

FEASIBILITY STUDY

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US 158 Bypass
From Southern Shores
To Whalebone
Dare County
R-2227

Prepared by
Planning and Research Branch
Division of Highways
N. C. Department of Transportation

July, 1987

US 158 Bypass
From Southern Shores
To Whalebone
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The subject portion of US 158 Bypass is included in the 1987-1995 Transportation Improvement Program for feasibility study and/or right-of-way protection. This report provides a brief initial analysis of possible improvements. The project is not currently funded.

I. GENERAL DESCRIPTION

The portion of US 158 Bypass covered in this report is located on the Outer Banks and runs from Southern Shores to Whalebone, a distance of 15.0 miles. The project runs through the towns of Kitty Hawk, Kill Devil Hills and Nags Head. The entire project is within the town limits of one of these three towns. The studied improvement is the widening of the existing three lane portions of US 158 Bypass to five lanes.

II. EXISTING CONDITIONS

At the present time, US 158 Bypass is a mixture of three lane and five lane cross sections within a 150-foot right-of-way. A breakdown of the cross sections is as follows:

FROM	TO	X-SECT.	LENGTH (mi.)
Northern Interchange with US 158 Business	Sandlin St. in Kitty Hawk	3-lanes	1.90
Sandlin St. in Kitty Hawk	Palmetto Street in Kill Devil Hills	5-lanes	2.25
Palmetto Street in Kill Devil Hills	Pine Grove Trail in Kill Devil Hills	3-lanes	3.55
Pine Grove Trail in Kill Devil Hills	Villa Dunes Dr. in Nags Head	5-lanes	1.95
Villa Dunes Dr. in Nags Head	Danube Street in Nags Head	3-lanes	2.45
Danube Street in Nags Head	Nags Head Town Hall	5-lanes	1.00
Nags Head Town Hall	Southern interchange with US 158 Bypass	3-lanes	1.90

The terrain in the project area is relatively flat resulting in almost level vertical alignment for the highway. The horizontal alignment is also very good. The existing roadway is straight except for gentle curves in the vicinity of the Jockey's Ridge sand dune.

The existing speed limit is 45 mph throughout the project length.

There are a number of utilities located along US 158 Bypass, including Virginia Electric and Power Company, Carolina Telephone, and water lines belonging to each of the towns and to the Dare County regional water system.

The existing land uses along the project are mixed. The uses are primarily residential and commercial. The residential uses are summer vacation residential uses for the most part. The commercial activity is mostly vacation, tourist and recreation oriented. There are support businesses such as contractors and building supply firms. However, all businesses hinge on vacation and tourist trade either in a primary or secondary manner.

In addition to the private development there are two public sites located along US 158 Bypass that attract large numbers of visitors each year. The Wright Brothers National Memorial, site of the first powered flight, is located in Kill Devil Hills. Further south in Nags Head is Jockey's Ridge State Park which has the largest natural dune on the east coast.

The vacant land along the project is being held or traded on a speculative basis. There is continuous building activity changing the vacant land to residential or commercial use. There is no industrial activity and the area is unsuited for such.

III. PURPOSE OF PROJECT

US 158 Bypass is classified as a rural major collector route in the 1980 Functional Classification System. This highway provides the major access into Manteo and the Dare County beaches from the north. It also directly serves the numerous resort properties located along its length.

US 158 Bypass is also designated a "major thoroughfare" in the mutually adopted 1972 Nags Head-Kill Devil Hills Thoroughfare Plan. The recommended cross section in this plan is a 6 lane divided facility with a 24-foot grassed median. This cross section would be desirable from a traffic handling standpoint, limiting left turns to median opening locations only. The divided cross section is especially desirable for the handling of through traffic. Since the present roadway is built in the center of the existing 150-foot right-of-way, the construction of a divided roadway would require the removal of part of the existing pavement. The removal of two lanes for the median and their replacement outside the median area would significantly increase the cost of widening US 158 Bypass over the cost of a non-median cross section. US 158 Bypass is the major north-south highway in the area and it will

remain the major highway in the future because there is no available location to replace it. The land adjacent to US 158 Bypass has undergone rapid development, primarily commercial, in the past few years. While a divided facility would provide good traffic carrying characteristics, especially for through travelers, it would result in large U-turn volumes at intersections because of the existing strip development. A multi-lane facility with a center turn lane would best serve adjacent development by allowing left turns directly into their driveways.

The current average daily traffic ranges from a low of 10,800 vehicles per day (vpd) at the northern end of the project to a high of 16,800 vehicles per day near the center of the project on a year-round basis. The volumes during the summer tourist season range from 16,000 vpd to 24,000 vpd respectively. The projected 2007 traffic volumes range from 21,500 vpd to 31,800 vpd on a year-round basis and from 31,800 vpd to 47,800 vpd during the summer months. The traffic volumes include approximately 1% tractor trucks with semi-trailers and 3% dual tired trucks.

These volumes exceed the capacity of the three lane portions at present and they are becoming congested, with traffic queing up in long lines. This condition will continue to deteriorate in the future if additional lanes are not added. The widening of the three lane portion of the highway will greatly improve the traffic flow. In the future, additional lanes will be needed along the entire length of US 158 Bypass to handle the anticipated high traffic volumes.

IV. RECOMMENDED IMPROVEMENTS

It is recommended that the existing three lane portions of US 158 Bypass be widened to five lanes. The proposed widening should be primarily with a shoulder cross section that is consistent with the existing five lane shoulder sections. This would consist of five 12-foot travel lanes and 4-foot paved shoulders. US 158 Bypass is a designated bicycle route and the extra paved shoulder width (over the standard 2 feet) will provide increased safety for bicycles. The 4-foot shoulder can be constructed with a reduced depth, as it was with the construction of the existing five lane segments, reducing the cost difference between the 2 and 4-foot shoulders. The 4-foot shoulders will be beneficial to motorists as well as bicyclists and pedestrians. It will provide a slightly wider shoulder that will help motorist keep two wheels on the pavement if they have to pull off the roadway in an emergency situation rather than pulling off completely onto the sandy shoulders. The wider paved shoulders will also be desirable from a drainage standpoint. The blowing sand presently tends to build up on the edge of the pavement, resulting in water standing in the highway during a rain. The wider shoulder will provide an increased storage area for this standing water.

In Kill Devil Hills, it is recommended that the existing five lane curb and gutter cross section be extended from Palmetto Street to Third Street on the north end of town and from Pine Grove Trail to Ocean Bay Boulevard on the south end of town. The use of curb and gutter in these

areas is consistent with the previous widening project and will provide a curb and gutter roadway throughout the commercially developed portions of Kill Devil Hills. The recommended roadway width in these areas is 64 feet, face to face of curbs. The lanes should be marked for additional width in the outside lanes due to the bicycle route designation.

It is recommended that the remaining portion of US 158 Bypass in Kill Devil Hills, from Third Street to Ocean Bay Boulevard, be widened to five lanes with shoulders. This portion of the highway is outside of the Kill Devil Hills business areas and is bordered by residential development and the Wright Memorial.

The proposed widening should be symmetrical about the existing centerline, and it is anticipated that it can be contained within the existing 150-foot right-of-way.

The project has been discussed with the Division Engineer and with officials of each of the three towns involved. All are in agreement with the recommended cross sections.

The estimated cost of the proposed improvements is \$7,650,000 including \$7,600,000 for construction and \$50,000 for utility adjustments. The construction costs include engineering and contingencies.

V. ALTERNATIVES

Since the study involves the improvement of an existing highway located within an adequate right-of-way, no alternative alignments were considered. Because of the high volume of left turning traffic along US 158 Bypass, the widening of the three lane segments to four lanes would provide only limited improvement in traffic flow. Drivers desiring to turn left would have to slow down, and oftentimes stop, in the left lane which is normally used for higher speed vehicles. This would reduce the capacity and safety of the roadway, especially in the future when the roadside becomes fully developed and traffic volumes increase.

A four or six lane divided roadway, as proposed in the thoroughfare plan, would promote good traffic flow for through motorists. However, because left turns are limited to median openings only, access to the adjacent properties would not be as good as with a cross section having a center turn lane. There are significant amounts of commercial and recreational development along US 158 Bypass that attract motorists, and there are numerous side streets at close spacings. Left turns into any of these businesses, attractions or streets that do not have a median opening would require U-turns at adjacent openings, resulting in high U-turn volumes. The construction of a median would also require the removal of the center portion of the existing roadway and rebuilding this lane width on the outside edge of the highway. This additional construction would increase the cost of the improvement significantly. Because of the reasons, the median cross section is not recommended.

VI. POSSIBLE ENVIRONMENTAL IMPACTS

No significant impacts are anticipated with the proposed improvements to US 158 Bypass.

The project will not require the relocation of any families or businesses. It will have no adverse effect on religious, educational, or medical facilities. The project should have no adverse effects on the economy of the area and it will have little effect on the existing or planned land use of the area.

The construction of the project will have no effect on historic or cultural resources. It will not affect any historical places or archaeological sites.

Predicted carbon monoxide levels are well below acceptable limits and are in compliance with the North Carolina Plan for Implementing National Air Quality Standards.

The project does not encroach on any wetlands, and it is not within any of the Coastal Area Management Act's Areas of Environmental Concern.

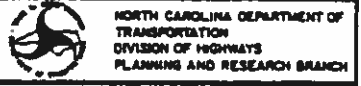
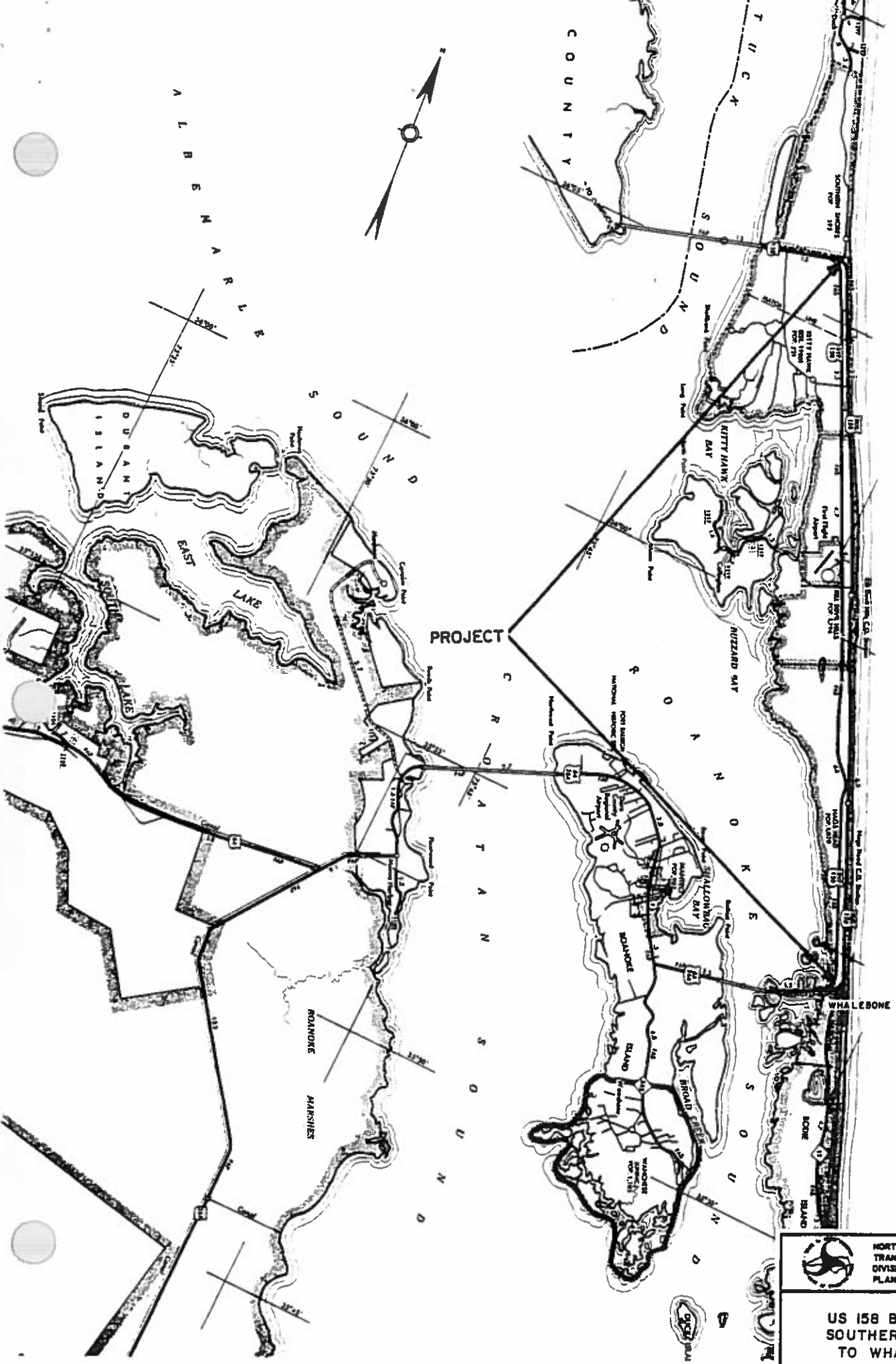
Any construction impacts will be of short term duration and will cease upon the completion of the project.

VII. FUTURE ACTIVITIES

If the project is to be implemented at a future date, all feasible alternatives and their associated impacts will need to be evaluated in a planning/environmental document prior to that time, and a final decision made as to the most appropriate improvement.

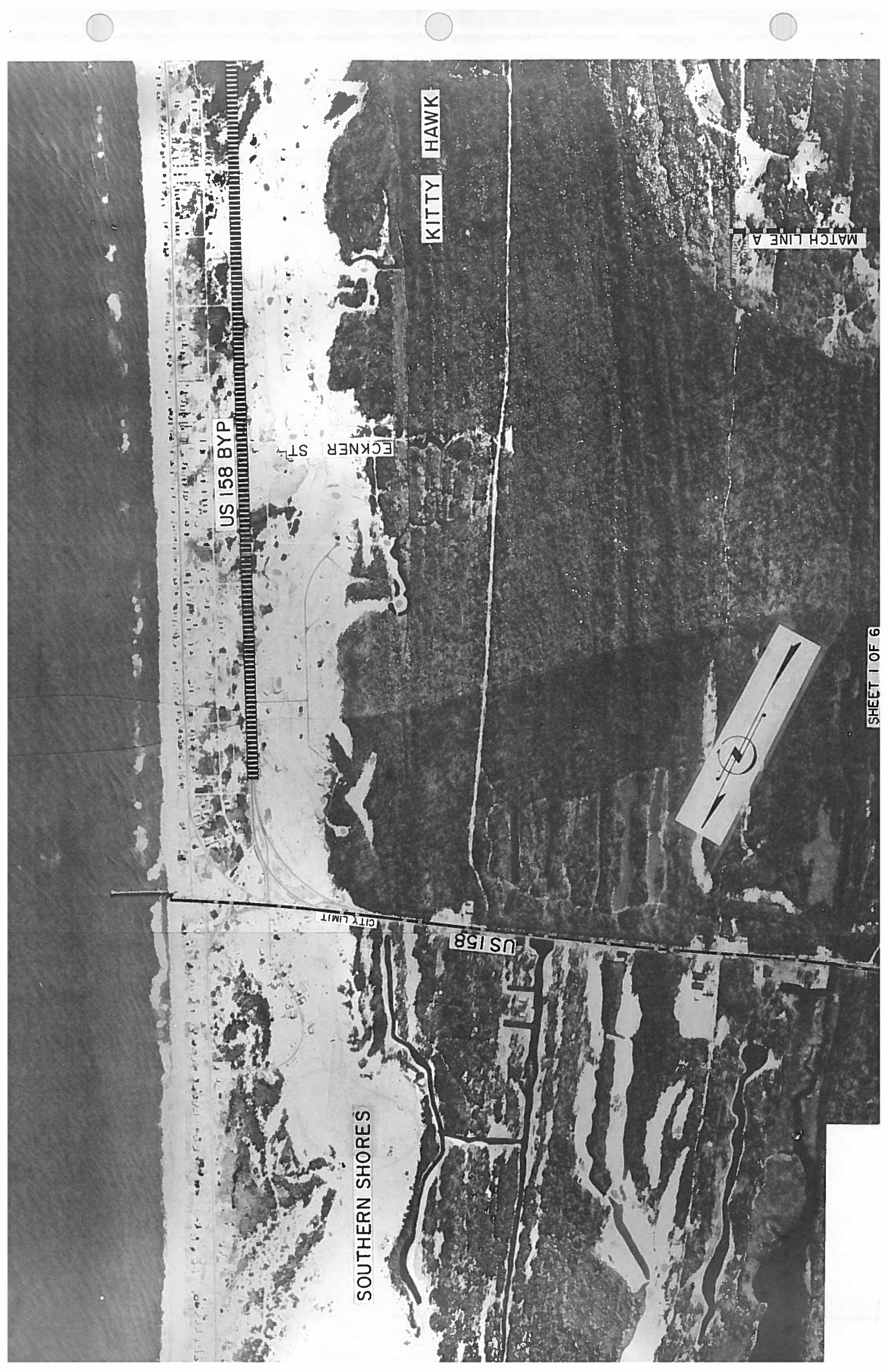
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A T L A N T I C O C E A N



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US 158 BYP FROM
SOUTHERN SHORES
TO WHALEBONE



US 158 BYP

ST

ECKNER

KITTY HAWK

MATCH LINE A



CITY LIMIT

US 158

SOUTHERN SHORES

NAGGS HEAD

HOLLOWELL ST.

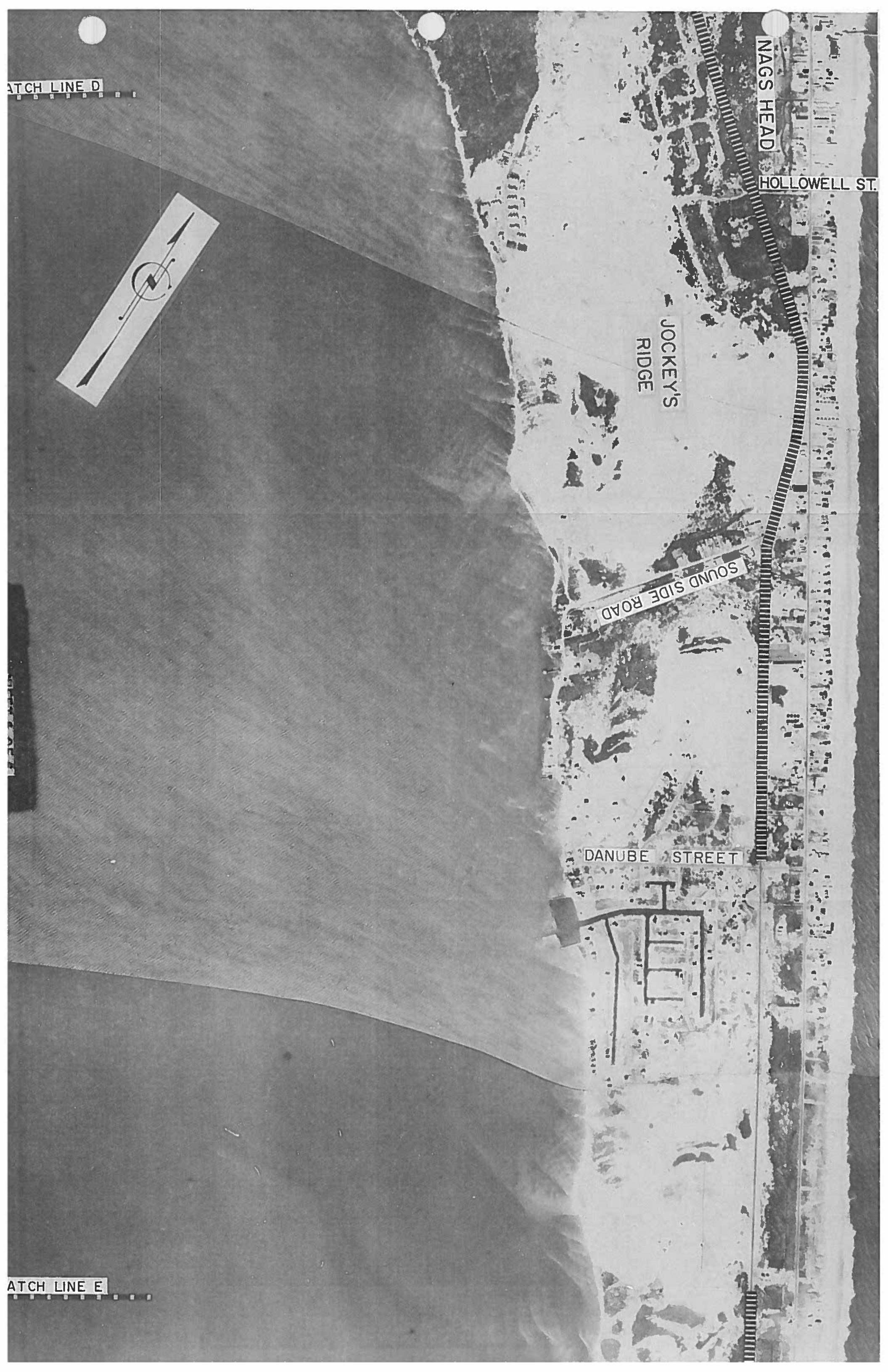
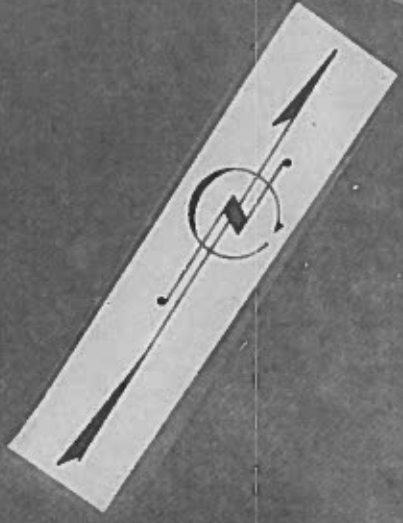
JOCKEY'S RIDGE

SOUND SIDE ROAD

DANUBE STREET

ATCH LINE D

ATCH LINE E



MATCH LINE C

PINE GROVE TRAIL

OCEAN ACRES

CITY LIMIT

DRIFTWOOD S

ABALONE ST.

BONNETT ST

VILLA DUNES DR

NAGS I



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US 158 BYP FROM
SOUTHERN SHORES
TO WHALEBONE

7/87 0 1. 1000 FIG. 2

MATCH LINE D

MATCH LINE B

PALMETTO ST.

THIRD ST.

KILL DEVIL HILLS

US 158 BUS

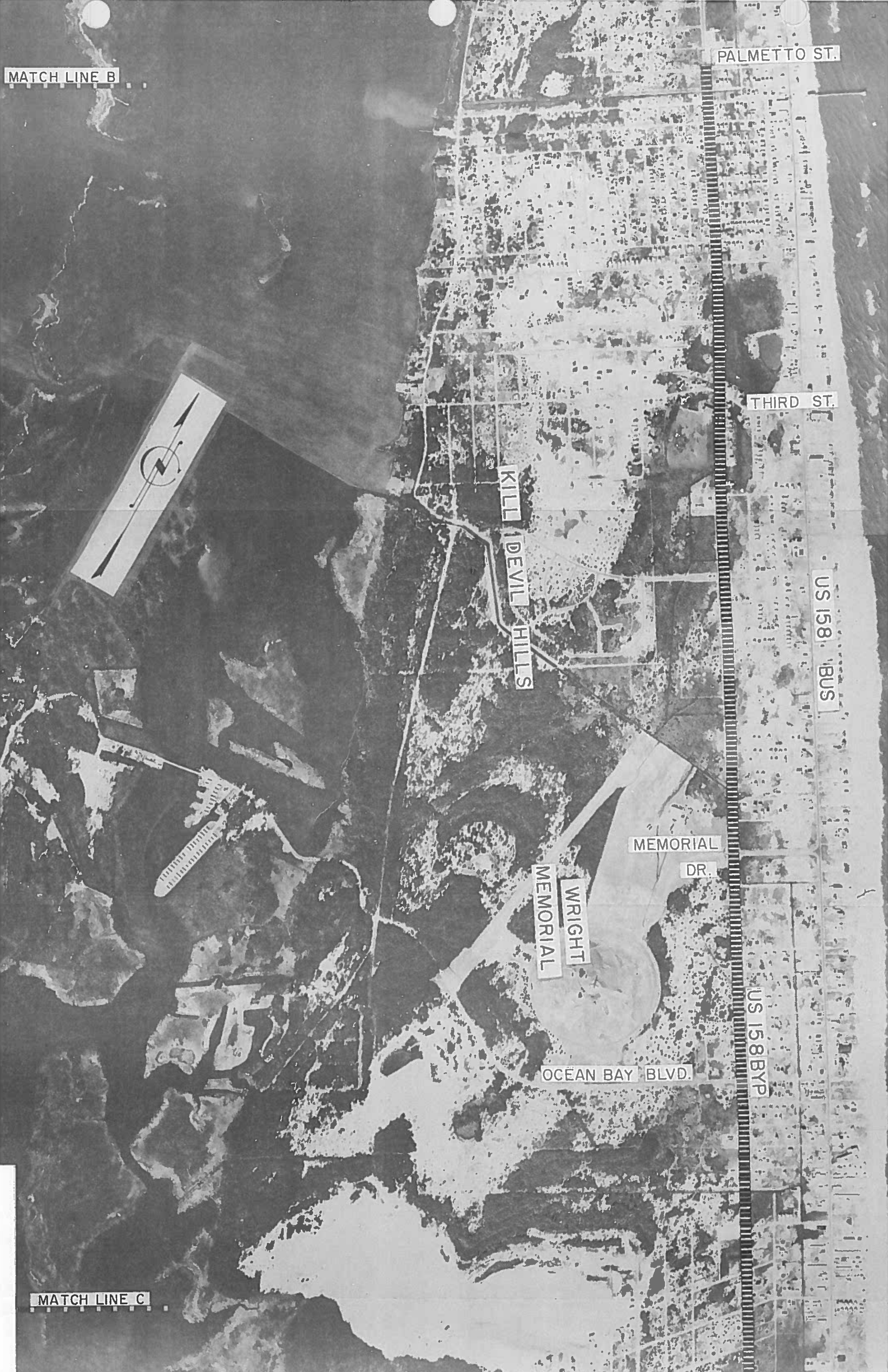
MEMORIAL DR.

WRIGHT MEMORIAL

OCEAN BAY BLVD.

US 158 BYP

MATCH LINE C





MATCH LINE A


KITTY HAWK

SANDLIN ST

KITTY HAWK RD.

CITY LIMIT

SHEET 2 OF 6

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	US 158 BYP FROM SOUTHERN SHORES TO WHALEBONE

7/87 0 1: 1000 FIG. 2

MATCH LINE E

US 158BYP

WHALE BONE

US 64-264

NC12



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PLANNING AND RESEARCH BRANCH

US 158 BYP FROM
SOUTHERN SHORES
TO WHALEBONE

7/87 0 1. 1000 FIG. 2

SHEET 60F6