range stake piles. The task consisted of two phases: a field investigation phase and an assessment phase.

The field investigation phase consisted of an underwater inspection of submerged cables and instrument tubes by two engineers and two technician-divers. The inspection was conducted in such detail as to permit a general assessment of the physical condition of the portions of the elements that are submerged or subject to frequent wetting by wave or tidal action. A visual "swim-by" inspection was made of all facilities under investigation.

The "swim-by" inspection was conducted in accordance with the government's guidelines for a Level I inspection. Level II inspections were not required under this task. Level III inspections were not performed for the tidal gauge because the new structure was under construction. Level I inspections are defined below.

Level I: General Inspection: This type of inspection is essentially a "swim-by" overview, which does not involve cleaning of any structural and/or instrumental elements, thus making it quicker than the other levels of inspection. The Level I inspection should confirm as-built drawings of the structures, instruments and cable layouts. The Level I inspection should also detect obvious major damage, visible misalignment due to collisions, ice, drug anchors, and deterioration due to severe corrosion or extensive biological growth and attack. The underwater inspection shall rely primarily on visual and/or tactile observations (depending on water clarity) to make conditions assessments. These observations will normally include the specified exterior surface area of the underwater structure, whether it is a pile, mooring, sensor tube with connector, dolphin or cable. A typical sensor tube inspection will include checking the I.D. number on the tube, recording the existence of the probe in the tube, checking if the tube has a cap secured in place, checking if the cable is secured to the tube and verifying whether the cables are secured at the platform leg adjacent to the range. Also, metallic debris found in the inspection will be noted. Underwater television and/or photography showing examples of the facility's condition may be included.

The assessment phase of the investigation consisted of documenting the configuration of the existing structures; summarizing the conditions encountered during the field inspection; evaluating their structural significance; and recommending actions that should be taken to insure long-term, cost-effective maintenance and utilization of the facilities.

1.2 Report Content

The report contains a description of the Naval Station and its facilities including location; mission; and environmental data including climatic, topographic, and hydrologic features along with a discussion of the inspection procedures. The report also contains the results of the inspection and the assessment of the findings, accompanied by pertinent drawings and photographs. The inspection results include a description of the configuration of each facility along with its apparent condition and an assessment of the conditions found.

2. ACTIVITY DESCRIPTION

2.1 Name of Activity

Naval Station, Mayport, Florida

2.2 Location of Activity

Naval Station Mayport is located on the Atlantic seacoast approximately 30 miles south of the Georgia border at latitude 30 degrees 24 minutes north and longitude 81 degrees 26 minutes west (Figure 1, 2 and 3). Situated on the south bank of the St. Johns River, the Navy Base lies approximately 16 miles east of downtown Jacksonville in the town of Mayport, Florida (Reference 1).

2.3 Mission of Facility

The mission of the Naval Station Mayport is: To provide support to its tenant commands. This involves 116 specific tasks which are performed by the station. The more important tasks include:

1) The operation of a harbor for berthing ships under Navy control and visiting ships of friendly powers,

2) The operation of an airfield and air terminal,

3) The provision of utilities and services in support of berthed ships,

4) The provision of logistic support for assigned ships and units,

5) The provision of operational and personnel support services,

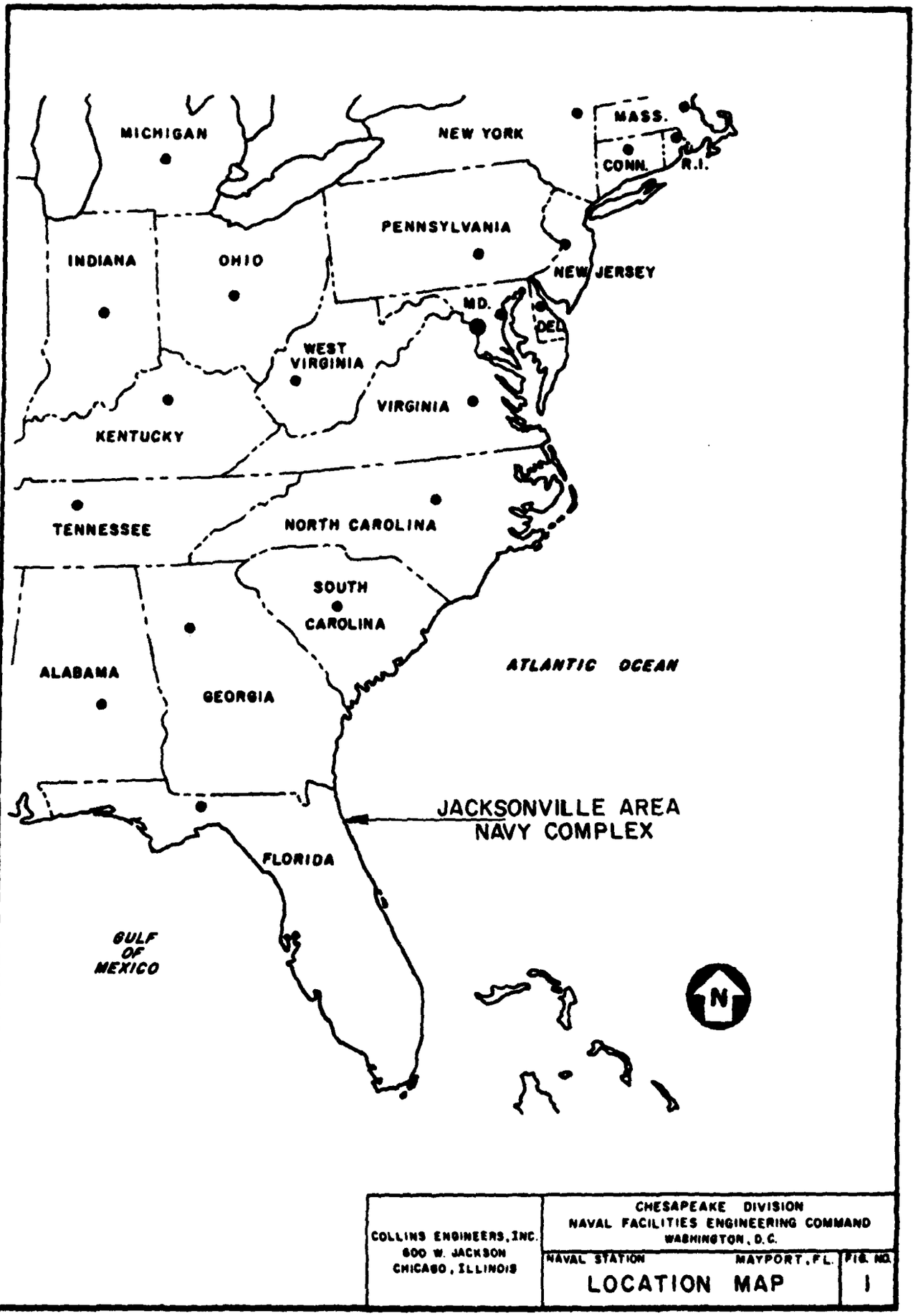
6) The provision of handling assistance and safety supervision to ships receiving or discharging ordnance,

7) The provision for storage and transshipment of ordnance and weapons within station capabilities,

8) The provision of fuel storage,

9) The provision of administrative support to base and tenant operations,

10) The provision of pilot and tugboat services for ship movements to, from, and within Mayport Harbor. (Reference 1).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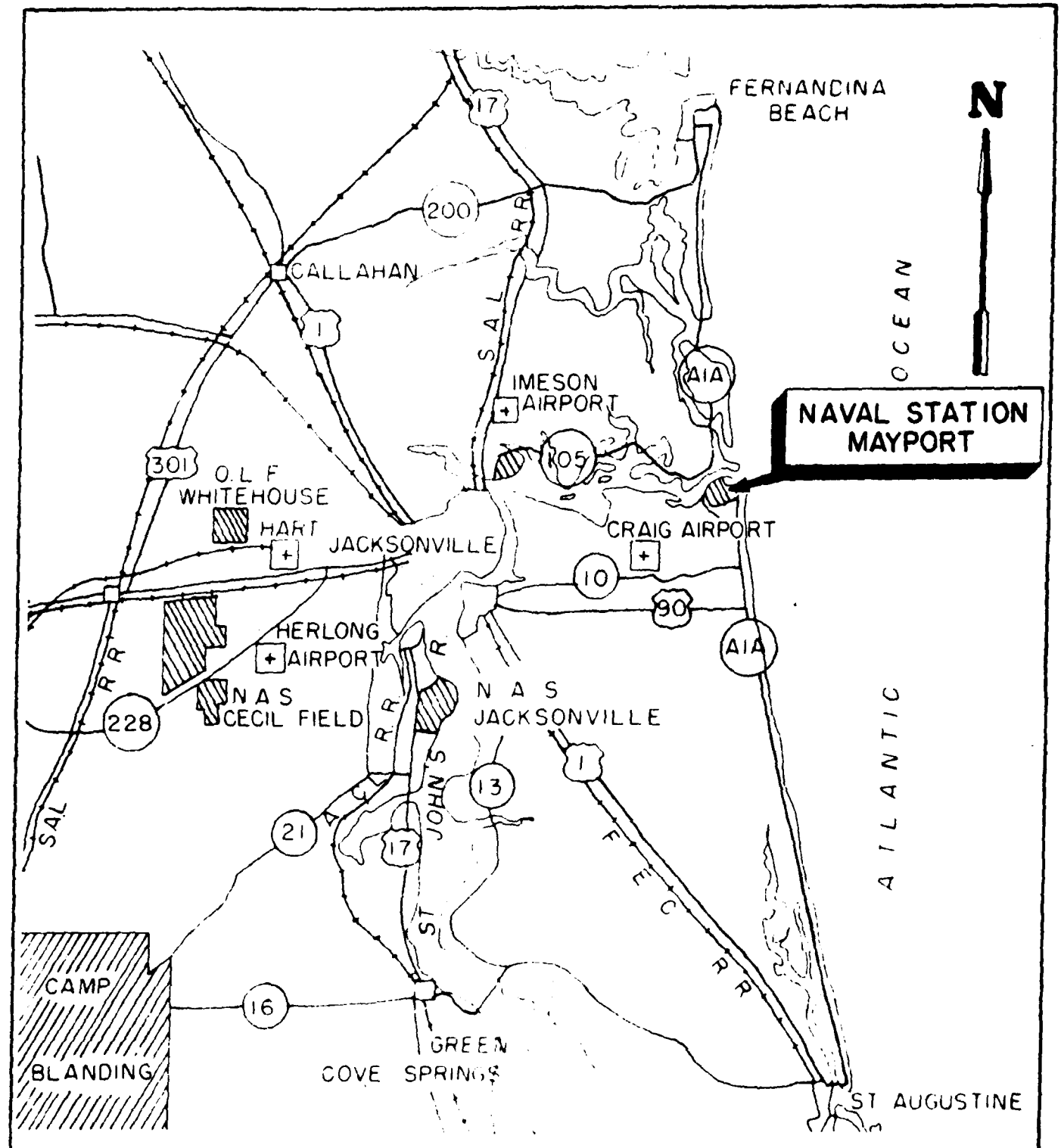
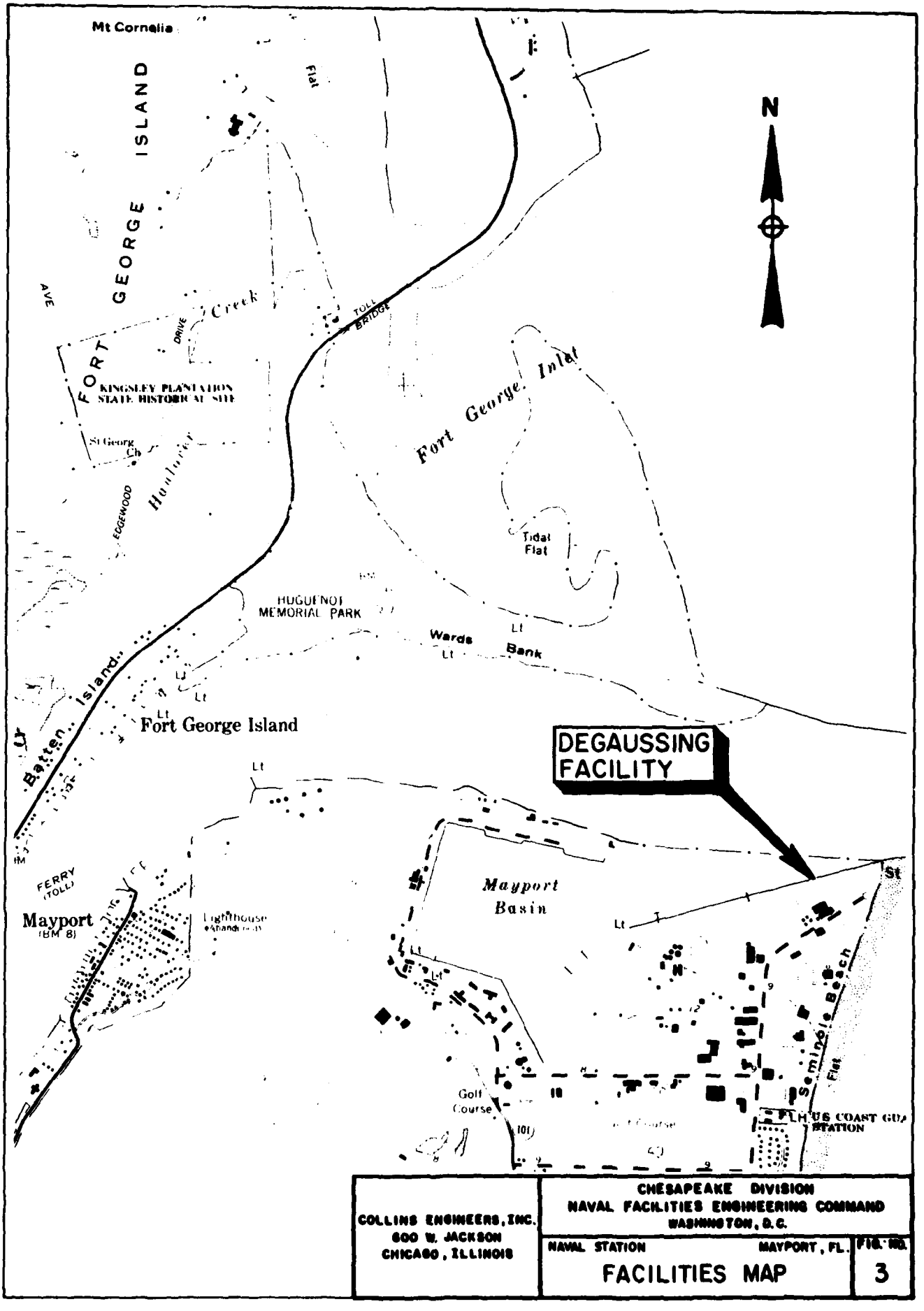
KENTUCKY
TENNESSEE
NORTH CAROLINA
SOUTH CAROLINA
ATLANTIC OCEAN
ALABAMA
GEORGIA
JACKSONVILLE AREA NAVY COMPLEX
FLORIDA
GULF OF MEXICO
N
COLLINS ENGINEERS, INC.
600 W. JACKSON
CHICAGO, ILLINOIS
CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON, D.C.
NAVAL STATION MAYPORT, FL.
LOCATION MAP
FIG. NO. 1



COLLINS ENGINEERS, INC 600 W JACKSON CHICAGO, ILLINOIS	CHESAPEAKE DIVISION NAVAL FACILITIES ENGINEERING COMMAND WASHINGTON, D.C.	
	NAVAL STATION MAYPORT, FL. AREA MAP	FIG. NO. 2



COLLINS ENGINEERS, INC. 600 W. JACKSON CHICAGO, ILLINOIS	CHESAPEAKE DIVISION NAVAL FACILITIES ENGINEERING COMMAND WASHINGTON, D.C.	
	NAVAL STATION MAYPORT, FL. FACILITIES MAP	FIG. NO. 3

2.4 Description of Activity

Magnetic measurements of ships are made at periodic intervals for checking their magnetic condition. Where many ships need this service, it is essential that measurements be made expeditiously and at maximum convenience for the ships. Degaussing range facilities are designed to provide this kind of service. Magnetic measurements are made while the ships are underway. The instrumentation, therefore, is designed to measure moving magnetic fields.

The purpose of the degaussing range facilities is to keep the fleet in a constant state of readiness for any sudden onset of mine warfare.

This report is concerned with the degaussing facility which services five major components of the Atlantic Fleet. These are Carrier Group 6, Cruiser-Destroyer Group 12, Destroyer Squadrons 14 and 24, and Service Squadron 2. The table below identifies the principal facilities that were included in this investigation.

Facility	Year Built	L.F./Number of Piles
Sensor Tubes	1979	/30
Sensor Cables	1979	1000/
Tidal Gauge	Under Construction	/3

2.5 Environmental Data

2.5.1 Climate

"The climate of the Mayport area approaches semi-tropical ambience with summer highs in the middle to upper 90s and winter lows in the middle 20s. The area annually experiences 3762 hours of wet bulb readings of 67 degrees F or higher. Afternoon thunderstorms are frequent during the summer months. One or two morning fogs per week are experienced during the winter but usually burn off by 0800. Flying conditions are usually excellent in spite of these factors, with Naval Air Station Jacksonville reporting 86 percent VFR and Naval Air Station Cecil Field 90 percent VFR conditions."

"Since the complex is located in Florida, hurricanes pose a general problem. Winds of hurricane force (75 miles per hour and above, with resulting damage) can be expected about once in five years. In September 1964, Hurricane Dora hit the area with major erosion damage at Naval Station Mayport. On an average of about once each year, the predicted path of a hurricane requires the movement of all operable airplanes to a safer area and the securing of all structures and appurtenances. This expensive and disruptive procedure is necessary to minimize damage

should the center of a major hurricane pass near the station" (Reference 2).

2.5.2 Topography and Soils

"The area is predominantly flat with swampy areas of varying sizes scattered between slightly elevated high ground. This flat terrain tends to cause torrential problems after heavy rains, but the same flatness prevents damaging airfield erosion as long as the natural drainage systems are not radically disturbed. The soil, except for the muck and peat deposits in the swampy areas, is predominantly sand with some isolated deposits of clay. Many areas have an underlying strata of hardpan. The water table is close to the surface and excavations in excess of five feet, except on the highest ground, require de-watering to keep the excavation dry. The load bearing capacity of the soil in most areas is good and most structures are built on spread footings. There are, however, isolated areas that might cause problems for various types of facilities. Soil investigations in some areas should precede all facility sitings" (Reference 2).

2.5.3 Hydrology

The principal bodies of water in the area are the Atlantic Ocean and the St. Johns River. The facilities inspected as part of this work are located on the Mayport channel, but very close to the Atlantic Ocean so that the water is salty, and water levels are subject to tidal variations.

Tidal Range at the site is:

Extreme High Water	+7.6 feet
Mean High Water	+4.5 feet
Mean Low Water	0.0 feet
Extreme Low Water	-3.0 feet

Datum is Mean Low Water (Reference 3)

2.5.4 Seismic Activity

The Naval Station is located in Seismic Probability Zone 1, where only minor earthquake damage would be expected.

2.6 References

1. Master Plan, Naval Station, Mayport, Florida, Naval Facilities Engineering Command, Southern Division, June 1975.

2. Underwater Facilities Inspections and Assessment at Naval Air Station (NAS) Jacksonville and the Navy Fuel Department Jacksonville, Florida, August, 1980.

3. Design Manual, Harbor and Coastal Facilities, NAVFAC DM-26, 1968.

3. INSPECTION PROCEDURE

On December 10 and 11, 1983, an underwater search for exposed and damaged components of the degaussing range was performed by two technician-divers at the Naval Station, Mayport, Florida. The inspection was conducted in such detail as to permit a general assessment of the physical condition of any components of the degaussing range that were exposed and subject to mechanical damage by channel traffic.

The nature of the task to be performed and the job site required the selection of search methods that were effective and efficient. The techniques were selected to yield sufficient information to verify the general configuration of the facility; identify areas of significant damage or deterioration; and note any apparent scour along the line of the degaussing range components.

3.1 Level of Inspection

The methods chosen and used to accomplish an effective and efficient search were selected from methods recommended in the U.S. Navy Diving Manual, Volume I. Both a circle-search and a linear search pattern were used to locate the components of the degaussing range. A Level I inspection was made of the new wooden piles for the partially completed tidal gauge.

3.2 Inspection Procedure

The inspection was conducted by a four person team, including one engineer, two technician-divers and one engineer-tender. The divers, using scuba equipment, worked from a fourteen foot aluminum power boat. In performing the search, at least two divers were in the water near each other at all times. A tender observed and coordinated the divers' work.

The circular search method employed a vertical descending line anchored on the centerline of the degaussing range. A distance line 25 feet long was attached to the vertical descent line. The divers searched areas around the vertical descent line from zero to twenty-five feet in a radial pattern at distance. Once an area around the vertical descent line was completely searched, the line was moved approximately 40 feet further across the channel. The radial search pattern was then repeated around the descent line at the new location. This procedure was used in the northern portion of the degaussing range.

For the linear-search, a rope baseline was established on the channel bottom with marker buoys along the entire centerline of the degaussing range. To this baseline, a distance line 12 feet long was attached. The divers searched areas east and west of the baseline for distances of zero to twelve feet.

The marker buoys which established the baseline were located using the established sight-line at the degaussing range house. This method of search was used for the entire degaussing range.

Because of the swiftly moving currents at the site, and the numberous ship movements through the channel, the only windows that were available for the search were on Saturday afternoon and Sunday morning. During each of those periods, the currents would only permit safe diving operations for about one hour. The currents not only made it difficult for the divers to maintain their position, but reduced visability to near zero as clouds of silt billowed across the channel bottom.

Underwater photography was attempted, but had to be abandoned because of the poor water visibility and strong currents.

3.3 Inspection Equipment

During the inspection, various pieces of equipment were used to accomplish different tasks. A recording fathometer was used to determine the channel bottom along the facility. Miscellaneous minor equipment included dive lights and knives.

4. FACILITY INSPECTED

The facility inspected at the Naval Station are discussed separately in the following section. The discussion is presented in four parts:

1. A description of the structural configuration,
2. A discussion of the conditions observed during the inspection,
3. An assessment of the structural condition,
4. Recommendations to ensure long term serviceability.

In the section which describe the structural configuration, the figure included was developed from available drawings and inspection notes.

The underwater visibility at the time of the inspection averaged one foot. All water depths described in the following sections are referred to Mean Low Water, Elevation 0.00 ft.

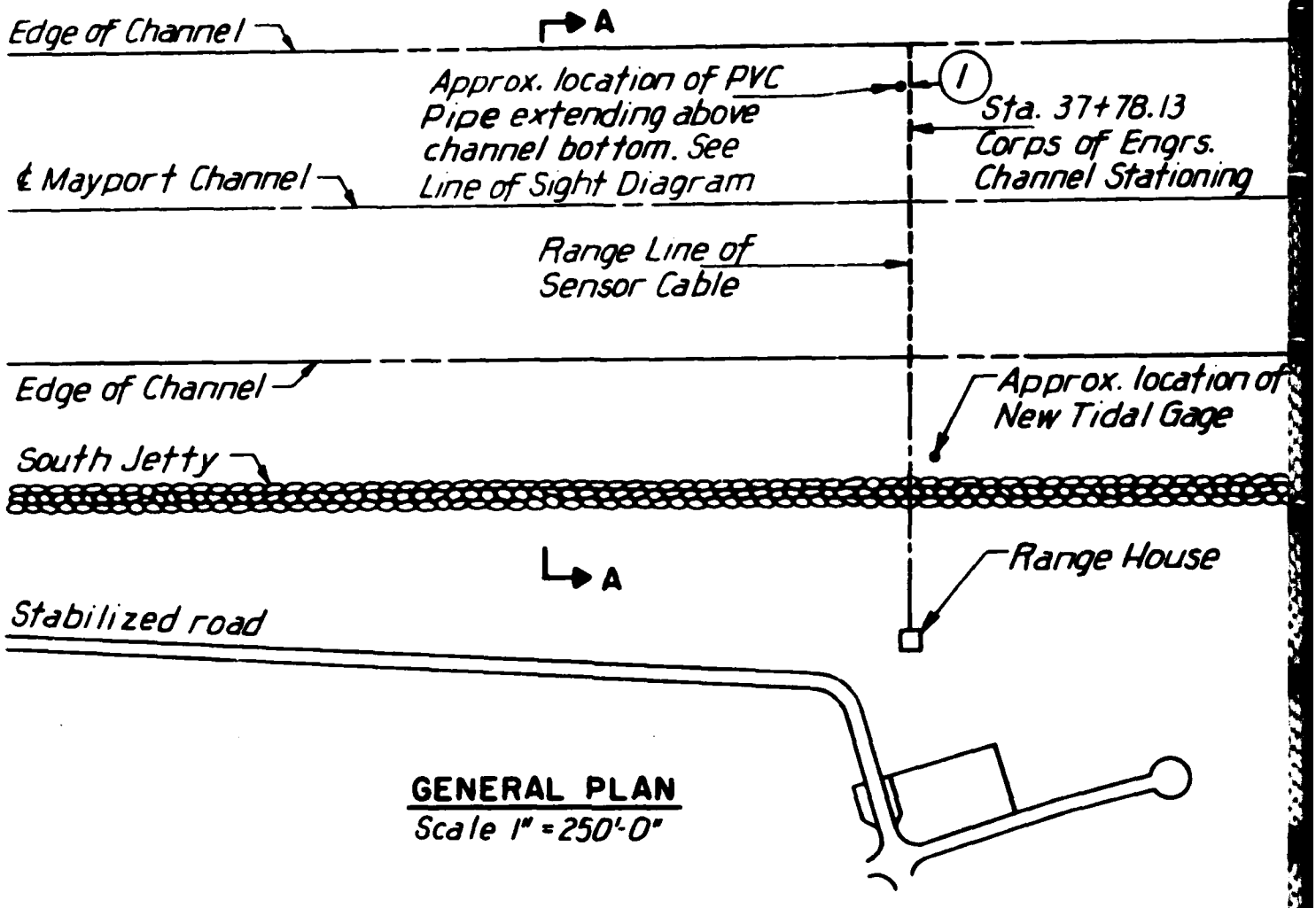
4.1 Description

The Degaussing Facility is located on the northernmost portion of the Mayport Naval Station. This facility makes magnetic measurements of ships while they are are underway. Constructed in 1979, the facility consists of the following components: degaussing range house situated on the south shore of the Mayport Channel; 1000 feet of buried cable connecting the range house with the magnetic sensor tubes; and thirty magnetic sensor tubes buried in the channel bed. Refer to Figure 4 for a plan and typical section of this facility.

4.2 Observed Inspection Condition

The inspection of the area of the cable runs between the shore and the sensor tubes did not detect any scouring or unburying of the cables. The eleven degaussing range stake piles and thirty magnetic sensor tubes were also buried. One PVC pipe was found along the range but is not known if this is one of the stake piles. This pipe extended approximately two feet above the channel bottom, and nothing was attached to the exposed pipe. Refer to Figure 4 on page 4-2 for the location of this pipe and to Photograph 1 for a view from shore.

The tidal gauge to be inspected had been removed. Three new timber piles have been driven in order to construct a new tidal gauge. Refer to Photograph 2 for a view of the new timber piles. River soundings using a recording fathometer were made to document the river bed elevations. The soundings are shown on Figure 4.



GENERAL PLAN
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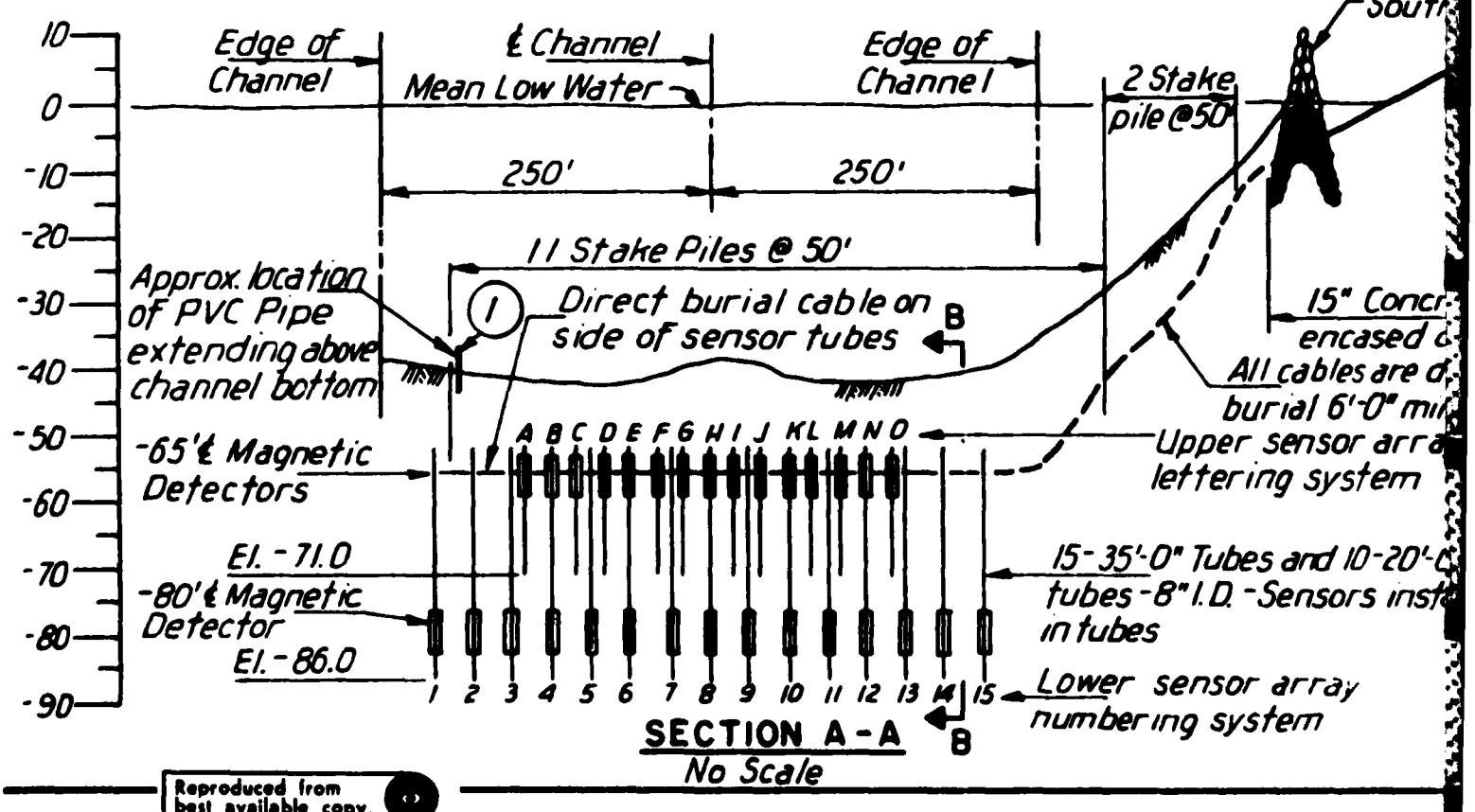
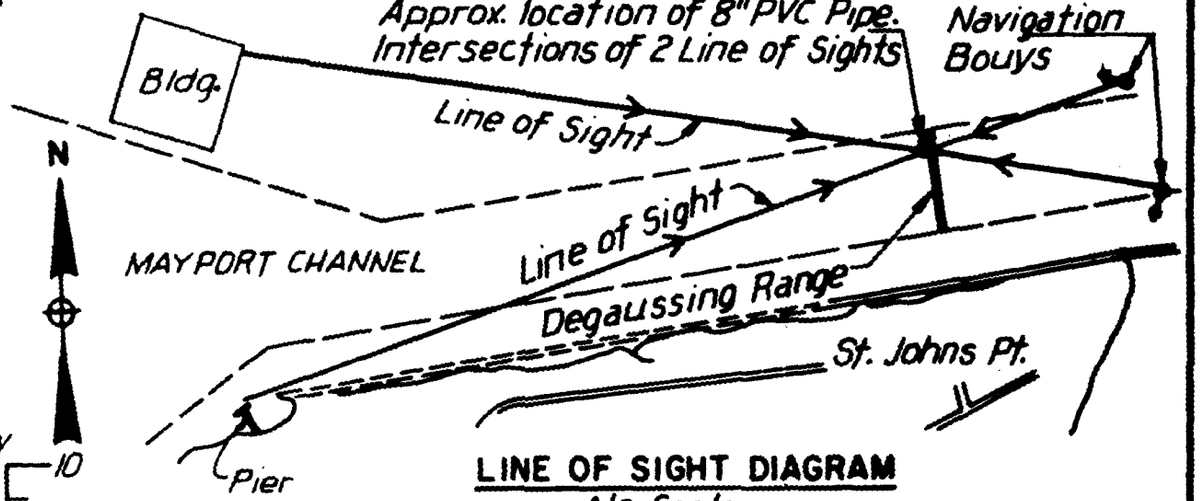


SECTION A-A
No Scale

GENERAL NOTES:
This drawing was developed in part from NAVFAC Drawing No. 5042776 and 5042778.
All cables and sensors were given a Level I inspection.
Channel bottom elevations were determined from river soundings made along the Degaussing Range

INSPECTION NOTES:
(1.) 8" PVC Pipe extending 2'± above channel bottom; No cables exposed



LINE OF SIGHT DIAGRAM
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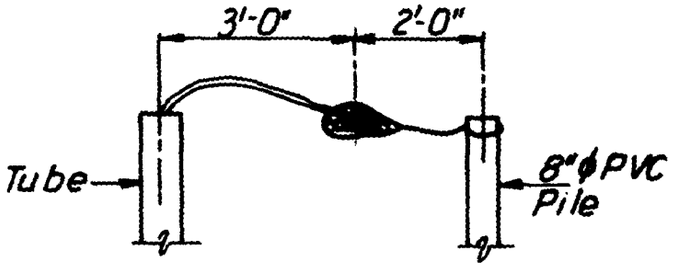

SECTION B-B
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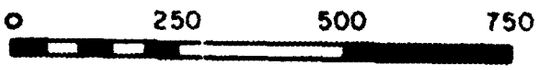

1" = 250'-0"

10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90

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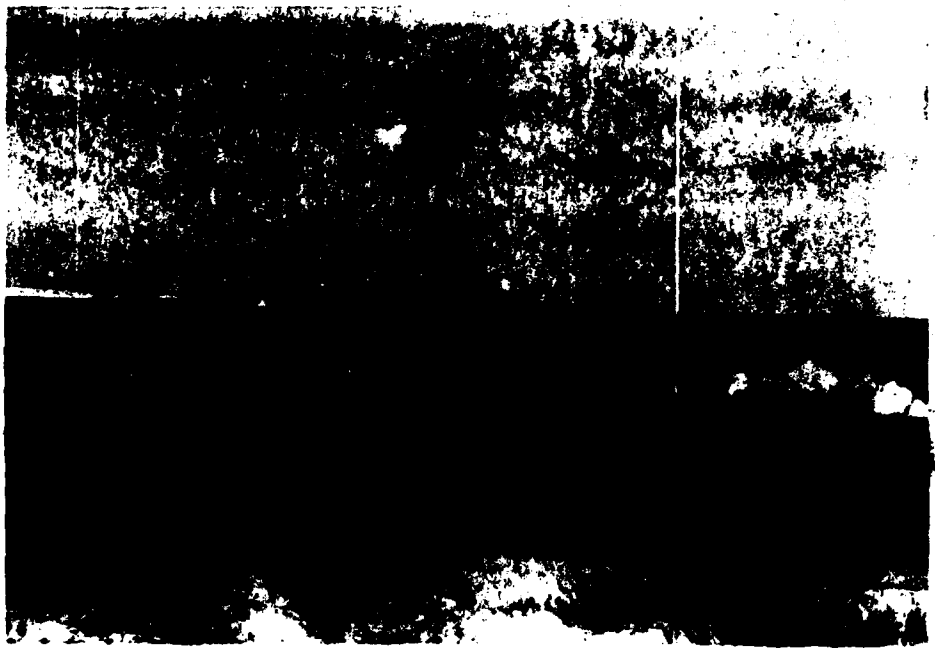
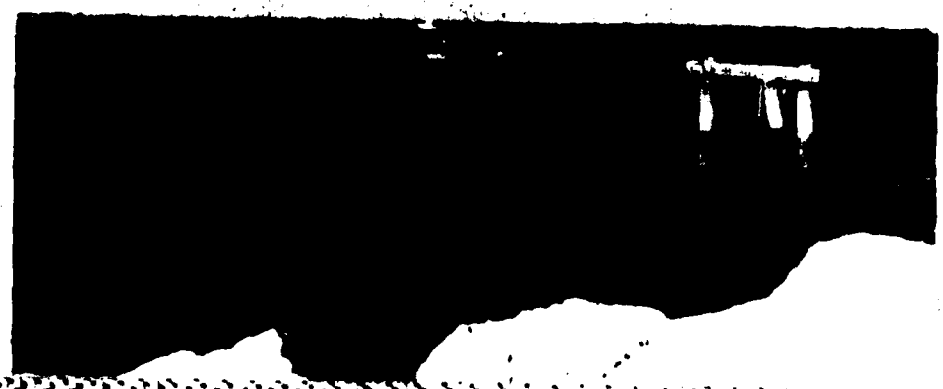
	NAVAL STATION MAYPORT, FL	FIG. NO.
	DEGAUSSING FACILITY	4



PHOTOGRAPH 1 View Looking North from South Jetty at Degaussing Facility

PHOTOGRAPH 2 New Tide Gauge Under Construction



4.3 Condition Assessment

Correlation of the sounding data with the original design drawings for the facility indicate that the present channel bottom is above the cable runs and magnetic sensors.

The timber piles of the new tidal gauge are in excellent condition.

The cable runs and magnetic sensors were found to be buried. No deficiencies were detected.

4.4 Recommendations

It is recommended that future periodic reinspections of this facility be scheduled on 5 year intervals to monitor the long-term serviceability of these structures. No repairs are recommended at this time.

END

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