

CARTERET COUNTY

CARTERET COUNTY EVACUATION PLAN

CARTERET COUNTY, NORTH CAROLINA

RECOMMENDED EVACUATION OPERATIONS AND PROCEDURES

JUNE, 1984

CARTERET COUNTY HURRICANE EVACUATION PLAN
HAZARD MITIGATION PLANS

And

POST DISASTER RECONSTRUCTION PLANS

For

CARTERET COUNTY

ATLANTIC BEACH

BEAUFORT

EMERALD ISLE

INDIAN BEACH

MOREHEAD CITY

PINE KNOLL SHORES

U. S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Prepared by:

George Eichler & Associates
Atlanta, Georgia

Satilla Planning, Inc.
St. Marys, Georgia

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RECOMMENDED EVACUATION OPERATIONS AND PROCEDURES

prepared by

GEORGE EICHLER & ASSOCIATES, INC.

JUNE, 1984

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CARTERET COUNTY

RECOMMENDED HURRICANE EVACUATION OPERATIONS AND PROCEDURES

I. INTRODUCTION

The Carteret County Hurricane Evacuation Plan provides the overall framework for conducting county-wide evacuation operations in the event of a major storm disaster. The hurricane evacuation plan is intended to be a component of a larger, more comprehensive local natural disaster plan. The larger plan is to address issues and procedures related to: communications and public warning systems; public information; debris removal after a storm; law enforcement; traffic control; search and rescue; emergency transportation; the provision of shelters; and the maintenance of public health.

The primary objective of the Carteret County Hurricane Evacuation Plan is to provide for the safety of the public immediately before, during and after a major storm disaster. The Plan is intended to provide the framework under which Carteret County and the municipalities located within the County can jointly provide for the orderly and efficient evacuation of the public from danger areas to designated public shelters. While the existing Plan does provide the organizational structure for achieving this objective, it does not go far enough in delineating the specific functions and responsibilities that each level of government must assume if evacuation operations are to be successfully carried out in an efficient and effective manner.

The remainder of this report outlines specific recommendations concerning how a joint county - municipal evacuation operation could work in Carteret County.

II. SUMMARY ASSESSMENT OF THE EXISTING CARTERET COUNTY HURRICANE EVACUATION PLAN

A. ORGANIZATION

The Plan establishes a joint organization for making decisions and deploying resources during the evacuation period. This is accomplished through the establishment of a Control Group and a Support Group.

The Control Group has the responsibility for directing overall evacuation operations and for making decisions related to the issuance of evacuation and reentry orders during the emergency. This Group consists of the Carteret County Manager (who serves as Chairman), the Mayors of the eight county municipalities and the County Emergency Management Coordinator who serves as the Group's advisor.

The Support Group is comprised primarily of County Department Heads. Its members include: the County Accountant; the County Sheriff; the Director of Social Services; the County Health Director; the Superintendent of Schools; the County Tax Assessor; the County Fire Marshall; and the County Public Information Officer. The primary responsibility of this group is to provide personnel and material resources from the various County departments which is needed to implement the provisions of the evacuation plan. Attachment III of the Evacuation Plan consists of a comprehensive listing of responsibilities to be performed by each member of the Support Group at each readiness condition. It is a very thorough compilation.

ASSESSMENT

The organizational framework established in the Hurricane Evacuation Plan is good. However, it does not go far enough. The Plan does not address specific actions to be undertaken by municipal officials prior to hurricane landfall. Additionally, local governments in the County are not required to have, and do not have specific evacuation plans of their own.

A two-pronged approach is needed. The Carteret County Hurricane Evacuation Plan should provide, as it does, the overall framework for an evacuation effort. The existing County Plan is generally adequate for this purpose. Local evacuation plans should spell out the specific actions that officials of each municipality should undertake to issue warnings to its citizens and visitors; move them to safe locations; and secure each town in the best manner possible.

A suggested delineation of County and municipal evacuation responsibilities is included in Section V. A model plan that can be tailored to meet the specific needs and resources

of the different Carteret County municipalities is also presented.

B. SHELTER LOCATION AND CAPACITY

The updated (unpublished) shelter component of the County Hurricane Evacuation Plan lists only 6 shelters that would serve the entire County during an emergency period. The capacities of these designated shelters totals less than 6,000. This capacity does not come close to meeting the potential need. Realistically, a community would not attempt to provide shelters for all evacuees because a relatively large percentage of visitors and non-residents would be expected to leave the coastal area and head inland to homes or more secure locations rather than utilize Carteret County shelters as a storm approaches. However, the shelter capacity is still well below what might be needed, especially when these shelters would have to meet the needs of the entire County and not just the Bogue Banks. (A high percentage of evacuees from mainland sectors of the County would be expected to be permanent residents who would be more inclined to use the County shelters than would vacationers to the Banks).

There are additional problems associated with the geographical distribution of the designated shelters. For example, the only shelter directly servicing evacuees from the western end of the Bogue Banks and low lying areas along the White Oak River is the White Oak Elementary School which has a capacity of less than 1,000. This is very inadequate in comparison to the potential need.

Recommendations concerning the provision of additional shelters in various sectors of the County are contained in Section III.

C. EVACUATION ROUTE CAPACITY

The Hurricane Evacuation Plan delineates evacuation routes to the designated shelters from the various sectors of the County. The capacity of the designated routes is adequate to meet evacuation needs within the recommended 4 to 6 hour evacuation period identified in the existing Evacuation Plan except for the Bogue Banks. This is a very major exception. While the Banks housed only about 7% of the County's permanent population in 1980, it is estimated that by the summer of 1990, the maximum seasonal population of the Bogue Banks will be almost 53,000 people, which would represent about 44% of the peak seasonal population of the entire County. These numbers and percentages can be expected to increase beyond 1990. Existing evacuation routes from the Banks have capacity limitations that seriously impact the

meeting of these needs.

The County Hurricane Evacuation Plan does not specifically address possible evacuation route problems. However, as part of this study a traffic analysis of the Bogue Banks evacuation routes was undertaken. The major conclusions of this analysis were:

- o The evacuation routes shown in the published Hurricane Evacuation Plan would encourage too many evacuees to use the old two-lane bridge from Atlantic Beach to U. S. 70 on the mainland. The capacity of this route will be exceeded even during the 1984 peak season and will get worse as peak visitation to the Banks increases.
- o The projected evacuation times from the Banks exceed the recommended 4 to 6 hours regardless of the directional split (i.e. the delineation of which routes the evacuees from different sectors of the Banks should use - the old bridge from Atlantic Beach or the new bridge on the western end of the Banks).

Chapter IV discusses the traffic analysis in much greater detail and presents recommendations related to designation of evacuation routes and traffic control problems that need to be addressed.

III. RECOMMENDED EVACUATION SHELTERS

Table 1 contains a summary of the population projections for Carteret County localities. Shown are the 1980 census of permanent population, the estimated 1980 peak seasonal population, and the peak seasonal population projected for 1990.

As can be seen from Table 1, Carteret County is experiencing phenomenal peak seasonal growth, especially on the Bogue Banks. This can easily be seen from the magnitude of current and recent construction activity.

In assessing evacuation and shelter needs, data on permanent population is of little value because of the vast discrepancies between permanent and seasonal population. Likewise, while the maximum seasonal population provides an indication of the magnitude of potential need, it is not reasonable to base hurricane evacuation shelter planning on peak seasonal population estimates because:

- o The mere threat of a hurricane will keep visitors away from the beach area.
- o A significant portion of non-local residents are likely to vacate the beach area prior to the Hurricane Warning period.
- o Many evacuees who wait until an evacuation order is issued are likely to continue inland and not stop at County shelters.
- o Although the general hurricane season coincides with the peak seasonal visitation period, North Carolina's experience is that major storms typically occur after the peak summer season.

Consequently, while it is not realistic to base shelter needs on the maximum number of potential evacuees, it is helpful to compare shelter capacities with the number of potential evacuees in order to determine order of magnitude differences and potential problems.

Table 2 contains a list of designated Carteret County public shelters as obtained from the latest revision of the County Hurricane Evacuation Plan.

TABLE 1

CARTERET COUNTY POPULATION DATA

<u>LOCALITY</u>	<u>1980 CENSUS POPULATION</u>	<u>MAX. SEASONAL 1980 EST.</u>	<u>POPULATION 1990 PROJ.</u>
CARTERET COUNTY TOTAL	41,095	74,050	120,981
<u>UNINCORPORATED TOWNSHIPS</u>			
ATLANTIC	810	1,077	1,409
BEAUFORT	3,166	3,375	4,101
CEDAR ISLAND	333	409	557
DAVIS	492	653	900
HARKERS	1,910	3,053	4,689
HARLOWE	956	1,156	1,727
MARSHALLBERG	580	743	1,000
MERRIMON	426	493	736
MOREHEAD	9,303	9,616	14,799
NEWPORT	3,586	4,467	9,113
SEA LEVEL	540	415	494
SMYRNA	637	744	1,054
STACY	322	342	455
STRAITS	1,520	1,715	2,510
WHITE OAK	<u>2,493</u>	<u>3,238</u>	<u>5,829</u>
TOTAL	27,074	31,496	49,373
<u>MUNICIPALITIES OFF BOGUE BANKS</u>			
BEAUFORT	3,829	4,873	6,787
CAPE CARTERET	944	1,678	3,524
MOREHEAD CITY	4,359	5,700	5,901
NEWPORT	<u>1,883</u>	<u>2,103</u>	<u>2,548</u>
TOTAL	11,015	14,264	18,760
<u>ON BOGUE BANKS</u>			
ATLANTIC BEACH	941	12,300	26,158
EMERALD ISLE	865	8,500	12,500
INDIAN BEACH	54	3,987	7,920
PINE KNOLL SHORES	<u>646</u>	<u>3,413</u>	<u>6,270</u>
TOTAL	3,006	28,200	52,848

SOURCES: 1980 CENSUS
1983 OFFICE OF COASTAL MANAGEMENT ESTIMATES
LOCAL LAND USE PLANS

NOTE: Seasonal population totals do not include day visitors

TABLE 2
SHELTER CAPACITIES

<u>BUILDING</u>	<u>CAPACITY</u>
Atlantic Elementary School	577
Beaufort Elementary School	928
West Carteret High School	2672
White Oak Elementary School	899
Newport Elementary School	441
Senior Citizens Center	347
	5864

In 1990 the peak seasonal population of just the Bogue Banks portion of Carteret County is projected to be almost 53,000, with 1984 peak visitation expected to reach 38,000. Additionally, the peak seasonal population elsewhere in the County is estimated to be over 50,000. While there are too many unknowns to convert visitation numbers to specific shelter needs, it appears certain that a total shelter capacity of less than 6000 will not meet the needs should a major storm have its landfall in the immediate vicinity of Carteret County.

A second problem is the geographic distribution of designated shelters as discussed below.

- o The Atlantic Elementary School serves primarily Cedar Island, Atlantic and Sea Level Townships. The capacity of this shelter appears adequate for meeting these needs.
- o Beaufort Elementary is the designated shelter for all areas east of Beaufort Inlet and the Intracoastal Waterway. This building does not have the capacity to handle this large geographic area. An additional shelter that would serve primarily the Harkers Island area is needed.
- o Newport Elementary School, the Morehead City Senior Citizens Recreation Center and the Newport Elementary school are well situated for handling evacuees from the eastern end of the Bogue Banks. However, the combined capacity of these shelters is less than 3500 which would not meet evacuation needs especially if a storm also necessitates the evacuation of mainland areas fronting on Bogue Sound. Additional shelters to serve this area are needed.
- o White Oak Elementary school is the only shelter designated to serve the eastern end of the County, which include major sectors of the Bogue Banks

(Emerald Isle, Indian Beach and possibly Pine Knolls Shore), and the areas along the White Oak River that are very susceptible to flooding. The capacity of this shelter is about 900, which is totally inadequate.

There are six public schools in Carteret County, which are not currently designated as shelters. The capacities of these school buildings is shown in Table 3.

TABLE 3
CAPACITIES OF POTENTIAL SHELTERS

BUILDING	CAPACITY
Smyrna Elementary School	1105
East Carteret High School	3430
Camp Glenn Elementary	1042
Beaufort Middle School	911
Morehead Middle School	783
Morehead Elementary School	994
	<hr/> 8265

Designating these 6 schools as shelters would increase the County's shelter capacity to over 14,000, which would probably be adequate to handle evacuation needs under most circumstances. However, designating all six of these school buildings as shelters would merely duplicate services in some areas that are already adequately served by shelters, and would do little to solve the problem in the southern end of the county.

The following recommendations are made concerning the designation of additional shelters:

1. Smyrna Elementary school should be designated as a shelter to serve Harkers Island and the population concentrations on the mainland to the north. It is understood that the structural integrity of this building is questionable. Consequently, it should be opened only after visual inspection following a storm event.
2. Beaufort Elementary School is the designated shelter to serve the Town of Beaufort and Beaufort Township. Under most circumstances, this shelter would probably have the capacity to meet the area's needs. However, if a major disruptive storm occurs, a second shelter in this area might be needed.

Because of its capacity, it is recommended that East Carteret High School be considered a secondary shelter to be opened based on need and at the discretion of the Carteret County Emergency Management Coordinator and the Control Group. Because this structure is located in a flood prone area it should be opened only after visual inspection following a storm event.

3. The three shelters that would serve Morehead City, the eastern end of the Bogue Banks, and unincorporated areas in Morehead Township have a combined capacity of only about 3,500. Morehead Elementary School, Morehead Middle School and Camp Glenn Elementary could also serve this area. Camp Glenn Elementary has the largest capacity and the best access from the Bogue Banks. It should be designated as a primary shelter. Morehead Elementary School should be designated as a secondary shelter to be utilized as needed at the discretion of the Emergency Management Coordinator and the Control Group.
4. Craven County which is located immediately to the northwest of Carteret County along U.S. 70 has excess shelter capacity. Havelock Middle School and Havelock Elementary School which are both located off U.S. 70 less than 20 miles from the Bogue Banks have a combined shelter capacity of over 1,700. Neither facility is designated as a primary shelter by Craven County. It is recommended that the Emergency Management Coordinator initiate discussions with Craven County for the joint use of these facilities as shelters as needed.
5. There are no adequate public buildings that could serve as shelters for evacuees from the western end of Bogue Banks other than the White Oak Elementary School which has a capacity of about 900. Three options are available to meet the needs of this sector of the County:
 - o When the White Oak shelter reaches its capacity, evacuees could be routed east on N.C.24 to U. S. 70 and shelters located at West Carteret High School, Newport Elementary School or to shelters located along U.S. 70 in Craven County. This is dependent upon Route 24 remaining open from flooding.
 - o Agreements to utilize shelters in Jones County, Onslow County and other inland communities along Route 58, as needed, could be negotiated with the respective county officials.

- o The possible use of barracks at Camp LeJeune as emergency shelter facilities should be explored with officials of the U. S. Marine Corps.

The Carteret County Board of Education is currently looking for a location of a new school in the western end of the County (generally along N.C. 24 east of Cape Carteret) which would help alleviate the shelter problem. However, this school is probably 3 to 5 years from being constructed.

Following is a summary of recommended Carteret County shelters. The location of these shelters and the evacuation routes to the shelters are illustrated in Figure 1.

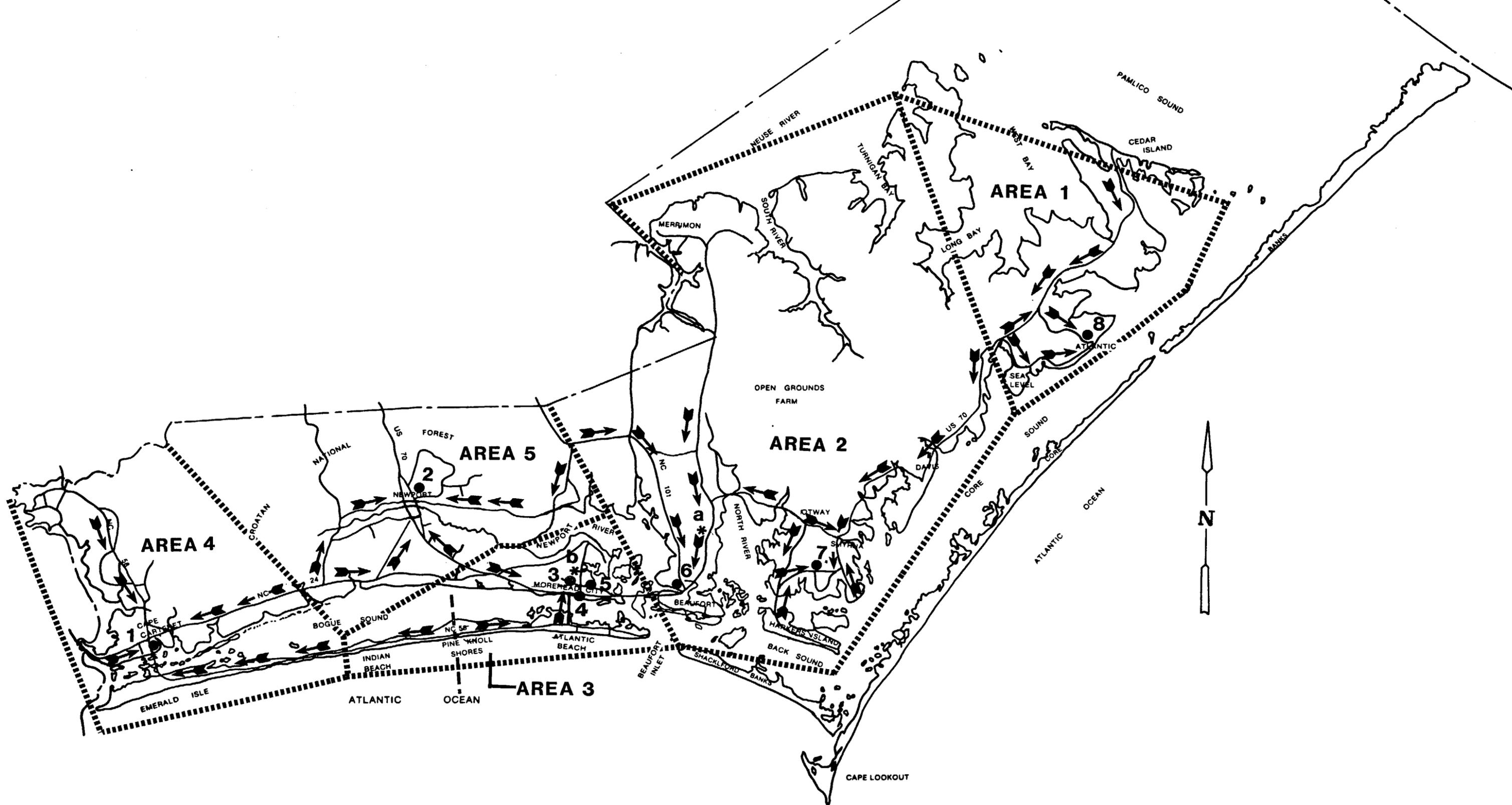
Recommended Primary Shelters (To be opened by the Carteret County School Superintendent upon the request of the Control Group). It is suggested that the shelters with the exception of Smyrna Elementary School be opened auto-matically upon the setting of Condition 2.

- o Atlantic Elementary School
- o Beaufort Elementary School
- o West Carteret High School
- o White Oak Elementary School
- o Newport Elementary School
- o Morehead City Senior Citizens Center
- o Smyrna Elementary School
- o Camp Glenn Elementary School

Recommended Secondary Shelters (To be utilized as needed at the discretion of the Control Group). These shelters should not be opened automatically to coincide with the setting of a specific condition.

- o East Carteret High School
- o Morehead Elementary School

Additionally, it must be accepted and understood that many evacuees from Carteret County will seek safety and security at shelters located within inland counties to the west of Carteret County. Consequently, it is recommended that a multi-county or regional shelter plan be prepared either by the State or by a multi-county task force.



LEGEND

- PRIMARY SHELTER
- * SECONDARY SHELTER

- | | |
|--------------------------|-----------------------|
| 1 White Oak Elementary | 6 Beaufort Elementary |
| 2 Newport Elementary | 7 Smyrna Elementary |
| 3 Senior Citizens Center | 8 Atlantic Elementary |
| 4 West Carteret High | a East Carteret High |
| 5 Camp Glenn Elementary | b Morehead City Elem |

CARTERET COUNTY, N.C.

SATILLA PLANNING, INC. St. Marys, Georgia GEORGE EICHLER & ASSOC. Atlanta, Georgia

JUNE, 1984 20000' 30000'

Hurricane Evacuation Routes & Shelters **FIG. 1**

IV. ASSESSMENT OF EVACUATION ROUTES

U. S. 70, N.C. Highway 101, N.C. Highway 24 and N.C. Highway 58 are the primary evacuation routes located on the mainland portion of Carteret County. These routes are adequate for meeting anticipated evacuation needs. However, these and other routes include areas subject to early flooding and contain a number of critical bridge crossings. These key locations are shown in Figure 2. They should be monitored by the County Sheriff's Department and the State Highway Patrol during the early phases of a significant storm. Of particular importance because of the magnitude of the potential operations are problems associated with the evacuation routes on and leading from the Bogue Banks. The remainder of this section is devoted to a discussion of this issue based on a detailed traffic assessment undertaken as part of this study.

N.C. Highway 58 (Salter Path Road) runs in an east-west direction along almost the entire length of Bogue Banks. The cross section of this roadway is 30 feet, with single 12-foot travel lanes in each direction and 3 foot shoulders.

On the east end of the Island, access to the mainland is by way of the old 2-lane Atlantic Beach drawbridge. The approach lanes to the bridge along Morehead Avenue (the Causeway) narrow from 4 lanes to 2 lanes which creates traffic problems even during non-emergency periods. The alignment of a new 4-lane high rise bridge between Atlantic Beach and Morehead City has recently been finalized by the North Carolina Department of Transportation (DOT). The new bridge will be located adjacent to the existing drawbridge. DOT is scheduled to receive bids for the construction of the new bridge this July. It is estimated that the bridge could be operational in time to handle peak seasonal traffic loads to and the from the Bogue Banks by the summer of 1987.

On the west end of the Island, access to the mainland is by way of the relatively new Highway 58 highrise bridge.

There are two basic characteristics that differentiate traffic operations on a two-lane roadway, such as N. C. 58, from multi-lane facilities. First, distribution of traffic by direction has practically no effect on operating conditions at any given total volume level. Therefore, the capacity and service volumes of two-lane highways are expressed in total vehicles per hour, regardless of the distribution of traffic by direction. Second, overtaking and passing maneuvers must be made in the traffic lane normally occupied by opposing traffic. Inasmuch as the maintenance of a desired speed requires passing maneuvers, the volume of traffic plus the highway geometrics, which establish available passing sight distance, have a much more significant effect on operating speeds than is the case on multi-lane roads.



LEGEND

*

CRITICAL EVACUATION ROUTE BRIDGES



ROADWAYS PRONE TO EARLY FLOODING

CARTERET COUNTY, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984

20000'

30000'

Possible Evacuation
Route Problem Areas

FIG. 2

The capacity of a two-lane, two-way roadway under ideal conditions is 2,000 passenger vehicles per hour regardless of directional distribution.

Traffic volume increases have a direct effect on operating speeds, independent of roadway alignment features. Operating speeds for uninterrupted flow on all two-lane roadways are 40 mph or above. The total volume for both directions reaches 70 percent of capacity with continuous passing sight distance, or 1,400 passenger cars per hour, under ideal conditions. With operating speeds of 35 mph, total traffic volumes for both directions may reach 85 percent of capacity with continuous passing sight distance, or 1,700 passenger cars per hour, under ideal conditions. This represents the highest volume that can be maintained for short periods of time without a high probability of breakdown in flow.

The ability of the transportation network to adequately handle evacuation needs is dependent upon the evacuation time as established by Carteret County in its Hurricane Evacuation Plan. A major element of the evacuation time is the clearance time, which is directly related to the vehicular capacity of the transportation network. Clearance time is defined as the amount of time necessary for the relocation of all vulnerable evacuees to their respective shelter destinations once the official evacuation order is issued. The clearance time consists of three main subcomponents: mobilization time, travel time and queuing delay time. The desired clearance time from the Bogue Banks as stated in the County Hurricane Evacuation Plan is 4 to 6 hours.

Mobilization time is that period between the issuance of the evacuation order and the departure time of the last vehicle from the vulnerable area. It depends to a large extent on the attitudes and response time of residents. Travel time is the period necessary for the vehicles to travel the length of the evacuation route at an anticipated operating speed assuming no traffic delays (queuing). Queuing delay time is defined as the time spent by vehicles in traffic jams resulting when the capacities of the evacuation routes are exceeded by the number of vehicles using those routes.

The following assumptions were made in assessing the clearance time from the Bogue Banks:

- o A peak number of 38,000 persons might have to be evacuated in the summer of 1984, and 53,000 by the summer of 1990. An estimated distribution of this population on the Banks has been estimated as shown in Table 4.
- o Approximately 15% of the beach population will leave the area prior to the issuance of official evacu-

ation orders (this is probably a very conservative estimate).

- o The evacuation roadways will only be able to operate at 80 percent of capacity due to the general storm conditions that will be present (this number is probably realistic as an average for a 24-hour evacuation period and probably too optimistic if a shorter evacuation period is utilized).
- o Each vehicle will contain 2.5 persons on the average.
- o The departure speed will average 35 mph.
- o Under the above assumptions, the normal unrestricted travel volume of 1,700 vehicles per hour (vph) would be reduced to 1,340 vph as the maximum roadway capacity.

TABLE 4

MAXIMUM SEASONAL POPULATION ESTIMATES

<u>MUNICIPALITY</u>	<u>1984</u>	<u>1990</u>
ATLANTIC BEACH	18,000	26,000
EMERALD ISLE	10,500	13,000
INDIAN BEACH	5,000	8,000
PINE KNOLL SHORES	4,500	6,000
BOGUE BANKS TOTAL	38,000	53,000

ASSESSMENT OF 1984 EVACUATION

There are three options, as described below, for evacuating the Bogue Banks.

Option 1. Evacuees from Atlantic Beach, Pine Knolls Shore and Indian Beach (the eastern sector) would evacuate the Banks via the Atlantic Beach drawbridge. The evacuees from Emerald Isle (the western sector) would evacuate via the Highway 58 bridge (this is consistent with the published Carteret County Hurricane Evacuation Plan).

Option 2. Evacuees from Atlantic Beach and most of Pine Knolls Shore would evacuate via the Atlantic Beach drawbridge and evacuees from Indian Beach, Emerald Isle, and a portion of Pine Knoll Shores would evacuate via the Highway 58 bridge (this is consistent with existing but unpublished policies).

Option 3. Only evacuees from Atlantic Beach would evacuate via the Atlantic Beach drawbridge. All other evacuees would utilize the Highway 58 bridge.

Table 5 contains a summary of the clearance times associated with the above options based on the defined assumptions.

TABLE 5
1984 ESTIMATED EVACUATION CLEARANCE TIMES

<u>OPTION</u>	<u>FROM</u> <u>EASTERN SECTOR</u>	<u>FROM</u> <u>WESTERN SECTOR</u>
1	7.0 hours	2.7 hours
2	5.7 hours	3.9 hours
3	4.6 hours	5.1 hours

Based on the information summarized in Table 5, it is recommended that the dividing line on the Boque Banks for evacuation purposes be established at Pine Knolls Boulevard in Pine Knolls Shore. All evacuees east of this point would evacuate the Banks utilizing the Atlantic Beach bridge and all residents west of this point would evacuate the Banks using the Highway 58 bridge.

ASSESSMENT OF 1990 EVACUATION (Assuming the new bridge is not built by this time)

The options would be the same as are described for the 1984 evacuation. Table 6 contains a summary of the estimated clearance times for the three options.

TABLE 6
1990 ESTIMATED EVACUATION CLEARANCE TIME
(without a new Atlantic Beach Bridge)

<u>OPTION</u>	<u>FROM</u> <u>EASTERN SECTOR</u>	<u>FROM</u> <u>WESTERN SECTOR</u>
1	10.2	3.2
2	8.2	5.2
3	6.6	6.8

The prime conclusion based on the information shown in Table 5, is that evacuation of the Boque Banks cannot be accomplished within the desired 6 hour time period regardless of

how the traffic is routed from the Banks if a new Atlantic Beach bridge is not built by 1990. If the new bridge is not operational by 1987, the County Hurricane Evacuation Plan should be revised to reflect Option 3. Under this option only evacuees from Atlantic Beach would use the Atlantic Beach drawbridge. All other evacuees from the Banks would travel west and use the Highway 58 bridge to evacuate.

ASSESSMENT OF 1990 EVACUATION (assuming new Atlantic Beach bridge is built by this time)

A four lane roadway can accomodate 1,800 passenger cars per lane per hour at an operating speed of about 35 mph. However, based on the assumptions utilized in this analysis it is assumed that the new 4-lane bridge could only accomodate 1,440 passenger cars per lane per hour and that only two lanes would be used to evacuate (while 3 lanes could possibly be used to evacuate, it is assumed that for purposes of this analysis that the third lane would be used for emergency vehicles, for conducting emergency operations, etc.)

Table 7 contains a summary of the estimated evacuation clearance times for the three basic options.

TABLE 7

1990 ESTIMATED EVACUATION CLEARANCE TIME
(assuming construction of a new Atlantic Beach bridge)

<u>OPTION</u>	<u>FROM EASTERN SECTOR</u>	<u>FROM WESTERN SECTOR</u>
1	4.7	3.3
2	3.8	5.3
3	3.1	6.9

Based on the information shown in Table 7, it is recommended that upon construction and opening of the new Atlantic Beach bridge the the existing County Hurricane Evacuation Plan evacuation route distribution be revised. All evacuees from Atlantic Beach and Pine Knoll Shores would use the new bridge and evacuees from Indian Beach and Emerald Isle would utilize the Highway 58 bridge. While the new bridge could handle evacuees from Indian Beach, the possibility of a bottleneck at the intersection of N.C. 58 with U.S. 70 leads to a recommendation for evacuating only Atlantic Beach and Pine Knolls Shore residents by way of the new bridge.

In conducting the above analysis, an assumption has been made that the problems of congestion at key intersections will be resolved by having the State Highway Patrol and/or

the County Sheriff's Department and local police departments manually control traffic flow, including turning movements, at the key intersections listed below. If this is not accomplished, the evacuation time improvements associated with the construction of the new bridge will be difficult to achieve.

Manual traffic control at the following intersections is recommended upon issuance of any evacuation orders.

- o The intersection of Morehead Avenue with Salterpath Road (N.C. 58) and Fort Macon Road, south of the approach to the Atlantic Beach Bridge. (Causeway)
- o The intersection of Atlantic Beach Road with Arendell Street (U.S.70) in Morehead City
- o The intersection of Salterpath Road (N.C. 58) with Coast Guard Road in Emerald Isle at the approach to the Highway 58 bridge.
- o The intersection of N.C. Highway 58 with N.C. Highway 24.
- o On U.S. 70 just south of Newport where S.R. 1140, S.R. 1124 and S.R. 1154 converge.
- o Additionally, the approaches to the Atlantic Beach Bridge should be manually controlled and patrolled.

A new bridge, combined with effective traffic flow control at key intersections should permit the safe evacuation of the Bogue Banks well into the 1990's.

V. ORGANIZATIONAL RESPONSIBILITIES

In the event, of a potential storm disaster, a joint effort on the part of Carteret County and local municipalities within the county will be needed in order to: 1) alert residents and visitors to the area; 2) carry out evacuation operations; 3) man and operate the designated public shelters; and 4) permit reentry in an orderly manner after the emergency has passed.

As discussed in Section II, the existing Carteret County Hurricane Evacuation Plan provides the overall framework for conducting evacuation operations and also details the responsibilities of the various county departments. However, responsibilities of local municipalities are not adequately addressed. In this section of the report, a general division of responsibilities between Carteret County and municipal governments is suggested. Finally, a model for a local hurricane evacuation plan, which can be modified to meet available personnel and resources of a specific local community, is presented.

CARTERET COUNTY RESPONSIBILITIES

Following is a listing of the major responsibilities that Carteret County should assume as part of a comprehensive hurricane evacuation program.

1. Monitor storm conditions and collect meteorological information as a storm approaches the North Carolina coast. This should be accomplished through the monitoring of U.S. Weather Service advisories and other available information.
2. Set the various readiness conditions, as defined in the County Hurricane Evacuation Plan, as a storm approaches.
3. Inform the public regarding: issuance of weather advisories; setting of readiness conditions; issuance of evacuation orders; issuance of travel advisories; conditions along evacuation routes; shelter location and availability; and reentry, using the local news media, primarily radio and television.
4. Activate The County Control Group and Support Group upon the setting of Readiness Condition 3 (Hurricane Watch). Members of both groups should be alerted by the County Emergency Management Coordinator upon the setting of this readiness condition and should report to the Emergency Control Center prior to the setting of Readiness Condition 2 (Hurricane Warning).
5. Issue Evacuation Orders for various sectors of the

County. The County Evacuation Plan calls for evacuations decisions to be made by the Control Group, based upon the recommendations of the Emergency Management Coordinator. If the landfall of a major storm is projected to occur in or near Carteret County, it is expected that at a minimum an order would be issued to evacuate the Bogue Banks upon the setting of Readiness Condition 2 (an estimated 24 hours before landfall).

The issuance of evacuation orders must be clearly coordinated with municipal officials, who will be responsible for actively carrying out the evacuation operations.

6. Open, man and operate the designated public shelters. Monitor conditions at shelters to determine if secondary shelters should be opened.
7. Coordinate traffic control activities with the North Carolina Highway Patrol. Insure that manual controls are established at the key intersections identified in Section IV of this report. Serve as a clearinghouse for information concerning conditions on major evacuation routes. Disseminate evacuation route information received from the State Patrol, the County Sheriff's Department and local police departments.
8. Coordinate evacuation operations along State Route 58 with local Bogue Banks police departments. While it is desirable to attempt to operate State Route 58 one-way east bound and one-way westbound from the dividing point designated in the County Hurricane Evacuation Plan it is understood that local police departments do not consider this feasible. Because Route 58 is in many locations, the only east-west route on the Banks, it is imperative that this route be kept cleared during evacuation periods. The County Sheriff's Department should be responsible for coordinating road clearance operations with local police departments.
9. Establish and man roadblocks at entrances to the Banks after the evacuation is complete. Reentry should be prohibited, except for official public or emergency vehicles, until a re-entry order is issued by the County Control Group.
10. Issue reentry orders to the Banks, as appropriate, after the emergency has passed. Only the County Control Group should be authorized to issue such an order. A municipality should not issue a reentry order on its own behalf. A reentry pass system should be operated by the County Sheriff's Department at the entrances to the Banks. Lists of property owners from each municipality should be provided by the municipalities and maintained at the entrance points to the Banks. Passes should be

issued only to those possessing valid identification cards. The pass system should be maintained until the overall emergency order is lifted by the County Control Group.

11. Lift emergency orders in coordination with individual towns.

LOCAL MUNICIPAL RESPONSIBILITIES

Local municipalities in Carteret County must assume major responsibilities as part of a comprehensive county evacuation program. Specific activities are discussed in detail in the next section which presents a model Local Hurricane Evacuation Plan. General responsibilities are listed below.

1. Adopt a local Evacuation Plan as a supplement to the County Hurricane Evacuation Plan.
2. Establish an Emergency Operations Center upon the setting of Readiness Condition 3 (Hurricane Watch). This should be the point at which coordination with the County Emergency Management Coordinator begins and is continued with the County Control Group upon the setting of Readiness Condition 2 (Hurricane Warning).
3. Designate a member of the Town Council to serve as the town's representative on the County Control Group. It is recommended that this person not be the Mayor of the town, as is currently the case, because in most situations the Mayor will assume the responsibility for coordinating local evacuation operations.
4. Implement activities outlined in the Local Hurricane Evacuation Plan in response to the setting of the various readiness conditions by the County Control Group.
5. The primary objectives of the local evacuation operations should be to:
 - o Alert town residents and visitors upon the issuance of evacuation orders.
 - o Assist local residents and visitors in evacuating the town.
 - o Keep the major evacuation routes clear of debris, accidents that are blocking the roadway, etc.
 - o Secure the town in the most effective manner possible.

LOCAL HURRICANE EVACUATION PLAN

A model for a local hurricane evacuation plan is presented beginning in the next section. This suggested plan has been modeled after plans that have been adopted by other North Carolina Coastal communities.

The major activities that should be undertaken by a local municipality upon the setting of various readiness conditions are listed. The responsibilities for carrying out each activity are left blank so that a local community may assign responsibilities in a manner consistent with its departmental, personnel, material and volunteer resources.

Local communities should modify or expand upon the suggested plan to meet their specific needs. The important points are that 1) each municipality must adopt its own hurricane evacuation plan; and 2) the local plan must be consistent with and compatible with the Carteret County Hurricane Evacuation Plan. Local governments cannot afford to be complacent and rely solely on the County Evacuation Plan which is not designed for conducting local evacuation operations.

VI. SUGGESTED LOCAL HURRICANE EVACUATION PLAN

PURPOSES:

1. To provide information on actions to be taken by the public in a hurricane emergency in order to minimize danger to individuals and assist in recovery operations following the emergency.
2. To insure an orderly and coordinated evacuation of the town by residents and visitors in a hurricane emergency.
3. To provide a summary of actions to be taken by Town Personnel in the event of a hurricane emergency.

READINESS CONDITIONS:

Readiness conditions 5 (Hurricane Season), 4 (Hurricane Advisory), and 3 (Hurricane Watch) are to be set by the Carteret County Emergency Management Coordinator. Readiness Conditions 2 (Hurricane Warning), 1 (Evacuation), 0 (Landfall imminent) and Reentry are to be set by the County Hurricane Control Group.

The Town will conduct its own hurricane emergency operations in conjunction with the setting of Conditions 3, 2, 1, 0 and Reentry as outlined in this Plan.

ACTIONS TO BE TAKEN PRIOR TO EMERGENCY PHASE ACTIVITIES

<u>Action</u>	<u>Responsibility</u>
1. Prepare and adopt local hurricane evacuation plan.	
2. Publish and disseminate a one page version of the local evacuation plan which: describes the town's alert system; identifies actions that visitors and residents should take to secure dwellings; and identifies evacuation routes and shelters.	
3. Designate an Emergency Operations Center and Local Emergency Operations Coordinator.	
4. Designate an elected town official to represent the town on the County Hurricane <u>Control Group</u> .	
5. Assign responsibilities as outlined in the Plan to various personnel and departments.	
6. Familiarize and train town employees with steps necessary to carry out town shutdown and evacuation operations as outlined in the Plan.	
7. Divide the community into sectors for notification upon issuance of evacuation orders.	
8. Prepare list(s) of town property owners to be used at the reentry points to the Banks.	
9. Maintain emergency generator and other emergency equipment in good operating order.	
10. Develop and maintain list of persons (e.g. invalids) requiring evacuation assistance.	

HURRICANE EMERGENCY ACTIONS AND RESPONSIBILITIES

CONDITION 3 - HURRICANE WATCH (48 hours before expected landfall)

<u>Action</u>	<u>Responsibility</u>
1. Meeting of Town Council and Key Town employees to review emergency plans.	
2. Town personnel placed on standby alert.	
3. Town personnel complete all personal arrangements.	
4. Activate Emergency Operations Center at Town Hall.	
5. Establish communications with Carteret County Emergency Management Coordinator.	
6. Staff public information center at Town Hall.	
7. Assemble all town records needed at reentry checkpoints and for damage assessment operations.	
8. Check emergency generator, communications equipment and supplies.	
9. Gas all town vehicles, including spare tanks when available.	
10. Advise active construction projects to secure all materials.	
11. Begin filling water tanks.	

HURRICANE EMERGENCY ACTIONS AND RESPONSIBILITIES

CONDITION 2 - HURRICANE WARNING (24 hours before expected landfall)

<u>Action</u>	<u>Responsibility</u>
1. Town representative to County Control Group departs for County Emergency Operations Center after being informed by County EMC that Hurricane Warning will soon need to be issued.	
2. Communications established with County Control Group.	
3. Assemble all town personnel for final preparations and briefing.	
4. Assemble, refuel and load all vehicles, including fire trucks, rescue squad ambulances, public works vehicles (to be used for road clearance operations), police vehicles, and other town vehicles. Remove unnecessary vehicles to mainland.	
5. Insure water tanks are full. Cut off all unnecessary water lines.	
6. Place emergency power generator at emergency operations center.	
7. Evacuate all invalids and persons unable to evacuate themselves.	
8. Confirm information on shelters from County Emergency Management Coordinator.	
9. Establish traffic control operations at key intersections.	
10. Secure town buildings other than Emergency Operations Center.	
11. Designated town representative(s) departs for designated shelter(s) to establish alternative town emergency operations center.	

HURRICANE EMERGENCY ACTIONS AND PROCEDURES

CONDITION 1 - EVACUATION (as ordered by County Control Group)

<u>Action</u>	<u>Responsibility</u>
1. Proclaim state of emergency and issue local evacuation order.	
2. Inform residents by using fire siren for three continuous cycles every ten minutes.	
3. Inform residents directly by sector in accordance with pre-established plan. Hand out maps to evacuation shelters.	
4. Establish State Highway 58 as a one-way route in accordance with County Hurricane Evacuation Plan.	
5. Carry-out local traffic control responsibilities.	
6. Cut off all remaining water lines.	
7. Cut off valves to water tanks.	
8. Cut off power to all town motors and pumps.	
9. Cut off gas valves.	
10. Establish town operations center at one of designated shelters.	
11. Move town records to alternative town emergency operations center.	
12. Town trucks to be stationed along evacuation routes to assist in clearance operations.	
13. Assist in evacuation.	
14. Make final check to insure evacuation is complete.	
15. Drive town vehicles off the Banks.	

HURRICANE EMERGENCY ACTIONS AND RESPONSIBILITIES

CONDITION 0 - LANDFALL IMMINENT

<u>Action</u>	<u>Responsibility</u>
1. Remove all emergency vehicles and emergency personnel to town emergency operations center established at one of designated shelters.	
2. Request that power be shut off to town.	
3. Town personnel standby at operations center at shelter.	
4. Maintain contact with County <u>Control Group</u> .	

HURRICANE EMERGENCY ACTIONS AND RESPONSIBILITIES

REENTRY

<u>Action</u>	<u>Responsibility</u>
1. Allow only elected officials, police officials and Damage Assessment Team reentry to inspect and evaluate damage.	
2. Conduct damage assessment activities.	
3. Establish pass system for residents and property owners reentry.	
4. Coordinate assistance necessary to restore municipal services.	
5. Request power be reestablished.	
6. Restore power to pumps and motors. Check for visual breaks in water lines. Restore water service one section at a time and make necessary repairs to insure the complete system will not be contaminated because of small breaks.	
7. Emergency operations center reestablished at town hall.	
8. Permit reentry of residents and property owners by Pass when authorized by Control Group. (A local government could also control reentry at its town limits if desired.)	
9. Patrol streets to prevent looting.	
10. Rescind evacuation order and remove check points when safe.	
11. Compile information provided by damage assessment team.	
12. Transport invalids back to residents after checking for habitability.	

CARTERET COUNTY

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
POST DISASTER RECONSTRUCTION PLAN

Prepared for

CARTERET COUNTY, NORTH CAROLINA

By:

George Eichler & Associates
and
Satilla Planning, Inc.

June 1, 1984

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the Department of Natural Resources and Community Development.

The objective of this report is to present storm hazard mitigation and post-disaster reconstruction plans for Carteret County which 1) meet the specific needs of the County; and 2) conform with the State rules for storm hazard planning.

Individual storm hazard mitigation and post-disaster reconstruction plans have also been prepared for Morehead City, Beaufort and the Bogue Banks communities: Atlantic Beach, Pine Knoll Shores, Indian Beach, and Emerald Isle. These municipal plans are expected to be implemented in concert with the overall County plan during disaster recovery operations and reconstruction.

The remainder of this report describes Carteret County's storm hazard planning program. Chapter II presents the County's Storm Hazard Mitigation Plan. Chapter III presents Carteret County's Post-Disaster Reconstruction Plan. Additionally, a companion report was prepared to recommend hurricane evacuation operations and procedures. This report outlines specific recommendations to conduct joint County-municipal evacuation operations.

II. CARTERET COUNTY STORM HAZARD MITIGATION PLAN

Most of Carteret County's 41,000 permanent residents live close to area waterways, sounds or the Atlantic Ocean. Nearly 70 percent of the County's population is located in three townships: Morehead City, Beaufort and Newport (Table 1). Most of the remaining population lives close to Bogue Sound (Cape Carteret and development along N.C. 24 to Morehead City), Back Sound (Harkers Island) and Core Sound, (Atlantic, Sea Level, and other small/unincorporated communities). The County's population increased by 30% during the period 1970-1980 with about a third of this growth occurring within the County's eight municipalities and two-thirds in unincorporated areas.

TABLE 1

CARTERET COUNTY EXISTING POPULATION

TOWNSHIPS	<u>Incorp. & Unincorp.</u>		<u>Peak Seasonal Unincorporated</u>	
	<u>1970</u>	<u>1980</u>	<u>1983</u>	<u>1990</u>
Atlantic	814	810	1,077	1,409
Beaufort	6,147	6,992	3,395	4,101
Cedar Island	290	333	409	557
Davis	456	492	653	900
Harkers Island	1,639	1,910	3,053	4,689
Harlowe	762	956	1,156	1,727
Marshallberg	525	580	743	1,000
Merrimon	330	426	493	736
Morehead City	11,929	15,803	9,616	14,794
Newport	3,926	5,469	4,467	9,113
Portsmouth	2	N/A	N/A	N/A
Sea Level	347	540	415	494
Smyrna	517	637	744	1,054
Stacy	257	322	342	455
Straits	1,166	1,520	1,715	2,510
White Oak	<u>2,496</u>	<u>4,302</u>	<u>3,238</u>	<u>5,829</u>
TOTAL:	31,603	41,092	31,496	49,373

Source: U.S. Department of Commerce Bureau of the Census; Carteret County 1970 Comprehensive Water and Sewer Planning Report; Office of Coastal Management Estimates.

The County's population is expected to reach 67,278 persons by the year 2000 according to the North Carolina Office of State Budget and Management. This sizable population growth - 64% - is typical of North Carolina's twenty coastal counties which are expected to increase by 61 percent during the same period.

Commercial development is concentrated in Morehead City, Beaufort, Newport, Cape Carteret (the County's mainland municipalities) and on Bogue Banks along Salter Path Road (N.C. 58).

B. Hazard Areas in Carteret County

Due to the fact that the County's population is concentrated adjacent to the ocean, sounds and rivers, hurricane damage is likely to result primarily from flooding and high winds. The following presents specific hazard area locations within the County.

Areas of Environmental Concern (AEC's)

The Coastal Resources Commission has identified four broad categories of AEC's: 1) the estuarine system; 2) ocean hazard areas; 3) public water supplies; and 4) natural and cultural resource areas. Development within these areas that is potentially damaging to property, the public health, and/or the natural environment is managed through a state/local permitting system.

Ocean hazard areas and the estuarine system are the primary AEC's in Carteret County. Ocean hazard AEC's consist of: beaches, frontal dunes, inlet lands, and other areas susceptible to excessive erosion or flood damage; specifically: Ocean Erodible AEC's, High Hazard Flood AEC's, and Inlet Hazard AEC's. Estuarine system AEC's are comprised of coastal wetlands, estuarine waters, public trust areas, and estuarine shorelines. The following defines each of these AEC's relative to Carteret County:

- o Coastal Wetlands are defined as any salt marsh subject to regular or occasional flooding by tides, including wind tides but not hurricane or tropical storm tides.
- o Estuarine Waters are defined as " all the water of the Atlantic Ocean...and all the water of the bays, sounds, rivers, and tributaries thereto seaward of the dividing line between coastal fishing waters and inland fishing waters...". In Carteret County, estuarine waters consist primarily of Bogue Inlet, Bogue Sound, the White Oak River, Beaufort Inlet, the Newport River, the North River, Back Sound, Core Sound, Pamlico Sound, and the Neuse River.

- o Public Trust waters are defined as all navigable waterways to which the public has access: public trust waters overlap estuarine waters but also extend upstream to the limits of navigation.
- o Estuarine Shorelines are non-ocean shorelines that are especially vulnerable to erosion, flooding, or other adverse effects of wind and water and are intimately connected to the estuary. The actual area extends from the mean high water level or normal water level 75 feet landward. Map 1 delineates this AEC in unincorporated Carteret County except within the Salter Path community where it is identified by Map 2.
- o Ocean Erodible AEC'S are areas where there is a major possibility of excessive erosion and significant shoreline fluctuation. Current State regulations establish ocean erodible AEC's as beginning at the mean low water line. Setback measurements begin at the first line of stable vegetation and continue inland to a depth 60 times the average annual rate of erosion. Provided there has been no long term erosion or the rate of erosion is less than two feet per year, this distance is set at 120 feet. In areas where the erosion rate is more than 3.5 feet per year, the setback line is based on a distance of 30 times the long-term annual erosion rate plus 105 feet. The only Carteret County ocean erodible AEC that is not within a municipality's jurisdiction or within the Cape Lookout National Seashore is Salter Path Community on Bogue Banks. Map 1 identifies these areas in the County except in Salter Path where they are outlined by Map 2.
- o High Hazard Flood AEC's are subject to high velocity waters during the 100-year flood event. This AEC corresponds to the National Flood Insurance program's "V" zones. Map 3 delineates these areas outside the jurisdiction of the County's municipalities. In Salter Path, Map 4 depicts this AEC.
- o Inlet Hazard AEC's are natural hazard areas that are especially vulnerable to erosion, flooding and other adverse effects of sand, wind, and water because of proximity to dynamic ocean inlets. Carteret County's inlet hazard areas are either within the jurisdiction of a town (Emerald Isle), the State (Ft. Macon State Park), or the federal government (Cape Lookout National Seashore), and therefore the County does not have management jurisdiction over any lands within the AEC.



LEGEND



ESTUARINE SHORELINE A.E.C.



OCEAN ERODIBLE A.E.C.

CARTERET COUNTY, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984

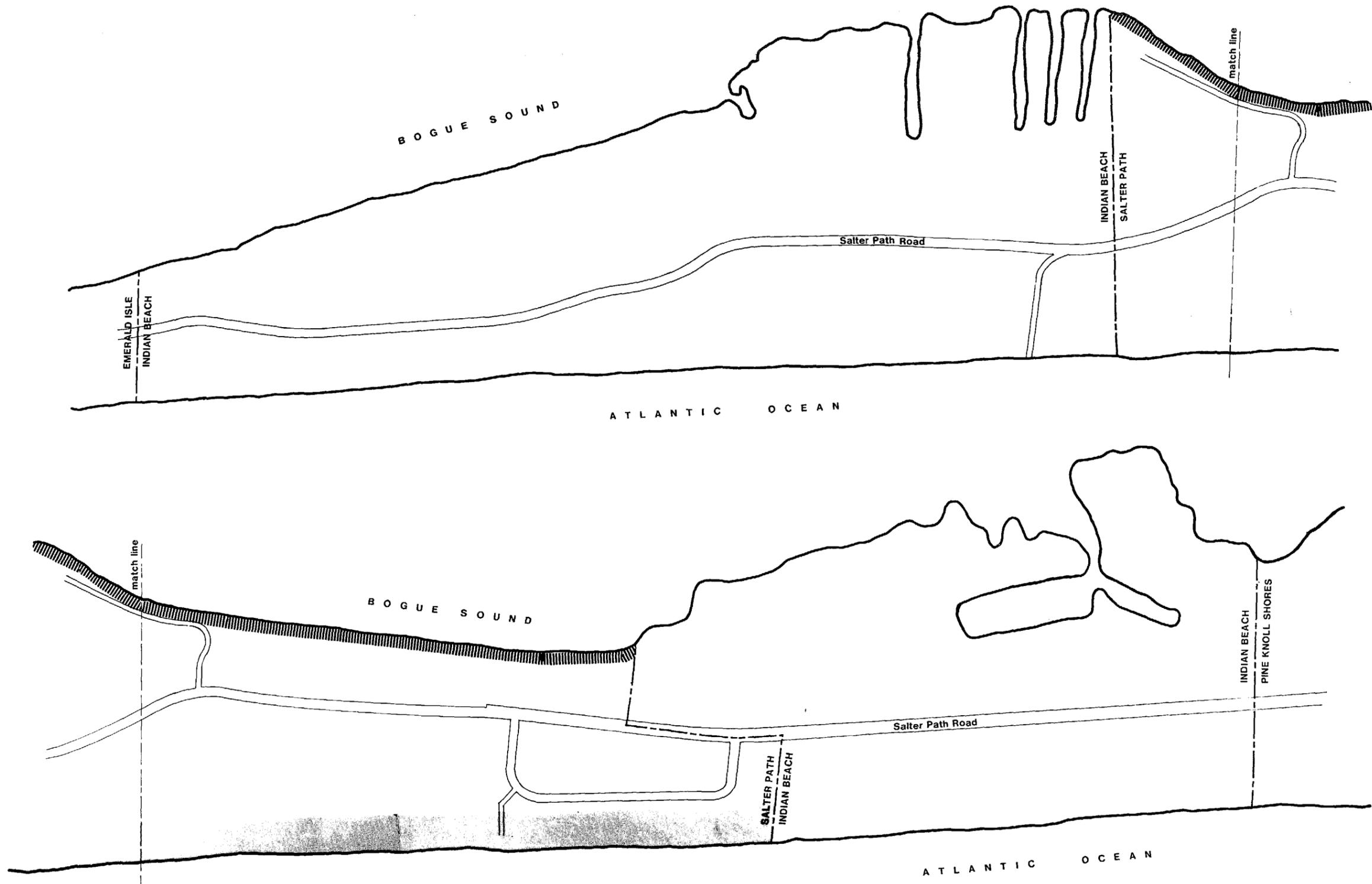
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This map is for planning purposes only: the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

Storm Hazard Areas

MAP ONE



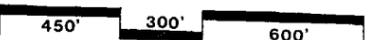
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 ESTUARINE SHORELINE A.E.C.

SALTER PATH, N.C.

SATILLA PLANNING, INC. St. Marys, Georgia
 GEORGE EICHLER & ASSOC. Atlanta, Georgia

JUNE, 1984



Storm Hazard Areas

MAP TWO

Flood Hazard Areas

In addition to the designated AEC's, the balance of the 100-year flood plain (that not included in flood insurance "V" zones), is also a hazard area that should be addressed by the County's mitigation plan. As delineated by Map 3, significant portions of the County are within the 100-year flood plain. Flood hazard areas in Salter Path are depicted by Map 4. With the exception of high areas around Atlantic, the Beaufort Peninsula, and the Ottway-Smyrna area, the entire eastern half of the County is subject to flooding. Flood areas within Croatan National Forest are not mapped but most of the populated areas in the western half of the County (excluding Bogue Banks) are not subject to flooding. The following areas in particular are generally not subject to flooding: lands between N.C. 24 and to within about two to three hundred feet of Bogue Sound; and areas northwest of U.S. Route 70 to the Newport River between Morehead City and Newport.

Areas Subject to Wind Damage

The major damage to development and agricultural areas in Carteret County from future hurricanes will be attributable to flooding and high winds. The identification of areas particularly susceptible to high winds cannot be mapped except to say that the entire County will obviously be subject to high winds during a hurricane.

Summary of Hazard Area Identification

Maps 3 and 4 identify areas in the County that are particularly susceptible to hurricane damage related to flooding combined with high winds. The scale of Map 3 makes the exact delineation of these hazard areas imprecise. More exact locations of specific hazard areas can be determined by consulting: the actual Federal Emergency Management Agency Flood Insurance Rate Maps; AEC maps available from the State Coastal Resources Commission; and the publication: Natural Areas Inventory of Carteret County, North Carolina (Office of Coastal Management). Additionally, similar storm hazard mitigation reports have been prepared for each of the Bogue Banks towns Morehead City and Beaufort; these reports contain relatively detailed maps for each jurisdiction.

C. Existing Development Located in Hazard Areas

Historically, development in Carteret County has been primarily in and adjacent to the incorporated towns and in the Down East communities along Core Sound. During the past ten or fifteen years, most of the County's growth has occurred on Bogue Banks. This growth, however, is reflected



LEGEND



HIGH HAZARD FLOOD A.E.C. ("V" ZONES)



BALANCE OF 100 YEAR FLOOD PLAIN ("A" ZONES)

CARTERET COUNTY, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984

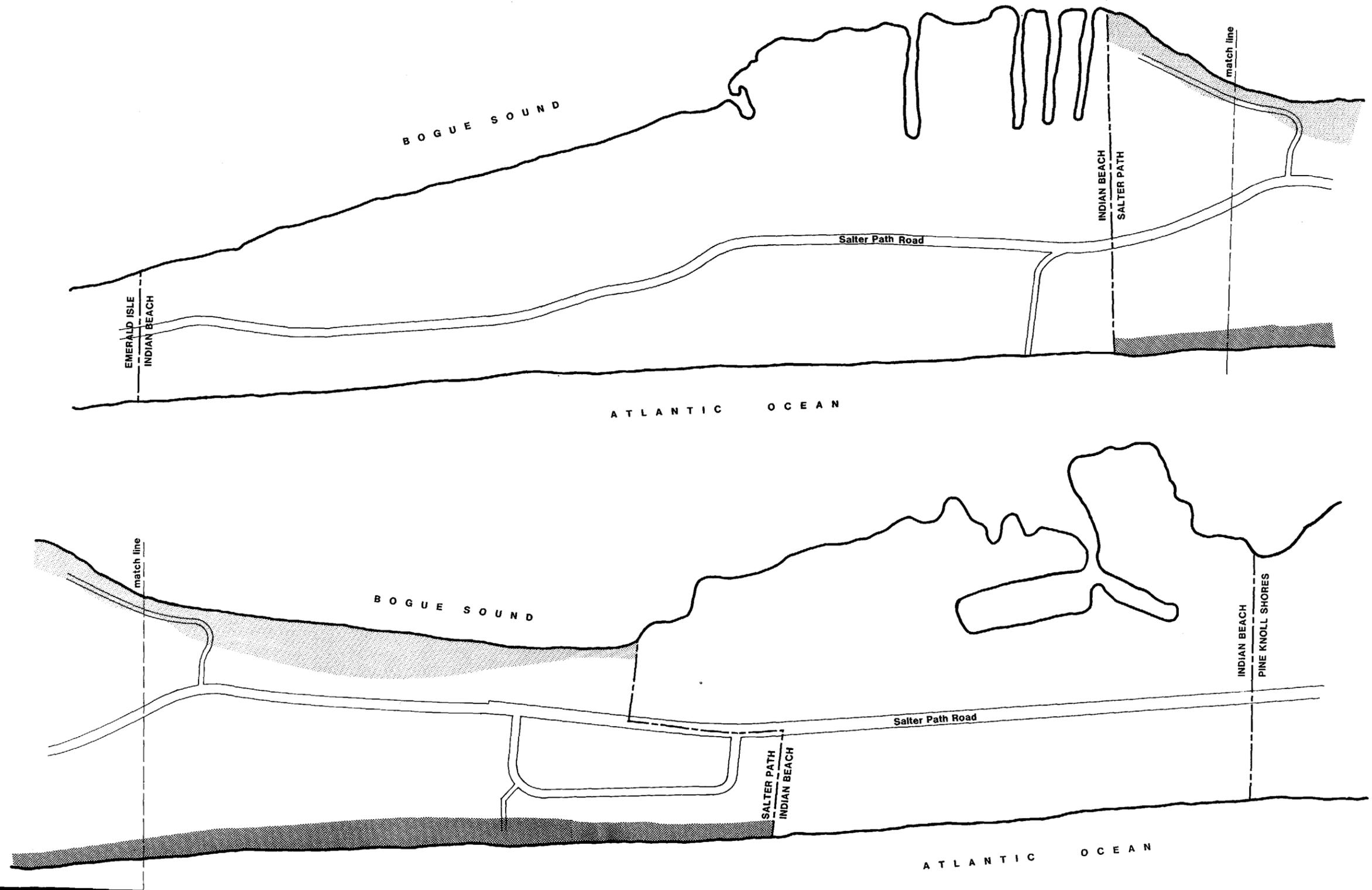
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This map is for planning purposes only; the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

Flood Hazard Areas

MAP THREE



LEGEND

 HIGH HAZARD FLOOD A.E.C. ("V" ZONES)

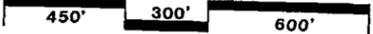
 BALANCE OF 100 YEAR FLOOD PLAIN ("A" ZONES)

SALTER PATH, N.C.

SATILLA PLANNING, INC. St. Marys, Georgia

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JUNE, 1984



Flood Hazard Areas

MAP FOUR

in summertime tourist populations and housing units - not in permanent populations. Development within and adjacent to the County's towns is addressed by each jurisdiction's plan.

While there is considerable existing development within flood hazard areas, Carteret County's most frequently occurring flood hazard problems are related to road flooding and subsequent inaccessibility of the Down East communities. Beyond this important evacuation and emergency services issue, the vast majority of existing development as well as rapidly growing areas are within the planning jurisdiction of the County's incorporated towns.

Hazardous Waste Storage and Disposal Sites

Table 2 identifies two hazardous waste storage sites in the County. The Morehead City Coal Terminal site is part of the port operation; the primary hazardous waste management issue is containment of coal residue and storm runoff within the coal yard. The Coast Guard site is used primarily for storing used engine oil or contaminated fuel. As indicated, the coal terminal is within a flood hazard area; the Coast Guard site is in an "area(s) of undetermined, but possible flood hazard(s)", according to the County's Flood Insurance Rate maps.

TABLE 2

CARTERET COUNTY HAZARDOUS WASTE FACILITIES

<u>Facility Name</u>	<u>Primary Use</u>	<u>Location</u>	<u>In Flood Hazard Area</u>
Morehead City Coal Terminal	Coal Storage & Transfer	Highway 70 Port Area	Yes
U.S. Coast Guard Base/Ft.Macon	Used Oil/Contaminated Oil Storage	Ft.Macon Rd. Near Ft. Macon State Park	Undetermined

Public and Private Utilities and Facilities

The County does not operate any water or sewer systems. Municipal and private systems within each municipality are addressed by individual town mitigation plans. Table 3 summarizes water source and sewage disposal methods for the 20,598 year round dwelling units that were identified by the 1980 census of Housing. Almost half of the County's dwelling units were supplied by public or private company water systems while less than 30% of the units were connected to public or community sewer.

Table 3

CARTERET COUNTY WATER SUPPLY SOURCE
AND SEWAGE DISPOSAL METHODS - 1980

	<u>Number of Units</u>	<u>Percent of Total</u>
WATER		
Public or Private	10,158	49%
Well	10,359	50%
Other	81	<1%
SEWAGE		
Public	5,754	28%
Septic	14,577	71%
Other	<u>267</u>	1%
TOTAL UNITS:	20,598	

Source: 1980 Census of Housing.

D. Estimated Severity of Possible Hazard Area Damage

Table 4 summarizes the County's 1983 Tax Valuations. A township by township analysis of tax appraisals is not possible because tax records are not compiled by township. Additionally, the values of commercial and industrial properties cannot be estimated or generalized from County records because it was not possible to break the property values into these components. Thus, the values presented by Table 4 represent the maximum "values at risk" in the incorporated and unincorporated areas of the County.

TABLE 4

CARTERET COUNTY TAX ASSESSMENT - 1983

	<u>Municipalities</u>	<u>Unincorporated</u>	<u>County Total</u>
Real Property	\$556,447,437	\$616,727,013	\$1,173,168,360
Autos, Personal Property, Inventories, Etc.	\$146,588,484	\$162,460,622	\$ 309,055,196
Total Valuation	\$703,035,921	\$779,187,635	\$1,482,223,556

Estimates of potential hazard area damage within the County's municipalities (except Cape Carteret and Newport) are made by each Town's respective Storm Hazard Mitigation Plan. Table 5 presents the estimated value of dwellings in the unincorporated areas of the County that are susceptible to flood damage. This analysis is intended to identify potential property damage based on the best available information. The following assumptions were made to prepare the estimates:

- 1) The number of dwelling units in the unincorporated areas of each Township was estimated by using Office of Coastal Management population estimates for 1983 in conjunction with the 1980 census figure of 2.72 persons per dwelling unit.
- 2) The percentage of each Township's unincorporated housing stock in the 100-year flood plain was then estimated from the County's Flood Insurance Rate Maps and generalized existing land use data (it was beyond the scope of this project to conduct specific field counts of these units).
- 3) The census reported a median dwelling value of \$39,000. This was factored by 80% to arrive at an estimated value of improvements - (house, out buildings, etc.) not including land. The resulting figure of \$31,200 per unit was used to factor the estimated number of dwellings in the 100-year flood plain to arrive at the estimated potential real property damage.

As indicated in Table 5, the total estimated value of residential structures exposed to damage from waters of the 100-year flood is \$92,913,600, or 15% of the estimated real property tax assessment for the unincorporated areas of the County. Potential damage to commercial and industrial properties cannot be estimated; however, most of these properties are within the County's incorporated towns.

TABLE 5

UNINCORPORATED CARTERET COUNTY

ESTIMATE OF POTENTIAL RESIDENTIAL PROPERTY DAMAGE
UNDER WORST CASE CONDITIONS

	Estimated # of Dwelling Units 1983	Estimated #/% in Flood Plain	Potential Real Property Damage
Atlantic	396	99/25%	\$ 3,088,800
Beaufort	1,240	93/7.5%	\$ 2,901,600
Cedar Island	150	150/100%	\$ 4,680,000
Davis	240	240/85%	\$ 7,488,000
Harkers Island	1,122	224/20%	\$ 6,988,800

Harlowe	425	319/75%	\$ 9,952,800
Marshallberg	273	259/95%	\$ 8,080,800
Merrimon	181	145/80%	\$ 4,524,000
Morehead	3,535	354/10%	\$11,044,800
Newport	1,642	82/5%	\$ 2,558,400
Sea Level	152	129/85%	\$ 4,024,800
Smyrna	273	232/85%	\$ 7,238,400
Stacy	125	119/95%	\$ 3,712,800
Straits	631	473/75%	\$14,757,600
White Oak	<u>1,190</u>	<u>60/5%</u>	<u>\$ 1,872,000</u>
Total:	11,575	2,978/26%	\$92,913,600

E. Anticipated Development in Hazard Areas

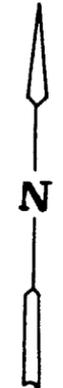
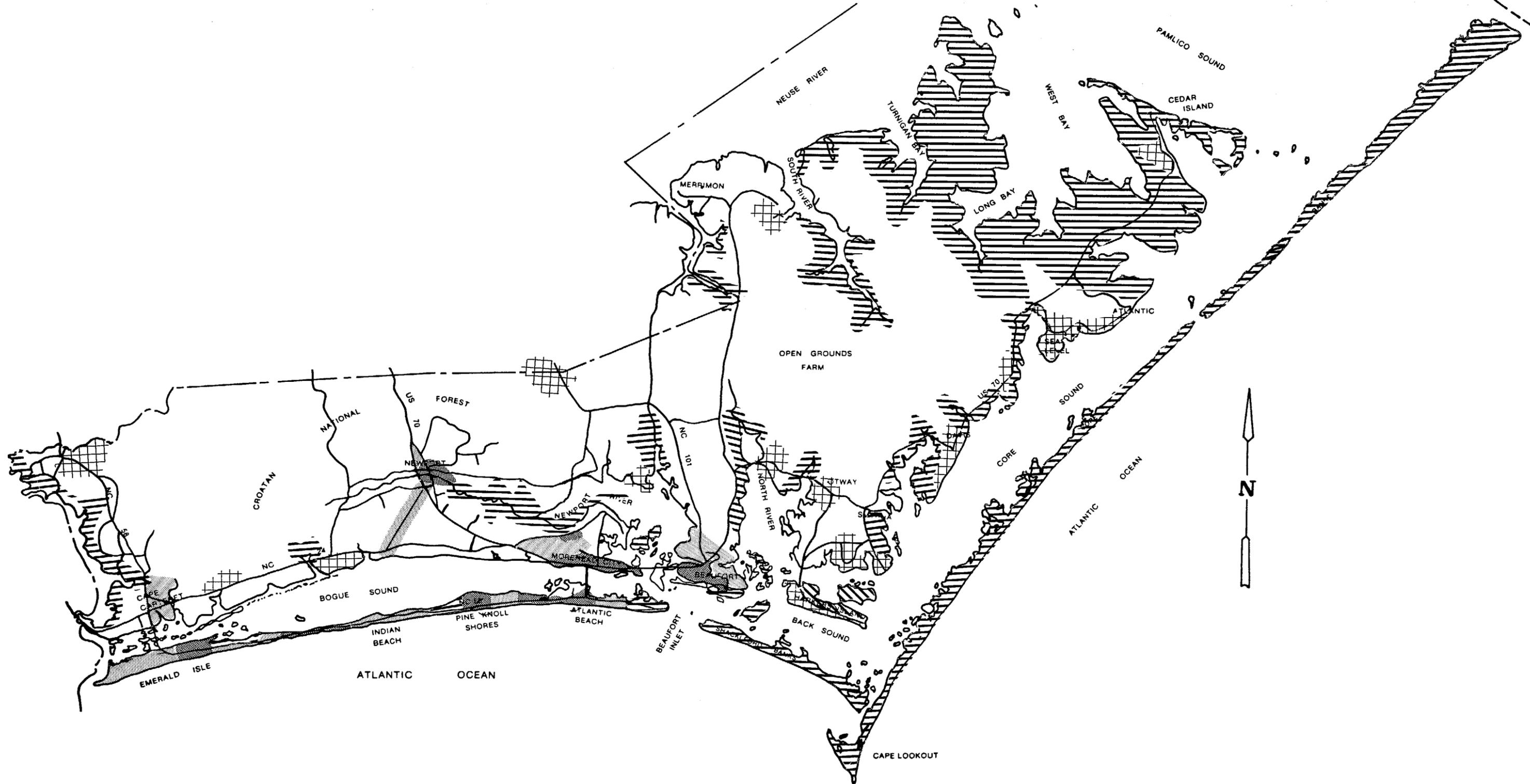
Map 5 presents the County's CAMA land classification map. When viewed in connection with Maps 1 through 4, it can be seen that development is anticipated to occur in areas that are generally not subject to storm hazard (not considering wind damage potential). This is particularly true of anticipated development in unincorporated areas with the possible exception of the eastern half of the County. Until 1970, growth of the County's Down East area was virtually stagnant. During the period 1970 - 1980, the ten townships comprising this area saw a 61 percent increase in population. Growth and development of this area is expected to continue due to availability of considerable waterfront land which will come into higher demand as developable land on Bogue Banks and other rapidly growing areas becomes more scarce.

Development of flood prone areas in the County is expected to continue. The land use management issue is, therefore, how will the County control this development to minimize future damage attributable to flooding. The following section reviews the County's existing policies and ordinances. This Chapter's concluding section then presents recommended mitigation policies.

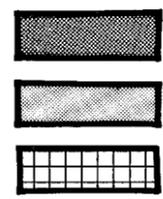
F. Existing County Mitigation Policies and Regulations

The following reports, ordinances and regulations were reviewed in order to assess existing Carteret County policies regarding storm hazard area mitigation.

- o Carteret County Flood Damage Prevention Ordinance and Flood Insurance Rate Maps
- o Carteret County Mobile Home, Mobile Home Park and Travel Trailer Park Ordinance
- o The Carteret County Zoning Ordinance
- o The Carteret County Subdivision Regulations



LEGEND



DEVELOPED
TRANSITION
COMMUNITY



CONSERVATION
RURAL

CARTERET COUNTY, N.C.

SATILLA PLANNING, INC. GEORGE EICHLER & ASSOC.
 St. Marys, Georgia Atlanta, Georgia

JUNE, 1984 20000' 30000'

CAMA Land Use

MAP FIVE

- o Guidelines for Areas of Environmental Concern

- o North Carolina Residential Building Code

It seems clear that development in Carteret County is and will continue to occur in hazard areas, although the majority of new development in unincorporated areas is expected to occur outside these hazard areas. The principal issue is how the County's land use policies and regulations can be used to minimize potential flood damage.

The following summarizes specific findings relating to the ability of existing Carteret County ordinances and policies to properly manage development in hazard areas.

- 1) The County's Flood Damage Prevention Ordinance was adopted in 1980 to conform to requirements of the National Flood Insurance Program. Specific requirements for new construction or substantial improvements (those amounting to value) in areas of special flood hazard (as identified by the County's Flood Insurance Rate Map) include:

GENERAL PROVISIONS:

- o Structures must be anchored in place to prevent flotation, collapse or lateral movement.
- o Construction materials and utility equipment shall be resistant to flood damage
- o Construction shall be by methods and practices that minimize flood damage
- o Water supply systems shall be designed to minimize infiltration of flood waters
- o Sewage disposal systems shall be designed to minimize: 1) infiltration of flood waters into the system; and 2) discharge from the system into flood waters
- o On-site sewage systems (e.g. septic) shall be located to avoid contamination during times of flooding.

SPECIFIC STANDARDS:

- o Residences shall have the lowest floor, including basement, elevated to or above the 100-year base flood elevation
- o Non-residential structures shall be either elevated to the 100-year base flood elevation or

flood proofed below the base flood elevation. A registered professional engineer or architect must certify compliance with these standards.

- o No mobile homes are allowed in "V" zones except in existing mobile home parks or subdivisions; all mobile homes must be anchored.
- o In new mobile home parks or subdivisions, stands or lots must be elevated so that the mobile home is at or above the base flood elevation.

The ordinance's terms set for relatively specific policies but lack specific construction standards. For example, there may be many ways to "minimize infiltration of flood waters into a septic sewage disposal system." However, without specific, accepted methods, such provisions become somewhat meaningless.

- 2) The Carteret County Mobile Home, Mobile Home Park, and Travel Trailer Ordinance requires that mobile home spaces "be located on ground with an elevation that is not susceptible to flooding" (Section 9.8). Likewise, spaces within camping vehicle parks must "be located on sites with elevations that are not susceptible to flooding" (Section 3.9,F.) This language would appear to eliminate the option of elevating mobile homes with pilings or any means other than fill. There are no specific references to flood damage prevention in the design of mobile home or travel trailer parks nor is there reference to whether or not such developments are allowed in flood hazard areas. Additionally, the two excerpts cited above do not reference any specific means of defining what elevations are "susceptible to flooding".
- 3) The Carteret County Zoning Ordinance does not apply to all unincorporated areas of the County. It is County policy to adopt zoning regulations only upon the request of property owners. Therefore, zoning is only enforced in a relatively small portion of the areas beyond the extraterritorial jurisdiction of of the County's towns. The lack of uniform zoning standards means that Carteret County does not possess the principal means available to local governments for controlling the location of different land uses and development in general. Without uniform zoning standards there is no means of effectively defining non-conforming uses and structures nor is there a mechanism to be used during reconstruction that permits the rebuilding of individual structures based upon the percentage of damage sustained and

susceptibility to future damage if reconstructed in the same location.

- 4) The Carteret County Subdivision Regulations apply to the subdivision of land throughout the County except within the jurisdiction of the municipalities. Article 8, Section 2.01 briefly addresses the "prevention of flood damage within subdivisions. This section requires that streets and utilities either be elevated or "flood-protected"; and dwellings and individual sewage disposal units must be elevated "above maximum flood heights". There is no definition of "maximum flood heights".
- 5) The Bogue Banks Land Protection Ordinance was adopted in 1979 to limit the destruction or alteration of existing natural topography and vegetation. It's jurisdiction is the unincorporated areas on Bogue Banks excluding areas regulated under the Coastal Area Management Act as Areas of Environmental Concern. The effective jurisdiction of the ordinance is therefore limited to the Salter Path Community.
- 6) The North Carolina Uniform Residential Building Code is the means by which the County manages development to minimize wind damage. Structures must be designed to withstand winds of up to 110 m.p.h., and mobile homes require from 6 to 11 tie-downs depending on the size of the unit. The County does not have the flexibility of modifying the Building Code requirements to meet its special needs. Under State law, each County must enforce these uniform regulations.

Without uniform zoning to control where development is to occur, it appears that the biggest need in Carteret County regarding storm mitigation is the development of strong, well-coordinated standards to control how development takes place.

G. Recommended Hazard Mitigation Policies

Existing Carteret County policies and ordinances permit development to occur in hazard areas. All hazard areas in Carteret County are encompassed within the 100-year flood plain boundary. As discussed in Section E, it is expected that development within the flood plain will continue to occur because in many coastal communities, flood plains are not generally considered to be an impediment to development. It is even stated in Before the Storm that "Safe reconstruction can occur on hazardous parcels of land if buildings are designed to withstand flood waters, high winds and wave action."

However, the fact that flooding represents a potentially serious hazard to both the public safety and to property must remain the major consideration in permitting development to occur in flood plain areas. In addition to inundating homes and business, flooding can pollute water supplies, cause sewers to back up and overflow, and undermine structures of various types. Despite these problems, the basic issue in developing the Carteret County Hazard Mitigation Plan and accompanying policies is not where future development should or should not locate (e.g. in flood hazard areas), but how should this development be constructed so as to minimize damages in the event of a major storm.

There are two issues that must be addressed regarding development in flood hazard areas - the control of new development, and reconstruction in flood plain areas after a storm.

- 1) Mitigation Policies Related to New Development. The Carteret County Zoning Ordinance is not applied uniformly throughout the unincorporated areas of the County (zoning is done on a "request only" basis from land owners) and it therefore is not a useful tool in mitigating storm damage. However, the County does have three other ordinances that can be utilized to manage development in flood prone areas; the Flood Damage Prevention Ordinance, Subdivision Regulations, and the Mobile Home Park and Travel Trailer Park Ordinance. Recommended policy changes are presented below:

Carteret County Flood Damage Prevention Ordinance

This ordinance is the County's primary means of controlling flood plain development. Its policies are straightforward and meet requirements of the National Flood Insurance Program. However, the ordinance lacks reference to specific, accepted methods of "minimizing flood damage". The ordinance should be amended to reference such accepted practices and methods. This would remove possible discretion on the part of County enforcement personnel while setting forth uniform rules for developers. For example, the section governing water and sewage should be amended to include:

- o all new and replacement water supply and waste disposal systems shall be designed to minimize or eliminate infiltration of flood waters into the system either by elevating the system above the 100-year flood elevation or by floodproofing the system. The adequacy of a flood proofed system shall be certified by a registered professional engineer.

Additionally, the County Central Permitting Office should maintain a complete set of up to date Flood Insurance Rate Maps at all times. Maps that are obsolete through revisions should be purged from County files and new maps should be filed in such a way that finding a particular piece of property on the maps can be accomplished through a specific procedure.

Carteret County Subdivision Regulations

Article VIII, Section 2, of the subdivision regulations states that "lands subject to flooding, improper drainage, erosion or that is for topographical or other reasons unsuitable for residential use as determined by the Planning Board, shall not be platted for residential use nor for any other uses that will continue or increase the danger to health, safety, or property unless the hazards can be and are corrected." As discussed in the previous section of this report, the ordinance goes on to discuss the prevention of flood damage. This entire section is vague and needs to be strengthened. It is recommended that this section of the subdivision regulations be amended to include the following provisions:

- o The 100-year flood plain shall be clearly indicated on all subdivision plats and or deeds and plats for all individual building sites as determined from the County's FIRM's
- o A portion of each building lot shall be filled to provide a safe building site above the 100-year flood plain elevation or restrictive covenants shall be filed to require structures to be placed on pilings or otherwise structurally elevated above the 100-year flood plain.
- o All water lines, sewers and other public facilities shall be either flood proofed with the flood proofing measures designed and certified by a registered professional engineer or such facilities shall be elevated above the 100-year flood plain elevation.
- o All streets in new subdivisions or access roads to such subdivisions shall be elevated above the 100-year flood plain elevation. This shall be certified on the plat by a registered professional engineer.

Carteret County Mobile Home, Mobile Home Park and
Travel Trailer Ordinance

This ordinance can be an effective tool for controlling mobile home development in flood prone areas. It could be strengthened by stating:

- o "Areas susceptible to flooding" shall include all areas located within the 100-year flood plain.
- o Specifically require that all new mobile homes be elevated above the 100-year flood plain elevation.
- o All water lines, sewers, and individual sewage disposal systems shall be either flood proofed with the flood proofing methods designed and certified by a registered professional engineer or such facilities shall be elevated above the 100-year flood plain elevation.

2. Mitigation Policies Related to Redevelopment of
Hazard Areas After a Storm

Reconstruction of damaged properties in Carteret County after a storm will be subject to the following:

- o The North Carolina Building Code requires any building damaged in excess of 50 percent of its value to conform with code requirements for new buildings when repaired. (This will be particularly beneficial in the event of wind damage.)
- o The Flood Damage Prevention Ordinance requires that all existing structures must comply with requirements related to elevation above the 100-year flood plain elevation and floodproofing if they are substantially improved. A substantial improvement is defined as "any repair, reconstruction, or improvement of a building, the cost of which equals or exceeds 50 percent of the market value of the building either before the improvement or repair is started, or before damage occurred if the building has been damaged."

A final recommendation is that the Carteret County Mobile Home Park and Travel Trailer Ordinance be revised to require that all "old" mobile home parks (those constructed prior to the adoption of the Ordinance) comply with all provisions of the Mobile Home Ordinance if either: 1) more than 50% of the homes in the park suffer wind or flooding damage (this would not require that each of the mobile homes sustain damages amounting to 50% of their value); or, 2) damage is such that either the water system, sewer system,

or the on-site disposal systems serving the park is damaged to the extent that more than 50% of any of the systems has to be repaired or replaced. Currently, Section 18(3) allows the reconstruction of non-conforming facilities if work is begun within one year of damage.

III. CARTERET COUNTY POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community.
2. Damage information is compiled and summarized and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).
3. DEM compiles local data and makes recommendations to the Governor concerning state actions.

4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The County has been provided a comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm. The programs identified fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Carteret County.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the County. While damage assessment (Section B & C) will be the first operations conducted by the County after a disaster, it should be realized that the recommended recovery operations (Section D) will begin simultaneously. The remainder of this chapter is, therefore, organized as follows:

- 1) Procedures that Carteret County should follow to carry out its damage assessment program to meet all federal and state requirements including organization of the damage assessment team and recommended damage assessment procedures.

- 2) An overall organizational framework for restoration operations after the emergency period.
- 3) Replacement/Reconstruction policies that the County should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs. Additionally, the logistics involved in assessing damage in unincorporated sections of the County after a major storm will necessitate the organization of several damage assessment teams in Carteret County. The following are recommended team members.

Public Property Survey Team

County Department Head(s)
 Professional Engineer *
 Architect *
 Sheriff's Deputy (driver)

Business and Industry Survey Team

Tax Assessor
 Building Inspector
 Industrial/Commercial Real Estate Broker *
 Chamber of Commerce Representative *
 Architect *
 Sheriff's Deputy (driver)

Private Dwelling Survey Team

2 teams - depending upon capacities and plans of Cape Carteret and Newport:

Tax Assessor
 Building Inspector
 Residential Real Estate Broker *
 Building Contractor *
 Sheriff's Deputy (driver)

*Community volunteer.

The Emergency Management Coordinator should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. It is suggested that the County assume the responsibility for developing and implementing a training program for both County damage assessment teams and the local damage assessment teams that the Towns establish. In establishing the County teams, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster. A commitment from the Home Builders Association may be a way of guaranteeing needed assistance. Additionally, the Emergency Management Coordinator should establish an active "Volunteer file"; volunteers should have standing instructions where to automatically report following a storm. Damage assessment forms and procedures should be prepared now and distributed to volunteers as part of the training program.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center for a briefing from the Emergency Management Coordinator. One way to effectively deploy teams to areas where damage seems to be concentrated would be to have a pre-arranged commitment from the Marine Corps to provide for a helicopter in reconnaissance of storm damage within the County for the Emergency Management Coordinator in order to establish field reconnaissance priorities. The Civil Air Patrol may also appropriately provide assistance during the damage assessment phase.

The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure. This first phase assessment should be made by "windshield" survey.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).
- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, mail boxes and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, (aerial photographs with property line overlays) other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure. (Samples of damage assessment worksheets are contained in Appendix Two).

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Emergency Management Coordinator. A special team consisting of County tax clerks, tax assessment personnel, and other qualified staff should be organized by the Emergency Management Coordinator. This team should then be incorporated into this Damage Assessment Plan.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps (including aerial photographs) identical to those utilized by the damage assessment field team.
- o County Maps delineating areas assigned to each team.

- o Copies of all County property tax records. This information should indicate the estimated value of all commercial and residential structures within the County. Because time will be of the essence, it is recommended that the County immediately commence a project listing the property values of existing structures in unincorporated areas of the County on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 2 to 3 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

An alternative method that would be less accurate but perhaps more practical due to the time constraints would be to utilize median housing values from the 1980 census or derived from the County's tax digest. A simple chart could be devised for use in the field that presents median values for houses and mobile homes by township. This chart could include the multiplying factors to avoid the need for actual math calculations in the field. Because there are significantly less commercial and industrial structures than homes, this portion of the assessment could still be made utilizing the first method above.

County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the flood plain have 75% to 80% coverage. Overall, it was estimated that only 10% - 15% of all homes in the flood plain have insurance covering 75% - 80% of the improvements. This information should be updated before each hurricane season. Annual updates should be disseminated to each Town and kept available in the Emergency Operations Center for estimating the value of sustained damages covered by hazard insurance.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within unincorporated areas of the County should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of tax maps and multiplied by the following percentages for appropriate damage classification category.

- o Destroyed - 100%
- o Major Damage - 50%
- o Minor Damage (uninhabitable) - 25%
- o Habitable - 10%

3. The total value of damages for the unincorporated areas of the County should then be summarized.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.
5. Damage assessment reports should be obtained from each municipality and the data should then be consolidated into a single County damage assessment report which should be forwarded to the appropriate State officials.
6. Damage to public roads and utility systems should be estimated by utilizing current construction costs for facilities by lineal foot (e.g. 10' water line replacement cost = X\$/L.F.)

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster. This process will not provide the required information within the time constraints if organization and data collection are not completed prior to the storm event.

D. Organization of Recovery Operations

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created to guide restoration and reconstruction activities during a post-emergency phase which could last from weeks to possibly more than a year. The responsibilities of the Task Force will be:

1. Establishing an overall restoration schedule.
2. Setting restoration priorities, in advance, by definition.
3. Determining requirements for outside assistance

and requesting such assistance when beyond local capabilities. (Pre-disaster agreement, procedures, contact persons, should be defined before the disaster event.)

4. Keeping the appropriate State officials informed using Situation and Damage Reports.
5. Keeping the public informed.
6. Assembling and maintaining records of actions taken and expenditures and obligations incurred. Standardized forms should be developed in advance and kept on file at the EOC.
7. Proclaiming a local "state of emergency" if warranted.
8. Commencing cleanup, debris removal and utility restoration activities which would include coordination of restoration activities undertaken by private Utility companies.
9. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
10. Assisting private businesses and individual property owners in 1) obtaining information on the various types of assistance that might be available from federal and state agencies; 2) in understanding the various assistance programs, and 3) applying for such assistance. When a major storm does eventually hit Carteret County and major damages occur, consideration should be given to establishing a Community Assistance Team within the appropriate County Department to carry out the above functions as long as there is a need to do so.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until after a storm hits and the magnitude of the damage can be assessed. The following sequence of activities and schedule is submitted as a guide which should be considered by the Recovery Task Force and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1) Complete Initial Damage Assessment	Immediately after storm passes
2) Complete Second Phase Damage Assessment	Completed by second week after the storm
3) Prepare Summary of Reconstruction Priorities and Master Reconstruction Schedule	Completed one week after second phase damage assessment is completed
4) Decision with Regard to Imposition of Temporary Development Moratorium	One week after second phase damage assessment is completed
5) Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed one week after summary of reconstruction needs is completed
6) Begin Repairs to Critical Utilities and Facilities	As soon as possible after disaster
7) Permitting of Reconstruction Activities for all Structures Receiving Minor Damage Not Included in Development Moratorium Areas	One week after second phase damage assessment is completed
8) Permitting of Reconstruction Activities for all Structures Receiving Major Damage Not Included in Development Moratorium Areas	Two weeks after second phase damage assessment is completed
9) Initiate Assessment of Existing Mitigation Policies	Two weeks after second phase damage assessment is complete
10) Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	The length of the period for conducting re-evaluations and receiving input from the State should not exceed two months
11) Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium	Two months after Temporary Development Moratorium is imposed. (Subject to change based on circumstances encountered)
12) Permit New Development	Upon suspension of any temporary development moratorium

E. Recommended Reconstruction Policies

It is recommended that the Carteret County Task Force consist of the following individuals:

- o Chairman of the Board of County Commissioners
- o Carteret County Manager
- o Emergency Management Coordinators
- o Chief County Tax Appraiser
- o County Finance Director
- o County Code Inspections Director

The following policies have been designed to be considered and adopted by the Carteret County Board of Commissioners prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the County's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Carteret County Flood Damage Prevention Ordinance, Carteret County Zoning Ordinance, the Bogue Banks Land Protection Ordinance, Group Housing Ordinance, and Mobile Home Park Ordinance.
3. All structures suffering minor damage as defined in the Carteret County Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition, provided non-conforming use regulations of the zoning ordinance are met.
4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern, the Carteret County Flood Prevention Ordinance, and Carteret County Mobile Home Park Ordinance appeared adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.

5. All individual mobile homes located in mobile home parks sustaining some damage to at least 50% of their mobile homes in the park shall be required to conform with the provision of the Carteret County Mobile Home, Mobile Home Park and Travel Trailer Park ordinance; and the County's Flood damage Prevention Ordinance regardless of whether such park is currently subject to these ordinances.
6. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Carteret County Board of Commissioners.

Utility And Facility Reconstruction

1. All damaged water and sewer systems (both public and private) shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.
2. All damaged roads used as major evacuation routes in flood hazard areas shall be repaired so as to be elevated at least one foot above the 100-year flood plain evacuation.
3. All local roads that have to be completely rebuilt shall be elevated so as to be above the 100-year flood plain elevation.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. The Carteret County policy regarding the proclamation of temporary development moratoriums shall be to:

Require the Carteret County Recovery Task Force to assess whether a Temporary Development Moratorium is needed within one week after the Damage Assessment process is completed. Such an assessment should clearly document why such a moratorium is needed, delineate the specific uses that would be affected by the moratorium, propose a specific schedule of activities and actions that will be taken during

the moratorium period, and establish a specific time period during which the moratorium will be in effect.

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Carteret County has no technical studies to indicate that the provisions of the Code are inadequate as they effect the County, the County should have some flexibility in imposing stricter standards if it desires. This is a problem that the Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The County policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

TOWN OF ATLANTIC BEACH

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
AND
POST-DISASTER RECONSTRUCTION PLAN

Prepared for
THE TOWN OF ATLANTIC BEACH, NORTH CAROLINA

By:
George Eichler & Associates
and
Satilla Planning, Inc.

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local planning efforts.

The objective of this report is to present storm hazard mitigation and post disaster reconstruction plans for Atlantic Beach that 1) meet specific needs of the Town; and 2) conform with the adopted State rules for storm hazard planning.

The remainder of this report describes Atlantic Beach's hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan.

II. ATLANTIC BEACH STORM HAZARD MITIGATION PLAN

A. Existing Development

The Atlantic Beach planning jurisdiction is bounded by Fort Macon State Park on the East, the Atlantic Ocean on the South, Pine Knoll Shores to the West and Bogue Sound on the North. Recent annexations have brought most of this area within the town's actual incorporated area with the notable exception of an area either side of Salter Path Road between Pine Knoll Shores and Bogue Boulevard West. The Town has developed as a vacation resort area with a current maximum seasonal population of about 16,000 persons.

Table 1 presents the maximum seasonal populations for the years 1980, 1983 and 1990, based on the Office of Coastal Management projections and supplemental information as noted. 1

TABLE 1
ATLANTIC BEACH POPULATION PROJECTIONS

<u>YEAR</u>	<u>MAXIMUM SEASONAL</u>
1980	12,300
1983	16,182
1990	26,158

Table 2 indicates existing land use tabulations from the most recent Land Development Plan (not dated). There are about 1,543 acres of land within the Atlantic Beach Planning jurisdiction. Of this, about half is developed (47%) and half undeveloped (53%). However, when only existing developed and potentially developable areas are considered, there are about 1,243 acres - 58% developed and 42% undeveloped. Of the 722 acres of developed land, single family residential is the dominant land use, comprising 57%; streets and utilities account for 19%, multi-family and motels 12%, commercial 11%, and government/institutional 1% of the developed land area.

1 From DeLeuw Cather. Preliminary Dwelling Unit Estimate - NCDOT Bogue Banks Bridge Analysis, 1984.

TABLE 2
EXISTING LAND USE TABULATIONS

<u>LAND USE CATEGORY</u>	<u>ACREAGE</u>	<u>% OF TOTAL</u>
Developed Land - Total	722	47%
Transportation, Utilities, Communications	140	19%
Single Family Residential (including mobile homes)	411	57%
Multi-Family and Motels	85	12%
Government/Institutions	8	1%
Commercial	78	11%
Undeveloped Land - Total	821	53%
Vacant-Potentially Developable	521	63%
Marsh	300	37%
TOTAL DEVELOPED AND UNDEVELOPED:	1,543	100%

About a third of the vacant land is considered to be undevelopable under existing regulations. The balance, or 521 acres, is generally available for development. The Atlantic Beach Land Development Plan projected that 428 acres would be required to accommodate the projected 1990 seasonal population. This 428 acres was allocated as follows: single family - 280 acres; multi-family and motel - 58 acres; commercial 82 acres; and institutional - 8 acres. The Plan assumes that these future land requirements will be met through the development of currently vacant land. Thus, it does not consider the redevelopment of existing areas which is a distinct possibility in Atlantic Beach.

Existing commercial development is located primarily in "strip" fashion along Morehead Avenue (Atlantic Beach Causeway), from the intracoastal waterway bridge south to Fort Macon Boulevard, and along Fort Macon Boulevard. The "triad" area at the southern end of Morehead Avenue consists primarily of amusement arcades and night clubs.

Residential development falls into four basic categories and areas:

- 1) the older beach houses to the south (oceanside) of Fort Macon Boulevard;
- 2) townhouse/condominium developments

south of Salter Path Road at the western end of the planning jurisdiction and north of Fort Macon Boulevard at the eastern end; 3) single family subdivisions located along canal lots on the north side of town east and west of the causeway; and 4) five relatively large mobile home parks located west of the City limits north of Salter Path Road, between Fort Macon Boulevard and Davis Boulevard just west of the causeway; North Shore Drive; Oceanna Pier area; and along Tyson Street.

Table 3 presents estimates and projections of dwelling units by type. The total estimated number of dwelling units increased by more than 1,500 or 39% from 1980 to 1983. Condominium units accounted for about 40% of this growth. By the year 2000, it is projected that condominiums will constitute nearly one-half of Atlantic Beach's dwelling units, with 3,200 new units being built. Mobile homes are expected to drop from an estimated 41% of all units in 1980 to only 9% in 2005. Single family (including duplex, triplex, and quadraplex) units are expected to increase by 1,430 units during the 25-year period but will continue to account for 30% of all units. Likewise, motel units are projected to about double in actual number but will continue to comprise about 15% of the total units. In summary, Atlantic Beach's current development trend is clearly dominated by condominiums and this is expected to continue.

TABLE 3
ESTIMATED AND PROJECTED DWELLING UNITS BY TYPE

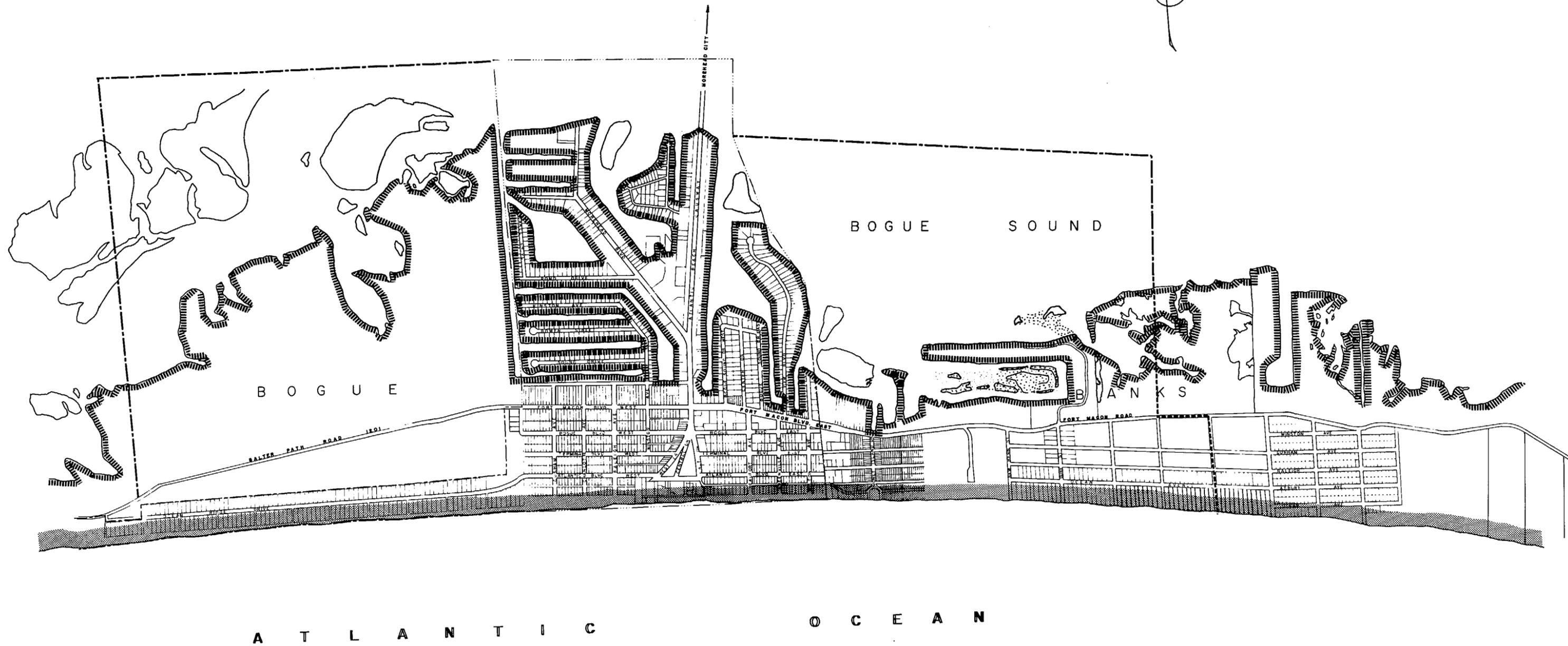
<u>Year</u>	<u>Type Unit</u>				<u>Total</u>
	<u>Mobile Home</u>	<u>Single Family, Duplex Triplex & Quadraplex</u>	<u>Multi-Family</u>	<u>Motel</u>	
1980	1,588	1,052	679	568	3,887
1983	1,638	1,678	1,262	816	5,394
2005	781	2,482	3,907	1,140	8,310

Source: DeLeuw, Cather and Company - preliminary dwelling unit estimates for N.C.D.O.T. causeway study, 1984.

B. Hazard Areas in Atlantic Beach

Areas of Environmental Concern (AEC's) relative to storm hazard in Atlantic Beach consist of : 1) Ocean Erodible AEC's; 2) Estuarine Shoreline AEC's; and 3) Flood Hazard AEC's. While not designated by the State as an AEC, the balance of the 100-year flood plain is also a hazard area that should be addressed by the mitigation plan. The first three AEC's identified above are depicted by Map One. Map Two delineates both the Flood Hazard AEC and the balance of the 100-year flood plain.

Map One Here



LEGEND

 OCEAN ERODIBLE A.E.C.
 ESTUARINE SHORELINE A.E.C.

This map is for planning purposes only; the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

ATLANTIC BEACH, N.C.

SATILLA PLANNING, INC. St. Marys, Georgia GEORGE EICHLER & ASSOC. Atlanta, Georgia

JUNE, 1984 

Storm Hazard Areas

MAP ONE

Ocean Erodible AEC's

These are areas where a substantial possibility of excessive erosion and significant shoreline fluctuation exists. The ocean erodible AEC is based on a setback from the first line of stable natural vegetation plus an additional area where erosion can be expected from storm surges and wave action.

Current State regulations establish ocean erodible AEC's as beginning at the mean high low water line. Setback measurements begin at the first line of stable vegetation and continue inland to a depth 60 times the average annual rate of erosion. Provided there has been no long term erosion or the rate of erosion is less than two feet per year, this distance is set at 120 feet. In areas where the erosion rate is more than 3.5 feet per year, the setback line is based on a distance of 30 times the long-term annual erosion rate plus 105 feet. (Source: Office of Coastal Management, "Long Term Average Annual Erosion Rates Through 1980".)

Estuarine Shoreline AEC's

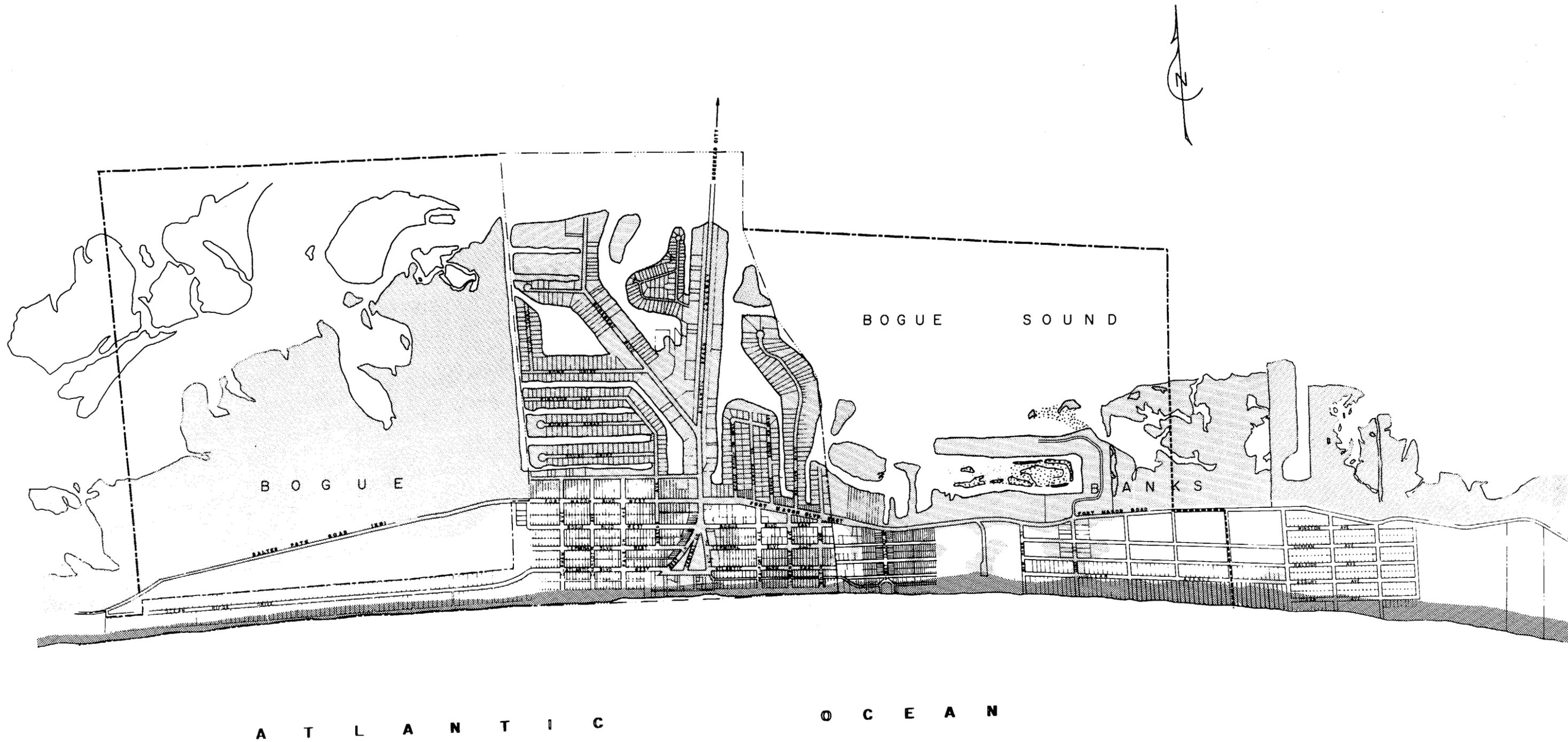
Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. In Atlantic Beach, the estuarine shoreline encompasses the area landward from Bogue Sound for a distance of 75 feet from the mean high water level.

Flood Hazard AEC's

The flood hazard AEC corresponds to the National Flood Insurance Program V-zones, which refer to flood prone areas that are also susceptible to high velocity wave surges. Atlantic Beach was converted to the Regular Phase of the National Flood Insurance Program (NFIP) in 1977 with the issuance of Flood Insurance Rate Maps (FIRMS). During the fall of 1983, the town was presented with a preliminary flood insurance study to update all previous flood hazard maps. The study includes revised FIRMS which are now under review. The revised maps include significant changes from the previous March 15, 1977 FIRM. First, the entire Atlantic Beach planning jurisdiction is included, and secondly, the "V" zones along the sound side of the Island were eliminated. Finally, the "B" and "C" zones or areas above the 100 and 500-year floods respectively, were increased in size. This is to say that the area of the 100-year flood plain was reduced.

As delineated on Map Two, the 1976 FIRM designates the oceanfront area varying from about 120 feet to 300 feet inland from mean high water as being within "V" zones. Less than 9 percent of the developed or developable areas of the town are within designated "V" zones.

(Map Two here)



LEGEND



HIGH HAZARD FLOOD A.E.C. ("V" ZONES)



BALANCE OF 100 YEAR FLOOD PLAIN ("A" ZONES)

This map is for planning purposes only; the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

ATLANTIC BEACH, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984

600'

900'

1500'

Flood Hazard Areas

**MAP
TWO**

Other Flood Prone Areas

This area is simply the balance of the 100-year flood plain - that area not within "V" zones. Again, Map Two portrays the area subject to flooding during the 100-year storm in accordance with the 1983 preliminary FIRM. The FIRM designates these areas as "A" zones. About one-third of the town's planning jurisdiction is within "A" zones. The balance of land - approximately 60% - is above the 100-year flood level.

C. Existing Development Located In Hazard Areas

In Before the Storm, the following system for classifying hazard areas (shown in Table 4) was presented:

TABLE 4
DEFINITION OF HAZARD AREAS

Forces Present/Expected

Hazard Area Category	<u>Erosion</u>	<u>Wave Action</u>	<u>High Flooding</u>	<u>High Winds</u>	<u>Boundaries</u>
1	x	x	x	x	Ocean erodible AEC's; inlet hazard AEC's; estaurine shoreline AEC's.
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

The number of structures within each hazard area based on the above classifications was determined from an update of the 1980 Land Use Plan's Land Use Inventory as follows:

TABLE 5
STRUCTURES BY HAZARD AREA
(Before the Storm Method)

Hazard Area Category	<u>Residential Units*</u>	<u>Commercial Units</u>
1	240	19
2	220	11
3	815	78
4	3,543	--

*Not including motel rooms

The above Table is not totaled because to do so would be misleading. All the units included in Flood Insurance "V" zones (Category 2) were also in Hazard Area Category 1. Additionally, the structures in estuarine shoreline AEC's are also in Flood Insurance "A" zones.

Atlantic Beach does not have a central sewage disposal system but there are privately owned package treatment systems to treat sewage from motels and condominiums. Individual septic systems handle the balance of sewage disposal requirements. Septic and package plant systems used to serve the units identified as being in categories 2 or 3 in Table 5, are in flood hazard areas.

The Carteret County '201' Facilities Plan proposed that Pine Knoll Shores and Atlantic Beach be served by a single sewage treatment plant. While Atlantic Beach is pursuing a single central sewage treatment, Pine Knoll Shores has officially determined not to participate. Funding for the Atlantic Beach system is uncertain at this time.

The town's water system is supplied by three wells, with an in-ground and 1 elevated storage tank. Well No. 1 and the storage tanks are located partially within a flood insurance "A" zone. Wells two and three are above the 100-year flood plain.

There are no potentially hazardous material storage or disposal sites in Atlantic Beach.

D. Estimated Severity of Possible Hazard Area Damages

The current Atlantic Beach tax digest for real property is \$88,947,020, not including exempt property which is relatively insignificant (less than \$150,000 total) for all but public property. Potential damage to Atlantic Beach's roads, utilities and buildings is certainly significant. About \$35,000,000 or about 40% of the digest is structures and improvements with the balance being land - both vacant or in use. There is \$3,859,590 in assessed personal property; most of which is assumed to be mobile homes. Based on the analysis presented by Table 5, 77% of Atlantic Beach's structures are located above the 100-year flood plain. All structures built since 1980 were subject to flood plain regulations and are assumed to be constructed above the 100-year flood elevation. Therefore, it is estimated that 763, or 17% of the structures in Atlantic Beach will receive damage from flood waters during a storm event. It is assumed that all structures in Atlantic Beach will be subject to damage from high velocity winds. However, damages from this source have not been estimated.

The potential flood damage from a "worst case" standpoint is \$5,950,000. This is the total estimated exposure of all privately owned structures in flood hazard areas.

E. Anticipated Development in Hazard Areas

About 521 acres of developable land is vacant in Atlantic Beach. About one-third of this land is above the 100-year flood level. Some development may occur in the Estuarine Shoreline AEC but because of the narrowness of this zone, it is expected to be relatively minor.

F. Existing Atlantic Beach Hazard Mitigation Policies and Regulations

Atlantic Beach regulates development in hazard areas primarily through its zoning ordinance, land protection ordinance, and flood plain management regulations. Development in AEC areas must conform with State guidelines. The primary provisions of the Atlantic Beach zoning, land protection and floodplain management regulations related to hazard area development are summarized below. Mobile home regulations are also discussed.

Atlantic Beach Zoning Ordinance

1. Single family residences, duplexes, triplexes, four family and multi-family structures are allowed in the Town's residential districts as permitted uses regardless of whether such districts are located in hazard areas.
2. Mobile Home parks are permitted only in RA-3 residential districts upon the issuance of a special use permit and are subject to special development standards. Individual mobile homes on lots are no longer permitted uses under any of the zoning ordinance districts.
3. Non-conforming mobile homes (all those not within a mobile home park that is properly established in a RA-3 zoning district with a special use permit), are allowed to continue for a period not longer than eight years. This amendment was adopted in December, 1980. Therefore, as the zoning ordinance currently exists, non-conforming mobile homes would conceivably be removed by 1989.
4. Non-conforming structures (i.e. those not meeting setback or other similar requirements) can be rebuilt if damage does not exceed 60% of its replacement cost. Additionally, non-conforming uses can only be moved if they thereafter conform to the regulations of the district in which they are relocated.
5. Non-conforming uses cannot be re-established if abandoned or discontinued for six consecutive months

or for eighteen months during any three year period. Structures housing non-conforming uses can be repaired so long that such repairs during any one year do not exceed fifty percent of assessed building value. There is no specific provision that prohibits repairs or replacement when a use is destroyed beyond a certain point of its value.

Land Protection Ordinance

This ordinance was adopted in 1980 to preserve natural vegetation and topography, particularly in unstable areas such as the land water interface as it requires the restoration of damaged dunes and vegetation. Sites must retain at least 35% of area in undisturbed and natural states; construction cannot take place within 100 feet of natural vegetation closest to the ocean or within 50 feet of the seaward primary dune's toe, or within 75 feet of estuarine waters on the sound side. While comprehensive in scope and well targeted at preserving natural stabilizing forces along the water's edge, the ordinance explicitly excludes areas regulated as Areas of Environmental Concern under C.A.M.A. This effectively excludes from the ordinance's jurisdiction the Ocean Erodible A.E.C. Flood Insurance "V" zones, and the Estuarine Shoreline A.E.C.

Flood Plain Management Regulations

The Town's floodplain management regulations were adopted during December, 1976 to fulfill requirements of the National Flood Insurance Program. The terms of this Ordinance include:

- 1) New residential structures must be elevated to or above the 100-year flood elevations (11 to 15 feet in "V" zones and 7 to 10 feet AMSL in "A" zones).
- 2) Commercial buildings located in either the "V" or "A" zones must be elevated to the base flood level or flood-proofed.
- 3) Open space or breakaway walls must be used below base flood elevation in the "V" zones.
- 4) The design and installation of pilings must be not less than 8 feet apart.
- 5) No use of fill for structural support shall occur in the "V" zone.
- 6) No new mobile home parks, or expansion of existing parks, or the placement of new mobile homes are allowed in "V" zones.

Mobile Home Regulations

Mobile homes account for more than a third of the existing dwelling units in Atlantic Beach, an estimated 1,638 units. Most of these units are in mobile home parks which are regulated by an ordinance adopted in 1975. The zoning regulations also establish general standards, such as minimum park area, space sizes, setbacks, etc. Tie-downs are the only requirements of either ordinance relative to storm hazards. The Town's floodplain management regulations do, however, address mobile homes as discussed above. Also, as discussed, all non-conforming mobile homes must be removed by January, 1989.

G. Recommended Hazard Mitigation Policies

The entire Town of Atlantic Beach is susceptible to significant storm damage from a hurricane or a storm of similar magnitude. About half of the development in the Town is located in AEC's or in areas susceptible to flooding associated with the 100-year storm. Virtually all vacant land that is generally available for development is also within the 100-year floodplain. The entire Town is susceptible to wind damage. In general, the Town's existing mitigation policies meet the requirements for hazard mitigation planning outlined in Before the Storm. Specifically:

1. The Town's policies support and are consistent with State policies and regulations for development in Areas of Environmental Concern.
2. All new development must conform with the provisions of the N.C. Building Code.
3. The Town's floodplain development policies conform with all Federal and State requirements (although an update may be required in connection with the new flood insurance rate maps).
4. The Town does an adequate job of controlling mobile home developments in order to minimize hazard damages. Mobile homes are restricted to a specific district and must conform with elevation and other requirements. There is also an existing zoning provision to eliminate all non-conforming mobile homes by January, 1989, although this has been extended in the past.

The modification and strengthening of the following policies is recommended:

- 1) The Town's land use plan states that "most of the (Town's) ordinances need to be revised to make them consistent with enabling legislation and the policies

from this land use plan". It appears that this recommendation is still valid although the Town has adopted a land protection ordinance which sets good policies relative to preserving natural defense mechanisms from storm damage. Specific areas for revision are outlined in the Land Use Plan's policy section.

2) Being one of the original beach/vacation communities on the N.C. coast, much of the Town's older housing has fallen into a state of disrepair. Much of this housing is located out of the 100-year floodplain while most of the vacant-undeveloped land is within hazard areas. The Town should actively pursue re-development policies of the land use plan to encourage new development in these areas that are relatively safe from storm damage.

3) The Town's non-conforming structures section of the zoning ordinance is generally good but it does not specifically prohibit the re-establishment of uses that are destroyed beyond a specific point of value. It is recommended that non-conforming structures or uses damaged beyond 50% of their value not be permitted to rebuild in the same location. The rationale is that if a building is for all practical purposes destroyed and if the terms of the zoning ordinance classify it as non-conforming, it should not be allowed to rebuild unless it can meet all applicable regulations as to zoning, flood hazard, building code, health codes, etc. Also, the language in the non-conforming section that allows repairs that do not exceed 50% of the structure's value in a given year could conceivably allow the intent to be circumvented by permitting repairs to a 90% destroyed building in two different years - 45% each year.

4) The land protection ordinance provides policies relative to the preservation of natural storm hazard defenses (vegetation, dunes, etc.). Areas of Environmental Concern under C.A.M.A. are specifically exempt from this ordinance (Section II-I). By not exempting these areas from the jurisdiction of the ordinance and providing that the restrictive requirements shall govern, the Town's management of hazard areas would be significantly strengthened. This is particularly true in flood hazard "V" zones, the Ocean Erodible AEC's, and Estuarine Shoreline AEC's.

III. ATLANTIC BEACH POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community and report this damage to the County Emergency Services Coordinator.
2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).

3. DEM compiles local data and makes recommendations to the Governor concerning state actions.
4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The Town has been provided a comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm. The programs identified fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Atlantic Beach.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the Town. While damage assessment (Section B & C) will be the first operations conducted by the Town after a disaster, it should be realized that the recommended recovery operations (Section D) will begin simultaneously. The remainder of this chapter is, therefore, organized as follows:

- 1) Procedures that Atlantic Beach should follow to carry out its damage assessment program to meet all federal and state requirements including organization of the damage assessment team and recommended damage assess-

ment procedures.

- 2) An overall organizational framework for restoration operations after the emergency period.
- 3) Replacement/Reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Atlantic Beach personnel including volunteers available to assume these responsibilities:

Administrative

Town Clerk
Building Inspector
Clerks

Police

1 Police Chief
12 Officers
10 Auxiliary Officers

Town Officials

1 Mayor
4 Commissioners

Fire and Rescue

1 Chief
4 Engineers/EMT's

Water and Sanitation

Superintendent

The Building Inspector should head the Damage Assessment Team. Other members of the team should consist of volunteers recruited from the community. The Building Inspector and volunteers must be recruited, organized and trained prior to a storm occurrence. There should also be back-ups or alternates to ensure the availability of adequate resources.

The suggested make-up of the Atlantic Beach Damage Assessment Team is as follows:

- o Building Inspector (Team Chief)
- o Local Property Appraiser (MAI or qualified broker) *
- o Building Contractor *
- o Architect *

* Community Volunteer

The Mayor should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. There are about 2,800 structures in the Town. The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).
- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, mail boxes and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure.

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Town Clerk. Specific administrative employees in Town Hall should be assigned to assist in carrying out this task.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.
- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project listing the property values of existing structures on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 1 to 2 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

Information concerning flood insurance coverage should be kept available in the Emergency Operations Center for estimating the value of sustained damages covered by hazard insurance. County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the floodplain have 75% to 80% coverage. Overall, it was estimated that only 10%-15% of all homes in the floodplain have insurance covering 75% to 80% of the improvements. The Town should verify these estimates and update this information annually before the hurricane season.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within the Town should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of Town tax maps and multiplied by the following percentages for appropriate damage classification category.
 - o Destroyed - 100%
 - o Major Damage - 50%
 - o Minor Damage (uninhabitable) - 25%
 - o Habitable - 10%
3. The total value of damages for the Town should then be summarized and reported, as required, to the County Emergency Operations Center.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. Organization of Recovery Operations

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created. In Atlantic Beach, the Mayor and Commission should assume the responsibilities of such a Task Force with the Police Chief directing day-to-day operations based on the policy guidance received from the Mayor and Commission. The following must be accomplished:

1. Establishing reentry procedures.
2. Establishing an overall restoration schedule.
3. Setting restoration priorities.

4. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
5. Keeping the appropriate County and State officials informed using Situation and Damage Reports.
6. Keeping the public informed.
7. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
8. Proclaiming a local "state of emergency" if warranted.
9. Commencing cleanup, debris removal and utility restoration activities undertaken by private utility companies.
10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until after a storm hits and the magnitude of the damage can be assessed. The following sequence of activities and schedule is submitted as a guide which should be reconsidered by the Mayor and Commissioners and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1. Complete Initial Damage Assessment	Immediately after the storm passes
2. Complete Second Phase Damage Assessment	Completed by second week after the storm
3. Prepare Summary of Reconstruction Needs	Completed one week after second phase damage assessment is complete
4. Decision with Regard to Imposition of Temporary Development Moratorium	One week after second phase damage assessment is completed

- | | | |
|-----|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 5. | Set Reconstruction Priorities and Prepare Master Reconstruction Schedule | Completed one week after summary of reconstruction needs is completed |
| 6. | Begin Repairs to Critical Utilities and Facilities | As soon as possible after disaster |
| 7. | Permitting of Reconstruction Activities for all Structures Receiving Minor Damage Not Included in Development Moratorium | One week after second phase damage assessment is completed |
| 8. | Permitting of Reconstruction Activities for all Structures Receiving Major Damage Not Included in Development Moratorium | Two weeks after second phase damage assessment is completed |
| 9. | Initiate Assessment of Existing Mitigation Policies | Two weeks after second phase damage assessment is completed |
| 10. | Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium | The length of the period for conducting re-evaluations and receiving input from the State should not exceed two months. |
| 11. | Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium | Two months after Temporary Development Moratorium is imposed. (Subject to change based on circumstances encountered) |
| 12. | Permit New Development | Upon suspension of any temporary development moratorium |

E. Recommended Reconstruction Policies

All the following policies have been designed to be; 1) considered and adopted by the Mayor and Commissioners of Atlantic Beach prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Reentry

1. Reentry of Atlantic Beach town residents and/or property owners shall not be permitted until 1) the critical damage assessment has been completed; 2) the Mayor proclaims the Town safe to re-enter (after the County

Control group issues an overall reentry order).

2. A list of Atlantic Beach property owners and residents shall be maintained at the bridge entrances to Bogue Banks. Valid identification must be shown in order to proceed. Passes shall be issued and displayed at all times until the State of Emergency is officially lifted. This procedure will require close coordination and reciprocal agreements with the other Bogue Banks communities.

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Atlantic Beach Zoning Ordinance, and the Atlantic Beach Floodplain Management Regulations.
3. All structures suffering minor damage as defined in the Atlantic Beach Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition.
4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern, and the Atlantic Beach Floodplain Management Regulations appeared adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed. If mobile home damage is extensive, a moratorium on the rebuilding or replacement of mobile homes should be imposed in order for the Town to decide whether this should remain a permitted use.
5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Atlantic Beach Town Council.

Utility and Facility Reconstruction

1. All damaged water systems components shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.
2. Overhead power lines and utility poles along Salter Path Road and Morehead Avenue present the greatest obstacle to the safe evacuation of residents in the event of a major storm disaster. Relocating these lines underground or moving them away from rights-of-way would be very costly at this time. However, if major damage occurs as a result of a storm, the cost effectiveness would improve and public safety considerations might override economic considerations. Atlantic Beach should now request the EMC initiate an assessment of the feasibility of relocating overhead powerlines underground or away from evacuation routes if substantial damage to the existing system is sustained during a major storm.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

There is no doubt that Atlantic Beach will suffer heavy and serious damages should a major storm have its landfall in its vicinity. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Atlantic Beach, such a situation is most likely to occur in one or more of the AEC's.

The Atlantic Beach policy regarding the proclamation of temporary development moratoriums shall be:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Atlantic Beach Floodplain Management Regulations appeared adequate in minimizing storm damages. For AEC's

where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.

2. To assess the overall damage to mobile homes within one week of the storm occurrence and to determine whether a temporary moratorium on the rebuilding of mobile homes suffering major damage should be imposed.
3. After imposing a Temporary Development Moratorium for an AEC, the Town of Atlantic Beach shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities similarly situated in order to determine how local regulations for those hazard areas, which are based on State and or Federal guidelines or requirements, should be improved or modified. A response from the State within a reasonable time period as determined through negotiations should be requested.
4. The Temporary Building Moratorium in all AEC's shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordance with existing regulations and requirements.
5. If a temporary moratorium on the rebuilding of mobile homes is imposed, the Town Council shall within one month determine whether the Atlantic Beach Zoning Ordinance should be revised so that mobile homes are no longer a permitted use in any Town zoning district. If such a policy decision is made, based on a review of the magnitude of damages sustained, all existing mobile homes would be treated as non-conforming uses in accordance with the recommended revision of the Atlantic Beach Zoning Ordinance (Chapter II of this report).

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity

of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Atlantic Beach has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing stricter standards if it desires. This is a problem that the Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The Town policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

TOWN OF BEAUFORT

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
AND
POST DISASTER RECONSTRUCTION PLAN

Prepared for

THE TOWN OF BEAUFORT, NORTH CAROLINA

By:

George Eichler & Associates
and
Satilla Planning, Inc.

June 1, 1984

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local planning efforts.

The objective of this report is to present storm hazard mitigation and post disaster reconstruction plans for Beaufort that 1) meet specific needs of the Town; and 2) conform with the adopted State rules for storm hazard planning.

The remainder of this report describes Beaufort's hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan.

II. BEAUFORT STORM HAZARD MITIGATION PLAN

A. Existing Development

The Beaufort planning jurisdiction is bounded by the North River on the east, Taylor's Creek on the south, the Beaufort and Galiant channels of the Newport River to the west and an area about one mile to the north of the city limits. Beaufort's economy centers primarily around fishing and other water related activities. It is the Carteret County seat and as such is also a governmental center. Tourism is becoming increasingly more important and this trend is expected to continue as the waterfront redevelopment area grows.

Table 1 presents the maximum seasonal and permanent populations for the years 1980 and 1990, based on the Office of Coastal Zone Management projections and the 1980 Land Use Plan update.

TABLE 1
BEAUFORT POPULATION PROJECTIONS

<u>YEAR</u>	<u>MAXIMUM SEASONAL</u>	<u>PERMANENT</u>
1980	4,873	3,826
1990	6,787	4,300

The 1980 Land Use Plan update did not provide existing land use tabulations and it is beyond the scope of this plan to undertake such field work and research. The 1980 plan does provide the following information:

- o The Town's incorporated area is 1,652 acres.
- o The Town's planning jurisdiction is 3,304 acres.
- o Residential is the principal land use.
- o Commercial activities are centered in two primary areas:(1) the downtown waterfront redevelopment area; (2) the highway 70 corridor from the Route 101 intersection north to the Town limits. Additional commercial development is located along Cedar Street, West Beaufort Road, Lennoxville Road and Live Oak Street.
- o Industrial uses inside the Town occupy only ten acres but there are two large fish processing plants within

the planning jurisdiction off Lennoxville Road.

- o Transportation, communications and utilities account for about 145 acres inside the Town's limits.
- o Government and institutional uses cover about 40 acres.
- o Agricultural land is found to the north of the City and dominates the extraterritorial jurisdiction area.
- o There are about 250 acres of land classified as "barren" on Town Marsh, Bird Shoal and Carrot Island; this is now the Rachel Carson National Estuarine Sanctuary.

Table 3 presents dwelling units by type. Information provided by the 1980 Land Use Plan was supplemented by estimates by Town officials.

TABLE 2
DWELLING UNITS BY TYPE

<u>Year</u>	<u>Mobile Home</u>	<u>Single Family</u>	<u>Public Housing</u>	<u>Multi-Family</u>	<u>Motel</u>	<u>Total</u>
1975	80	1,140	55	30	14	1,319
1979	110	1,194	55	53	14	1,426
1983	110	1,200	100	182	14	1,606

Source: 1980 Land Use Plan Update, supplemented by Town officials estimates.

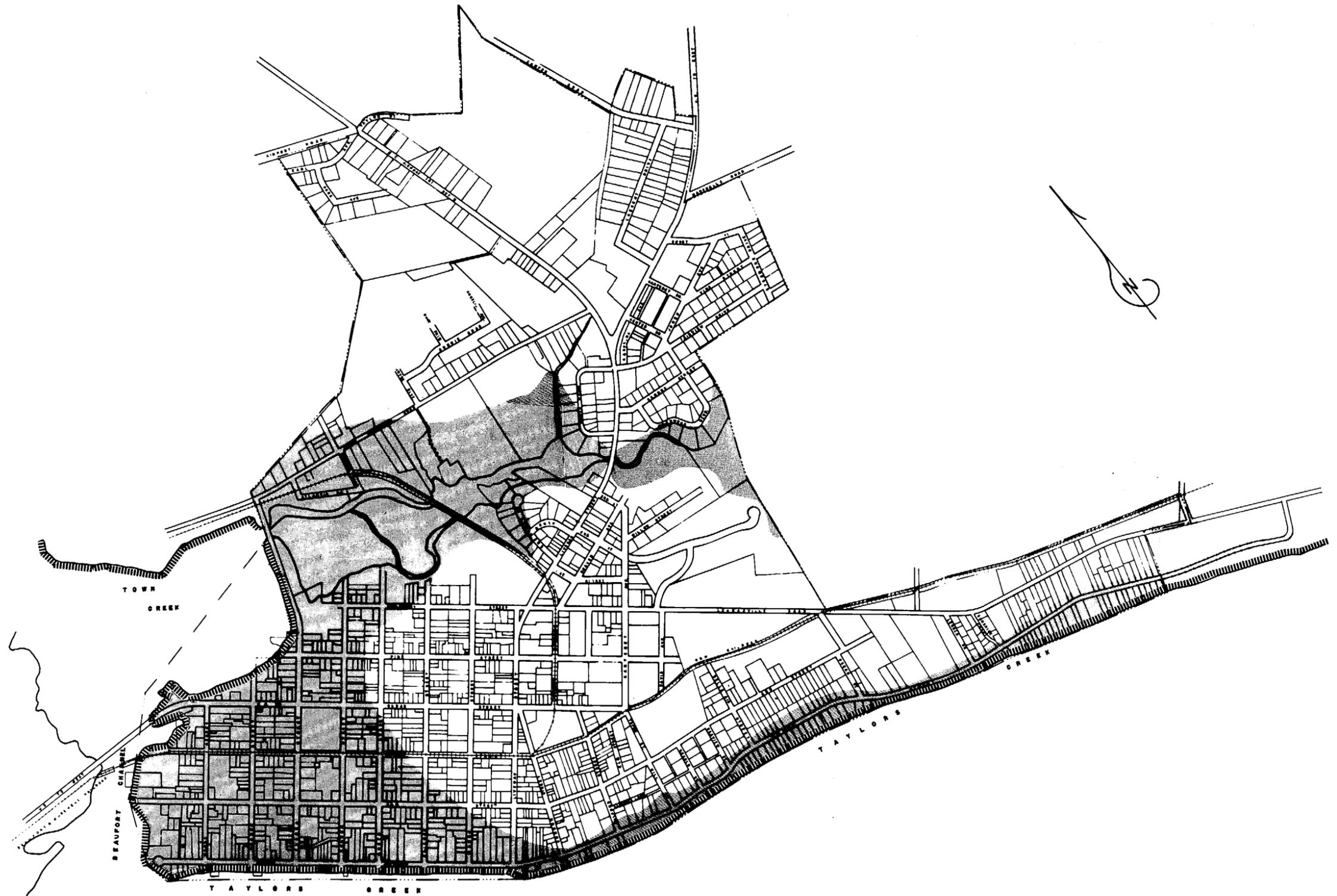
B. Hazard Areas in Beaufort

The only area of Environmental Concern (AEC) relative to storm hazard in Beaufort is its Estuarine Shoreline AEC's. While not designated by the State as an AEC, the 100-year flood plain is also a hazard area that should be addressed by the mitigation plan. Map One delineates both the 100-year flood plain and the Estuarine Shoreline AEC.

Estuarine Shoreline AEC's

Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. Because Beaufort is located on a peninsula that extends into estuarine waters, this AEC bounds the town and its extraterritorial jurisdiction to the south, east and west.

Map One Here



LEGEND



**100 YEAR FLOOD PLAIN
ESTUARINE SHORELINE A.E.C.**



BEAUFORT, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984

500'

750'

1250'

This map is for planning purposes only: the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

STORM HAZARD AREAS

**MAP
ONE**

Flood Prone Areas - The 100 Year Flood Plain

The Town's revised Flood Insurance Rate Map (FIRM) dated October 18, 1983, deleted the previously designated "V" zones or areas of highest flood hazard due to high velocity water from the momentum of breaking waves. Therefore, there are no flood hazard AEC's in Beaufort.

Although not in "V" zones, the residential areas along the Town Creek flood plain are also subject to flooding. Base flood elevations are generally 7' above MSL to the west of Live Oak Street (U.S. Rt. 70) and 8' to the east. These areas are designated as "A" flood zones by the FIRM. "A" zones are areas that will experience rising flood waters with little or no wave action. During the 100-year flood event, the FIRM indicates that flood waters from Town Creek will meet water from Turner Creek making the south end of the peninsula an island until flood waters recede. About 30 per cent of Beaufort's planning jurisdiction is within the 100-year flood plain and over 50 percent of its area is above the 500-year flood level.

C. Existing Development Located In Hazard Areas

In Before the Storm, the following system for classifying hazard areas (shown in Table 4) was presented:

TABLE 3
DEFINITION OF HAZARD AREAS

Forces Present/Expected

Hazard Area Category	<u>Erosion</u>	<u>Wave Action</u>	<u>High Flooding</u>	<u>High Winds</u>	<u>Boundaries</u>
1	x	x	x	x	Ocean erodible AEC's; inlet hazard AEC's; estaurine shoreline AEC's.
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

The number of structures within each hazard area based on the above classifications was then determined from an update of the 1980 Land Use Plan's Land Use Inventory as follows:

TABLE 4
STRUCTURES BY HAZARD AREA
(Before the Storm Method)

<u>Hazard Area Category</u>	<u>Residential Units*</u>	<u>Commercial Units</u>
1	12	9
2	0	0
3	375	52
4	1,217	--

*Not including motel rooms

The above Table is not totaled because to do so would be misleading. Some of the units included in Flood Insurance "A" zones (Category 3) were also in Hazard Area Category 1.

Beaufort's sewage treatment capacity is 750,000 gallons per day. Most of the Town is served by sewer and the City will negotiate for expansion of the system to serve new developments. The sewage treatment plant is located above the 500-year flood plain.

The town's water system is supplied by two deep wells, with storage in a 200,000 gallon tank. Both wells are above the 500-year flood plain.

There are no potentially hazardous material storage or disposal sites in Beaufort, according to information supplied to Carteret County by the N.C. Department of Human Resources.

D. Estimated Severity of Possible Hazard Area Damages

The current Beaufort tax digest for real property is \$71,391,000, not including exempt property which is about \$2,500,000. The value of public property (Town, County, State) is not known but it is estimated that about \$35,700,000 or about 50% of the digest is structures and improvements with the balance being land - both vacant or in use. All structures built since 1978 were subject to flood plain regulations and are assumed to be constructed above the 100-year flood height. Based on the data presented by Table 5, a worst case estimate of property damage resulting from hurricane flood waters is \$8,925,000. This does not include potential damage from high winds.

E. Anticipated Development in Hazard Areas

The majority of developed land in Beaufort as well as developing areas are outside the 100-year flood plain. Future development may "spill over" into areas of flood hazard if not controlled by the Town. Areas of immediate concern are the Town Creek and Turner Creek flood plains, and the area designated as "Transition" (by the October, 1980 Land Use Plan's Extraterritorial Classification map) to the northeast

of Town along Davis Bay. Some development may occur in the Estuarine Shoreline AEC but because of the narrowness of this zone, it is expected to be relatively minor.

F. Existing Beaufort Hazard Mitigation Policies and Regulations

Beaufort regulates development in hazard areas primarily through its zoning ordinance and flood plain management regulations. Development in AEC areas must conform with State guidelines. The primary provisions of the Beaufort zoning ordinance and floodplain management regulations related to hazard area development are summarized below.

Beaufort Zoning Ordinance

1. Single family residences, duplexes and multi-family structures are allowed in the Town's residential districts as permitted uses regardless of whether such districts are located in hazard areas.
2. Mobile Home parks are in the R-10 Residential District and are subject to special development standards as outlined by Section 11-A of the zoning ordinance.
3. Mobile homes on individual lots are permitted uses in the R-10 and R-20 residential zoning districts and are subject to "special exceptions" which require minimum foundation standards, tie-downs, and other specific considerations.
4. Non-conforming structures (i.e. those not meeting setback or other similar requirements) are addressed and regulated by the zoning ordinance "Non-conforming Lots, Structures, and Uses". However, the actual regulations do not specifically set forth any guidelines as to maintenance, expansion, alteration, rebuilding, etc. The zoning ordinance's definitions of non-conforming uses and structures seem to make them synonymous which they actually are not.
5. Non-conforming uses cannot be re-established if abandoned or discontinued for six consecutive months. Buildings housing non-conforming uses can be repaired so long that such repairs do not exceed eighty percent of replacement cost.

Flood Plain Management Regulations

The Town's floodplain management regulations were originally adopted during 1978. A major amendment to the 1978 ordinance was adopted during September, 1983

to meet revised requirements of the National Flood Insurance Program. The terms of this ordinance include (the reference to "V" zones results from the use of standard flood insurance language in the ordinance; there are no designated "V" zones in Beaufort):

- 1) New or substantially improved (improvements greater than 50% of value) residential structures must be elevated to or above the 100-year flood elevations (7 to 10 feet in "A" zones.
- 2) Commercial buildings located in either the "V" or "A" zones must be elevated to the base flood level or flood-proofed.
- 3) Open space or breakaway walls must be used below base flood elevation in the "V" zones.
- 4) The design and installation of pilings or columns used as structural support must be certified by an architect or engineer in meeting loads and water flow.
- 5) No use of fill for structural support shall occur in the "V" zone.
- 6) No new mobile home parks, or expansion of existing parks, or the placement of new mobile homes are allowed in "V" zones.
- 7) Mobile homes must be anchored and be placed above flood elevations.

G. Recommended Hazard Mitigation Policies

The entire Town of Beaufort is susceptible to significant storm damage from a hurricane or a storm of similar magnitude. About one-fourth of the Town's land area is located in AEC's or in areas susceptible to flooding associated with the 100-year storm. Most of the Town's vacant land that is available for development is above the 100-year flood level. The entire town is susceptible to wind damage. In general, the Town's existing mitigation policies meet the requirements for hazard mitigation planning outlined in Before the Storm. Specifically:

1. The Town's policies support and are consistent with State policies and regulations for development in Areas of Environmental Concern.
2. All new development must conform with the provisions of the N.C. Building Code.
3. The Town's floodplain development policies conform with

all Federal and State requirements.

4. The Town does a good job of controlling mobile home developments in order to minimize hazard damages. Mobile homes are restricted to a specific district and must conform with elevation and other requirements.

The general conclusion is that Beaufort is already doing an adequate job to mitigate future storm damages, and that the Town's policies meet both the requirements and philosophical objectives delineated in Before the Storm. Further, Beaufort does not face the threat of extensive property destruction from hurricanes or the phenomenal growth rate being experienced by Carteret County's Bogue Banks communities. The Town's inland location affords it some protection from the direct assault of a hurricane and vast majority of the Town's housing stock is located above the 100-year flood plain.

The modification of only one Town policy is recommended. The zoning ordinance's non-conforming uses and structures section should be amended to: 1) distinguish between non-conforming structures (those that don't meet setbacks, building codes, minimum lot size, etc.) and non-conforming uses - those that are not permitted in the zoning district in which they are located; 2) specifically prohibit the repair, alteration or reconstruction of a non-conforming structure if it is destroyed beyond 50% of value unless it is brought into compliance with all zoning provisions; 3) revise the non-conforming use section to prohibit re-establishment of such uses if damage exceeds 50% instead of the 80% which exists now. The definitions section of the zoning ordinance should also be amended to distinguish between non-conforming uses and structures.

III. BEAUFORT POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community and report this damage to the County Emergency Services Coordinator.
2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).

3. DEM compiles local data and makes recommendations to the Governor concerning state actions.
4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The Town has been provided a comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm. The programs identified fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Beaufort.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the Town. While damage assessment (Sections B & C) will be the first operations conducted by the Town after a disaster, it should be realized that the recommended recovery operations (Section D) will begin simultaneously. The remainder of this Chapter is, therefore, organized as follows:

- 1) Procedures that Beaufort should follow to carry out its damage assessment program to meet all federal and state requirements including organization of the

damage assessment team and recommended damage assessment procedures.

- 2) An overall organizational framework for restoration operations after the emergency period.
- 3) Replacement/Reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Beaufort personnel available to assume these responsibilities.

Administrative

Town Administrator
5 Office Personnel

Police

1 Police Chief
11 Officers

Town Officials

1 Mayor
5 Commissioners

Fire

1 Chief
5 Engineers
2 Equipment Operators

Public Works

1 Director
10 Sanitation Employees
4 Water System Employees
6 Storm and Sewer System Employees

The Administrator should head the Damage Assessment Team. Other members of the team should consist of volunteers recruited from the community, and possibly Public Works personnel that may be experienced in construction. The Administrator and volunteers must be recruited, organized and trained prior to a storm occurrence. There should also be back-ups or alternates to ensure the availability of adequate resources.

The suggested make-up of the Beaufort Damage Assessment Team is as follows:

- o Administrator (Team Chief)
- o Local Property Appraiser (MAI or qualified broker) *
- o Building Contractor *
- o Architect *

* Community Volunteer

The Mayor should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. There are about 1,750 structures in the Town. The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).

- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, street signs, house addresses and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure.

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Town Clerk. Specific administrative employees in Town Hall should be assigned to assist in carrying out this task.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.
- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project listing the property values of existing structures on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 1 to 2 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the flood plain have 75% to 80% coverage. Overall, it was estimated that only 10-15% of all homes in the flood plain have insurance covering 75%-80% of

the improvements. The Town should verify these estimates and update this information annually before the hurricane season. This information should then be kept available in the Emergency Operations Center for estimating the value of sustained damages covered by hazard insurance.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within the Town should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of Town tax maps and multiplied by the following percentages for appropriate damage classification category.
 - o Destroyed - 100%
 - o Major Damage - 50%
 - o Minor Damage (uninhabitable) - 25%
 - o Habitable - 10%
3. The total value of damages for the Town should then be summarized and reported, as required, to the County Emergency Operations Center.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. Organization of Recovery Operations

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created. In Beaufort, the Mayor and Commission should assume the responsibilities of such a Task Force with the Town Administrator directing day-to-day operations based on the policy guidance received from the Mayor and

Commission. The following must be accomplished:

1. Establishing reentry procedures for secured areas such as the waterfront and areas that were evacuated.
2. Establishing an overall restoration schedule.
3. Setting restoration priorities.
4. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
5. Keeping the appropriate County and State officials informed using Situation and Damage Reports.
6. Keeping the public informed.
7. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
8. Proclaiming a local "state of emergency" if warranted.
9. Commencing cleanup, debris removal and utility restoration activities undertaken by private utility companies.
10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until after a storm hits and the magnitude of the damage can be assessed. The following sequence of activities and schedule is submitted as a guide which should be reconsidered by the Mayor and Commissioners and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1. Complete Initial Damage Assessment	Immediately after storm passes
2. Complete Second Phase Damage Assessment	Completed by second week after the storm
3. Prepare Summary of Reconstruction Needs	Completed one week after second phase damage assessment is completed
4. Decision with Regard to Imposition of Temporary Development Moratorium	One Week after second phase damage assessment is completed
5. Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed one week after summary of reconstruction needs is completed
6. Begin Repairs to Critical Utilities and Facilities	As soon as possible after disaster
7. Permitting of Reconstruction Activities for All Structures Receiving Minor Damage Not Included in Development Moratorium Areas	One week after second phase damage assessment is completed
8. Permitting of Reconstruction Activities for All Structures Receiving Major Damage Not Included in Development Moratorium Areas	Two weeks after second phase damage assessment is completed
9. Initiate Assessment of Existing Mitigation Policies	Two weeks after second phase damage assessment is completed
10. Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	The length of the period for conducting re-evaluations and receiving input from the State should not exceed two months
11. Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium	Two months after Temporary Development Moratorium is imposed. (Subject to change based on circumstances encountered)

<u>Activity</u>	<u>Time Frame</u>
12. Permit New Development	Upon suspension of any temporary development moratorium

E. Recommended Reconstruction Policies

All the following policies have been designed to be 1) considered and adopted by the Mayor and Commissioners of Beaufort prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Reentry

1. Reentry of secured areas or evacuated areas by property owners shall not be permitted until 1) the critical damage assessment has been completed; and 2) the Mayor proclaims such areas of the Town safe to re-enter.
2. A list of Beaufort property owners and business proprietors shall be maintained at the Emergency Operations Center. Valid identification must be shown in order to proceed into evacuated or secured areas. Passes shall be issued and displayed at all times until the State of Emergency is officially lifted.

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Beaufort Zoning Ordinance, and the Beaufort Floodplain Management Regulations.
3. All structures suffering minor damage as defined in the Beaufort Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition.
4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern, and the Beaufort Floodplain Management Regulations appeared adequate in minimizing storm damages. For areas where the construction

and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.

5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Beaufort Town Council.

Utility and Facility Reconstruction

1. All damaged water systems components shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

There is no doubt that Beaufort will suffer heavy and serious damages should a major storm have its landfall in its vicinity. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Beaufort, such a situation is most likely to occur along the waterfront and in flooded areas.

The Beaufort policy regarding the proclamation of temporary development moratoriums shall be:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Beaufort Floodplain Management Regulations appeared adequate in minimizing storm damages. For AEC's where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific

AEC shall be imposed.

2. After imposing a Temporary Development Moratorium for an AEC, the Town of Beaufort shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities so similar, in order to determine how local regulations for those hazard areas, which are based on State and or Federal guidelines or requirements, should be improved or modified. A response from the State within a reasonable time period as determined through negotiations should be requested.
3. The Temporary Building Moratorium in all AEC's shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordance with existing regulations and requirements.

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Beaufort has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing stricter standards if it desires. This is a problem that the Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The Town policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

TOWN OF EMERALD ISLE

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
AND
POST DISASTER RECONSTRUCTION PLAN

Prepared for

THE TOWN OF EMERALD ISLE, NORTH CAROLINA

By:

George Eichler & Associates
and
Satilla Planning, Inc.

June 1, 1984

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local planning efforts.

The objective of this report is to present storm hazard mitigation and post disaster reconstruction plans for Emerald Isle that 1) meet specific needs of the Town; and 2) conform with the adopted State rules for storm hazard planning.

The remainder of this report describes Emerald Isle's hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan.

II. EMERALD ISLE STORM HAZARD MITIGATION PLAN

A. Existing Development

Emerald Isle's developable incorporated area consists of about 3,000 acres, one-half of which has been developed. It is eleven miles long and ranges from 4,000 feet in width at the west end to about 800 feet at the east end. It has developed as a family-oriented vacation/second home community with seasonal populations reaching as high as 10,000 persons during peak summer holiday periods. In contrast, the year-round population is currently only about 1,000 persons.

Table 1 presents the permanent and average seasonal populations for the years 1980, 1985, 1990 and 2000 based on data from the 1981 Land Use Plan Update. The State of North Carolina estimated that there were 1,003 permanent residents in 1983.

TABLE 1
EMERALD ISLE POPULATION PROJECTIONS

<u>YEAR</u>	<u>AVERAGE SEASONAL</u>	<u>PERMANENT</u>
1980	8,500	865
1985	10,000 - 12,000	1,200 - 1,400
1990	12,000 - 15,000	1,500 - 1,900
2000	15,000 - 18,000	2,200 - 2,800

The 1981 Land Use Plan Update did not include existing land use tabulations and it is beyond the scope of this study to conduct detailed land use surveys. However, the following generalized land use calculations were provided by the Plan.

TABLE 2
EXISTING LAND USE TABULATIONS

<u>LAND USE CATEGORY</u>	<u>ACREAGE</u>	<u>% OF TOTAL</u>
Developed Land - Total	1,402	47%
Residential	1,240	9%
Institutional	3	1%
Commercial	123	9%
Undeveloped Land - Total	1,598	53%
TOTAL DEVELOPED and UNDEVELOPED:	3,000	100%

As indicated by Table 2, more than half of the Town's acreage was vacant and available for development in 1981 when the Land Use Plan update was prepared. Since this time, it is estimated that an additional 300 acres have been developed, leaving about 1,300 acres vacant. The Town's density in persons per acre is 5.88 in developed areas. Assuming that future development continues at this density, an additional 766 acres will be developed by the year 2,000. Ultimate capacity of the Town at this density is 17,625 persons during summer peak periods. However, a relatively minor increase in density would greatly increase this potential number. Such an increase in density could be expected if a central sewage system was constructed. The existing commercial development occupies about 125 acres, but there are 400 acres zoned for commercial use. There are basically four existing commercial areas; one where the causeway Bridge enters the town, along Emerald Drive and Beach Drive; one along Emerald Drive West of its intersection with Ferry Road and at the original Ferry Landing on Bogue Sound; one along Emerald Drive near the western pier; and another along Emerald Drive around the eastern pier.

In 1980, there were an estimated 2,400 dwelling units in Emerald Isle. The current estimate of total dwelling units is 3,250. This represents an increase of more than 35% in just three years. Based on 1983 dwelling units and estimated average seasonal population, approximately 3.5 persons occupied each dwelling unit. To reach the 1990 projected population (top range) an additional 1,035 dwelling units would have to be constructed; and a total of 1,893 new units to reach the year 2000 projection of 18,000 persons. Table 3 presents a summary of estimated dwelling units by type.

TABLE 3
ESTIMATED DWELLING UNITS BY TYPE - 1983

<u>Type of Residential Unit</u>	<u>Estimated Total Number</u>
Single Family, Duplex/Triplex	1,884
Multi-Family	139
Motel	137
Mobile Home	<u>1,090</u>
Total:	3,250

B. Hazard Areas in Emerald Isle

Areas of Environmental Concern (AEC's) located in Emerald Isle consist of : 1) Ocean Erodible AEC's; 2) Inlet Hazard AEC's; 3) Estuarine Shoreline AEC's; and 4) Flood

Hazard AEC's. While not designated by the State as an AEC, the balance of the 100-year flood plain is also a hazard area that should be addressed by the mitigation plan. The first three AEC's identified above are depicted by Map One. Map Two delineates both the Flood Hazard AEC, and the balance of the 100-year flood plain.

Ocean Erodible AEC's

These are areas where a substantial possibility of excessive erosion and significant shoreline fluctuations exists. The ocean erodible AEC is based on a setback from the first line of stable natural vegetation plus an additional area where erosion can be expected from storm surges and wave action.

Current State regulations establish ocean erodible AEC's as beginning at the low water line. Setback measurements begin at the first line of stable vegetation and continue inland to a depth 60 times the average annual rate of erosion. Provided there has been no long term erosion or the rate of erosion is less than two feet per year, this distance is set at 120 feet. In areas where the erosion rate is more than 3.5 feet per year, the setback line is based on a distance of 30 times the long-term annual erosion rate plus 105 feet. Erosion near Bogue Inlet has averaged 3 feet per year and the AEC is 230 feet deep in this area. (Source: Office of Coastal Management, "Long Term Average Annual Erosion Rates Through 1980").

Inlet Hazard AEC's

An inlet hazard area is a natural hazard area that is especially vulnerable to erosion, flooding and other adverse effects of sand, wind, and water because of its proximity to dynamic ocean inlets. The area adjacent to Bogue Inlet is designated a hazard area. During recent years, the Inlet area has accreted as the Inlet migrated to the west. A false sense of security from this short term phenomenon may encourage further development of this unstable area. The land use subdivided and platted prior to the existence of C.A.M.A. and therefore current regulations allow the use and development of these lots of record.

As outlined on Map 1, the Bogue Inlet Hazard consists of the western 1,250 feet of Bogue Banks/Emerald Isle.

Estuarine Shoreline AEC's

Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. In Emerald Isle, the estuarine shoreline encompasses the area landward from Bogue Sound for a distance of 75 feet from the mean high water level along the entire northern edge of the Town.

Map one here



LEGEND



OCEAN ERODIBLE A.E.C.



ESTUARINE SHORELINE A.E.C.



INLET HAZARD AREA

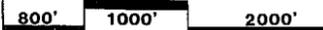
This map is for planning purposes only; the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

EMERALD ISLE, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984



Storm Hazard Areas

MAP ONE

Flood Hazard AEC's

The flood hazard AEC corresponds to the National Flood Insurance Program V-zones, which refer to flood prone areas that are also susceptible to high velocity wave surges. Emerald Isle was converted to the Regular Phase of the National Flood Insurance Program (NFIP) in 1977 with the issuance of Flood Insurance Rate Maps (FIRMS). Town officials recently received 1984 FIRMS which are now under review. Because this represents the best available data for flood hazard in Emerald Isle, this new data is provided by Map Two.

Flood crest elevations in the "V" zones range from 11 to 16 feet AMSL. The "V" zone areas were reduced by the new FIRM. Areas along Bogue Sound are no longer within "V" zones. The new "V" zones basically parallel the ocean to a depth of approximately 100' to 250' inland from mean high water. Less than 8% of the Town's area lies within "V" zones.

Other Flood Prone Areas

This area is simply the balance of the 100-year flood plain - that area not within "V" zones. Again, Map Two portrays the area subject to flooding during the 100-year storm in accordance with the 1984 FIRM. The FIRM designates these areas as "A" zones. About 15 percent of the town is within "A" zones.

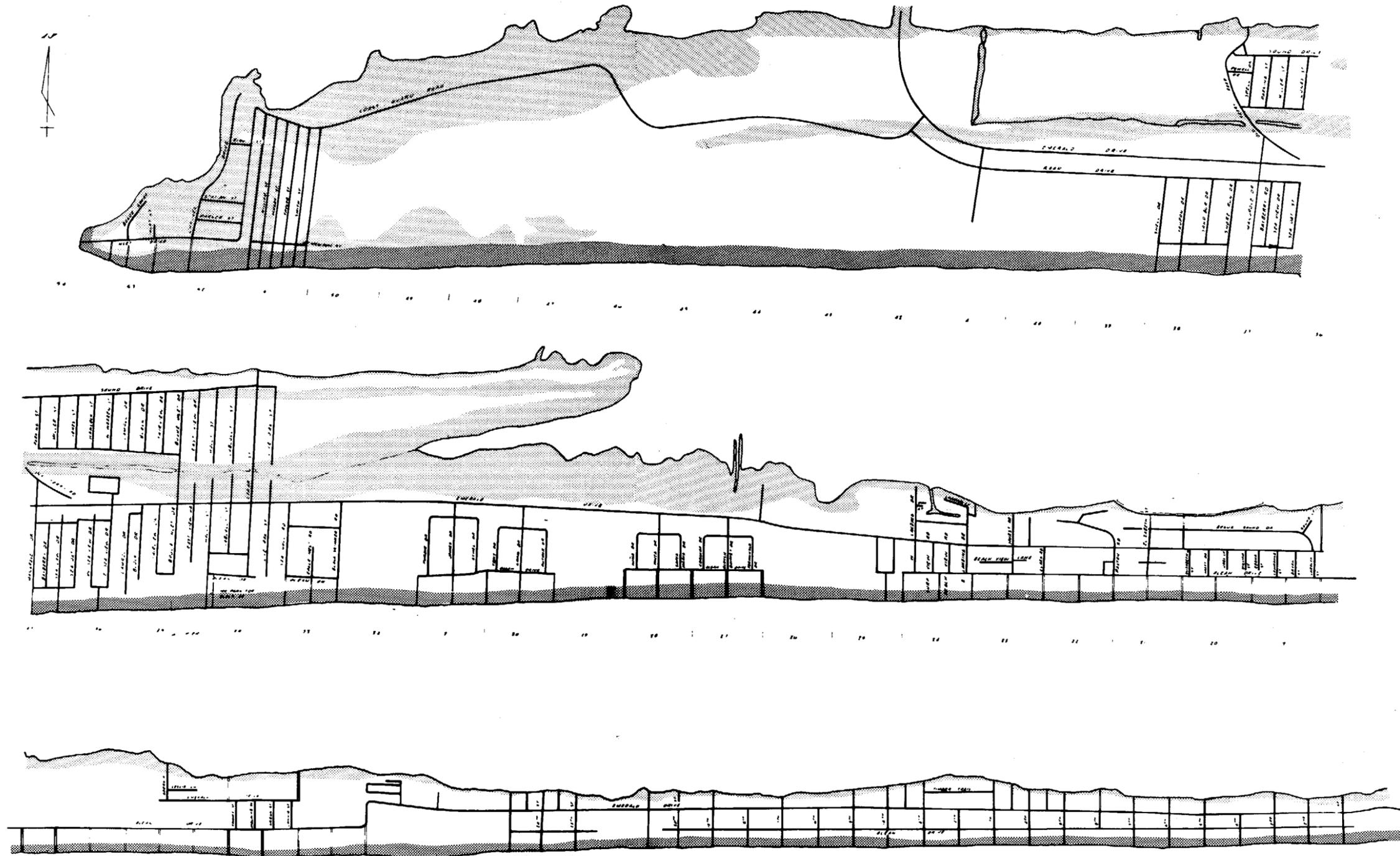
C. Existing Development Located in Hazard Areas

In Before the Storm, the following system for classifying hazard areas (shown in Table 4) was presented:

TABLE 4
DEFINITION OF HAZARD AREAS

Hazard Area Category	<u>Forces Present/Expected</u>				
	<u>Erosion</u>	<u>Wave Action</u>	<u>Flooding</u>	<u>High Winds</u>	
1	x	x	x	x	Ocean erodible AEC's; inlet hazard AEC's; estaurine shoreline AEC's.
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

Mpa Two here



LEGEND



HIGH HAZARD FLOOD A.E.C. ("V" ZONES)



BALANCE OF 100 YEAR FLOOD PLAIN ("A" ZONES)

This map is for planning purposes only: the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

EMERALD ISLE, N.C.

SATILLA PLANNING, INC.
St. Marys, Georgia

GEORGE EICHLER & ASSOC.
Atlanta, Georgia

JUNE, 1984



Flood Hazard Areas

MAP
TWO

The number of structures within each hazard area based on the above classifications was then determined from aerial photographs, interviewing with town personnel, and field checks as follows:

TABLE 5
STRUCTURES BY HAZARD AREA
(Before the Storm Method)

<u>Hazard Area Category</u>	<u>Residential Units</u>	<u>Commercial Areas</u>
1	135	2
2	75	1
3	110	1
4	<u>3,015</u>	<u>2</u>

The above Table is not totaled because to do so would be misleading. Some of the units included in Flood Insurance "V" zones (Category 2) were also in Hazard Area Category 1. Additionally, the structures in estuarine shoreline AEC's are also in Flood Insurance "A" zones.

Emerald Isle does not have a central sewage disposal system. Therefore, sewage is handled through individual septic systems, some of which are in flood hazard areas. Generally, the structures and commercial areas identified by Table 5 are served by systems that are also in the flood plain. The Town's water is supplied by the Bogue Banks water authority. There are currently three wells with one planned. There are two elevated and one ground storage tank. These facilities are above the 100-year flood level as are the majority of the system's distribution system.

There are no potentially hazardous material storage or disposal sites in Emerald Isle.

D. Estimated Severity of Possible Hazard Area Damages

The current Emerald Isle Tax Valuation is \$186,000,000. This does not include tax exempt property nor does it include appreciation of values since the assessment was completed by County tax appraisal officials.

Structures constitute about \$74,000,000 or 40% of the total tax digest. This ratio of structure value to property represents the high value and quantity of undeveloped land. Additional property at risk during a major storm includes roads, public buildings and facilities, public utilities, and tax exempt property. Potential worst case flood damage to privately owned structures in Emerald Isle from a 100-year storm event is estimated to be \$4.5 million. This does not include any damage from wind which will certainly be

significant.

E. Anticipated Development in Hazard Areas

About 1,600 acres of developable land remains vacant in Emerald Isle. The vast majority of this land lies above the 100-year flood plain and significant areas are also above the 500-year event. Some development may occur in the Estuarine Shoreline AEC but because of the narrowness of this zone, it is expected to be relatively minor.

F. Existing Emerald Isle Hazard Mitigation Policies and Regulations

Emerald Isle regulates development in hazard areas primarily through its zoning ordinance, dunes and vegetation control ordinance, and floodplain management regulations. Development in AEC areas must conform with State guidelines. The primary provisions of Emerald Isle zoning, dunes and vegetation control and floodplain management regulations related to hazard area development are summarized below.

Emerald Isle Zoning Ordinance

1. Single family residences, duplexes and multi-family structures are allowed in the Town's residential districts as permitted uses regardless of whether such districts are located in hazard areas.
2. Mobile Home parks are permitted only in MH Mobile Homes districts and subject to special development standards.
3. Non-conforming structures (i.e. those not meeting setback or other similar requirements) are not specifically dealt with by the Emerald Isle zoning ordinance.
4. Non-conforming uses can generally be rebuilt unless destroyed or damaged beyond 70% of value or if the use is abandoned for 180 continuous days.

Dunes and Vegetation Protection Ordinance

At least 45% of the natural vegetation must be left in place on residential lots and 15% on commercial lots under the terms of this ordinance.

Flood Plain Management Regulations

The Floodplain ordinance is part of the Town's zoning ordinance (Article I). It is designed to meet requirements of the National Flood Insurance key provisions including:

1. All new residential construction, or substantial improvements (repairs or reconstruction worth 50 percent of market value) must be elevated to or above the base flood level elevations.
2. Commercial buildings located in either the "V" or "A" zones must be elevated to the base flood level or floodproofed.
3. Open space or breakaway walls must be used below base flood elevation in the "V" zones.
4. The design and installation of anchorings and pilings must be certified by a registered engineer or architect.
5. No alteration of dunes or use of fill for structural support shall occur in the "V" zone.

Mobile Home Regulations

Mobile homes constitute about thirty-five percent of the existing housing stock - an estimated 1,090 units. The Town's zoning ordinance establishes mobile home placement and design standards; flood hazard design considerations are included in the floodplain regulations and require elevation above the 100-year flood elevation, tiedowns, and prohibition on mobile homes locating in "V" zones.

G. Recommended Hazard Mitigation Policies

The entire Town of Emerald Isle is susceptible to significant storm damage from a hurricane or a storm of similar magnitude. However, only 6% of the Town's dwelling units are located in AEC's or in areas susceptible to flooding associated with the 100-year storm. The entire Town is susceptible to wind damage. In general, the Town's existing mitigation policies meet the requirements for hazard mitigation planning outlined in Before the Storm.

Specifically:

1. The Town's growth policy encourages relatively low density residential development; high rise developments along the ocean are not typically found in Emerald Isle. The Town has also down-zoned lands that originally allowed up to 13.5 dwelling units per acre to 8 dwelling units per acre. This may reduce the ultimate number of units by 2,200 or about 7,200 seasonal sites.
2. The Town's policies support and are consistent with State policies and regulations for development in Areas of Environmental Concern.

3. All new development must conform with the provisions of the N.C. Building Code.
4. The Town's floodplain development policies conform with all Federal and State requirements.
5. The Town does a good job of controlling mobile home developments in order to minimize hazard damages. Mobile homes are restricted to a specific district and must conform with elevation and other requirements.
6. The Town has made an obvious effort to keep up with building code and land use regulation enforcement during the recent growth period by hiring additional building inspection personnel.

The basic conclusion is that Emerald Isle is already doing a good job to mitigate future storm damages and that the Town's policies meet both the requirements and philosophical objectives contained in Before the Storm.

The only recommended changes to existing policies are:

- 1) That the Town consider revising its zoning ordinance provisions governing non-conforming situations (Section 9-4033) to: a) to more explicitly cover replacement or repair of non-conforming structures so that they are required to meet applicable floodplain regulations and provisions of the North Carolina State Building Code governing wind loads; and b) that upon destruction to or beyond a specific percentage of structure value (50% is recommended) all structures be required to meet all applicable regulations (zoning, flood, building code, health code, etc.) The rationale is that if a building sustains more than 50% damage it is for all practical purposes destroyed and if the zoning ordinance terms classify it as "non-conforming", it should not be allowed to rebuild to the same size and conditions in the same location. Additionally, these provisions should be applied specifically to both non-conforming uses and structures.

III. EMERALD ISLE POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community and report this damage to the County Emergency Services Coordinator.
2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).

3. DEM compiles local data and makes recommendations to the Governor concerning state actions.
4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The Town has been provided a comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm. The programs identified fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Emerald Isle.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the Town. While damage assessment (Sections B & C) will be the first operations conducted by the Town after a disaster, it should be realized that the recommended recovery operations (Section D) will begin simultaneously. The remainder of this chapter is, therefore, organized as follows:

- 1) Procedures that Emerald Isle should follow to carry out its damage assessment program to meet all

Federal and State requirements including organization of the damage assessment team and recommended damage assessment procedures.

- 2) An overall organizational framework for restoration operations after the emergency period.
- 3) Replacement/Reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Emerald Isle personnel including volunteers available to assume these responsibilities:

Administrative

Town Manager
Building Inspector
Assistant Building Inspector
Part-time Building Inspector

Police

1 Police Chief
10 Officers
6 Dispatchers
6 Reserve

Town Officials

1 Mayor
5 Commissioners

Fire and Rescue

1 Chief
20 Volunteers

Street

Maintenance Supervisor
Assistant Maintenance Supervisor

The Building Inspector should head the Damage Assessment Team. Other members of the team should consist of the Assistant Building Inspector, the Maintenance Supervisor and volunteers recruited from the community. Town Personnel and volunteers must be recruited, organized and trained prior to a storm occurrence. There should also be back-ups or alternates to ensure the availability of adequate resources.

The suggested make-up of the Emerald Isle Damage Assessment Team is as follows:

- o Building Inspector (Team Chief)
- o Assistant Building Inspector
- o Local Property Appraiser (MAI or qualified broker) *
- o Maintenance Supervisor
- o Architect *

* Community Volunteer

The Mayor should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. There are about 3,000 dwelling units in the Town. The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).

- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, mail boxes and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure.

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Town Manager. Specific administrative employees in Town Hall should be assigned to assist in carrying out this task.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.
- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project listing the property values of existing structures on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 1 to 2 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the flood plain have 75% to 80% coverage. Overall, it was estimated that only 10% to 15% of all homes in the flood plain have insurance covering 75% to

80% of the improvements. The Town should verify these estimates and update this information annually before the hurricane season. This information should then be kept available in the Emergency Operations Center for estimating the value of sustained damages covered by hazard insurance.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within the Town should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of Town tax maps and multiplied by the following percentages for appropriate damage classification category.
 - o Destroyed - 100%
 - o Major Damage - 50%
 - o Minor Damage (uninhabitable) - 25%
 - o Habitable - 10%
3. The total value of damages for the Town should then be summarized and reported, as required, to the County Emergency Operations Center.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. Organization of Recovery Operations

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created. In Emerald Isle, the Mayor and Commission should assume the responsibilities of such a Task Force with the Town Manager directing day-to-day operations based on the policy guidance received from the Mayor and

Commission. The following must be accomplished:

1. Establishing reentry procedures.
2. Establishing an overall restoration schedule.
3. Setting restoration priorities.
4. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
5. Keeping the appropriate County and State officials informed using Situation and Damage Reports.
6. Keeping the public informed.
7. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
8. Proclaiming a local "state of emergency" if warranted.
9. Commencing cleanup, debris removal and utility restoration activities undertaken by private utility companies.
10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until after a storm hits and the magnitude of the damage can be assessed. The following sequence of activities and schedule is submitted as a guide which should be reconsidered by the Mayor and Commissioners and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1. Complete Initial Damage Assessment	Immediately after storm passes
2. Complete Second Phase Damage Assessment	Completed by second week after the storm

<u>Activity</u>	<u>Time Frame</u>
3. Prepare Summary of Reconstruction Needs	Completed one week after second phase damage assessment is completed
4. Decision with Regard to Imposition of Temporary Development Moratorium	One week after second phase damage assessment is completed
5. Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed one week after summary of reconstruction needs is completed
6. Begin Repairs to Critical Utilities and Facilities	As soon as possible after disaster
7. Permitting of Reconstruction Activities for all Structures Receiving Minor Damage Not Included in Development Moratorium Areas	One week after second phase damage assessment is completed
8. Permitting of Reconstruction Activities for all Structures Receiving Major Damage Not Included in Development Moratorium Areas	Two weeks after second phase damage assessment is completed
9. Initiate Assessment of Existing Mitigation Policies	Two weeks after second phase damage assessment is completed
10. Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	The length of the period for conducting re-evaluations and receiving input from the State should not exceed two months
11. Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium	Two months after Temporary Development Moratorium is imposed. (Subject to change based on circumstances encountered)
12. Permit New Development	Upon suspension of any temporary development moratorium

E. Recommended Reconstruction Policies

All the following policies have been designed to be; 1) considered and adopted by the Mayor and Commissioners of Emerald Isle prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Reentry

1. Reentry of Emerald Isle town residents and/or property owners shall not be permitted until 1) the critical damage assessment has been completed; 2) the Mayor proclaims the Town safe to re-enter, after the County Control Group issues an overall reentry order.
2. A list of Emerald Isle property owners and residents shall be maintained at the bridge entrances to the Bogue Banks. Valid identification must be shown in order to proceed on to the Island. Passes shall be issued and displayed at all times until the State of Emergency is officially lifted. (This procedure will require cooperation and reciprocal assistance from all Bogue Banks towns and unincorporated Salter Path. The towns of Emerald Isle and Atlantic Beach should take the lead in establishing such procedures as each has jurisdiction at each of the two bridges.)

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Emerald Isle Zoning Ordinance, and the Emerald Isle Floodplain Management Regulations.
3. All structures suffering minor damage as defined in the Emerald Isle Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition.
4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of

Environmental Concern, and the Emerald Isle Flood Plain Management Regulations appeared adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed. If mobile home damage is extensive, a moratorium on the rebuilding or replacement of mobile homes should be imposed in order for the Town to decide whether this should remain a permitted use.

5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Emerald Isle Town Council.

Utility and Facility Reconstruction

1. All damaged water systems components shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.
2. Overhead power lines and utility poles along Salter Path Road present the greatest obstacle to the safe evacuation of residents in the event of a major storm disaster. Relocating these lines underground or moving them away from rights-of-way would be very costly at this time. However, if major damage occurs as a result of a storm, the cost effectiveness would improve and public safety considerations might override economic considerations. Emerald Isle should now request the EMC initiate an assessment of the feasibility of relocating overhead power lines underground or away from evacuation routes if substantial damage to the existing system is sustained during a major storm.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

There is no doubt that Emerald Isle will suffer heavy and serious damages should a major storm have its landfall in its vicinity. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Emerald Isle, such a situation is most likely to occur in one or more of the AEC's.

The Emerald Isle policy regarding the proclamation of temporary development moratoriums shall be:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Emerald Isle Floodplain Management Regulations appeared adequate in minimizing storm damages. For AEC's where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
2. To assess the overall damage to mobile homes within one week of the storm occurrence and to determine whether a temporary moratorium on the rebuilding of mobile homes suffering major damage should be imposed.
3. After imposing a Temporary Development Moratorium for an AEC, the Town of Emerald Isle shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities so similar, in order to determine how local regulations for those hazard areas, which are based on State and or Federal guidelines or requirements, should be improved or modified. A response from the State within a reasonable time period as determined through negotiations should be requested.
4. The Temporary Building Moratorium in all AEC's shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordance with existing regulations and requirements.
5. If a temporary moratorium on the rebuilding of mobile homes is imposed, the Town Council shall within one month determine whether the Emerald Isle Zoning Ordinance should be revised so that mobile homes are no longer a permitted use in any Town zoning district. If such a policy decision is made, based on a review

of the magnitude of damages sustained, all existing mobile homes would be treated as non-conforming uses in accordance with the recommended revision of the Emerald Isle Zoning Ordinance (Chapter II of this report).

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Emerald Isle has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing stricter standards if it desires. This is a problem that the Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The Town policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

TOWN OF INDIAN BEACH

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
AND
POST-DISASTER RECONSTRUCTION PLAN

Prepared For

THE TOWN OF INDIAN BEACH, NORTH CAROLINA

By:

George Eichler & Associates
and
Satilla Planning, Inc.

June 1, 1984

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local planning efforts.

The objective of this report is to present storm hazard mitigation and post disaster reconstruction plans for Indian Beach that 1) meet specific needs of the Town; and 2) conform with the adopted State rules for storm hazard planning.

The remainder of this report describes Indian Beach's hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan.

II. INDIAN BEACH STORM HAZARD MITIGATION PLAN

A. Existing Development

Indian Beach's incorporated area consists of about 360 acres between Pine Knoll Shores on the east and Emerald Isle on the west. It has developed as a vacation-resort oriented community with seasonal populations as high as 3,987 persons during peak summer holiday periods. In contrast, the year-round population is currently only about 61 persons.

Table 1 presents the permanent and maximum seasonal populations for the years 1980, 1984 and 1990, based on data from the Draft Carteret County Land Use Plan being prepared by the Office of Coastal Management.

TABLE 1
INDIAN BEACH POPULATION PROJECTIONS

<u>YEAR</u>	<u>MAXIMUM SEASONAL</u>	<u>PERMANENT</u>
1980	3,987	61
1984	4,500	80
1990	7,920	--

Table 2 indicates existing land use tabulations from the 1982 Land Use Plan. Most of Indian Beach's developed land is in residential use - 90% (33% of all land); commercial makes up 10% of the developed acreage and 4% of the total. The balance consists of uses totaling less than one acre each.

TABLE 2
EXISTING LAND USE TABULATIONS

<u>LAND USE CATEGORY</u>	<u>ACREAGE</u>	<u>% OF TOTAL</u>
Developed Land - Total	135	37%
Residential	121	90%
Governmental	14	10%
Undeveloped Land - Total	229	63%
TOTAL DEVELOPED AND UNDEVELOPED:	364	100%

Approximately 63% of Indian Beach's land area was vacant and available for development when the Land Use Plan was prepared. Since this time, two major condominium projects have been started and others discussed. The 1982 Plan states that current density in developed areas was 11 dwelling units per acre (1,329 units on 121 acres).

Existing commercial development is concentrated near two points: near Town Hall along Salter Path Road (NC 58) and at the Indian Beach fishing pier.

It has been estimated by Town officials that in 1984, the Town contained 1,827 dwelling units including camping sites. Based on 1980 housing and population data, approximately 3.0 persons occupied each dwelling unit. To reach the 1990 projected population, an additional 813 dwelling units would have to be constructed. Table 3 presents a summary of estimated dwelling units by type.

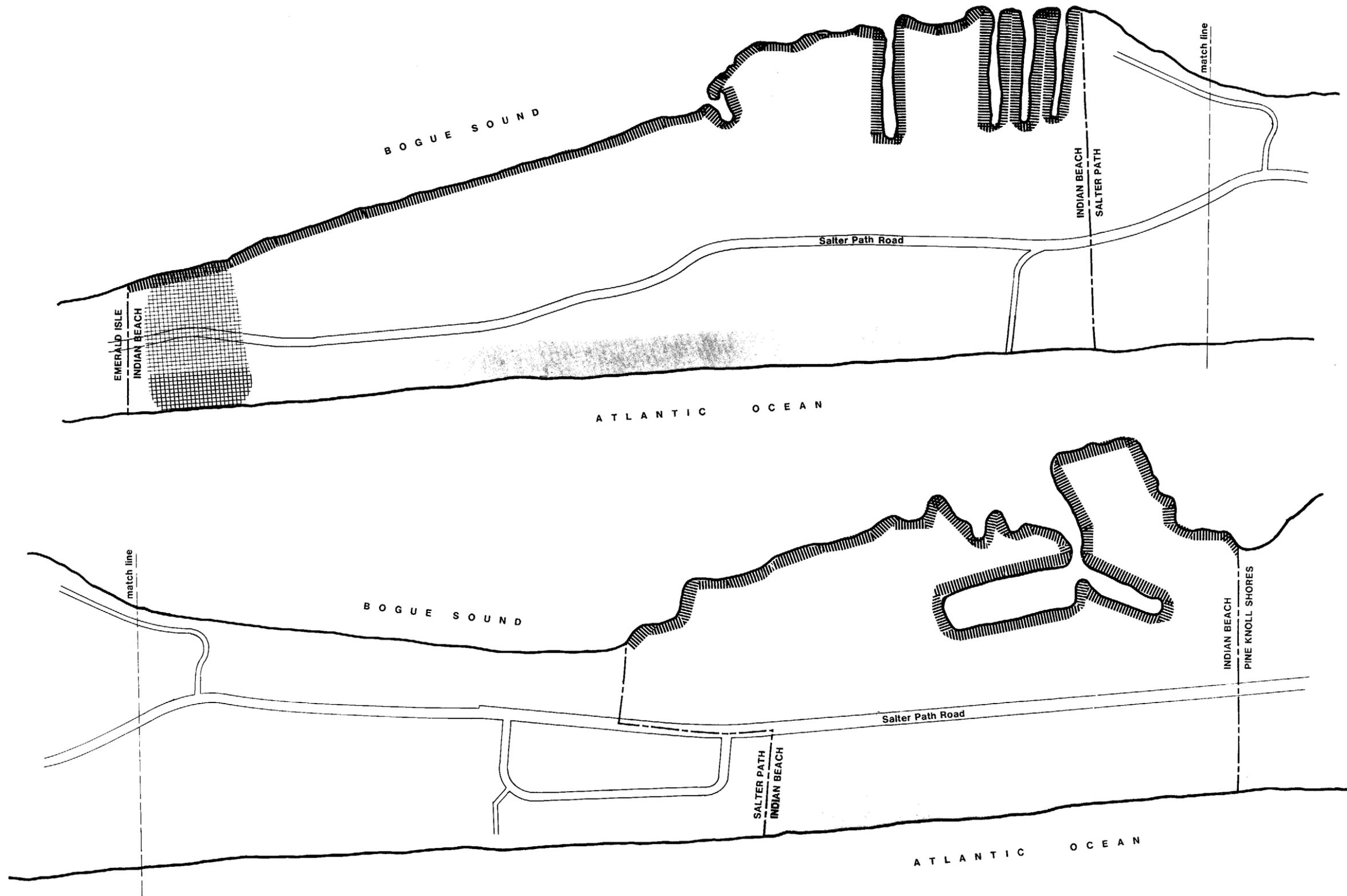
TABLE 3
ESTIMATED DWELLING UNITS BY TYPE - 1984

<u>Type of Residential Unit</u>	<u>Estimated Total Number</u>
Single Family	25
Multi-Family and Motels	256
Camp Sites	489
Mobile Home	<u>1,057</u>
Total:	1,827

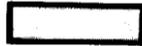
Table 3 illustrates that Indian Beach is now predominantly a mobile home community with this type of unit accounting for 58% of its housing stock. Condominiums are expected to account for the majority of future unit construction.

B. Hazard Areas in Indian Beach

Areas of Environmental Concern (AEC's) located in Indian Beach consist of : 1) Ocean Erodible AEC's; 2) Estuarine Shoreline AEC's; and 3) Flood Hazard AEC's. While not designated by the State as an AEC, the balance of the 100-year flood plain is also a hazard area that should be addressed by the mitigation plan. The first two AEC's identified above are depicted by Map One. Map Two delineates both the Flood Hazard AEC, the balance of the 100-year floodplain and highlights the area west of the fishing pier that was breached during Hurricane Hazel in 1954.

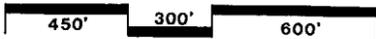


LEGEND

	OCEAN ERODIBLE A.E.C.
	ESTUARINE SHORELINE A.E.C.
	HURRICANE HAZEL BREACH AREA

INDIAN BEACH, N.C.

SATILLA PLANNING, INC. GEORGE EICHLER & ASSOC.
 St. Marys, Georgia Atlanta, Georgia

JUNE, 1984 

Storm Hazard Areas

MAP ONE

Ocean Erodible AEC's

These are areas where a substantial possibility of excessive erosion and significant shoreline fluctuation exists. The ocean erodible AEC is based on a setback from the first line of stable natural vegetation plus an additional area where erosion can be expected from storm surges and wave action.

Current State regulations establish ocean erodible AEC's as beginning at the mean low water line. Setback measurements begin at the first line of stable vegetation and continue inland to a depth 60 times the average annual rate of erosion. Provided there has been no long term erosion or the rate of erosion is less than two feet per year, this distance is set at 120 feet. In areas where the erosion rate is more than 3.5 feet per year, the setback line is based on a distance of 30 times the long-term annual erosion rate plus 105 feet. (Source: Office of Coastal Management, "Long Term Average Annual Erosion Rates through 1980".)

Estuarine Shoreline AEC's

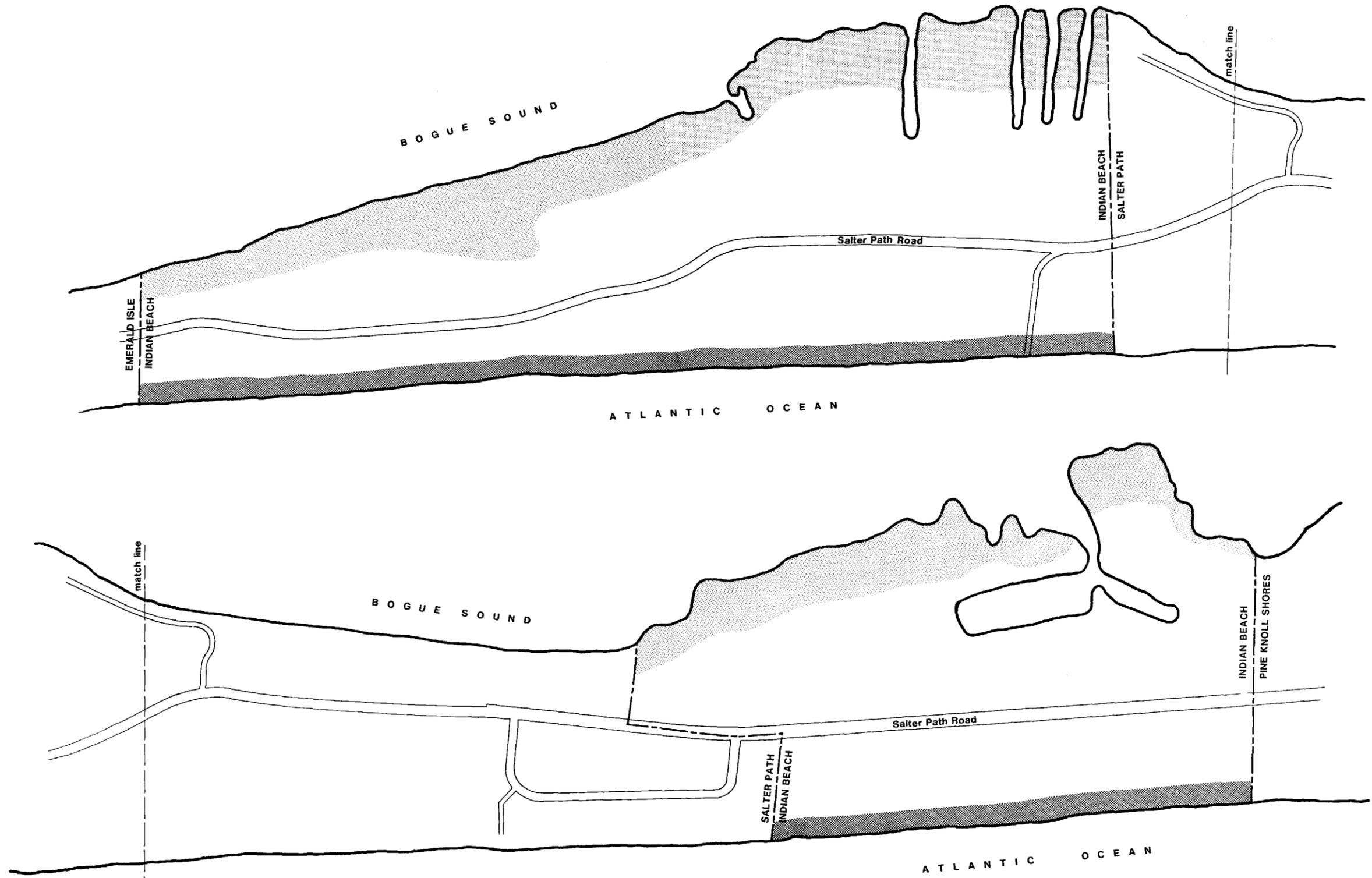
Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. In Indian Beach, the estuarine shoreline encompasses the area landward from Bogue Sound for a distance of 75 feet from the mean high water level along the entire northern edge of Town.

Flood Hazard AEC's

The flood hazard AEC corresponds to the National Flood Insurance Program V-zones, which refer to flood prone areas that are also susceptible to high velocity wave surges. The existence of Indian Beach was inadvertently overlooked by the National Flood Insurance Program until just recently. Just this year program personnel have met with the Town elected officials to initiate the Town's participation in the program. There are no Flood Hazard maps currently available; flood hazard data was interpolated from the maps and flood insurance studies of adjacent Pine Knoll Shores (east) and Emerald Isle (west). This data is presented by Map Two.

Other Flood Prone Areas

This area is simply the balance of the 100-year flood plain - that area not within "V" zones. Again, Map Two portrays the area subject to flooding during the 100-year storm in accordance with data interpolated from the adjacent communities' flood hazard maps.



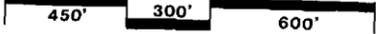
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 HIGH HAZARD FLOOD A.E.C. ("V" ZONES)
 BALANCE OF 100 YEAR FLOOD PLAIN ("A" ZONES)

INDIAN BEACH, N.C.

SATILLA PLANNING, INC. St. Marys, Georgia
 GEORGE EICHLER & ASSOC. Atlanta, Georgia

JUNE, 1984



Flood Hazard Areas

MAP TWO

Area Breached by Hazel

This is a low area to the west of the Indian Beach fishing pier. It was filled in by the State DOT following Hazel and residential development has since occurred along both the ocean and sound in this area. It is highlighted by Map Two.

C. Existing Development Located In Hazard Areas

In Before the Storm, the following system for classifying hazard areas (shown in Table 4) was presented:

TABLE 4
DEFINITION OF HAZARD AREAS

Forces Present/Expected

Hazard Area Category	<u>Erosion</u>	<u>Wave Action</u>	<u>Flooding</u>	<u>High Winds</u>	<u>Boundaries</u>
1	x	x	x	x	Ocean erodible AEC's; inlet hazard AEC's; estaurine shoreline AEC's.
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

The number of structures within each hazard area based on the above classifications was then determined from an update of the 1982 Land Use Plan's Land Use Inventory as follows:

TABLE 5
STRUCTURES BY HAZARD AREA
(Before the Storm Method)

Hazard Area Category	<u>Residential Units</u>	<u>Commercial Units</u>
1	14	1
2	13	
3	86	
4	<u>1,346</u>	<u>1</u>

The above Table is not totaled because to do so would be

misleading. Some of the units included in Flood Insurance "V" zones (Category 2) were also in Hazard Area Category 1. Additionally, the structures in estuarine shoreline AEC's are also in Flood Insurance "A" zones.

Indian Beach does not have a central sewage disposal system; a privately owned package treatment system is used to treat sewage from the 210 unit condominium project (94 units complete; 54 under construction; and 64 in final phase.) A smaller, 84-unit condominium project (36 built, 48 planned) also uses a package treatment system. Therefore, sewage is handled through individual septic systems for all but 130 of the Town's estimated 1,827 dwelling units. The Town's water system is supplied by the Bogue Banks Water Authority.

There are no potentially hazardous material storage or disposal sites in Indian Beach.

D. Estimated Severity of Possible Hazard Area Damages

The current Indian Beach Tax Digest for real property is \$14,966,140. This does not include tax exempt property, appreciation of values since the assessment was completed by County tax appraisal officials, nor does it include significant portions of the two new condominium projects that are under construction.

Structures account for only \$1,588,140 of this assessment or 10.6%. Personal property including mobile homes totals \$158,000. Because mobile homes comprise such a large percentage of the Town's existing housing stock and it is predominantly mobile home units that are in flood hazard areas, it is not practical to estimate total exposure to flood hazard - e.g. the value of these mobile homes is not known. It is, however, expected that the market value of these units is relatively low in as much as all personal property valuations in the Town totaled less than \$160,000. Equally important is the fact that all structures in the Town will be subject to wind damage which may very well exceed damage from flood water during a major storm.

E. Anticipated Development in Hazard Areas

About 230 acres of developable land remains vacant in Indian Beach. Most of this is contiguous land located on eastern Indian Beach - the part of Town separated from the original town area by unincorporated Salter Path. Another relatively large contiguous area of undeveloped land lies in western Indian Beach on the north (sound side) of Salter Path Road. About one-half of this latter area is in "A" zones, while very little of the eastern Indian Beach area is subject to flooding. Some development may occur in the Estuarine Shoreline AEC but because of the narrowness of this zone, it is expected to be relatively minor.

F. Existing Indian Beach Hazard Mitigation Policies and Regulations

Indian Beach regulates development in hazard areas primarily through its zoning ordinance. Development in AEC areas must conform with State guidelines. The primary provisions of the Indian Beach zoning regulation related to hazard area development are summarized below. Also, pending flood plain management regulations are discussed.

Indian Beach Zoning Ordinance

1. Single family residences, duplexes and multi-family structures are allowed in the Town's residential districts as permitted uses, regardless of whether such districts are located in hazard areas.
2. Mobile Home parks are permitted only in B-1, General Business Districts and in R-2 residential districts. Individual mobile homes on lots are not a permitted use in any of the zoning ordinance's five districts.
3. Non-conforming structures (i.e. those not meeting setback or other similar requirements) are not specifically dealt with by the Indian Beach ordinance.
4. Non-conforming uses cannot:(1) be changed to another non-conforming use; (2) be enlarged; (3) be re-established after discontinuance for 180 days (it is not specified if such days must be consecutive); (4) rebuilt, altered or repaired after damage exceeding 60% of fair market value; and (5) moved from one site to another.

Flood Plain Management Regulations

The specific ordinance of the Town was not available for analysis at the time of this draft writing, and it may not yet be adopted. The Town is just now entering the National Flood Insurance Program due to an oversight on the part of the federal agency administering the program. It is anticipated that the Indian Beach provisions will include:

1. All new residential construction, or substantial improvements (repairs or reconstruction worth 50 percent of market value) must be elevated to or above the base flood level elevation (14 feet above MSL) in both "V" and "A" zones.
2. Commercial buildings located in either the "V" or "A" zones must be elevated to the base flood level or floodproofed.

3. Open space or breakaway walls must be used below base flood elevation in the "V" zones.
4. The design and installation of anchorings and pilings must be certified by a registered engineer or architect.
5. No alteration of dunes or use of fill for structural support shall occur in the "V" zone.

G. Recommended Hazard Mitigation Policies

While the entire Town of Indian Beach is susceptible to significant storm damage from a hurricane or a storm of similar magnitude, only about 7 percent of the development in the Town is located in AEC's or in areas susceptible to flooding associated with the 100-year storm. The entire Town is susceptible to wind damage. In general, the Town's existing mitigation policies meet the requirements for hazard mitigation planning outlined in Before the Storm. Enforcement staffing may currently be a problem, but the Town is moving to correct this.

1. The Town's policies support and are consistent with State policies and regulations for development in Areas of Environmental Concern.
2. All new development must conform with the provisions of the N.C. Building Code.
3. The Town's floodplain development policies are expected to conform with all Federal and State requirements upon adoption.
4. Current mobile home regulations, in conjunction with new Flood hazard requirements, control mobile home development in order to minimize hazard damages. Mobile home parks are now only allowed in one zoning district and there are no provisions to allow mobile homes on individual lots as a permitted use in any of the zoning districts.

The basic conclusion is that Indian Beach is already doing an adequate job to mitigate future storm damages and that the Town's policies meet the requirements contained in Before the Storm.

Recommended changes to existing policies are as follows:

1. The Town's non-conforming uses section of the zoning ordinance is generally good but there is not a corresponding section to specifically prohibit the re-

establishment of non-conforming structures that are destroyed beyond a specific point of value. It is recommended that non-conforming structures damaged beyond 50% of their value not be permitted to rebuild in the same location unless it can meet all applicable regulations as to zoning, flood hazard, building code, health codes, etc. The rationale is that if a building sustains more than 50% damage it is for all practical purposes destroyed and if the zoning ordinance terms classify it as "non-conforming", it should not be allowed to rebuild to the same size or conditions in the same location.

2. It is recommended that the Town actively enforce mobile home tie-down provisions of the zoning ordinance. The Town should ensure that such structures are adequately secured to avoid predictable damage and danger during a hurricane or other storm event. This provision should be applied retroactively to all mobile homes in the Town.

3. A major hurricane will probably destroy the Town's mobile home concentrations: these uses can either be re-established or the Town can view this as a re-development opportunity. While the reconstruction policies presented in Chapter III provide a means to make such policy decisions, the Town should consider these options now and adopt the appropriate policies (e.g. if mobile homes are to be prohibited from re-establishing after the next hurricane, the zoning ordinance should now be amended to make them non-conforming uses).

III. INDIAN BEACH POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community and report this damage to the County Emergency Services Coordinator.
2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency

Management (DEM).

3. DEM compiles local data and makes recommendations to the Governor concerning state actions.
4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The Town has been provided a comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm. These programs fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Indian Beach.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the Town. While damage assessment (Section B & C) will be the first operations conducted by the Town after a disaster, it should be realized that the recommended recovery operations (Section D) will begin simultaneously. The remainder of this chapter is, therefore, organized as follows:

- 1) Procedures that Indian Beach should follow to carry out its damage assessment program to meet all federal and state requirements including organization of the damage assessment team and recommended damage assessment procedures.
- 2) An overall organizational framework for restoration operations after the emergency period.
- 3) Replacement/Reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Indian Beach personnel including volunteers available to assume these responsibilities:

Administrative

Town Clerk
Building Inspector

Police

1 Police Chief
1 Officer

Town Officials

1 Mayor
4 Commissioners

Salter Path Fire and Rescue

1 Chief
26 Volunteers

The Building Inspector should head the Damage Assessment Team. Other members of the team should consist of volunteers recruited from the community. The Building Inspector and volunteers must be recruited, organized and trained prior to a storm occurrence. There should also be back-ups or alternates to ensure the availability of adequate resources.

The suggested make-up of the Indian Beach Damage Assessment Team is as follows:

- o Building Inspector (Team Chief)
- o Local Property Appraiser (MAI or qualified broker) *
- o Building Contractor *
- o Architect *

* Community Volunteer

The Mayor should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. There are about 600 structures in Indian Beach. The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).
- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than

15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, mail boxes and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure.

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Mayor. Specific administrative employees in Town Hall should be assigned to assist in carrying out this task.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.
- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project listing the property values of existing structures on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 1 to 2 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

Flood insurance coverage information should be kept available in the Emergency Operations Center for estimating the value of sustained damages covered by hazard insurance. County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the floodplain have 75% to 80% coverage. Overall, it was estimated that only 10% to 15% of all homes in the flood plain have insurance covering 75% to 80% of the improvements. The Town should verify these estimates and update this information annually before the hurricane season.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within the Town should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of Town tax maps and multiplied by the following percentages for appropriate damage classification category.
 - o Destroyed - 100%
 - o Major Damage - 50%
 - o Minor Damage (uninhabitable) - 25%
 - o Habitable - 10%
3. The total value of damages for the Town should then be summarized and reported, as required, to the County Emergency Operations Center.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. Organization of Recovery Operations

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created. In Indian Beach, the Mayor and Commission should assume the responsibilities of such a Task Force with the Police Chief directing day-to-day operations based on the policy guidance received from the Mayor and Commission. The following must be accomplished:

1. Establishing reentry procedures.
2. Establishing an overall restoration schedule.

3. Setting restoration priorities.
4. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
5. Keeping the appropriate County and State officials informed using Situation and Damage Reports.
6. Keeping the public informed.
7. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
8. Proclaiming a local "state of emergency" if warranted.
9. Commencing cleanup, debris removal and utility restoration activities undertaken by private utility companies.
10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until after a storm hits and the magnitude of the damage can be assessed. The following sequence of activities and schedule is submitted as a guide which should be reconsidered by the Mayor and Commissioners and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1. Complete Initial Damage Assessment	Immediately after storm passes
2. Complete Second Phase Damage Assessment	Completed by second week after the storm
3. Prepare Summary of Reconstruction Needs	Completed one week after second phase damage assessment is completed

<u>Activity</u>	<u>Time Frame</u>
4. Decision with Regard to Imposition of Temporary Development Moratorium	One week after second phase damage assessment is completed
5. Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed one week after summary of reconstruction needs is completed
6. Begin Repairs to Critical Utilities and Facilities	As soon as possible after storm
7. Permitting of Reconstruction Activities for all Structures Receiving Minor Damage Not Included in Development Moratorium Areas	One week after second phase damage assessment is completed
8. Permitting of Reconstruction Activities for all Structures Receiving Major Damage Not Included in Development Moratorium Areas	Two weeks after second phase damage assessment is completed
9. Initiate Assessment of Existing Mitigation Policies	Two weeks after second phase damage assessment is completed
10. Complete Re-Evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	The length of the period for conducting re-evaluations and receiving input from the State should not exceed two months
11. Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium	Two months after Temporary Development Moratorium is imposed. (Subject to change based upon circumstances encountered)
12. Permit New Development	Upon suspension of any Temporary Development Moratorium

E. Recommended Reconstruction Policies

All the following policies have been designed to be:
 1) considered and adopted by the Mayor and Commissioners of Indian Beach prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Reentry

1. Reentry of Indian Beach town residents and/or property owners shall not be permitted until 1) the critical damage assessment has been completed; and 2) the Mayor proclaims the Town safe to re-enter (after the County Control group issues an overall re-entry order).
2. A list of Indian Beach property owners and residents shall be maintained at the Salter Path Road entrances to Indian Beach, and at both bridge entrances to Bogue Banks. Valid identification must be shown in order to proceed. Passes shall be issued and displayed at all times until the State of Emergency is officially lifted. This procedure will require close coordination and reciprocal agreements with the other Bogue Banks Commission.

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Indian Beach Zoning Ordinance, and the Indian Beach Floodplain Management Regulations.
3. All structures suffering minor damage as defined in the Indian Beach Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition.
4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern, and the Indian Beach Floodplain Management Regulations appeared adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed. If mobile home damage is extensive, a moratorium on the rebuilding or replacement of mobile homes

should be imposed in order for the Town to decide whether this should remain a permitted use.

5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Indian Beach Town Council.

Utility and Facility Reconstruction

1. All damaged water systems components shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.
2. Overhead power lines and utility poles along Salter Path Road present the greatest obstacle to the safe evacuation of residents in the event of a major storm disaster. Relocating these lines underground or moving them away from rights-of-way would be very costly at this time. However, if major damage occurs as a result of a storm, the cost effectiveness would improve and public safety considerations might override economic considerations. Indian Beach should now request the EMC initiate an assessment of the feasibility of relocating overhead powerlines underground or away from evacuation routes if substantial damage to the existing system is sustained during a major storm.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

There is no doubt that Indian Beach will suffer heavy and serious damages should a major storm have its landfall in its vicinity. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Indian Beach, such a situation is most likely to occur in one or more of the AEC's.

The Indian Beach policy regarding the proclamation of temporary development moratoriums shall be:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Indian Beach Floodplain Management Regulations appeared adequate in minimizing storm damages. For AEC's where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
2. To assess the overall damage to mobile homes within one week of the storm occurrence and to determine whether a temporary moratorium on the rebuilding of mobile homes suffering major damage should be imposed.
3. After imposing a Temporary Development Moratorium for an AEC, the Town of Indian Beach shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities so similar, in order to determine how local regulations for those hazard areas, which are based on State and or Federal guidelines or requirements, should be improved or modified. A response from the State within a reasonable time period as determined through negotiations should be requested.
4. The Temporary Building Moratorium in all AEC's shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordance with existing regulations and requirements.
5. If a temporary moratorium on the rebuilding of mobile homes is imposed, the Town Council shall within one month determine whether the Indian Beach Zoning Ordinance should be revised so that mobile homes are no longer a permitted use in any Town zoning district. If such a policy decision is made, based on a review of the magnitude of damages sustained, all existing mobile homes would be treated as non-conforming uses in accordance with the recommended revision of the Indian Beach Zoning Ordinance (Chapter II of this report).

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in

Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Indian Beach has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing stricter standards if it desires. This is a problem that the Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The Town policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

MOREHEAD CITY

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
AND
POST-DISASTER RECONSTRUCTION PLAN

Prepared for

THE TOWN OF MOREHEAD CITY, NORTH CAROLINA

By:

George Eichler & Associates
and
Satilla Planning, Inc.

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local planning efforts.

The objective of this report is to present storm hazard mitigation and post disaster reconstruction plans for Morehead City that 1) meet specific needs of the Town; and 2) conform with the adopted State rules for storm hazard planning.

The remainder of this report describes Morehead City's hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan.

II. MOREHEAD CITY STORM HAZARD MITIGATION PLAN

A. Existing Development

The Morehead City planning jurisdiction is bounded by the Newport River/Calico Bay on the east, Bogue Sound on the south, the Mitchell Village Area on the west and an area about one mile to the north of the Town's limits. Morehead City serves as the County's retail trade center, including the County's tourism trade. Port activities and government employment are also important sectors of Morehead City's economy.

Table 1 presents the maximum seasonal and permanent populations for the years 1980 and 1990, based on the Office of Coastal Management projections and the 1980 Land Use Plan update. Morehead City's population declined 22 percent from 1970 to 1980.

TABLE 1
MOREHEAD CITY POPULATION PROJECTIONS

<u>YEAR</u>	<u>MAXIMUM SEASONAL</u>	<u>PERMANENT</u>
1980	5,233	4,359
1990	5,901	-----

The 1980 Land Use Plan update did not provide existing land use tabulations and it is beyond the scope of this plan to undertake such field work and research. The following is a general description of recent development patterns in Morehead City's planning jurisdiction.

- o Residential is the largest single land use in the City; the majority of current residential development is taking place to the north of Town within the one mile planning jurisdiction. Country Club Road, Mandy Farms, and Haystacks are three principal residential developments or development areas.
- o Commercial uses are continuing to develop in a "strip" fashion along Highway 70 both within the town and west. A professional park was also developed north of Highway 70A (Bridge Street) and west of Camp Glenn Drive.
- o Industrial uses have remained relatively stable over the past ten years; they consist of manufacturing and the port at the eastern end of Morehead City.

- o Undeveloped land is estimated to comprise about half of the Town's planning area.

The 1980 Land Use Plan does not provide dwelling unit data. However, Town officials recently compiled an estimate of dwelling units, by type. This data is presented in Table 3. Slightly more than 55% of the Town's dwelling units are single family homes; multi-family units comprise the next largest portion of the housing stock - 15%; with mobile homes accounting for 12%.

TABLE 2
DWELLING UNITS BY TYPE

<u>Year</u>	<u>Mobile Home</u>	<u>Single Family</u>	<u>Housing Authority</u>	<u>Multi-Family</u>	<u>Motel</u>	<u>Total</u>
1984	314	1,441	209	400	236	2,600
% of Total	12%	55.5%	8%	15.5%	9%	100%

Source: Town of Morehead City Estimate.

B. Hazard Areas in Morehead City

The only area of Environmental Concern (AEC) relative to storm hazard in Morehead City is its Estuarine Shoreline AEC's. While not designated by the State as an AEC, the 100-year flood plain is also a hazard area that should be addressed by the mitigation plan. Map One delineates both the 100-year flood plain and the Estuarine Shoreline AEC.

Estuarine Shoreline AEC's

Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. This AEC forms Morehead City's southern boundary - Bogue Sound and its eastern boundary - the Newport River and Calico Bay.

Flood Prone Areas - The 100-Year Flood Plain

Morehead City Flood Insurance Rate Map dated October 18, 1983 (F.I.R.M.) does not identify any "V" hazard zones or areas subject to high velocity water from the momentum of breaking waves. There are, however, significant developed and developing areas within the "A" hazard zones that will experience rising flood waters with little or no wave action. One-hundred year flood elevations range from seven (7) to nine (9) feet above mean sea level (MSL). Flood damage will be significant along Bogue Sound as the 100-year flood plain

Map One Here

extends inland from a minimum of 150' in the Town's extra-territorial jurisdiction to the west to approximately 900' at 13th Street. Similar flooding will occur on the north side of the peninsula along Calico Creek and Calico Bay. The most significant flooding from the standpoint of the most land inundated will occur in the extraterritorial jurisdiction west of Calico Bay and east of Country Club Boulevard. Significant residential development has occurred in this area, approximately 250 residential units, and the next major flood will probably cause considerable property damage in this area. Since 1975, most residential development has occurred to the west of this flood hazard area in the vicinity of Country Club Road (1177).

While these areas constitute significant potential flood damage, most of the Town's commercial and residential development is outside the 500-year flood plain (F.I.R.M. zone "C") and therefore subject to minimum flood hazard. Perhaps most importantly, recent and projected residential and commercial development is taking place, for the greater part, outside designated flood hazard areas.

C. Existing Development Located in Hazard Areas

In Before the Storm, the following system for classifying hazard areas (shown in Table 4) was presented:

TABLE 3
DEFINITION OF HAZARD AREAS

Forces Present/Expected

Hazard Area	<u>Erosion</u>	<u>Wave Action</u>	<u>High Flooding</u>	<u>High Winds</u>	<u>Boundaries</u>
1	x	x	x	x	Ocean erodible AEC's; inlet hazard AEC's; estaurine shoreline AEC's.
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

The number of structures within each hazard area based on the above classifications was then determined from an update of the 1976 Land Use Plan's Land Use Inventory (the 1980 Land Use Plan update did not compile existing Land Use). This information is presented in Table 5.

TABLE 4
STRUCTURES BY HAZARD AREA
(Before the Storm Method)

<u>Hazard Area Category</u>	<u>Residential Units</u>	<u>Commercial Units</u>
1	95	21
2	0	0
3	701	35
4	1,998	

The above Table is not totaled because to do so would be misleading. The structures in estuarine shoreline AEC's are also in Flood Insurance "A" zones.

Morehead City's sewage treatment capacity is 1,700,000 gallons per day. Most of the Town is served by sewer and the City is currently in the process of upgrading the treatment facility which discharges into Calico Creek. The sewage treatment plant is located within the 100-year flood plain.

The town's water system is supplied by deep wells, with storage in two 500,000 gallon elevated tanks.

While the port's bulk cargo handling facilities represent potentially hazardous material storage areas, the only specific hazardous waste storage facility identified by the State is the Morehead City Coal Terminal. This facility is used for coal storage and transfer and is in a flood hazard area.

D. Estimated Severity of Possible Hazard Area Damages

The current Morehead City tax digest is about \$145,000,000, not including exempt property which totals \$2,868,000. The value of public property (Town, County, State) is not known but it is estimated that about \$67,301,500 or 46% of the digest is structures and improvements with the balance being land (both vacant and in use), motor vehicles, personal property, and inventories. All structures built since 1977 were subject to flood plain regulations and are assumed to be constructed above the 100-year flood height, or flood-proofed. Based on the analysis presented in Table 5, 27% of the Town's dwelling units located in the 100-year flood plain. A worst case estimate of flood damage to residential land uses is \$17,500,000. Estimated potential commercial damage from a 100-year flood is \$2,600,000. Virtually the entire N.C. State Port Terminal is also within the 100-year flood plain; potential flood damage to these facilities has not been estimated. An additional consideration is that the entire Town will be exposed to damage from high winds during a major hurricane.

E. Anticipated Development in Hazard Areas

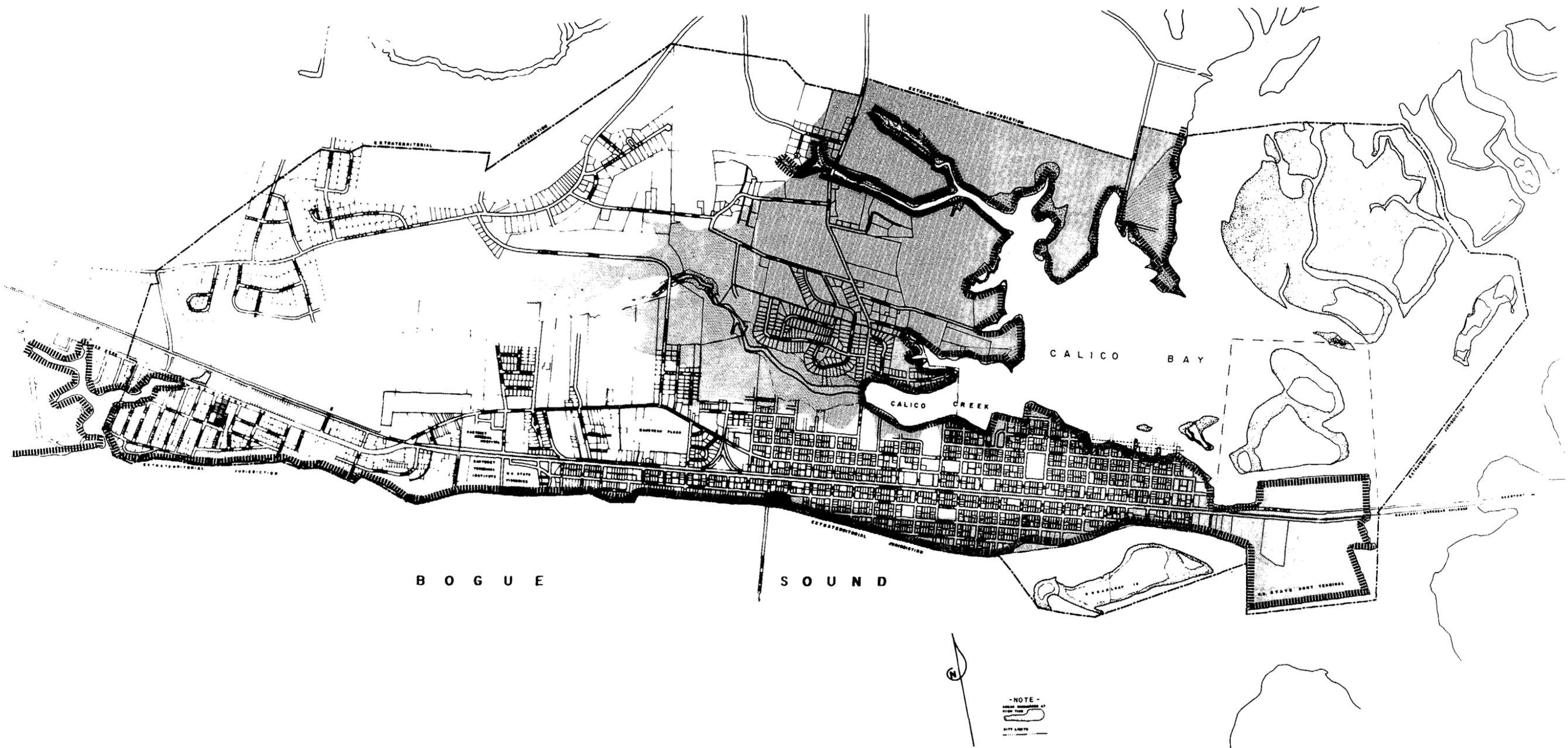
Most of the developing areas in and around Morehead City are above the 100-year flood plain with two notable exceptions. First, the area directly to the north of Calico Creek and continuing north to the end of the Town's planning jurisdiction is within "A" zones where the 100-year base flood elevation is 7 feet Above Mean Sea Level. The second is proposed waterfront condominium developments on Bogue Sound either side of Third Street and between Eighth and Ninth Streets. These will be multi-story units with the first habitable floor above the 100-year flood elevation. Some additional development may occur in the Estuarine Shoreline AEC but because of the narrowness of this zone, it is expected to be relatively minor.

F. Existing Morehead City Hazard Mitigation Policies and Regulations

Morehead City regulates development in hazard areas primarily through its zoning ordinance and flood plain management regulations. Development in AEC's must conform with State guidelines. The primary provisions of the Morehead City Zoning Ordinance and Floodplain Damage Prevention Ordinance related to hazard area development are summarized below.

Morehead City Zoning Ordinance

1. Single family residences, duplexes and multi-family structures are allowed in the Town's residential districts as permitted uses regardless of whether such districts are located in hazard areas.
2. Mobile Home parks are only allowed in the R-15M Residential District and are subject to special development standards as outlined by Section 11-A of the zoning ordinance.
3. Mobile homes on individual lots are permitted uses in the R-15M residential zoning districts and are subject to "special exceptions" which require minimum foundation standards, tie-downs, and other specific considerations.
4. Non-conforming structures (i.e. those not meeting setback or other similar requirements) cannot be enlarged or altered in any way which increases the non-conformity unless a variance is granted; such structures can be repaired or restored if damage does not exceed 75 percent of assessed value or 50 percent of replacement cost, whichever is smaller.



LEGEND

 100 YEAR FLOOD PLAIN

 ESTUARINE SHORELINE AREAS OF ENVIRONMENTAL CONCERN

This map is for planning purposes only; the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

MOREHEAD CITY, N.C.

SATILLA PLANNING, INC. GEORGE EICHLER & ASSOC.
 St. Marys, Georgia Atlanta, Georgia

JUNE, 1984 

Storm Hazard Areas

MAP ONE

5. Non-conforming uses cannot be re-established if discontinued for 180 days. The ordinance does not address repair or replacement of non-conforming uses beyond this provision.

Flood Plain Management Regulations

The Town's floodplain management regulations were adopted during 1977 to meet requirements of the National Flood Insurance Program. The terms of this ordinance include:

- 1) New or substantially improved (improvements greater than 50% of value) residential structures must be elevated to or above the 100-year flood elevations (7 to 9 feet in "A" zones).
- 2) Non-Residential buildings must be elevated to the base flood level or flood-proofed.
- 3) Open space or breakaway walls must be used below base flood elevation in the "V" zones. (Not applicable as there are no "V" zones in Morehead City).
- 4) The design and installation of pilings or columns used as structural support must be certified by an architect or engineer in meeting loads and water flow.
- 5) No use of fill for structural support shall occur in the "V" zone. (Not applicable as there are no "V" zones in Morehead City).
- 6) No new mobile home parks, or expansion of existing parks, or the placement of new mobile homes are allowed in "V" zones. (Not applicable since there are no "V" zones in Morehead City).
- 7) Mobile homes must be anchored and be placed above flood elevations.
- 8) Subdivision proposals must be designed to minimize flood damage.

G. Recommended Hazard Mitigation Policies

The entire Town of Morehead City is susceptible to significant storm damage from a hurricane or a storm of similar magnitude. About one-half of the Town's planning area is located in AEC's or in areas susceptible to flooding associated with the 100-year storm. However, most of the Town's vacant land that is available for development is above the 100-year flood level. The entire town is susceptible to significant damage. In general, the Town's existing mitigation

policies meet the requirements for hazard mitigation planning outlined in Before the Storm. Specifically:

1. The Town's policies support and are consistent with State policies and regulations for development in Areas of Environmental Concern.
2. All new development must conform with the provisions of the N.C. Building Code.
3. The Town's floodplain development policies conform with all Federal and State requirements.
4. The Town does a good job of controlling mobile home developments in order to minimize hazard damages. Mobile homes are restricted to a specific district and must conform with elevation and other requirements.
5. Subdivisions must be designed to minimize flood damage.

The general conclusion is that Morehead City is already doing a good job to mitigate future storm damages, and that the Town's policies meet both the requirements and philosophical objectives delineated in Before the Storm. Further, Morehead City does not face the threat of extensive property destruction from hurricanes or the phenomenal growth rate being experienced by Carteret County's Bogue Banks communities. The Town's inland location affords it some protection from the direct assault of a hurricane and vast majority of the Town's housing stock is located above the 100-year flood plain.

The only recommended modification of the Town's policies concerns the non-conforming uses and structures section of the Zoning Ordinance. First, Section 4-2, Repairs and Maintenance, should be amended to include non-conforming structures. Secondly, the non-conforming structures Section (4-3) should be amended to delete reference to 75 percent of the assessed value in determining at which point of destruction a non-conforming structure cannot be re-built. The reference to 50 percent of replacement value or cost is the recommended determining factor. If such a structure is damaged beyond this point, it should only be rebuilt if it is brought into compliance with all applicable provisions of the Zoning Ordinance, Flood Damage Prevention Ordinance and the N.C. Building Code. Finally, the non-conforming use Section(4-3) should be amended to prohibit continuance or rebuilding if the structure is damaged beyond 50 percent of its replacement value. Again, continuance after such damage should only be allowed if all applicable regulations can then be met. To assist in making these revisions, the definitions Section (Two) should be amended to include a definition for "non-conforming structures".

The rationale behind these recommended changes is that if a building is destroyed that did not formerly comply with local codes, it should not be rebuilt unless it does meet all existing requirements.

III. MOREHEAD CITY POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The Plan provides the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community and report this damage to the County Emergency Services Coordinator.
2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).

3. DEM compiles local data and makes recommendations to the Governor concerning state actions.
4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

The Town has been provided a comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm. The programs fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Morehead City.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the Town. While damage assessment (Sections B and C) will be the first operations conducted by the Town after a disaster, it should be realized that the recommended recovery operations (Section D) will begin simultaneously. The remainder of this chapter is, therefore, organized as follows:

- 1) Procedures that Morehead City should follow to carry out its damage assessment program to meet all federal and state requirements including organization of the damage assessment team and recommended damage assessment procedures.
- 2) An overall organizational framework for restoration operations after the emergency period.
- 3) Replacement/Reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Morehead City personnel available to assume these responsibilities.

Administrative

City Manager
2 Building Inspectors

Police

1 Police Chief
14 Officers

Town Officials

1 Mayor
5 Council Members

Fire

1 Chief
12 Engineers
20 Volunteers

Public Works

1 Director

Streets & Sanitation

1 Superintendent
1 Labor Supervisor

Public Utilities

1 Director
1 Labor Supervisor

Recreation

1 Director

Rescue

1 Captain
20 Volunteers

The Chief Building Inspector should head the Damage Assessment Team. Other members of the team should consist of the Fire Chief, volunteers recruited from the community, and

the other Building Inspector. The Building Inspectors, Fire Chief and volunteers must be recruited, organized and trained prior to a storm occurrence. There should also be back-ups or alternates to ensure the availability of adequate resources.

The suggested make-up of the Morehead City Damage Assessment Team is as follows:

- o Building Inspector (Team Chief)
- o Fire Chief
- o Building Inspector
- o Local Property Appraiser (MAI or qualified broker) *
- o Building Contractor *
- o Architect *

* Community Volunteer

The Mayor should immediately undertake a recruitment effort to secure the necessary volunteers and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).
- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, street signs, house addresses and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure.

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Town Clerk. Specific administrative employees in Town Hall should be assigned to assist in carrying out this task.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.
- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project listing the property values of existing structures on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 1 to 2 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

Additionally, the average value of flood insurance coverage that is carried by program participants needs to be determined. County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the floodplain have 75% to 80% coverage. Overall, it was estimated that only 10%-15% of all homes in the flood plain have insurance covering 75%-80% of the improvements. The Town should verify these estimates and update this information annually before the hurricane season.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within the Town should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of Town tax maps and multiplied by the following percentages for appropriate damage classification category.
 - o Destroyed - 100%
 - o Major Damage - 50%
 - o Minor Damage (uninhabitable) - 25%
 - o Habitable - 10%
3. The total value of damages for the Town should then be summarized and reported, as required, to the County Emergency Operations Center.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. Organization of Recovery Operations

Damage assessment operations are oriented to take place during the emergency period. After the emergency operations to restore public health and safety and the initial damage assessments are completed, the State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created. In Morehead City, the Mayor and Town Council should assume the responsibilities of such a Task Force with the City Manager directing day-to-day operations based on the policy guidance received from the Mayor and Town Council. The following must be accomplished:

1. Establishing reentry procedures for secured areas such as the waterfront and areas that were evacuated.
2. Establishing an overall restoration schedule.
3. Setting restoration priorities.
4. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
5. Keeping the appropriate County and State officials informed using Situation and Damage Reports.
6. Keeping the public informed.
7. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
8. Proclaiming a local "state of emergency" if warranted.
9. Commencing cleanup, debris removal and utility restoration activities undertaken by private utility companies.
10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until

after a storm hits and the magnitude of the damage can be assessed. The following sequence of activities and schedule is submitted as a guide which should be reconsidered by the Mayor and Town Council and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1. Complete Initial Damage Assessment	Immediately after storm passes
2. Complete Second Phase Damage Assessment	Completed by second week after the storm
3. Prepare Summary of Reconstruction Needs	Completed one week after damage second phase is completed.
4. Decision with Regard to Imposition of Temporary Development Moratorium	One week after second phase damage assessment is completed
5. Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed one week after summary of reconstruction needs is completed
6. Begin Repairs to Critical Utilities and Facilities	As soon as possible after disaster
7. Permitting of Reconstruction Activities for all Structures Receiving Minor Damage Not Included in Development Moratorium Areas	One week after second phase damage assessment is complete
8. Permitting of Reconstruction Activities for all Structures Receiving Major Damage Not Included in Development Moratorium Areas	Two weeks after second phase damage assessment is complete
9. Initiate Assessment of Existing Mitigation Policies	Two weeks after second phase damage assessment is complete
10. Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	The length of the period for conducting re-evaluation and receiving input from the State should not exceed two months.

<u>Activity</u>	<u>Time Frame</u>
11. Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium	Two months after Temporary Development Moratorium is imposed. (Subject to change based on circumstances encountered)
12. Permit New Development	Upon suspension of any temporary development moratorium

E. Recommended Reconstruction Policies

All the following policies have been designed to be 1) considered and adopted by the Mayor and Council of Morehead City prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Reentry

1. Reentry of secured areas or evacuated areas by property owners shall not be permitted until 1) the critical damage assessment has been completed; 2) the Mayor proclaims such areas of the Town safe to re-enter.
2. A list of Morehead City property owners and business proprietors shall be maintained at the Emergency Operations Center. Valid identification must be shown in order to proceed into evacuated or secured areas. Passes shall be issued and displayed at all times until the State of Emergency is officially lifted.

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Morehead City Zoning Ordinance, and the Morehead City Floodplain Management Regulations, and State regulations for development in AEC's, if applicable.
3. All structures suffering minor damage as defined in the Morehead City Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition.

4. For all structures in designated AEC's and for all mobile home locations, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern, and the Morehead City Floodplain Management Regulations appeared adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Mayor and Council.

Utility and Facility Reconstruction

All damaged water systems components shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

There is no doubt that Morehead City will suffer significant and serious damages should a major storm have its landfall in its vicinity. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Morehead City, such a situation is most likely to occur along the waterfront and in flooded areas.

The Morehead City policy regarding the proclamation of temporary development moratoriums shall be:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Morehead City Floodplain Management Regulations appeared adequate in minimizing storm damages. For AEC's where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
2. After imposing a Temporary Development Moratorium for an AEC, the Town of Morehead City shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities so similar, in order to determine how local regulations for those hazard areas, which are based on State and or Federal guidelines or requirements, should be improved or modified. A response from the State within a reasonable time period as determined through negotiations should be requested.
3. The Temporary Building Moratorium in all AEC's shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordance with existing regulations and requirements.

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Morehead City has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing stricter standards if it desires. This is a problem that the

Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The Town policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

TOWN OF PINE KNOLL SHORES

NORTH CAROLINA

STORM HAZARD MITIGATION PLAN

&

POST DISASTER RECONSTRUCTION PLAN

JUNE, 1984

STORM HAZARD MITIGATION PLAN
AND
POST DISASTER RECONSTRUCTION PLAN

Prepared for

THE TOWN OF PINE KNOLL SHORES, NORTH CAROLINA

By:

George Eichler & Associates
and
Satilla Planning, Inc.

June 1, 1984

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I. INTRODUCTION

The North Carolina Coastal Resources Commission has adopted rules for "Storm Hazard Planning" which require the incorporation of such a planning program into the land use plans that local coastal communities are required to prepare.

The Commission's rules are designed to implement a storm hazard planning process that is outlined in Before the Storm: Managing Development to Reduce Hurricane Damages. That publication was prepared for the Office of Coastal Management of the North Carolina Department of Natural Resources and Community Development to be used as a guide for local storm hazard planning efforts.

The objective of this report is to present storm hazard mitigation and post disaster reconstruction plans for Pine Knoll Shores that 1) meet specific needs of the Town; and 2) conform with the adopted State rules for storm hazard planning.

The remainder of this report describes Pine Knoll Shores' storm hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Post Disaster Reconstruction Plan.

II. PINE KNOLL SHORES STORM HAZARD MITIGATION PLAN

A. Existing Development

Pine Knoll Shores is bounded by Atlantic Beach (Planning Jurisdiction) on the east, the Atlantic Ocean on the south, Indian Beach to the west and Bogue Sound on the North. The town recently expanded its jurisdiction by annexing an area to the west, bringing its corporate limits to meet those of Indian Beach.

Unlike other Bogue Banks communities, Pine Knoll Shores' development plans are oriented toward accommodating retirees and second home owners, principally in single family homes. The Town, through a 1981 update of its land use plan, has de-emphasized the provision of commercial services to tourists and has also rezoned significant land areas from moderate density to single family homes. The Town does not anticipate any further development of motels, which can now accommodate 1,700 persons. In short, Pine Knoll Shores has done an excellent job of defining how it wishes to develop through plans, policies and ordinances and has successfully implemented these plans.

Table 1 presents population projections for the years 1980, 1985, 1990 and 2000 from the 1981 land use plan update. An ultimate build-out capacity based on existing zoning and platted lots was also provided by the plan.

TABLE 1
PINE KNOLL SHORES POPULATION PROJECTIONS

<u>YEAR</u>	<u>MAXIMUM SEASONAL</u>	<u>YEAR ROUND</u>
1980	3,413	775
1985	4,670	---
1990	6,270	---
2000	8,870	---
Ultimate Buildout	9,260	2,960

Tabulations for both existing land use and zoning are provided in Table 2. The Town's strong land use planning and management program make existing zoning very meaningful in projecting future land use. In other words, it is much more likely that the Town will actually develop in accordance with existing zoning than would the typical community. As indicated by Table 2, single family detached dwellings are the dominant developed use and will continue as such. Only recreation areas now exceed single family homes as to current land use. When Pine Knoll Shores is fully developed, single family homes are expected to constitute slightly more than

50% of the Town's land area. Retail commercial land use is extremely minimal in comparison to other beach communities with one-tenth of one percent of the land now being used for this purpose. Ultimately, it is expected that retail commercial will occupy only one percent of the Town's area. This reflects the Town's desire to serve only specific day to day consumer needs of the Town's residents and visitors and not the general tourist market. Future commercial uses are designated at a central area north of the Salter Path Road/ Pine Shores Boulevard intersection.

TABLE 2
LAND USE TABULATIONS

<u>LAND USE CATEGORY</u>	<u>ACREAGE</u>	<u>% OF TOTAL</u>
Single Family Residences	280	20%
Existing Development		
All Platted and Zoned Lots	716	50%
Moderate Density Residential (including motels)		
Existing Development	82	6%
Existing Zoning	150	11%
Retail Commercial		
Existing Development	2	---
Existing Zoning	20	1%
Recreation	473	33%
Municipal Services and Other Uses	<u>71</u>	<u>5%</u>
TOTAL:	1,430 *	100%

Ultimate oceanfront development is expected to consist of about one-half single family detached homes and one-half moderate density residential uses (including the existing motels). The eastern one-half of town north of Salter Path Road is dominated by the original planned single family residential subdivision of Pine Knoll Shores and its golf course. At the west end of Town and north of Salter Path Road, the Roosevelt Natural Area is the dominant land use with a relatively large vacant area that is classified as moderate (maximum 8 dwelling units per acre) density residential development at the western end of the Town.

Table 3 presents estimates and projections of dwelling units by type. The total estimated number of dwelling units increased by 195 or 16% from 1980 to 1983. Condominium units accounted for about 59% of this growth, By the year 2005, it is projected that condominiums will constitute nearly one-half of Pine Knoll Shores' dwelling units, with 1,276 new

units being built. New motel units are not expected due to a density limitation of 8 units per acre. Single family detached units are expected to increase by 565 units during the 22-year period and will continue to account for about a third of all units.

TABLE 3
Estimated and Projected Dwelling Units by Type

	<u>Single Family</u>	<u>Condominium</u>	<u>Motel</u>	<u>Total</u>
1980	357	280	590	1,227
1983	438	394	590	1,422
2005 (maximum anticipated)	1,103	1,670	590	3,363

Source: DeLeuw, Cather and Company - preliminary dwelling unit estimates for N.C.D.O.T. causeway study, 1984, with revisions by George Eichler Associates.

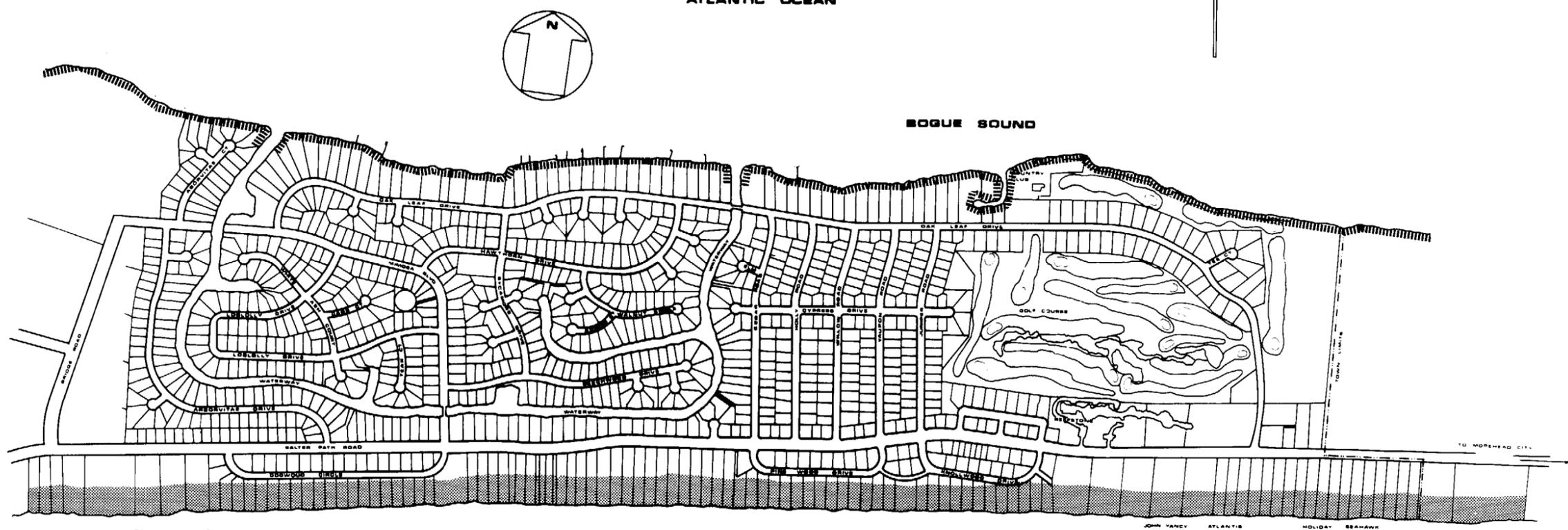
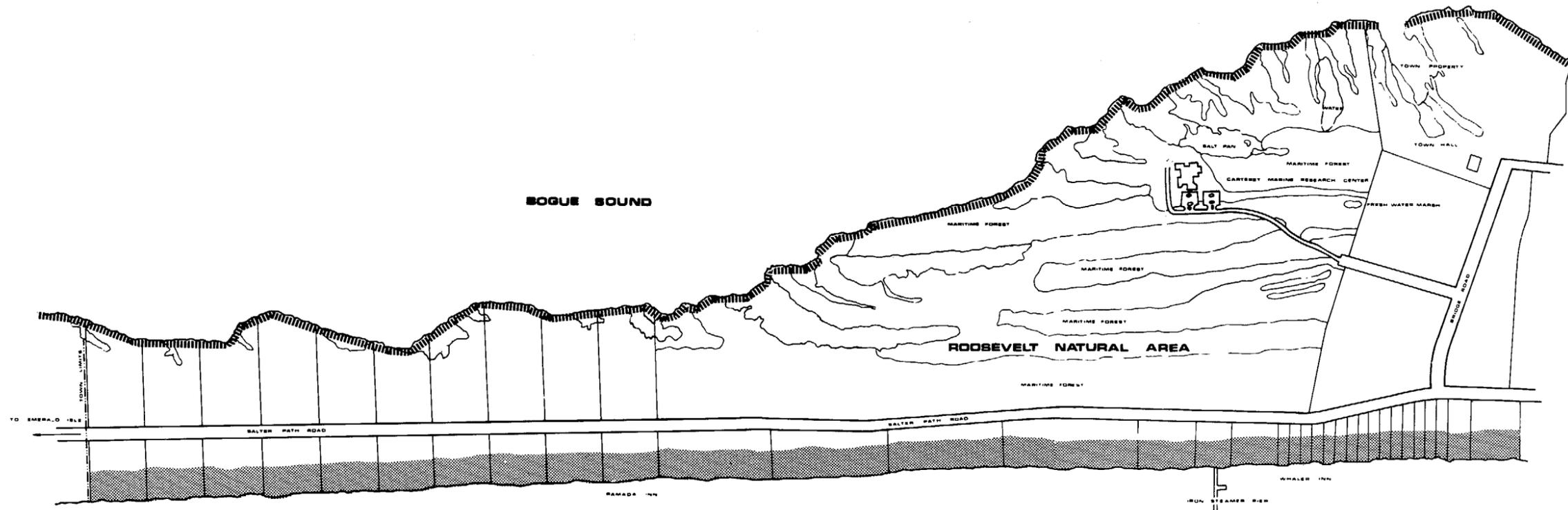
B. Hazard Areas in Pine Knoll Shores

Areas of Environmental Concern (AEC's) located in Pine Knoll Shores consist of: 1) Ocean Erodible AEC's; 2) Estuarine Shoreline AEC's; and 3) Flood Hazard AEC's. While not designated by the State as an AEC, the balance of the 100-year flood plain is also a hazard area that should be addressed by the mitigation plan. The first three AEC's identified above are depicted by Map 1. Map 2 delineates both the Flood Hazard AEC and the balance of the 100-year flood plain.

Ocean Erodible AEC's

These are areas where a substantial possibility of excessive erosion and significant shoreline fluctuations exists. The ocean erodible AEC is based on a setback from the first line of stable natural vegetation plus an additional area where erosion can be expected from storm surges and wave action.

Current State regulations establish ocean erodible AEC's as beginning at the mean low water line. Setback measurements begin at the first line of stable vegetation and continue inland to a depth 60 times the average annual rate of erosion which is two feet in Pine Knoll Shores. The setback in Pine Knoll Shores is therefore 120 feet. In areas where the erosion rate is more than 3.5 feet per year, the setback line is based on a distance of 30 times the long-term annual erosion rate plus 105 feet.



LEGEND

 OCEAN ERODIBLE A.E.C.

 ESTUARINE SHORELINE

This map is for planning purposes only; the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

PINE KNOLL SHORES, N.C.

SATILLA PLANNING, INC. GEORGE EICHLER & ASSOC.
 St. Marys, Georgia Atlanta, Georgia

JUNE, 1984 

Storm Hazard Areas

MAP ONE

Estuarine Shoreline AEC's

Estuarine shorelines are defined as non-ocean shorelines which are especially vulnerable to erosion, flooding or other adverse effects of wind and water and are intimately connected to the estuary. In Pine Knoll Shores, the estuarine shoreline encompasses the area landward from Bogue Sound for a distance of 75 feet from the mean high water level.

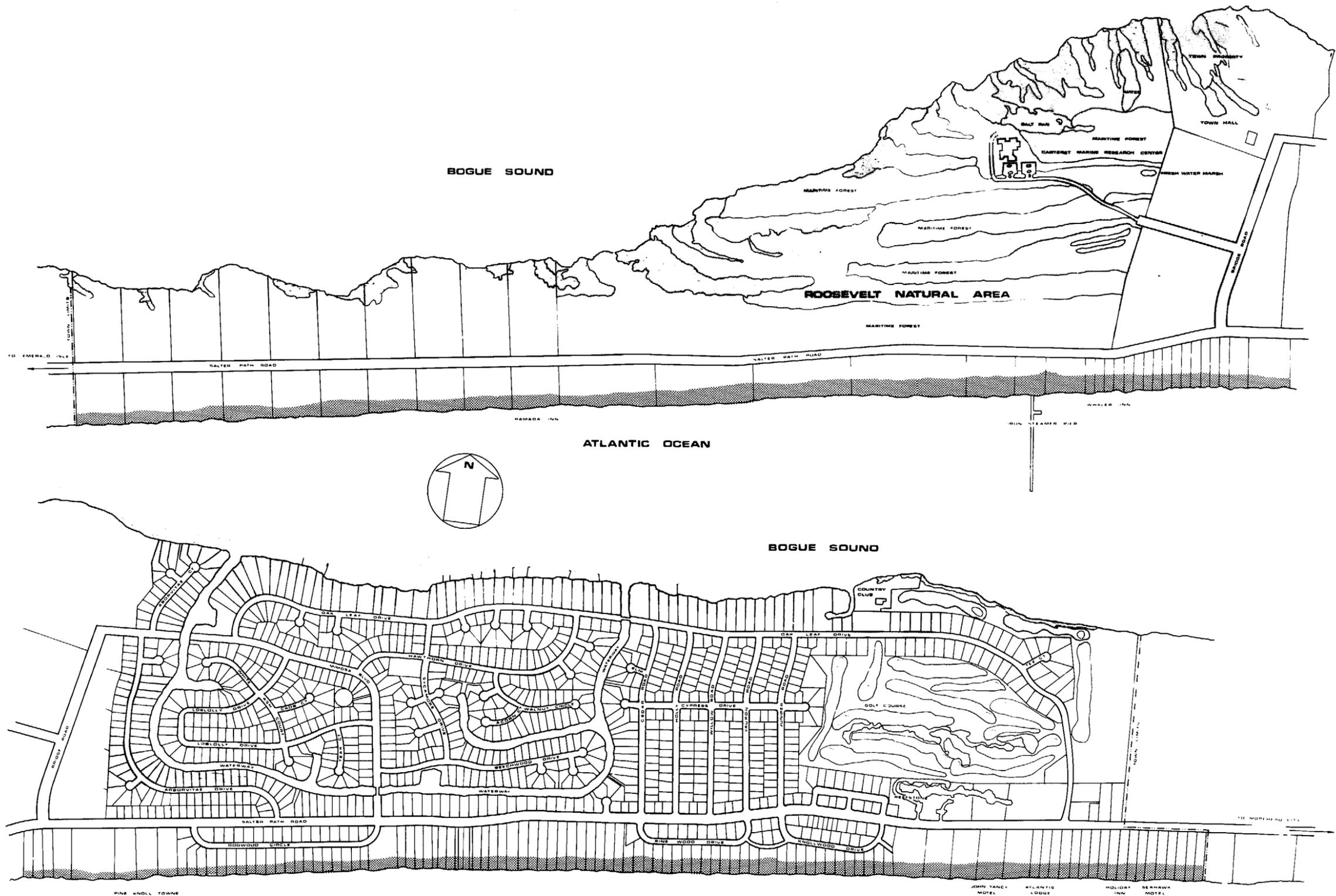
Flood Hazard AEC's

The flood hazard AEC corresponds to the National Flood Insurance Program V-zones, which refer to flood prone areas that are also susceptible to high velocity wave surges. Pine Knoll Shores was converted to the Regular Phase of the National Flood Insurance Program (NFIP) in 1975 with the issuance of Flood Insurance Rate Maps (FIRMS). During the fall of 1983, the Town was presented with a preliminary flood insurance study to update all previous flood hazard maps. The study includes significant changes from the September 28, 1979 FIRM. The most significant change concerns "V" zones along the sound side of the Town which were eliminated. The "C" zones or areas above the 500-year flood were decreased in size, while the "B" zones or areas above the 100-year flood but below the 500-year flood were increased by a corresponding amount.

As delineated on Map 2, the 1983 FIRM designates the oceanfront area approximately 160 feet inland from mean high water as being within "V" zones. Only about 6 percent of the developed or developable areas of the Town are within designated "V" zones. "V" zone flood elevations range from 11 to 16 feet AMSL (Above Mean Sea Level).

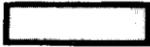
Other Flood Prone Areas

This area is simply the balance of the 100-year flood plain - that area not within "V" zones. Again, Map 2 portrays the area subject to flooding during the 100-year storm in accordance with the 1983 preliminary F.I.R.M. The F.I.R.M. designates these areas as "A" zones. About 17 percent of the town's area is within "A" zones. The vast majority of this is within the Roosevelt Natural Area. The balance of land - approximately 77% - is above the 100-year flood level.



LEGEND

 HIGH HAZARD FLOOD A.E.C. ("V" ZONES)

 BALANCE OF 100 YEAR FLOOD PLAN ("A" ZONES)

This map is for planning purposes only: the A.E.C.'s are approximate and therefore should not be used for permitting purposes.

PINE KNOLL SHORES, N.C.

SATILLA PLANNING, INC. GEORGE EICHLER & ASSOC.
 St. Marys, Georgia Atlanta, Georgia

JUNE, 1984 

Flood Hazard Areas

MAP TWO

C. Existing Development Located In Hazard Areas

In Before the Storm, the following system for classifying hazard areas (shown in Table 4) was presented:

TABLE 4
DEFINITION OF HAZARD AREAS

Forces Present/Expected

Hazard Area Category	<u>Erosion</u>	<u>Wave Action</u>	<u>High Flooding</u>	<u>High Winds</u>	<u>Boundaries</u>
1	x	x	x	x	Ocean erodible AEC's; inlet hazard AEC's; estaurine shoreline AEC's.
2		x	x	x	Flood insurance V-zones
3			x	x	Flood insurance A-zones
4				x	Rest of community

The number of structures within each hazard area based on the above classifications was then determined from an update of the 1981 Land Use Plan's Land Use Inventory as follows:

TABLE 5
STRUCTURES BY HAZARD AREA
(Before the Storm Method)

Hazard Area Category	<u>Residential Units *</u>	<u>Commercial Units</u>
1	12	0
2	12	1
3	138	2
4	<u>1,272</u>	<u>-</u>

* Including motel rooms.

The above Table is not totaled because to do so would be misleading. All the units included in Flood Insurance "V" zones (Category 2) were also in Hazard Area Category 1. Additionally, the structures in estaurine shoreline AEC's are also in Flood Insurance "A" zones.

Pine Knoll Shores does not have a central sewage disposal system but there are privately owned package treatment systems to treat sewage from motels and condominiums. Individual septic systems handle the balance of sewage disposal requirements. Septic and package plant systems used to serve the units identified as being in categories 2 or 3 in Table 5 are generally in flood hazard areas.

The Carteret County '201' Facilities Plan proposed that Pine Knoll Shores and Atlantic Beach be served by a single sewage treatment plant. While Atlantic Beach is pursuing central sewage treatment, Pine Knoll Shores has officially determined not to participate, and does not plan to construct a sewage system.

The Town's water system (privately owned) is supplied by deep wells, with elevated storage tanks. Key components of the system are located out of the 100-year flood plain.

There are no potentially hazardous material storage or disposal sites in Pine Knoll Shores.

D. Estimated Severity of Possible Hazard Area Damages

The current Pine Knoll Shores Tax Digest for real property is \$114,550,708, not including exempt property. About \$43,092,602 or about 38% of the digest is structures or improvements with the balance being land - both vacant or in use. There is \$4,357,600 in assessed personal property. Based on the analysis presented by Table 5, 90% of Pine Knoll Shores' structures are located above the 100-year flood plain. Therefore, it is estimated that 150 structures in Pine Knoll Shores will receive damage from flood waters during a storm event. It is assumed that all structures in Pine Knoll Shores will be subject to damage from high velocity winds. However, damages from this source have not been estimated.

The potential flood damage from a "worst case" standpoint is \$4,310,000. This is the total estimated exposure of all privately owned structures in flood hazard areas. Damage could certainly be higher if erosion exceeds projections for a 100-year storm and the oceanfront motels and condominiums are damaged. Potential damage to the Town's roads, utilities and buildings is certainly significant, but replacement cost is not known.

E. Anticipated Development in Hazard Areas

About 522 acres of developable land remains vacant in Pine Knoll Shores, but most of this land is above the 100-year flood level. If all single family lots are developed,

only 56 additional homes will be in the flood plain. Development in Ocean Erodible Areas is not anticipated due to the Town's setback requirements. The only significant and future development anticipated to occur is commercial - most of the 18 vacant acres of land zoned for commercial use are subject to flooding. Some development may occur in the Estuarine Shoreline AEC but because of the narrowness of this zone, it is expected to be relatively minor.

F. Existing Pine Knoll Shores Hazard Mitigation Policies and Regulations

Pine Knoll Shores regulates development in hazard areas primarily through its zoning ordinance, waterways ordinance, subdivision regulations and flood plain management regulations. The primary provisions of these regulations related to hazard area development are summarized below. In addition to the requirements of these ordinances, development in AEC's must conform with State guidelines.

Pine Knoll Shores Zoning Ordinance

1. Single family residences and multi-family structures are allowed in the Town's residential districts as permitted uses regardless of whether such districts are located in hazard areas.
2. Mobile Homes either in parks or on individual lots are not permitted in any of the Town's zoning districts.
3. Non-conforming structures (i.e. those not meeting setback or other similar requirements) are not specifically dealt with by the Pine Knoll Shores zoning ordinance.
4. Non-conforming uses cannot be re-established if abandoned or discontinued for twelve consecutive months. Structures housing non-conforming uses can be re-built or repaired so long that such repairs or reconstruction is commenced within one year of the date of damage and completed in a "prompt and orderly manner".

Waterways Ordinance

This ordinance's scope is designed to regulate development in and adjacent to the waterways (canals) within the town; primarily those that are part of the single family residential subdivision between Pine Knolls Boulevard and the Golf Course. The maximum distance a structure may extend into a waterway is established by this ordinance.

Subdivision Regulation Ordinance

- 1) Section 4.4 of this ordinance requires that "the design of all lots, structures, and utilities shall comply with the applicable AEC standards as prescribed by the State Guidelines for Areas of Environmental Concern issued pursuant to the Coastal Area Management Act."
- 2) Section 4.4 states that "land determined by the Town, State or Federal governments or other agencies to be uninhabitable shall not be platted for residential or commercial occupancy, nor for such other uses as may increase danger to health, life or property, or aggravate the flood hazard, but such land may be set aside for such uses as will not be endangered by periodic or occasional inundation."

Flood Plain Management Regulations

The Town's floodplain management regulations were adopted during September, 1977 and were amended in December, 1981 to conform with National Flood Insurance Program requirements. The Floodplain Management Ordinance creates a Flood Hazard Zoning District which is an "overlay" district to other zoning districts. The following summarizes the ordinance's terms:

- 1) New or substantially improved (repair or improvements greater than 50% of structure value) residential structures must be elevated to or above the 100-year flood elevations (11 to 16 feet in "V" zones and 7 to 10 feet AMSL in "A" zones).
- 2) New or substantially improved commercial buildings located in either the "V" or "A" zones must be elevated to the base flood level or flood-proofed.
- 3) Open space or breakaway walls must be used below base flood elevation in the "V" zones.
- 4) New or replacement water and sewerage facilities in flood zones must be flood-proofed.
- 5) No use of fill for structural support shall occur in the "V" zone.

G. Recommended Hazard Mitigation Policies

The entire Town of Pine Knoll Shores is susceptible to significant storm damage from a hurricane or a storm of similar magnitude. About 25% of the Town's developable areas are located in AEC's or in areas susceptible to flooding associated with the 100-year storm. Virtually all vacant land that is generally available for development is above the 100-year floodplain. The entire Town is susceptible

to wind damage. The Town's existing mitigation policies meet the requirements for hazard mitigation planning outlined by State regulations. Specifically:

1. The Town's policies support and are consistent with State policies and regulations for development in Areas of Environmental Concern.
2. All new development must conform with the provisions of the N.C. Building Code.
3. The Town's floodplain development policies conform with all Federal and State requirements (although an update may be required in connection with the new flood insurance rate maps).
4. The Town does not allow mobile homes, which are particularly susceptible to storm damage, anywhere within its jurisdiction.
5. The Town's oceanfront setbacks are more stringent than C.A.M.A.'s which exclude single family homes.
- 6) The Town's density limitation on multi-family development is stringent and will keep overall densities and ultimate population during peak season within manageable proportions.

The conclusion is that Pine Knoll Shores is already doing an excellent job to mitigate future storm damages. Additionally, the Town's efforts are enhanced by its natural topography. The modification of only two Town policies is recommended. First, the zoning ordinance should specifically address non-conforming structures and treat the repair, extension and alteration of such in much the same manner as non-conforming uses are dealt with. Secondly, the Town's non-conforming use regulations should be revised so that such uses damaged beyond 50% of their value are not permitted to rebuild in the same location. The rationale is that if a building is for all practical purposes destroyed, and if it is classified under the terms of the zoning ordinance as non-conforming, it should not be allowed to rebuild unless it can meet all applicable regulations as to zoning, flood hazard, building code, health codes, etc. This same percentage of destruction should apply to non-conforming structures for the same reasons. These changes would also make the zoning ordinance and flood plain management regulations more compatible.

III. PINE KNOLL SHORES POST-DISASTER RECONSTRUCTION PLAN

A. Introduction

A post-disaster plan provides a program that will permit a local government to deal with the aftermaths of a storm in an organized and efficient manner. The primary purpose of this plan is to provide the mechanisms, procedures, and policies that will enable a local community to learn from its storm experiences and to rebuild the community in a wise and practical manner. Specific disaster relief activities such as communications, public information, etc. are not addressed in detail by this plan. It is intended that the Carteret County Disaster Relief and Assistance Plan address these recovery requirements.

A post-disaster reconstruction plan encompasses three distinct reconstruction periods:

- o The emergency period is the reconstruction phase immediately after a storm. The emphasis is on restoring public health and safety, assessing the nature and extent of storm damage, and qualifying for and obtaining whatever federal and state assistance might be available.
- o The restoration period covers the weeks and months following a storm disaster. The emphasis during this period is on restoring community facilities, utilities, essential businesses, etc. so that the community can once again function in a normal manner.
- o The replacement reconstruction period is the period during which the community is rebuilt. The period could last from months to years depending on the nature and extent of the damages incurred.

It is important that local officials clearly understand the joint federal-state-local procedures for providing assistance to rebuild after a storm so that local damage assessment and reconstruction efforts are carried out in an efficient manner that qualifies the community for the different types of assistance that are available. The requirements are generally delineated in the Disaster Relief Act of 1974 (P.L. 93-288) which authorizes a wide range of financial and direct assistance to both local communities and individuals. The sequence of procedures to be followed after a major storm event is as follows:

1. Local damage assessment teams survey storm damage within the community and report this damage to the

County Emergency Services Coordinator.

2. Damage information is compiled and summarized by the County, and the nature and extent of damage is reported to the North Carolina Division of Emergency Management (DEM).
3. DEM compiles local data and makes recommendations to the Governor concerning state actions.
4. The Governor may request a Presidential declaration of "emergency" or "major disaster". A Presidential declaration makes a variety of federal resources available to local communities and individuals.
5. Federal Relief assistance provided to a community after an "emergency" has been declared typically ends one month after the initial Presidential declaration. Where a "major disaster" has been declared, federal assistance for "emergency" work typically ends six months after the declaration and federal assistance for "permanent" work ends after 18 months.

Federal disaster assistance programs previously provided aid for communities to rebuild in the same way as existed before the disaster occurred. This policy tended to foster recurring mistakes. However, recent federal policy has started to change the emphasis of disaster assistance programs. Specifically,

- o Executive Order 1198 (Floodplain Management) directs all federal agencies to avoid either directly or indirectly supporting future unwise development in floodplains (e.g. through sewer grants in locations that foster floodplain development).
- o Section 406 of the Disaster Relief Act can require communities, as a prerequisite for federal disaster assistance, to take specific actions to mitigate future flood losses.

A comprehensive listing of the Federal Disaster Assistance Programs that may be available following a major storm has been provided to Town Officials. These programs fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore all the programs listed may not be applicable to Pine Knoll Shores.

The remainder of this chapter presents recommended recovery procedures in the general sequence of response by the Town. While damage assessment (Sections B & C) will be the first operation conducted by the Town after a disaster, it should be realized that the recommended restoration

operations (Section D) will begin simultaneously. This chapter, therefore, is organized as follows:

- 1) Procedures that Pine Knoll Shores should follow to carry out its damage assessment program to meet all federal and state requirements including organization of the damage assessment teams and recommended damage assessment procedures.
- 2) An organizational framework for restoration operations after the emergency period.
- 3) Replacement/reconstruction policies that the Town should adopt to insure that future development that does occur in local hazard areas is constructed in a manner consistent with sound land use planning, public safety considerations, and existing and evolving federal and state policy.

B. Organization of Local Damage Assessment Team

A local damage assessment team should include individuals who are qualified to give reliable estimates of the original value of structures, an estimated value of sustained damages and a description of the repairs (and costs) that will be needed to rebuild each structure. Following is a listing of Pine Knoll Shores personnel including volunteers available to assume these responsibilities:

Administrative

Town Clerk
Deputy Clerk
Receptionist(part-time)

Police

1 Police Chief (also serves as Fire Chief)
1 Training Officer
3 Officers

Town Officials

1 Mayor
5 Commissioners

Civil Preparedness

Director
4 Assistant Directors
5 Area Coordinators
Block Captains (the number changes as the town grows)

The Building Inspector should head the Damage Assessment Team. Other members of the team should consist of the Assistant Civil Preparedness Director for damage assessment, and the Civil Preparedness Block Captains. The Building Inspector and other Team members must be recruited, organized and trained prior to a storm occurrence. There should also be back-ups or alternates to ensure the availability of adequate resources.

The suggested make-up of the Pine Knoll Shores Damage Assessment Team is as follows:

- o Building Inspector (Team Chief)
- o Assistant Civil Preparedness Director for Damage Assessment
- o Block Captains

The Mayor should immediately undertake a recruitment effort to secure the necessary team members and to establish a training program to familiarize the members of the damage assessment team with required damage classification procedures and reporting requirements. In doing so, it must be recognized that it might be very difficult to fill certain positions, such as the building contractor position, because the services of individuals with such skills will likely be in a great demand after a storm disaster.

C. Damage Assessment Procedures and Requirements

Damage assessment is defined as a rapid means of determining a realistic estimate of the amount of damage caused by a natural or man-made disaster. For a storm disaster, it is expressed in terms of 1) number of structures damaged; 2) magnitude of damage by structure type; 3) estimated total dollar loss; and 4) estimated total dollar loss covered by insurance.

After a major storm event, members of the Damage Assessment Team should report to the Emergency Operations Center prior to deployment. There are about 1,400 dwelling units in the town. The extent of damage will depend on the magnitude of the storm and where landfall occurs along the Atlantic coast. Because of the potentially large job at hand, the limited personnel resources available to conduct the assessments, and the limited time within which the initial assessment must be made, the first phase of the assessment should consist of only an external visual survey of damaged structures. A more detailed second phase assessment can be made after the initial damage reports are filed.

The initial damage assessment should make an estimate of the extent of damage incurred by each structure and identify the cause (wind, flooding, wave action, combination, etc.) of the damage to each structure.

Damaged structures should be classified in accordance with the suggested State guidelines as follows:

- o Destroyed (repairs would cost more than 80 percent of value).
- o Major (repairs would cost more than 30 percent of the value).

- o Minor (repairs would cost less than 30 percent of the value, but the structure is currently uninhabitable).
- o Habitable (some minor damage, with repairs less than 15 percent of the value).

It will be necessary to thoroughly document each assessment. In many cases, mail boxes and other information typically used to identify specific structures will not be found. Consequently, the Damage Assessment Team must be provided with tax maps, other maps and photographic equipment in order to record and document its field observations. Enough information to complete the Damage Assessment Worksheet must be obtained on each damaged structure.

The second phase of the Damage Assessment Operation will be to estimate the value of the damages sustained. This operation should be carried out in the Emergency Operations Center under the direction and supervision of the Town Clerk. Specific administrative employees in Town Hall should be assigned to assist in carrying out this task.

In order to estimate total damage values it will be necessary to have the following information available for use at the Emergency Operations Center:

- o A set of property tax maps identical to those utilized by the damage assessment field team.
- o Copies of all Town property tax records. This information should indicate the estimated value of all commercial and residential structures within the Town. Because time will be of the essence, it is recommended that the Town immediately commence a project listing the property values of existing structures on the appropriate lots of the property tax maps that will be kept at the Emergency Operations Center. While somewhat of a tedious job, it should be manageable if it is initiated now and completed over a 1 to 2 month period. The information will prove invaluable if a storm disaster does occur. This set of tax maps should be updated annually prior to the hurricane season.

County officials recently polled local mortgage institutions to determine the average flood insurance policy coverage and the estimated number of property owners in flood hazard areas that carry the insurance. The results of this May, 1984 survey were that 75% of the homeowners with mortgaged property in the flood plain have 75% to 80% coverage. Overall, it was estimated that only 10% to 15% of all homes in the flood plain have insurance covering 75% to

80% of the improvements. The Town should verify these estimates and update this information annually before the hurricane season. This information should then be kept available in the Emergency Operations Center for estimating the value of sustained damages covered by flood hazard insurance.

In order to produce the damage value information required, the following methodology is recommended:

1. The number of businesses and residential structures that have been damaged within the Town should be summarized by damage classification category.
2. The value of each damaged structure should be obtained from the marked set of Town tax maps and multiplied by the following percentages for appropriate damage classification category.
 - o Destroyed - 100%
 - o Major Damage - 50%
 - o Minor Damage (uninhabitable) - 25%
 - o Habitable - 10%
3. The total value of damages for the Town should then be summarized and reported, as required, to the County Emergency Operations Center.
4. The estimated value loss covered by hazard insurance should then be determined by: 1) estimating full coverage for all damaged structures for situations where the average value of such coverage exceeds the amount of damage to the structure; and 2) multiplying the number of structures where damage exceeds the average value of insurance coverage by the average value of such coverage.

The Damage Assessment Plan is intended to be the mechanism for estimating overall property damage in the event of a civil disaster. The procedure recommended above represents an approach for making a relatively quick, realistic "order of magnitude" damage estimate after a disaster.

D. Organization of Restoration Operations

State guidelines suggest that a Recovery Task Force to guide restoration and reconstruction activities be created after emergency operations to restore public health and safety, and the initial damage assessment, is completed. In Pine Knoll Shores, the Mayor and Commission should assume the responsibilities of such a Task Force with the Town Clerk directing day-to-day operations based on the policy guidance received from the Mayor and Commission. The following must

be accomplished:

1. Establishing reentry procedures.
(See Reentry - Page 21)
2. Securing private and public property.
3. Establishing emergency communications.
4. Establishing an overall restoration schedule.
5. Setting restoration priorities.
6. Establish fire and explosion control procedures.
7. Determining requirements for outside assistance and requesting such assistance when beyond local capabilities.
8. Determine need for emergency housing and work with the County to provide.
9. Keeping the appropriate County and State officials informed using Situation and Damage Reports.
10. Keeping the public informed.
11. Assembling and maintaining records of actions taken and expenditures and obligations incurred.
(A standard form should be used for this task; example provided as Appendix).
12. Proclaiming a local "state of emergency" if warranted (procedures are part of the County's Disaster Relief and Assistance plan).
13. Commencing cleanup, debris removal and utility restoration activities undertaken by private utility companies.
10. Undertaking repair and restoration of essential public facilities and services in accordance with priorities developed through the situation evaluations.
11. Assisting private businesses and individual property owners in obtaining information on the various types of assistance that might be available to them from federal and state agencies.

In Before the Storm, a sequence and schedule for undertaking local reconstruction and restoration activities is presented. The schedule was deliberately left vague because specific reconstruction needs will not be known until after a storm hits and the magnitude of the damage can be

assessed. The following sequence of activities and schedule is submitted as a guide which should be reconsidered by the Mayor and Commissioners and revised as necessary after the damage assessment activities are completed.

<u>Activity</u>	<u>Time Frame</u>
1. Complete Initial Damage Assessment	Immediately after storm passes
2. Complete Second Phase Damage Assessment	Completed by second week after the storm
3. Prepare Summary of Reconstruction Needs	Completed one week after second phase damage assessment is completed
4. Decision with Regard to Imposition of Temporary Development Moratorium	One week after second phase damage assessment is completed
5. Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed one week after summary of reconstruction needs is completed
6. Begin Repairs to Critical Utilities and Facilities	As soon as possible after disaster
7. Permitting of Reconstruction Activities for All Structures Receiving Minor Damage not Included in Development Moratorium Areas	One week after second phase damage assessment is completed
8. Permitting of Reconstruction Activities for All Structures Receiving Major Damage not Included in Development Moratorium Areas	Two weeks after second phase damage assessment is completed
9. Initiate Assessment of Existing Mitigation Policies	Two weeks after second phase damage assessment is completed
10. Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	The length of the period for conducting re-evaluations and receiving input from the State should not exceed two months

Activity

Time Frame

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 11. Revise Mitigation Policies and Development Standards for Areas Subjected to Development Moratorium and Lift Development Moratorium | Two months after Temporary Development Moratorium is imposed (subject to change based on circumstances encountered) |
| 12. Permit New Development | Upon suspension of any temporary development moratorium |

E. Recommended Reconstruction Policies

All the following policies have been designed to be; 1) considered and adopted by the Mayor and Commissioners of Pine Knoll Shores prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

Reentry

1. Reentry of Pine Knoll Shores town residents and/or property owners shall not be permitted until 1) critical damage assessment has been completed; a 2) the Mayor proclaims the Town safe to re-enter (after the County Control Group issues an overall reentry order).
2. A list of Pine Knoll Shores property owners and residents shall be maintained at the bridge entrances to Bogue Banks. Valid identification must be shown in order to proceed. Passes shall be issued and displayed at all times until the State of Emergency is officially lifted. This procedure will require close coordination and reciprocal agreements with the other Bogue Banks Communities.

Permitting

1. Building permits to restore structures located outside of designated AEC areas that were previously built in conformance with local codes, standards and the provisions of the North Carolina Building Code shall be issued automatically.
2. All structures suffering major damages as defined in the Town's Damage Assessment Plan shall be repaired or rebuilt to conform with the provisions of the North Carolina Building Code, the Pine Knoll Shores Zoning Ordinance, and the Pine Knoll Shores Floodplain Management Regulations.

3. All structures suffering minor damage as defined in the Pine Knoll Shores Damage Assessment Plan shall be permitted to be rebuilt to their original state before the storm condition.
4. For all structures in designated AEC's, a determination shall be made for each AEC as to whether the provisions of the N.C. Building Code, the State Regulations for Areas of Environmental Concern, and the Pine Knoll Shores Flood Plain Management Regulations appeared adequate in minimizing storm damages. For areas where the construction and use requirements appear adequate, permits shall be issued in accordance with permitting policies 1, 2 and 3. For AEC's where the construction and use requirements do not appear to have been adequate in mitigating damages, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
5. Permits shall not be issued in areas subject to a Temporary Development Moratorium until such a moratorium is lifted by the Pine Knoll Shores Town Council.

Utility And Facility Reconstruction

1. All damaged water systems components shall be repaired so as to be elevated above the 100-year floodplain or shall be floodproofed, with the methods employed and the construction being certified by a registered professional engineer.
2. Overhead power lines and utility poles along Salter Path Road present the greatest obstacle to a safe evacuation of residents in the event of a major storm disaster. Relocating these lines underground or moving them away from rights-of-way would be very costly at this time. However, if major damage occurs as a result of a storm, the cost effectiveness would improve and public safety considerations might override economic considerations. Pine Knoll Shores should now request the EMC initiate an assessment of the feasibility of relocating overhead powerlines underground or away from evacuation routes if substantial damage to the existing system is sustained during a major storm.

Temporary Development Moratorium

Under certain circumstances, interim development moratoriums can be used in order to give a local government time to assess damages, to make sound decisions and to learn from its storm experiences. Such a moratorium must be temporary and it must be reasonably related to the public health, safety and welfare.

There is no doubt that Pine Knoll Shores will suffer heavy and serious damages should a major storm have its landfall in its vicinity. Consequently, the Town should be prepared to issue Temporary Development Moratoriums as appropriate.

It is not possible to determine prior to a storm whether a temporary development moratorium will be needed. Such a measure should only be used if damage in a particular area is very serious and if redevelopment of the area in the same manner as previously existed would submit the residents of the area to similar public health and safety problems. In Pine Knoll Shores, such a situation is most likely to occur in one or more of the AEC's.

The Pine Knoll Shores policy regarding the proclamation of temporary development moratoriums shall be:

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Pine Knoll Shores Floodplain Management Regulations appeared adequate in minimizing storm damages. For AEC's where the construction and use requirements do not appear adequate, a Temporary Development Moratorium for all structures located within that specific AEC shall be imposed.
2. To assess the overall damage to non-conforming commercial uses within one week of the storm occurrence and to determine whether a temporary moratorium on the rebuilding of such use suffering major damage should be imposed.
3. After imposing a Temporary Development Moratorium for an AEC, the Town of Pine Knoll Shores shall request that the Coastal Resources Commission conduct a special analysis for the Town and all other communities so similar, in order to determine how local regulations for those hazard areas, which are based on State and or Federal guidelines or requirements, should be improved or modified. A response from the State within a reasonable time period as determined through negotiations should be requested.
4. The Temporary Building Moratorium in all AEC's shall be lifted after local ordinances and regulations have been revised after receiving recommendations from the State or at the discretion of the Mayor and Council if a response is not made within a reasonable period of time. In the latter case, reconstruction shall be permitted in accordance with existing regulations and requirements.

Wind Damage

It is assumed that many structures constructed to conform with the provisions of the North Carolina Building Code will not be able to withstand the accompanying winds if a major hurricane hits the N.C. coast. It is stated in Before the Storm that "the State Building Code, as it now stands, falls short in adequately protecting buildings from the damaging forces of hurricanes and other coastal storms. The Building Code Council, in seeking to maintain uniformity of regulation across the state, has been resistant in the past to allowing more stringent local standards. Another problem small coastal communities are likely to face is a lack of fiscal and staff resources to sponsor the engineering and architectural studies that the Building Code Council requires to justify any local variations to the Code."

While Pine Knoll Shores has no technical studies to indicate that the provisions of the Code are inadequate as they effect the Town, the Town should have some flexibility in imposing stricter standards if it desires. This is a problem that the Coastal Resources Commission must face if it expects local communities to take the initiative in developing effective storm mitigation programs. The Town policy shall be to request the Coastal Resources Commission to carefully assess this problem which is common to all coastal communities.

APPENDIX

Sample Form to Document Town Expenditures and Time of Town Personnel Devoted to Post Disaster Operations

TOWN OF PINE KNOLL SHORES

1) Date: _____

2) Department: _____

3) General Description of Activity/Items Purchased: _____

4) Cost and Number of Items: _____ @ _____ = \$ _____
_____ @ _____ = \$ _____
_____ @ _____ = \$ _____
_____ @ _____ = \$ _____

5) Personnel

<u>Employees Name</u>	<u>Hours Worked Re: Task in #3 Above</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

6) Equipment

<u>Type of Equipment</u>	<u>Hours Used</u>
_____	_____
_____	_____
_____	_____
_____	_____

7) Notes/Miscellaneous:

8) Submitted and verified by: _____
Signature/Date