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STORM HAZARD MITIGATION PLAN

HURRICANE EVACUATION PLAN

POST DISASTER RECONSTRUCTION PLAN

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

Prepared for

THE TOWN OF HOLDEN BEACH, NORTH CAROLINA

By:

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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 planning effort is to present storm hazard mitigation and post disaster reconstruction plans for Holden 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 Holden Beach's hazard planning program. Chapter II presents the Town's Storm Hazard Mitigation Plan. Chapter III presents the Town's Hurricane Evacuation Plan. Chapter IV presents the Town's Post Disaster Reconstruction Plan.

## II. HOLDEN BEACH STORM HAZARD MITIGATION PLAN

### A. Existing Development

Holden Beach's incorporated area consists of the entire Island between Shallotte Inlet on the west and Lockwood Folley Inlet to the east. 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 300 persons.

Table 1 presents the permanent and average seasonal populations for the years 1980, 1985, 1990 and 2000 based on data from the 1980 Land Use Plan Update.

TABLE 1  
HOLDEN BEACH POPULATION PROJECTIONS

<u>YEAR</u>	<u>AVERAGE SEASONAL</u>	<u>PERMANENT</u>
1980	6,800	224
1985	8,600	300
1990	10,400	350
2000	12,647	445

Table 2 indicates existing land use tabulations from the 1980 Land Use Plan update. Most of Holden Beach's developed land is in streets - 55%; Single family residential comprises the next largest category with 32%; 6% is in recreation; 4% in multi-family; 1.5% commercial; and 1% is mobile homes with the balance consisting of uses totaling less than 1 acre each.

TABLE 2  
EXISTING LAND USE TABULATIONS

<u>LAND USE CATEGORY</u>	<u>ACREAGE</u>	<u>% OF TOTAL</u>
Developed Land - Total	365	21%
Streets	201	55%
Single Family Residential	117	33%
Multi-Family	14	4%
Mobile Homes	5	1%
Recreation	22	6%
Commercial & Institutional	6	1%
Undeveloped Land - Total	1,399	79%
Platted and Vacant	349	25%

Unplatted - low and marsh	1,050	75%
TOTAL DEVELOPED		
AND UNDEVELOPED:	1,764	100%

Nearly 75% of the vacant land is considered to be undevelopable under existing regulations. The balance, or about 350 acres, is land that has already been platted and is generally available for development. There were 502 vacant oceanfront lots when the 1980 land use survey was conducted. Using existing average densities (.16 acres/unit or 6.25 units/acre) an additional 1,578 single family homes on individual lots are possible. This would also be allowable under the existing zoning ordinance. Of course, it is not likely that all of this land would be developed as single family but it is important to know the conceivable ultimate size of Holden Beach. This would bring the total possible dwelling units to 3,180 (1,100 existing and 2,080 potential). This times the current seasonal estimate of 6.5 persons per dwelling puts the possible built-out Island population at 20,670 persons during summer months.

Existing commercial development is concentrated near Jordan Boulevard (the bridge approach road); the fishing pier, Surfside Pavillion, with motels located along Ocean Boulevard. Residential development is dispersed relatively uniformly throughout the platted areas.

The 1980 census identified 1,044 dwelling units; the current estimate of total dwelling units is 1,100. Based on 1980 dwelling units and estimated average seasonal population, approximately 6.5 persons occupied each dwelling unit. To reach the 1990 projected population, an additional 223 dwelling units would have to be constructed; and a total of 845 new units to reach the year 2000 projection of 12,649 persons. 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	828
Multi-Family and Motel	208
Mobile Home	<u>64</u>
Total:	1,100

Table 3 illustrates that Holden Beach is predominantly a single family vacation/second home community with more than 75% of its housing stock falling in this category.

## B. Hazard Areas in Holden Beach

Areas of Environmental Concern (AEC's) located in Holden Beach 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. There are also three residential areas on the western half of the Island that are developed along finger canals and subject to hazard. The first three AEC's identified above are depicted by Map One. Map Two delineates both the Flood Hazard AEC, the balance of the 100-year flood plain, and highlights the finger canal developments.

### Ocean Erodible AEC's

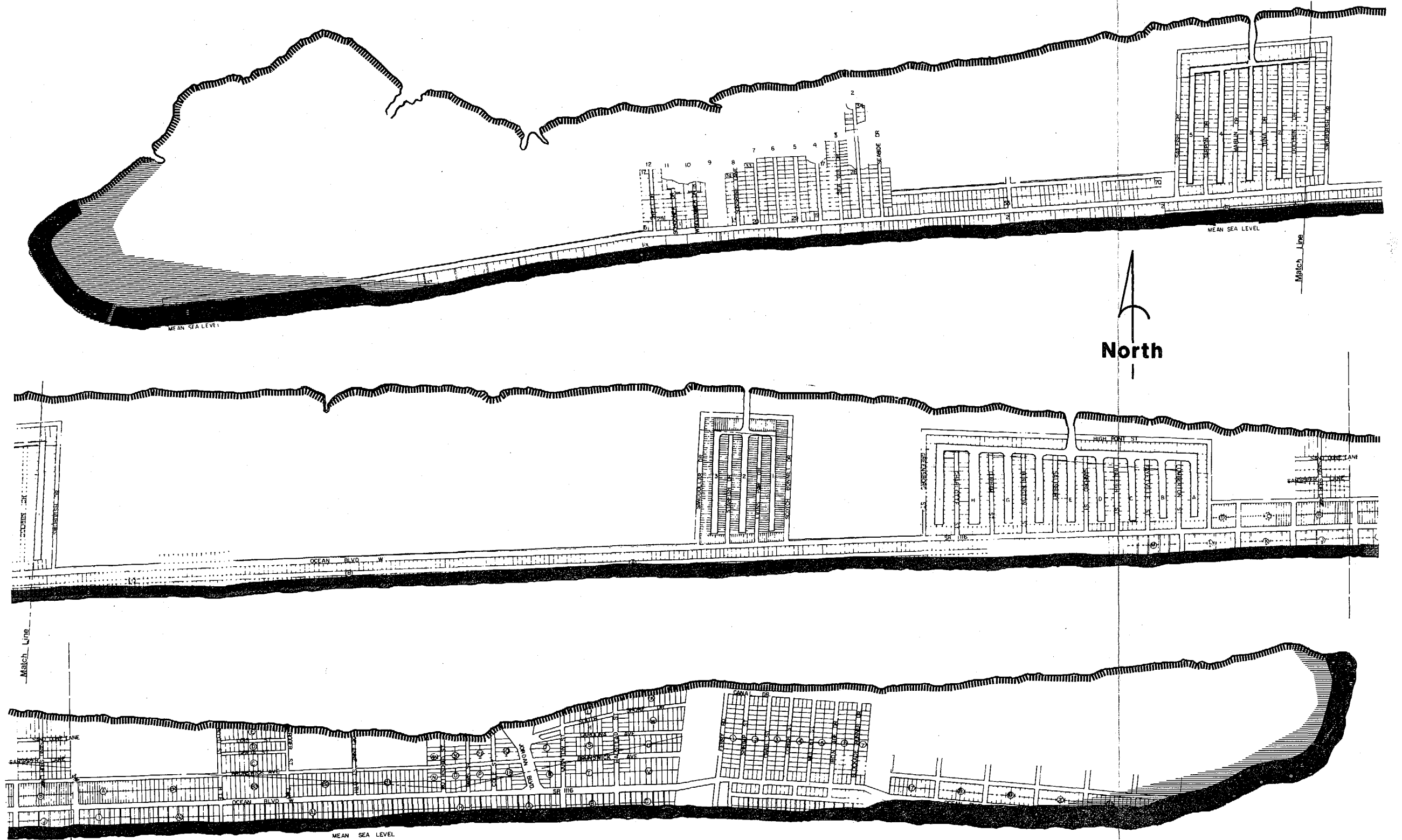
These are areas where a substantial possibility of excessive erosion and significant shoreline fluctuations exist. The ocean erodible AEC is based on a setback from the first line of stable natural vegetation plus an additional area where erosion can be expected from storm surges and wave action.

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. Erosion near each inlet has averaged 4 feet per year and the AEC is therefore 225 feet deep in these areas. (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. Areas adjacent to both the Shallotte Inlet and the Lockwood Folley Inlet are designated hazard areas. Erosion at Lockwood Folley Inlet has damaged State Route 1116 (Ocean Boulevard) and continues to threaten homes. Erosion during recent winter storms has been particularly pronounced and is expected to continue; more than 50 feet of beach has eroded during the past two years. Lands adjacent to Shallotte Inlet are relatively undeveloped and therefore damage to structures is not an immediate problem. However, there have been recent proposals to develop this area which is also subject to frequent flooding.





**LEGEND:**



OCEAN ERODIBLE AREAS OF ENVIRONMENTAL CONCERN



ESTUARINE SHORELINE AREAS OF ENVIRONMENTAL CONCERN



INLET HAZARD 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.

**HOLDEN BEACH, N.C.**

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JUNE, 1984 800' 400' 1000'



STORM HAZARD AREAS OF ENVIRONMENTAL CONCERN

**MAP ONE**

Map One delineates the Lockwood Folley Inlet Hazard area at the east end of the Island and the Shallotte Inlet Hazard area to the west. Each of these areas is considered to be extremely unstable and subject to high rates of erosion.

#### Estaurine Shoreline AEC's

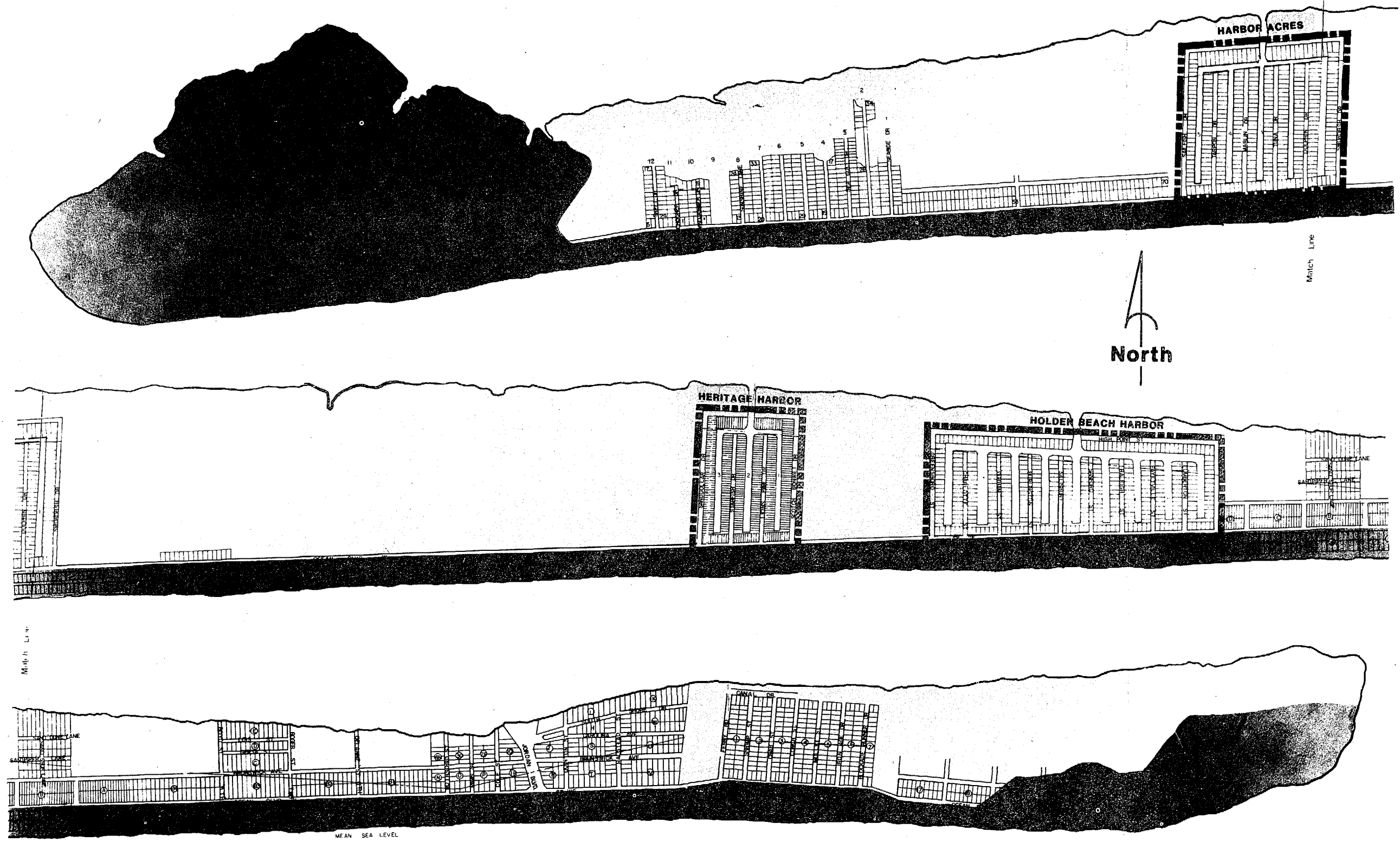
Estaurine shorelines are defined as non-ocean shorelines which are especially vulnerable to flooding or other adverse effects of wind and water and are intimately connected to the estuary. In Holden Beach, the estuarine shoreline encompasses the area landward from the Intracoastal Waterway for a distance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

#### Flood Hazard AEC's



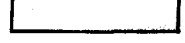
The flood hazard AEC corresponds to the National Flood Insurance Program V-zones, which refer to flood prone areas that are also susceptible to high velocity wave surges. Holden Beach was converted to the Regular Phase of the National Flood Insurance Program (NFIP) in 1976 with the issuance of Flood Insurance Rate Maps (FIRMS). While several coastal North Carolina communities have been presented with revised FIRMS, Holden Beach has not, and representatives of the National Flood Insurance Program could not estimate when such updated maps will be completed. The importance of the revised maps is that in all coastal North Carolina cases examined thus far south of Bogue Banks (Beaufort Inlet), the original V-zone designations have been reduced. As delineated on Map Two, the 1976 FIRM designates the area to the south of Ocean Boulevard; the western 6,800 feet and the eastern 2,400 feet of the Island as being within "V" Zones. If findings in other North Carolina Island studies are any indication of what Holden Beach can expect, the depth of the zones along the Ocean will be reduced. These areas will still be subject to flooding but not to the severe conditions that constitute the "V" zone designation. About a third of the developed or developable areas of the town are now within designated "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 1976 F.I.R.M. The F.I.R.M. designates these areas as "A" zones. About two-thirds of the town is within "A" zones or the entire balance of area not within "V" zones. When revised F.I.R.M.'s are received, these areas may also be subject to change, with some areas being designated above the 100-year flood level.



**LEGEND:**

-  FLOOD HAZARD AREA ("V" ZONES)
-  FINGER CANAL DEVELOPMENTS
-  FLOOD HAZARD AREA - 100 YEAR FLOOD PLAIN ("A" ZONES)

FLOOD HAZARD AREA ("V" ZONES)

FINGER CANAL DEVELOPMENTS

FLOOD HAZARD AREA - 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.

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JUNE, 1984 

FLOOD HAZARD AREAS OF ENVIRONMENTAL CONCERN

MAP TWO

### Finger Canal Areas

There are three distinct developments where channels were cut from the Intracoastal Waterway toward the ocean to provide fill and water access for residential building sites. A major storm could easily breach anyone of these locations, isolating all areas to the west from the remainder of the Island.

Holden Beach Harbor is the easternmost canal development and is located at about the Island's center. It is the largest, having nine canals off one waterway entrance. The canals are located between Greensboro Street and High Point Street and extend to within 500 feet of the ocean at mean high water.

Heritage Harbor is the next finger canal development consisting of a similar design with three canals between Sand Dollar Drive and Scotch Bonnet Drive. Again, there is one entrance from the waterway, and the canals extend to the south within 500 feet of the ocean.

The final area, known as Harbor Acres, consists of one entrance canal from the waterway and five parallel canals running south to within 500 feet of the ocean. These canals are between Sailfish Drive and Swordfish Drive.

The finger canal areas are 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

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

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 5  
STRUCTURES BY HAZARD AREA  
(Before the Storm Method)

<u>Hazard Area Category</u>	<u>Residential Units</u>	<u>Commercial Units</u>
1	140	7
2	384	6
3	716	14
4	<u>0</u>	<u>0</u>

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.

Holden Beach does not have a central sewage disposal system nor are there any privately owned package treatment systems on the Island. Therefore, sewage is handled through individual septic systems - all of which are in flood hazard areas. The town's water system is supplied by a 12" line crossing under Lockwood Folley Inlet. This line is very susceptible to parting in the event of storm surge or other strong tidal conditions. The elevated water tower is located at Town Hall on Rothschild Street and is within an "A" flood zone. Contamination and loss of water source are probable during a major storm event.

There are no potentially hazardous material storage or disposal sites on Holden Beach.

D. Estimated Severity of Possible Hazard Area Damages

The current Holden Beach Tax Digest for real property is \$63,104,060. This does not include tax exempt property nor does it include appreciation of values since the assessment was completed by County tax appraisal officials in 1978.

County tax appraisal staff suggests that a 10% per year increase in value has generally occurred since 1978. (Actually in the late 1970's and early 1980's, demand was relatively sluggish; the past 2-3 years have, however, brought unprecedented increases in Holden Beach property values - the 10% per year is considered a good overall factor). The 10% per year factor would bring total property values in Holden Beach to \$101,629,800 as of January 1, 1984. County appraisers also felt that a reasonable rule of thumb

to identify the portion of the digest attributable to structures as being 50%. Assuming this factor, the 1984 adjusted value of structures in Holden Beach is approximately \$50,815,000. Assuming a "Hazel Class" hurricane with 155 mile per hour plus winds, and associated flooding, all structures on Holden Beach are at risk and structural damage could approach total values. Additionally, these assumed values do not consider publically owned improvements such as roads, water system, buildings, etc. Further, the value of public utilities such as electricity and telephone have not been estimated.

E. Anticipated Development in Hazard Areas

About 350 acres of developable land remains vacant in Holden Beach. Of this, there are approximately 500 platted-vacant oceanfront lots according to the 1980 Land Use Plan. Development of these lots would place structures in Flood Hazard "V" zones. Any development in Holden Beach is within a flood hazard area as all land not designated as "V" zone is within "A" zones. 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 Holden Beach Hazard Mitigation Policies and Regulations

Holden Beach 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 Holden Beach zoning and flood plain management regulations related to hazard area development are summarized below.

Holden 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 R-2 residential districts upon the issuance of a conditional use permit and 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 structures (i.e. those not meeting setback or other similar requirements) can be rebuilt if partially or totally destroyed to their original size and single family residences may be enlarged; reconstructed structures must conform to existing dimensional requirements (setbacks, height,

etc.) unless this would "unduly burden the reconstruction process or limit the right to continue the nonconforming use of such a building." These provisions are relatively lenient and reflect a lack of non-conforming structures that are considered to be problems by the community.

4. Non-conforming uses can generally be rebuilt with the exception of mobile homes which specifically cannot be replaced. Repairs to non-single family residential uses that exceed 10 percent of the value of the structure are permitted with the issuance of a conditional use permit. Guidelines for such a permit seem to indicate approval for all reconstruction or repair activities that will not make the property more incompatible with surrounding properties than existed prior to damage or destruction. Clearly, the Town's ordinance allows the repair or replacement of virtually all non-conforming structures and uses to their original state with the exception of mobile homes.

#### Flood Plain Management Regulations

Specific requirements of the Town's Flood Damage Prevention Ordinance adopted under the National Flood Insurance Program includes the following provisions:

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 in both "V" and "A" zones (14 feet above MSL in "A" zones and 16.2 feet in "V" 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 both "V" and "A" zones.
4. The design and installation of anchorings and pilings must be certified by a registered engineer or architect, or must be in full compliance with the N.C. State Building Code.
5. No alteration of frontal dunes or use of fill for structural support shall occur in the "V" zone, except as may be specifically allowed under applicable C.A.M.A. regulations.

### Mobile Home Regulations

Mobile homes constitute only about six percent of the housing stock - an estimated 64 units. Additional mobile homes are not anticipated although it is conceivable that a mobile home park could be approved through rezoning. Section 6.3 of the Town's zoning ordinance establishes mobile home park design standards; flood hazard design considerations are not included in these regulations. Standard National Flood Insurance program regulations would, however, require elevation above the 100-year flood elevation, tiedowns, and prohibition on mobile homes locating in either "V" or "A" zones. Mobile homes are allowed only within approved mobile home parks and non-conforming mobile homes cannot be replaced under the terms of the Holden Beach Zoning Ordinance.

### G. Recommended Hazard Mitigation Policies

The entire Town of Holden Beach is susceptible to significant storm damage from a hurricane or a storm of similar magnitude. All 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. Specifically:

1. The Town's growth policy encourages low density residential development avoiding high density - high rise developments that are found in many North Carolina beach communities. The lack of plans for a central sewage treatment system will also enhance the continuance of this policy.
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 flood plain development policies conform with all Federal and State requirements.
5. The Town does an excellent 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 question of whether mobile homes should be rebuilt after a major storm is addressed in Chapter III, and is also specified under existing zoning regulations.)



The basic conclusion is that Holden Beach 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 3.0) to: a) to more explicitly cover replacement or repair of non-conforming single family residential structures so that they are required to meet applicable flood plain 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.

2) An area at the east end of Town (near Lockwood Folley Inlet) was recently reclassified in the Town's Land Use Plan from Rural Residential to Medium Density. This area includes a relatively small portion (the southeast corner) of land that is in the Flood Hazard "V" zone and Inlet Hazard area. It is recommended that this be reviewed during the planned 5-year update to the Holden Beach Land Use Plan scheduled for completion during 1985.

### III. HURRICANE EVACUATION PLAN

#### A. PURPOSES

- A. To identify actions to be taken by the public during a hurricane emergency to: 1) minimize danger to the public; and 2) to assist in orderly recovery operations following the emergency.
- B. To ensure the orderly and coordinated evacuation of Holden Beach by residents and visitors during a declared hurricane emergency.
- C. To identify the basic actions and procedures to be followed by Town Officials, Personnel and Volunteers during a hurricane emergency.

#### B. REFERENCES

- A. State of North Carolina General Statutes.
- B. State of North Carolina Disaster Relief and Assistance Plan.
- C. Brunswick County Disaster Relief and Assistance Plan (especially Annex O-Hurricane Response Plan).
- D. Town of Holden Beach State of Emergency Ordinance adopted July 20, 1977.

#### C. OPERATIONS SUMMARY

Operations during a hurricane emergency will be executed in five phases:

- A. Condition III - Hurricane Watch - possible threat exists - watch normally issued more than 24 hours before arrival of Hurricane conditions - approximately 96 hours or less to forecasted land fall.
- B. Condition II - Hurricane Warning - Landfall expected in specific coastal area in 24 hours or less.
- C. Condition I - Evacuation phase ordered by Mayor or designee during or after Condition II.
- D. Condition 0 - Evacuation complete; landfall imminent.
- E. Reentry - Threat passed; begin post-disaster phase.

D. COORDINATION PROCEDURES

- A. Emergency Operations Center (EOC). The Commission Room at the Town Hall is designated the EOC until Condition 0 when evacuation is complete, at which time the EOC will be moved to the Tri-Beach Fire Department building.
- B. Weather Reports. The U.S. Weather Service and the Brunswick County EOC will be used for weather advisories.
- C. The Town is divided into six (6) sections for planning and notifications as follows:
  - Section 1 - Quinton Street to East End of Island
  - Section 2 - High Point Street East to Quinton
  - Section 3 - Greensboro Street East to High Point
  - Section 4 - Dream Harbor Beach Access East to Greensboro Street
  - Section 5 - Sail Fish Drive East to Dream Harbor Beach Access
  - Section 6 - West End of Island East to Sail Fish Drive

E. ACTIONS AND RESPONSIBILITIES

Condition III (Hurricane Watch Preparation Phase)

<u>Action</u>	<u>Responsibility</u>
Meeting of Town Commissioners and Department Heads	Mayor or Mayor Pro Tem
Town Personnel and Volunteers placed on standby	Administrator
Advise residents to begin preparation for hurricane emergency through appropriate radio and TV stations and through personal notification by Six area leaders as shown in Section IV-D., C. above; augmented by volunteers from Coast Line Rescue Squad and volunteers from the Tri-Beach Volunteer Fire Department. Re-entry passes will be issued to all those notified.	Mayor
Staff public information center at Town Hall	Administrator
Assemble Town Records	Administrator
Notify contractors to secure materials at construction sites	Building Inspector

<u>Action</u>	<u>Responsibility</u>
Gas all town vehicles and equipment including spare tanks	Administrator
Test all communications equipment - base, mobile, portable	Police Chief
Establish communications with County EOC	Mayor and Administrator
Assemble Town personnel and volunteers for final preparation and briefing. Assembly area; Town meeting room.	Mayor
Fill elevated water tank	Administrator
Activate EOC at Town Hall	Mayor
Check emergency power generator for operational readiness and extra fuel	Administrator
Evacuate campground, travel trailers, and recreational vehicles (RV's) approximately 48 hours in advance of storm conditions through volunteer evacuation.	Mayor
Town personnel make arrangements for their personal property	All Town Personnel
Determine status of evacuation route to West Brunswick High School - traffic control points manned per County plan.	Police Chief

Condition II (Hurricane Warning)

<u>Action</u>	<u>Responsibility</u>
Assemble, refuel and load town vehicles: - firetrucks - public works vehicles - police squads - vehicle for town records	Administrator
Insure water tank is full. Close valves to non-essential lines.	Administrator
Board up windows to town hall.	Administrator
Recheck status of West Brunswick High School for receipt of evacuees - communicate with County EOC	Police Chief

Evacuate invalids and shut-ins without personal motor vehicles

Volunteers/Rescue Squad Chief/Volunteers

Condition I - Evacuation

Action

Responsibility

Emergency meeting of Town Commission; proclaim state of emergency and issue evacuation order.

Mayor

Establish local traffic control points at: 1) Jordan and Ocean Blvds.; and 2) Brunswick and Jordan Blvd. Also insure that County has assigned personnel at designated locations, especially the end of the Causeway.

Police Chief

Inform residents of evacuation order; radio and TV announcements, blasts of squad car sirens, door-to-door in 6 sections by volunteers and squad car P.A. systems.

Mayor

Cut off all remaining water lines; cut off power to town motors and pumps.

Administrator

Final check to insure complete evacuation of residents.

Chief of Police  
Section Chiefs

Move town vehicles with records to designated mainland site along with Town equipment and vehicles.

Administrator

Move EOC to Tri-Beach Volunteer Fire Department Building (mainland)

Mayor and Administrator

Determine if patrol of sounds and ICWW with Coast Guard begun per County plan.

Police Chief

Request Brunswick EMC to turn off power to Town.

Mayor

Evacuation complete. Establish security road block at bridge.

Police Chief

Condition 0 - Landfall Imminent

Stand by at EOC - Tri-Beach V.F.D.

Re-Entry - First Phase of Post-Disaster

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<u>Action</u>	<u>Responsibility</u>
Elected officials, Administrator, Building Inspector, Brunswick County Health Inspector allowed to re-enter and inspect for health and safety.	Police Chief
Coordinate actions necessary to re-establish critical town services.	Mayor
Implement "pass system" or property records from County Tax Office indicating property owners and permanent residents.	Police Chief
Begin initial damage assessment process for State or Federal Disaster Declaration and report to County.	Administrator
Coordinate police and patrol functions with National Guard, per Brunswick County plan.	Police Chief
Allow re-entry of property owners and permanent residents as soon as practical and prudent per pass or records system.	Mayor
Request and determine schedule of Brunswick EMC to re-establish power to Island.	Administrator
Re-establish water service.	Administrator
Enter post-disaster plan implementation.	Mayor/Administrator

RESCUE SQUAD AND VOLUNTEERS HURRICANE PROCEDURE

<u>TIME FRAME</u>	<u>ACTION</u>
Before Emergency	Maintain a complete list of invalids, shut-ins, and all persons requiring transportation.
Condition III	Visit all invalids to allow preparation time. Gas all vehicles and check supplies. Place personnel on alert; notify other squads.
Condition II	All personnel attend final briefing and preparation session at Town Hall. Re-check all vehicles. Members of squad make personal arrangements.  Evacuate all invalids, shut-ins, and those without transportation. Assist in Town Hall evacuation when above complete; furnish EOC with list of persons evacuated including where evacuated and phone number.
Condition I	After evacuation, drive emergency vehicles off Island. Also remove necessary supplies. One EMT assigned to each police car.
Condition 0	Stand by at Mainland EOC or relocation center.
Re-Entry	Stand by for report of casualties from Town Police. Transport invalids back to residences.

POLICE DEPARTMENT HURRICANE PROCEDURE

<u>TIME FRAME</u>	<u>ACTION</u>
Condition III	Prepare records for evacuation. Gas all vehicles, including 4-wheel drive. Aid rescue squad, if requested, in notification of invalids. Notify auxiliaries.
Condition II	Attend meeting for final briefing at Town Hall. Re-check all vehicles, assign drivers. File request with Brunswick County and State Highway Patrol for assistance at traffic checkpoints and highways if evacuation becomes necessary. Members of Department make personal arrangements.
Condition I	<p>After ordered, commence house-to-house notification of evacuation. Assign one officer to each section of the Town to work with Section leaders and assistants. Report any who refuse to leave to Town Hall. Hand out maps to West Brunswick High School relocation center. Continue to coordinate with Brunswick County EOC through Mayor.</p> <p>Determine if aid from Coast Guard and N.C. Wildlife Division/Fisheries in patrolling Sound and Intracoastal Waterway for looters has been established by County. After evacuation complete, move vehicles off Island.</p>
Condition 0	Stand by at E.O.C. - Tri-Beach V.F.D.
Reentry	<p>Establish checkpoints and roadblocks. Assist in patrolling sound and Intra-coastal as necessary.</p> <p>Police Chief or appointee assist in post-storm damage assessment team. Commence re-entry when authorized by Mayor. Use tax records to hand out I.D. cards to official residents only. Patrol town to avoid looting, unless handled by National Guard - then coordinate with Officer in charge of Guard unit.</p>



PUBLIC WORKS HURRICANE PROCEDURE  
(Responsibility of Town Administrator)

<u>TIME FRAME</u>	<u>ACTION</u>
Before Emergency	Familiarize department employees with steps necessary to implement shut-down of town services. Purchase, install and maintain emergency generator in working condition.
Condition III	Fill water tank. Check emergency generator and supplies. Gas up all Town vehicles and remove unnecessary vehicles (i.e. dump truck, backhoe) from the Island to the Tri-Beach Volunteer Fire Department. Secure vehicles.
Condition II	Cut off all unnecessary water lines, including the following specific valves: <ol style="list-style-type: none"><li>1) bottom of elevated water tank</li><li>2) 12" line at Brunswick Ave West and Jordan Blvd.</li><li>3) 12" line at Ocean Blvd. West and Jordan Blvd.</li><li>4) 12" line at Ocean Blvd. West and Neptune Street</li><li>5) 6" line at Brunswick Ave. West and Sand Spur Lane</li><li>6) 12" line at Ocean Blvd. West and Greensboro Street</li><li>7) 12" line at Ocean Blvd. West and Sand Dollar Drive</li><li>8) 12" line at Ocean Blvd. West and Sailfish Drive</li></ol> <p>Personnel make personal arrangements.</p>
Condition I	Cut off all remaining water lines and interconnections. Cut off valves to tanks. Cut off power to all motors and pumps. Assist in evacuation if requested by police. After evacuation, move vehicles off Island.
Condition 0	Standby at E.O.C. - Tri-Beach V.F.D.
Re-Entry	Restore power to pumps and motors. Check for breaks in water lines. Restore water service to the Town one section at a time and make necessary repairs.

## TOWN OFFICIALS HURRICANE PROCEDURE

<u>TIME FRAME</u>	<u>ACTION</u>
Before Emergency	<p>Print and distribute Instructions for Evacuees of Holden Beach.</p> <p>Coordinate and prepare Hurricane Evacuation plan; prepare staffing chart on 24-hour basis, to support plan and layout EOC.</p> <p>Insure that Town departments have completed their "Before Emergency" activities.</p> <p>Designate specific roles to implement plan, e.g. which vehicle used to remove which Town records; who drives off Island and to what location; (who, what, where exercise for all tasks).</p> <p>Conduct table-top evacuation exercises and mock disasters to continually update plan and procedures.</p> <p>Train Section Leaders and their assistants. Designate and train Disaster Assessment Team members.</p> <p>Establish public information center procedures including staffing responsibilities.</p>
Condition III	<p>Meeting of Mayor, Commissioners, Police Chief, Administrator to review emergency plans. At threat of a hurricane, all the above need to notify the Mayor as to how they can be located at all times. Town personnel placed on short alert. Request media to advise residents to prepare for possible evacuation.</p> <p>Assemble Town records. Gas up town vehicles. Begin liaison with Brunswick County Office of Emergency Management. Begin public information center at Town Hall.</p>
Condition II	<p>Activate Emergency Operation Center</p>

at Town Hall. Assemble all town personnel, rescue, fire and police personnel for final briefing. All communication with outside media to go through Mayor.

Condition I

Meeting of Mayor, Police Chief and Town Administrator. Proclaim state of emergency and issue evacuation order. Advise Brunswick County of action. Inform residents via media, fire truck, police vehicles and house-to-house notification.

Assist in evacuation as needed. Remain in Emergency Operation Center at Town Hall.

At conclusion of evacuation, move town records, tax records, and emergency passes to mainland Emergency Operations Center. Move town vehicles. Set up alternate operations center. Call Brunswick EMC and have electricity shut off in Holden Beach after evacuation complete.

Condition O

Stand by at EOC - Tri-Beach V.F.D.

Re-Entry

Mayor, Police Chief, Building Inspector, and others in accordance with post-disaster reconstruction plan form initial damage assessment team to inspect and evaluate possible citizen re-entry. Contact County EOC with initial damage report.

Mayor authorizes the re-entry of citizens; informs relocation centers and Brunswick County E.O.C. Officials aid police at roadblock. Brunswick EMC called to restore power. Operations center moved back to town hall and manned to assist citizens with problems and perform public information functions.

Mayor ends emergency order and removes roadblocks. Begin second phase of post-disaster reconstruction.

## F. HOLDEN BEACH EVACUATION ROUTE EVALUATION

This section of the plan presents findings of the roadway facilities and evacuation route analysis.

Holden Beach is served principally by one major state route, NC 130, and two routes on the state's secondary roadway system. They are essentially two-lane two-way facilities with a generally bad horizontal alignment.

- State Route 130 between U.S. 17 (north of Shallotte) and the single lane swing bridge over the Intracoastal Waterway is 20 feet wide with 10-foot travel lanes in each direction.
- The Intracoastal Waterway swing bridge is 200 feet long and 17 feet wide with a single directional travel lane.
- Holden Beach main arterial roadway (SR 1116) is approximately 20 feet wide with two directional travel lanes.

There are two basic characteristics that differentiate traffic operations on a two-lane roadway 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.

The capacity of a two-lane, two-way roadway under ideal conditions is 2,000 passenger vehicles per hour total, 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 1,700 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 (internal to external roadway facilities) to adequately handle the evacuation process is dependent upon the evacuation time as established by the Brunswick County Disaster Relief and Assistance Plan and the Town of Holden Beach Hurricane Plan. A major element of the evacuation timing 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.

Mobilization time is that period of time 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 entering those routes.

Insofar as the evacuation plan for Holden Beach is concerned, the entire beach must evacuate via a single-lane, approximately 17-foot wide swing bridge. Evacuation routes are:

- Holden Beach (SR 1116) - has two ten-foot travel lanes, essentially no shoulders, and open areas unprotected from wind and sand. Peak 1990 seasonal vacationers are projected at 10,400 with permanent residents at 350 per year.
- State Route 130 - has two ten-foot directional travel lanes (one/direction). This route has several bad horizontal curves along its alignment, particularly the 90-degree turn at its intersection with SR 1115 immediately north of the single-lane Intracoastal Waterway bridge. This alignment precludes motorists from driving at any high operating speeds.
- There are several secondary roads that either junction with or cross N.C. 130 and that ultimately intersect with U.S. 17 north of Shallotte. These are essentially two-lane two-directional roadway facilities with an approximate cross section of 20 feet. Evacuees using these facilities will have a destination other than Shallotte.

The intersection of U.S. 17 and N.C. 130 will ultimately be required to handle a major portion of the traffic from

Holden Beach, as well as a portion of the traffic from Shallotte Point, Civietown, and the local communities accessing N.C. 130. At this time, it is impossible to evaluate the capacity of that particular intersection due to the lack of realistic data. A signalized intersection under normal operation will accommodate approximately 1,500 vehicles per lane per hour of green. However, with emergency operation, this intersection should be monitored/manned by local law enforcement officials to ensure that the exiting traffic is provided orderly right-of-way and expedient movements due to the heavy left-turn traffic demands. This monitoring/manning also applies to the remaining three signalized intersections on U.S. 17 in Shallotte (the evacuees' 2.7 mile route to the West Brunswick High School Shelter), and should be mandatory since the intersection controls require electricity which may be "out/down" because of the hurricane conditions. Because this evacuation is of a barrier island, traffic flow should be highly directional and under local law enforcement control and therefore should be moving relatively unconstrained.

Blinding rain, in conjunction with gale-force winds (starting at 39 mph and increasing to 72 mph), blowing sand, debris and other objects, will severely impair drivers' vision and therefore make it difficult to drive along the evacuation route. This will in turn inhibit drivers' ability to maintain a reasonable vehicular operating speed. It is reasonable to assume that gale-force winds will be encountered within four hours of the hurricane's arrival, thereby adding another dimension to the timing of the evacuation.

#### Analysis

A location that will require extra attention during the evacuation process is the "neck-down" of the roadway facility (SR 1116) from Holden Beach at the approach to the swing bridge over the Intracoastal Waterway. This "neck-down" forms a barrier to the traffic flow process and consequently constrains traffic.

The following assumptions have been made relative to SR 1116 from Holden Beach to NC 130 to U.S. 17:

- 1990 seasonal projection of 10,400 vacationers plus a permanent contingent of 350.
- Approximately 15% of the beach population will leave the area prior to official notice (of imminent hurricane), or 1,600 people.
- It will require four hours to evacuate the remaining 85% of the vacationers.

- There will be 2.5 persons per vehicle.
- This will equate to approximately 3,800 vehicles evacuating the beach, including the permanent contingent.
- The facility will only be able to accommodate 60% of its normal capacity due to narrow 10-foot travel lanes, bad horizontal alignment, lateral clearances, and storm conditions.
- There will be a 30 mph speed of departure.
- There will be an additional reduction in capacity due to the capacity constraint at the swing bridge.

Under these assumptions, the normal unrestricted travel volume of 1,700 vehicles per hour (vph) will be reduced to 1,020 vph maximum roadway capacity on NC 130 north of the swing bridge. However, the capacity of the swing bridge with the prevailing assumption should be reduced. By reducing it by 50 percent to account for the single-lane bridge, gale-force winds, and hurricane conditions, the capacity of the swing bridge will be reduced to 510 vph, and consequently give a queuing delay time of two hours. Therefore, it will require approximately seven hours to evacuate the beach in addition to the mobilization time. This is consistent with the Holden Beach evacuation plan whereby evacuation notices will be issued within twelve hours of the time a hurricane is projected to hit land.

Under emergency conditions, federal rules and regulations concerning navigable waters (CFR 33-Part 117) state that in case of a need for evacuation during a major disaster, drawbridges will remain closed as necessary for public safety.

#### Additional Considerations and Proposed Bridge

Although no significant low areas were identified during the field investigation, the longer the vacationers take to leave the barrier island, in conjunction with the delay at the single-lane bridge, the more likely the evacuees will encounter flooding. Additionally, as the hurricane advances, the gale-force winds will change to hurricane force and, with NC 130 lined with pine trees, the likelihood of "downed trees" is prominent, thereby causing more problems and the likelihood of more delays. Should a hurricane become imminent during the "peak vacation time", serious consideration should be given to increasing the clearance time, at least until the existing single-lane bridge is replaced by a two-lane structure. Although with a new two-lane bridge, the capacity would be increased, delays would still be encountered at the bridge because of the lateral clearance perception. Capacity of a

new bridge during a hurricane evacuation is expected to be approximately 815 vehicles per hour as compared to the 510 vehicles per hour of the existing bridge.



#### IV. HOLDEN 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 Brunswick County Emergency Management 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 programs have various time frames for application and completion; these must be determined as soon as possible after the emergency occurs.

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 (Flood Plain 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 flood plain 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 is on file at Town Hall. The programs identified by this listing fall into the categories of Temporary Housing, Individual Assistance and Assistance to Local and State Governments. The listing is comprehensive and therefore, all of the programs listed may not be applicable to Holden Beach.

The remainder of this chapter presents recommendations regarding 1) procedures that Holden Beach should follow in carrying out its damage assessment program so as to meet all federal and state requirements; and 2) 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 Holden Beach personnel, including volunteers, available to assume these responsibilities:

Administrative

Town Administrator  
 Building Inspector  
 2 Secretaries

Police

1 Police Chief  
 3 Officers  
 2 Auxiliary Officers

Town Officials

1 Mayor  
 5 Commissioners

Volunteers

6 Section Evacuation  
 Leaders

Public Works

1 Water and Streets  
 Maintenance Employee

The Building Inspector should head the Damage Assessment Team. Other members of the team should consist of volunteers either recruited from the community or from the existing evacuation volunteer system. Such 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 personnel.

The suggested make-up of the Holden 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 over 1,000 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).

The Damage Assessment Team will color code tax maps in accordance with the above 4 damage classifications; e.g. destroyed, red; major, orange; minor, yellow; habitable, green.

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 Administrator. 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, the fact that there are only about 1,000 structures in the Town makes this task manageable. 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 Town should make a request to Brunswick County for the County to undertake a telephone survey of area lending institutions to determine the average value of flood insurance coverage that is carried by Brunswick County participants in the program. This information should 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 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 Holden Beach, the Mayor and Commissioners 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 Commissioners. 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 Second Phase Damage Assessment	When required by Brunswick County Hurricane Evacuation Plan
2. Prepare Summary of Reconstruction Needs	Completed 48 hours after damage assessment is completed.
3. Set Reconstruction Priorities and Prepare Master Reconstruction Schedule	Completed two weeks after damage assessment is completed

<u>Activity</u>	<u>Time Frame</u>
4. Begin Repairs to Critical Utilities and Facilities	As soon as possible after disaster
5. Decision with Regard to Imposition of Temporary Development Moratorium	One week after damage assessment is completed
6. Permitting of Reconstruction Activities for all Damaged Structures (major and minor) not included in Development Moratorium Areas	One week after damage assessment is completed
7. Complete Re-evaluation of Hazard Areas and Mitigation Policies in Areas Subjected to Development Moratorium	Cannot be determined until damages are assessed and input is received from the State
8. 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)
9. 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 Holden Beach prior to a storm; and 2) implemented, as appropriate, after a storm occurs.

REENTRY

1. Reentry of Holden Beach town residents and/or property owners shall not be permitted until 1) the initial damage assessment has been completed; a 2) the Mayor proclaims the Town safe to re-enter.
2. A list of Holden Beach property owners shall be maintained at the bridge entrance to Holden Beach. 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.



## 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 Holden Beach Zoning Ordinance, and the Holden Beach Flood Plain Management Regulations.
3. All structures suffering minor damage as defined in the Holden 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 Holden Beach 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 Holden 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 Ocean Drive and Jordan Avenue present the greatest obstacle to the safe evacuation of residents in the event of a major storm disaster. Relocating these lines underground

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. Holden Beach should now request the Brunswick EMC to initiate an assessment of the feasibility of relocating overhead powerlines underground if substantial damage to the existing system is sustained during a major storm.

3. If Ocean Blvd. (SR 1116) is breached or covered with sand and debris, making it impossible to travel, immediate action should be taken to restore the road to useable condition. A letter of agreement with the State Department of Transportation should be established to:  
1) allow the Town to perform these functions should the State be unable to respond in a timely manner due to emergency repair operations in other areas; and 2) provide a means of reimbursing the Town such costs incurred while performing such emergency repairs.

#### 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 Holden 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 Holden Beach, such a situation is most likely to occur in one or more of the AEC's.

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

1. To determine for each AEC whether the provisions of N.C. Building Code, the State Guidelines for Areas of Environmental Concern, and the Holden Beach Flood Plain 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 Holden 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 Holden 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 Holden 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 Holden 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.

V. ADOPTION OF PLAN

This Plan was approved by the Holden Beach Board of Commissioners at a special meeting held June 18, 1984.