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Federal Emergency Management Agency

Washington, D.C. 20472

AUG - 5 1991

MEMORANDUM FOR: FEMA Regional Directors
Regions I, II, III, IV, VI

ATTENTION: Chief, Natural and Technological
Hazards Division

FROM: Gary D. Johnson
Acting Assistant Associate Director
Office of Earthquakes and Natural
Hazards

SUBJECT: Mr. John Wilson's Report, "The Next Step..."

Attached is the report entitled "The Next Step...Incorporating Information from Comprehensive Hurricane Evacuation and Property Loss Studies into Community Emergency Plans and Programs" prepared by Mr. John D. Wilson, Lee County Department of Public Safety, Division of Emergency Management for your utilization.

This report is intended to improve existing plans by providing concrete examples that show how the hurricane evacuation and property loss studies have been used by other communties to improve hurricane plans, procedures and programs. This report should prove most beneficial to you as you deal with the emergency management community. We are in the process of reviewing and printing copies that ultimately will be made available for your distribution to State and local officials.

Should you have any questions, please contact Rita Henry of my staff. Ms. Henry can be contacted at (202) 646-2704.

Attachment

THE NEXT STEP...

INCORPORATING INFORMATION FROM COMPREHENSIVE HURRICANE EVACUATION AND PROPERTY LOSS STUDIES INTO COMMUNITY EMERGENCY PLANS AND PROGRAMS

Prepared for and supported by
The Federal Emergency Management Agency
and the Florida Department of Community Affairs,
Division of Emergency Management

BY
LEE COUNTY, FLORIDA
DEPARTMENT OF PUBLIC SAFETY
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 398
FORT MYERS, FLORIDA 33902-0398
DECEMBER 1990

ACKNOWLEDGEMENTS

The purpose for writing this manual would not have been possible had it not been for the support, talents and skills of many agencies and individuals. The wealth of data these studies offer to improve local and state emergency preparedness programs have the following federal agencies to thank for their continued funding support, technical support, ideas and guidance:

The Federal Emergency Management Agency;
The U.S. Army Corps of Engineers;
The Office of Oceanic and Coastal Resource Management,
National Oceanic and Atmospheric Administration;
The National Hurricane Center; and
The local National Weather Service Offices along the Atlantic and Gulf coastal areas.

Emergency management programs also owe a debt to those coastal States that have supported the development and implementation of these study efforts. A special thanks goes to the Florida Department of Community Affairs, Division of Emergency Management and the Florida Department of Environmental Regulation, Office of Coastal Management for their early and continued funding commitment and policy development which has contributed much to improving Florida's program for dealing with the hurricane problem.

Regional planning councils within Florida have also shared their talents and skills in refining the study efforts to meet local needs and for supporting budding hazard mitigation efforts to reduce future disaster potential. The efforts of the Southwest Florida Regional Planning Council and the Tampa Bay Regional Planning Council have done much to integrate the study results into local emergency operations plans and hazard mitigation programs. The continued support of Mr. Wayne Daltry of the Southwest Florida Regional Planning Council is also worthy of recognition because of his commitment to making the hurricane problem a growth management issue well before it was fashionable or popular.

The Community Reference Pages (TM) information pages contained in Appendix C is reproduced under permission from DirectoriesAmerica, Inc., and may not be further reproduced without the express written consent of DirectoriesAmerica, Inc. Appreciation is also extended to the United Telephone Company of Florida, United Telephone System for allowing their telephone directories to serve as a means to getting hazards information into the hands of the public.

The author of this manual would also like to recognize the talents of two individuals from Lee County who saw the value of these studies early on and had the foresight to use them: David Saniter and Terry Dillon. Many of the ideas and examples presented in this manual are the results of the these two individuals' work efforts.

Finally, helpful ideas, advise and comments were provided by Bill Massey, Richard Mayson and Dr. Eugene Zeizel from the Federal Emergency Management Agency, and Michael McDonald from the Florida Department of Community Affairs, Division of Emergency Management. Words cannot describe the patience and understanding they exhibited throughout this project in helping to make this work product a reality.

John D. Wilson
Lee County Department of
Public Safety, Division
of Emergency Management

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CHAPTER 1

INTRODUCTION

There it sits on your desk — this large document called a Hurricane Evacuation Study. Chocked full of the latest hurricane preparedness information, it is supposed to help you improve your community's preparedness program to respond to and recover from a hurricane emergency. You have been to meetings on it, been briefed on what it contains, and have probably provided information that contributed to its completion. Your community may also be participating in or have already been part of a Hurricane Property Loss Study, another large report designed to assist in dealing with hurricane recovery and mitigation efforts.

You may already have some ideas on how to use the data. But where do you start? What's the next step? How can you best use this information to improve your community's emergency management system that deals with hurricanes?

First of all, recognize that these studies are not plans; nor do they replace any plans and procedures you currently have. Your emergency plans are developed to guide what your community will do before, during, and after an emergency or disaster. They help you and other responsible parties "expect the unexpected" and decrease the uncertainties inherent in handling these rare but potentially catastrophic events. These plans, however, are only as good as the information and assumptions they are built upon. These studies provide data to update or revise these existing plans and to improve the procedures and programs used to carry out these plans.

What this manual intends to do is to help you improve these plans by providing concrete examples that show how the hurricane evacuation and property loss studies have been used by other communities to improve hurricane plans, procedures and programs. It will discuss how the data can be used to improve the hurricane preparedness portions of your community's emergency plan based on the Integrated Emergency Management System (IEMS) approach to developing Emergency Operations Plans (EOPs). It will also deal with how the information has been used to develop hurricane recovery programs and an on-going hazard mitigation program. Samples of documents developed using this data are presented in the manual's appendices to assist you in transferring the data from the studies to emergency documents that you can use.

The examples presented in this manual are based primarily on what Lee County, Florida (which includes the cities of Cape Coral, Fort Myers and Sanibel) has done with the information based on almost eleven years in working with these studies. As a result, the manual's focus will be oriented towards the local (county and city) emergency program manager. The studies used by Lee County are the 1979 Lee County Flood Emergency Evacuation Plan (U.S. Army Corps of Engineers), the 1980 Southwest Florida Re-

gional Hurricane Plan (Southwest Florida Regional Planning Council), the 1982 Southwest Florida Regional Hurricane Loss Study and the 1983 and 1987 updates of the Southwest Florida Regional Hurricane Evacuation Plan. Although many of the examples presented in this manual are based on these studies, other examples developed from other study efforts will be presented.

This manual is not meant to be the final authority on what has been done with information from hurricane evacuation and hurricane loss studies. Omission on what other communities have done should not infer that they are not also worthy of merit and consideration. What is presented in the manual also should not imply that this is the best or only way to use this information — other than to say that it has helped improve these communities' emergency planning and hazard mitigation programs for hurricanes.

CHAPTER 2

THE PLANNING PROCESS AND YOU

How successful you may be in incorporating this information into emergency plans and procedures requires an understanding of the steps that make up the disaster planning process. Equally important is your role in this process and how you can convince others that change might be necessary. This latter point is important because people normally resist change when they can see no direct benefit arising from it. This is an issue in hurricane planning because these storms are rare events and people may not see or perceive a need for change. Nevertheless, these factors will greatly affect whether this information will become part of the community's solution to hurricane problems or just another study sitting on a bookshelf collecting dust.

Although many books, publications and course study has been devoted to the disaster planning process, it basically consists of the following steps:

Hazard Identification and Assessment. This first step attempts to define the nature and extent of the hazards that exist in the community, and how they will affect people and property. Inherent in this process is determining the losses that may occur (how many are at risk, where are they located, how much property may be damaged, what type of damage). This identifies the baseline from which to measure achievement.

Goals and Objectives. This step builds on the first step and describes what the community wants to achieve to reduce the problem. This requires defining affects of the hazards. A major question to be answered here is how safe is safe enough, which may lead to possible conflicts with other goals on the community's agenda (i.e., reducing the number of people living on barrier islands to reduce evacuation times versus the economic benefit and additional tax base derived from the development).

Potential Strategies. This step identifies options that reduce the problem which have been defined by the goals and objectives developed in the previous step. Important to this process is understanding why the hazard causes these losses. Once this is done, options can be defined to address these losses. Three basic strategies can be applied to this end: (l) those that remove the hazard, (2) those that avoid its consequences, and, (3) those that mitigate the impact. Examples of options that illustrate each of these groups that could be used for the hurricane include cloud seeding, allowing no more development in high hazard areas, and warning and evacuation planning, respectively. Each of these will differ in cost, acceptability, timing and distribution of effect, which helps determine which one(s) are selected.

Criteria for Evaluating Alternative Strategies. This step identifies the factors that selecting the most desirable option or set of options will be based upon. This is probably the most difficult step in this process because of the many variables that come into play, many of which are difficult to control or predict. For one, it is political, and the option selected will depend heavily on the weight placed on safety by elected officials when compared to other desired ends, such as economic growth and environmental quality. It is one that is also based on experience — or lack of it — by those making the decisions. These factors, along with level of knowledge on hazards and their effects, will determine which strategies are available to address the problem.

Emergency Plan/Supporting Programs. The previous steps form the basis for the community's emergency plan and the programs needed to carry out the plan. From this, the purpose and scope of the plan are defined. The organization and resources needed to carry out the selected strategies can be developed. Programs needed to support plan implementation (public information, training, communications, etc.) are defined, developed and maintained.

Review and Revision. This is the final and continuing step in the process. It monitors the plans and programs through techniques such as drills, exercises and actual events. It is a necessary step of the process because of the changing nature of risk that hazards pose to the community. In addition, new or previously unacceptable strategies may become available to address the problem. Progress toward the achievement of goals and objectives also must be evaluated so that changes can be made when needed. This "feedback loop", as this step is sometimes called, provides a link back to any of the previous steps for updating purposes and makes the planning process a dynamic cycle.

Although this discussion on the planning process is admittedly abstract, it offers a "blueprint" for applying the data from these hurricane evacuation and loss studies into your community's emergency planning structure. The most obvious step where these studies can provide direct benefit is in **Hazard Identification and Assessment** because they quantify people and economic loss levels to hurricanes. For existing plans and programs, these studies can also be used in the **Review and Revision** step because of the latest baseline data they provide to the planning process for updating. Both these steps can influence the **Goals and Objectives** established to reduce the problem. For example, if the evacuation study shows that jail and hospital facilities are now at risk to hurricanes, then the plan's goals and objectives may have to change to deal with evacuating people residing in institutions. The studies can also influence the **Potential Strategies** step of the planning process by providing information that helps define which options can be used to address the problem. As an example, if evacuation times increase beyond current prediction levels for warning the community, then different options may have to be selected to deal with this. These studies can also provide insight into the often difficult **Criteria for Evaluating Alternative Strategies** step because it provides a

wealth of data to help define factors used to select the most desirable option. More importantly, they provide a tool that can help tip the scales toward safety when it competes with other community priorities through knowledge on cause and effect — that is, what may happen if you don't take some action to solve the hurricane problem as these studies define it. Finally, the data can be used to define and refine the various **Supporting Programs** that are needed to make the plan work when the emergency or disaster happens.

Two key points to remember about the planning process: it is complex and no single agency or individual can control the various forces that influence this process. To be successful in incorporating the information from these studies into this process requires not only your commitment to become involved in this planning process, but also your ability to sell or influence other agencies and individuals involved in this process to accept this information as a baseline for addressing the community's hurricane problem. Just as someone in business develops a marketing scheme to sell a product, so too must the emergency program manager develop a strategy that creates a demand for this information to be used.

How someone develops a marketing strategy to sell a product, which in this case is information, has been the subject of many books and training seminars. This manual does not attempt to address the complex subject of how to influence decision makers. On the other hand, it does offer the following suggestions that have had an impact on whatever successes Lee County and other coastal communities and states have achieved in influencing policy development:

USE THE DATA - When you first look over this information and realize its impact, you may be reluctant to advertise these studies' results. The area at risk may be larger than you thought, the number of people and property at risk may be higher than you expected, and the evacuation times a bit longer. There may have been a hurricane that affected your area in recent memory that caused impacts that differ somewhat from the information presented in the studies. As a result, you may think your credibility may be questioned if you start expounding on this data. **RESIST THIS URGE.** Find ways to incorporate the results of these studies into your speaking engagement program. People living on the coast seem naturally interested in weather and new information about its effect on them will usually receive a receptive audience. Formal meetings also help but don't underestimate what can be done with informal meetings with the people you work with. This can help you to determine how easy or difficult it may be in selling others and in turn, provide guidance on developing your market strategy. The point to remember here is that if you don't use the data, nobody else will.

SEEK OUT THOSE GROUPS THAT WILL SUPPORT YOU - These include not only those agencies or individuals or agencies you normally work with when emergencies arise, but also those that can help shape community policy. State and regional agencies can be a valuable help if they include the information as part of their agenda, as

has been the case in Florida over the past decade. Environmental groups, neighborhood associations, homeowner associations, and other community groups also can be helpful in spreading the word. After all, isn't it a lot easier to sell someone on something if others can do some of the selling for you?

LINK INFORMATION TO OTHER COMMUNITY ISSUES - One of the most important accomplishments to the hurricane program in Florida during the 1980's was to link the hazard to community growth management policies. No longer was the hurricane heard about once a year at the beginning of June or when one hit another coastal community. Decisions regarding certain growth and development now had to account for its impact on a community's ability to protect its citizens from hurricanes before it could be approved. In other words, the community's hurricane safety had come out of the shadows and became part of the supporting cast that makes up the agenda that community leaders have to address on a daily basis. Information from these studies played a very key role in this coming to pass. Perhaps this issue or one like it exists in your community that you can use, in concert with this information, to improve the hurricane emergency program.

BECOME INVOLVED IN THE PLANNING PROCESS - These previously mentioned factors will do little unless you have some role or say into the community's planning process. Sometimes this is difficult for emergency program managers to do, either because the manager's background is in a profession other than planning, or the perception that emergency management has little relation to the community's normal planning process. Keep in mind that the planning process has both a formal and informal structure and one can influence it using either or both these structures. The formal one, defined in this context as the community's planning agencies, could help you incorporate this information into your plans. The informal structure, or that which influences the planning process, could also be used to help achieve the same ends by convincing those who shape the planning agenda to use the information. Choosing which structure to use should be part of your market strategy. It takes a commitment from you, though, to see it through.

CHAPTER 3

DATA SOURCES: HURRICANE EVACUATION/LOSS STUDIES

The usefulness of the hurricane evacuation and loss study to the emergency program manager is that it identifies the baseline (Hazard Identification and Assessment) for plan development or maintenance. It does this by identifying where the risk area is, how many people and how much property are at risk, where they might have to go, when they might have to leave, and how long it would take to evacuate. Much of the information is contained in the five analysis elements of the hurricane evacuation study. These are:

Hazards Analysis

This analysis identifies the risk area by determining the extent of storm surge flooding and the wind speeds that can be expected from various hurricane categories, tracks and forward speeds having a reasonable chance of striking the study area. This is accomplished by using either the Sea, Lake and Overland Surges from Hurricanes (SLOSH) numerical model or its predecessor, the Special Program to List Amplitude Surges from Hurricanes (SPLASH). Time histories at user defined points within the model also provide specific information on both the duration (timing) and extent of surge flooding and the duration and strength of wind speeds. The results of this analysis are usually presented in map or tabular form. The maps either display the Envelopes of Water (EOW) that show the specific area at risk based on the modeled reference hurricane, the Maximum Envelope of Water (MEOW) based on the combination of hurricane parameters modeled (i.e., strength or category storm, track direction and forward speed, or the Maximum of Maximum (MOM) based on the worst likely case derived from the modeling effort. The tables list the history of the modeled storms at the selected points for both surge flooding and wind speed and is the basis for determining the time before hurricane eye landfall that evacuation should be completed. In recently completed studies, the maps are also digitized and saved in data files so that a computer can be used to display this information graphically.

Vulnerability Analysis

This analysis answers who and how many are at risk by identifying those areas, populations and facilities that are potentially vulnerable to the surge and wind hazards under a variety of hurricane threats. These areas are classified as evacuation zones and are developed using major natural or man-made geographic features. This analysis also develops evacuation scenarios in which groups of zones are identified at risk to storm surge flooding under certain combinations of

hurricane intensities. Using projected population data and in some cases housing data, the number of people at risk are listed for each hurricane threat scenario. The information has also been translated into computer data files in recently completed study efforts. The information on the data files is stored in "layers" so that a special program can access specific data for the user and display it graphically on a computer. The information can also be overlaid on maps created from the Hazard Analysis to show the relationship of vulnerability to storm surge flooding.

Behavioral Analysis

This important analysis determines the expected response of the threatened population to differing hurricane threats. The percentage of population expected to evacuate, the probable destinations of evacuees, use of public shelter and other safe refuges, and the usage of available vehicles are examined by this analysis. This information is usually collected using telephone sample surveys within the study area, data from other hurricane evacuation studies, and data from post-hurricane evacuation response studies. The results of the analysis are usually summarized in the body of the study with the detailed analysis presented in a technical appendix to the study. It helps answer where people might go in evacuation but it also affects evacuation timing and a host of other factors.

Shelter Analysis

This section of the study presents an inventory of existing public shelters, the capacities of the facilities, the vulnerability of the shelters to storm surge flooding, and identifies the potential shelter demand for each community within the study area. Potential shelter demand for ranges of hurricane threat scenarios are developed using data from the behavioral analysis. Certain study efforts have also identified the vulnerability of facilities such as nursing homes, hospitals and other institutions to hurricane threat scenarios. The information is usually shown using maps and table summaries.

Transportation Analysis

This analysis uses the results of all previous analyses to determine the time required to evacuate the threatened population according to a variety of hurricane threat scenarios. Transportation modeling techniques are used to simulate hurricane evacuation traffic patterns based on assumptions developed using the data from the previous analyses. The results of the analysis are clearance time estimates, which when combined with the time history data, form the evacuation time estimates.

The hurricane loss study takes this taskwork a few steps further by providing a loss analysis of potential property at risk, projecting individual and public assistance needs, response and recovery implementation factors, and hurricane hazard mitigation policies. These steps are summarized below.

Loss Analysis

The evacuation zones developed in the hurricane evacuation study form the basis for developing loss zones. A land use and structural inventory is conducted for each loss zone using existing land use classifications provided by community planning departments. The inventory portion of the study is accomplished using location surveys of certain types of structures based on real property assessment rolls developed and maintained by community property appraisers. Loss estimates are then determined using loss or damage curves compiled from insurance claim and damage assessment data that pinpoint the expected loss of a particular type of structure according to the degree of the hazard effect experienced. Losses by structural type are summarized by hurricane threat scenario through a series of tables, charts and figures.

Contingency Planning

In this section of the loss study, post-hurricane redevelopment activities and hazard mitigation policies are presented. Past studies have grouped the recovery activities into three time periods: immediate emergency period, short-range restoration period, and the long-range reconstruction period. Designation of Disaster Field Offices (DFOs) and Disaster Application Centers (DACs) is also covered. Finally, hurricane hazard mitigation policy recommendations are made to reduce future damage potential either in the pre or post disaster setting. The results of this segment of the study are presented in recovery implementation guides and lists identifying hazard mitigation policies.

CHAPTER 4

HOW TO USE THE DATA - EMERGENCY OPERATIONS PLANS

This section of the manual will discuss how the information from these studies have been used to improve the Emergency Operations Plan (EOP) and supporting programs dealing with hurricanes. Discussion will focus on the functional annexes making up the Emergency Operations Plan. The hurricane evacuation study will be the principal resource discussed, although the hurricane loss study's information will be highlighted as it relates to recovery planning.

Data from the evacuation study has been used to develop or refine the following annexes and supporting programs of the Emergency Operations Plan:

- Direction and Control
- Communications
- Warning
- Emergency Public Information
- Evacuation
- Reception and Care (Shelters)
- Law Enforcement
- Health and Medical
- Fire/Rescue
- Emergency Transportation

The information has also been used to support training activities, hazardous materials planning and hurricane recovery planning. Each area will be discussed by section.

Direction and Control

This annex of the EOP addresses how those activities of government needed to save lives and protect property will be managed. Part of this function requires information that provides a basis for evacuation decision making. It is here that the data from these studies have great value because it provides estimates of the number of people at risk, how they may react to a evacuation, and how much time it would take to move them out of harms way. From this, tools have been developed to guide decision makers as to when they should make decisions to evacuate from various hurricane threats. It can also be used to gauge when resources needed to support an evacuation should be mobilized.

An example of a decision making tool developed using this data is contained in **Appendix A** of the manual. It is a Response Storm Evaluation Work Sheet used by Lee County to determine if certain actions may be necessary based on the storm's forecasted threat. It combines data from National Hurricane Center products such as the public and

marine advisories, the technical data from the hurricane evacuation study effort, and other work efforts prepared by the county into a sequence of events that determine if certain actions or decisions should be taken and/or made. It identifies certain tasks to be addressed, identifies the particular response indicator to address each task, and provides space for the assessment based on the response indicators. Information from the following study analyses are used in this process as response indicators or assessment factors:

* From the Hazards Analysis, the reference hurricanes developed by the numerical storm surge model to determine the possible threat scenario;

* From the Vulnerability Analysis, the evacuation level resulting from the possible threat scenario (i.e., those at risk to a particular hurricane threat scenario), and tourist occupancy factors;

* From the Transportation Analysis, the clearance time estimates to help determine the minimum evacuation time; and

* From the Behavioral Analysis, guidance on what response curve should be used to determine the minimum evacuation time (see the Guidance/ Rules of Thumb section, Item Number 5).

Another example of a decision making tool is the Decision Arc concept. Developed as a work product in hurricane evacuation study efforts completed during the mid 1980's, this approach combines meteorological forecast and evacuation study technical data and presents this information graphically to the decision maker. It employs a special hurricane tracking chart called a Decision Arc Map and a two-dimensional graphic of a hurricane to convey a picture of a threatening hurricane and what it means to a specific community or state in relation to its evacuation situation, as defined by the evacuation study. The Decision Arc Map converts the various clearance times into a series of circles around a community, which serves as a geographical key for helping to determine when evacuation may have to be recommended and when evacuation may have to begin. Factors such as the hurricane's forward speed and extent of gale force winds are also accounted for by this tool.

Another decision making tool developed as a work product in more recent evacuation study efforts is HURREVAC. This approach uses a computer program that combines graphics with the versatility and speed of the computer into a presentation package for decision making. The program takes the data previously discussed in the other two examples and presents it a number of ways so that officials can get a general idea of the chances of a hurricane threatening their community, when the hurricane might strike the area, and the possible evacuation scenarios which could result from this. The program can display when the storm might arrive based on forecast data, "cutoff" times for decision making based on the storm's strength, the storm's forecast track, evacuation zone

maps for a community and which zones may be at risk based on real time storm parameters, and shelter availability based on the storm threat.

Another work product developed from the results of the study is shown in **Appendix B.** It is a standard operating procedure called the Time Delineating Schedule (TDS) for Storm Emergencies and it is used to determine what actions should be taken before, during and after the hurricane should it strike Lee County. These actions are grouped into discrete time periods that describe key phases of an emergency operation. These phases set forth a logical sequence for implementing actions according to prescribed needs and priorities. Specific actions are assigned to each phase to meet both the objectives for that phase and to lay the groundwork for the next phase and its assigned actions. Because each phase and its actions serves as a building block for succeeding phases, TDS provides a decision maker with a timetable for completing actions, while reducing the possibility of not implementing an action that may delay or hinder another action from taking place later on in the emergency response sequence.

The hurricane evacuation study played a significant role in developing this procedure by providing information on the area at risk to hurricanes, how many people may need to evacuate and how long it may take to evacuate a threatened area. By knowing the area at risk and how many are threatened, decisions were made on who needed to be involved, how many resources would be needed to respond to the various hurricane threats. This provided the basis for developing response actions to be carried out in each phase (see Appendix B, pages 6 through 15). Estimates of evacuation times formed the basis for estimating when these resources should be mobilized and when certain phases should begin and end. Time frames have been assigned to each phase based on when it should be completed according to the amount of time needed to evacuate the threatened population by category storm (see Appendix B, pages 3 through 5). This information, combined with actual storm response experiences, has created a tool which helps implement the direction and control actions needed to address hurricane response.

Communications

This portion of the EOP covers establishing, using, maintaining, and providing backup for communication networks needed for emergency response and recovery. Its main purpose is to help direct and control those activities listed in the previously discussed annex required to save lives and protect property. A key ingredient in developing this annex is knowing the communication requirements for emergency response agencies.

The hurricane evacuation study can help in this endeavor based on the work done for the Direction and Control Annex. By knowing what agencies and resources are needed to respond to the defined hurricane threats, communication networks can be identified or refined to promote the effective use of resources. This would include both primary and backup systems. If shortfalls are identified, then the study's results could be used to justify additional communication hardware in budget requests.

Data from the Hazard and Vulnerability Analyses can also be used to identify the risk of communication centers and equipment to storm surge flooding. For example, if certain key dispatch centers are found to be at risk under certain storm threat scenarios (Vulnerability Analysis), then steps can be taken to ensure that either the facility is protected or another center is used (and perhaps expanded). In Lee County, many of the remote radio transmitter or "repeater" sites where emergency power was needed were at risk according to the results of the study. This resulted in relocating key repeaters at a safer location where emergency power could be maintained, thus reducing the costs of elevating emergency generators to a height to reduce the chance of power loss.

Such an analysis can be done by the local emergency program manager using the published maps and time history information developed from the study's Hazard Analysis. By identifying the facility's location on the map, one can identify what storm threat scenario(s) the facility may be vulnerable to. If the location is close to a time history point, then the tabulated data could be used to identify the surge flooding height that might be expected under different storm threat scenarios. Then all one needs is the ground elevation of the facility, which when subtracted from the surge flooding height (which uses Mean Sea Level as the reference point for flooding and not around elevation), will identify how high the flooding might be for that particular storm threat. Although this approach is easy to do and uses readily accessible data found in many of the technical data reports, specific flooding height information for particular facilities will be a "hit and miss" operation.

Another way of obtaining this data is to transfer the surge inundation data used to develop the Maximum of Maximum (MOM) maps onto a standard community reference map. This is the method used in Lee County to determine the potential storm surge flooding heights for specific facilities. This was done by the Southwest Florida Regional Planning Council using a transparent mylar overlay of the Charlotte Harbor SLOSH model grid developed by the National Hurricane Center. The scale of the overlay was the same as both the National Oceanic Survey maps and the Lee County General Map. Special maps were developed by the Council showing both the county map and the SLOSH model grid. The mylar overlay was then used to transfer the highest surge value from the base SLOSH model runs onto the new maps. Five such maps were developed, each one representing the maximum surge height for the five categories of storm intensity described on the Saffir-Simpson Hurricane Scale. Lee County Emergency Management staff took this one step further by consolidating the information from the maps onto one map. Although laborious and time consuming, this work produced an invaluable tool in siting and determining more specific information about the potential flooding of key facilities,

— a work effort reaping additional benefits that will be discussed in Chapter 5 of this manual.

Warning

This section of the EOP focuses on developing systems and techniques that send information to officials and the general public on the hazards requiring emergency preparedness and response actions. It identifies warning systems, presents ways to get information quickly to people about impending threats, and describes the responsibilities and procedures for using these systems.

The study can give the emergency program manager insight in developing warning systems for hurricanes. By knowing the area at risk and its size from the Vulnerability Analysis, one can identify or update the resources needed to warn the public. This includes both equipment and personnel which, in turn, identifies agencies and individuals that need to be notified. Facilities such as hospitals, nursing homes, major industries and detention centers that may need special consideration in warning can also be identified. It can also guide decisions on the types of resources that would be the most effective in warning the public. For example, if the numbers and area at risk to certain hurricane threats are small, then enough resources may be available to conduct door-to-door warning operations. On the other hand if the area at risk is large, then relying more on radio and television may be a more realistic option to choose for warning.

The Behavioral Analysis results can also be helpful in shaping warning programs and message content. Recent behavioral study efforts have discussed the effect that local officials have on warning response and have shown the link this factor has in the development of response curves used to determine clearance time estimates. Based on these inferences, messages or a series of messages could be developed to illicit the type of response modeled by the response curves. For example, if some future hurricane threat to a community requires a time-consuming evacuation, then messages gradually raising the awareness of the public to the threat could be developed — promoting the slow response curve to the threat. On the other hand, a sudden turn of a storm forecasted not to be a threat may require a warning message that promotes the quick response curve and shorter evacuation times.

The evacuation clearance time estimates from the Transportation Analysis provide guidance on when warning messages should be issued to both response agencies and the public. It also helps guide the type of resource used to get the message to a particular recipient. For example, Lee County uses a high speed facsimile machine to send warning information to those facilities (hospitals, nursing homes, major tourist attractions and the county's airport authority) that may need more time to mobilize response resources than the general public. Other communities use "Plectron" paging systems to convey this information based upon the storm's timing.

Additional examples of how this information has been used to enhance Lee County's hurricane warning program include:

* Justifying a radio communications and warning capability for the U.S. Coast Guard at the Emergency Operations Center for notifying auxiliary members because of the vulnerability of the local Coast Guard Station to storm surge flooding.

* Establishing a remote Emergency Broadcast System (EBS) facility at the Emergency Operations Center because the primary control point radio station for the area and its emergency generator are at risk to storm surge flooding.

* Establishing an Storm Information Hot Line that allows the people at risk to confirm warning messages they have heard.

* Working with local cable vision franchises to use public access channels as a means to convey warning information, including the future use of digital microwave relays to broadcast live video and audio announcements from the Emergency Operations Center.

* Purchasing an automated phone notification system to assist emergency dispatchers in notifying the many agency representatives needed for response.

A future application of using the study results for warning is using national television or cable networks to help convey the warning message. The Weather Channel, for example, has recently started a program that allows emergency information specific to a community to be broadcasted during the local weather forecast segment of their program schedule. The study results could be used to develop evacuation order scripts for specific risk areas, shelter information tables and other useful information to support this effort. The information could then sent by telephone or facsimile machine to points coordinating this information with the Weather Channel. Conveying specific risk information graphically through such outlets offers a powerful tool to support local warning programs and the computerized maps produced from the more recent study efforts could support this concept once the technology becomes available.

Public Information

The Emergency Public Information annex of the EOP addresses ways to increase public awareness to hazards. A major part of this effort is developing and distributing public information materials on what people should do when threatened by hazards. This is a pivotal element of any emergency program and perhaps no where else does the study offer the greatest potential for benefit than in improving public information programs. For the first time, many communities get a complete picture of their specific risk

to hurricanes through the evacuation zones developed in the Vulnerability and Transportation Analyses' sections of the study. This specific information can now be linked with traditional preparedness information to bring home the message for being prepared.

A breakthrough in hurricane public information programs has been the use of the print media with large circulations to convey the specific risk of people to hurricanes. This would not have been possible without the information that has been produced from these studies. Counties around the Tampa Bay area of Florida have been publishing evacuation zone data along with general preparedness information in newspaper tabloids since the early 1980s. Sarasota County, Florida has recently published the Maximum Envelope of Water Map in the local telephone directory to aid people in determining their risk.

Appendix C of this manual contains a reproduction of the information in the telephone directory serving Lee County. This information includes a county map showing risk areas to hurricanes, evacuation routes, shelter locations, and information on how to use the map to determine specific risk. It is used in conjunction with a decision matrix to help people answer two key questions: Am I at risk?; and, Have I been ordered to evacuate by state or local officials? This matrix, by the way, was developed based on the conclusions derived from the Behavioral Analysis that identified key "triggering" agents needed for people to respond. This information, combined with general preparedness information on what to do if one has to evacuate, forms a triad that has been very effective in educating the public to their risk, in a document that is highly recognizable and accessible to them, while, at the same time, offering coverage to the Lee County emergency program that could never be duplicated through existing funding sources.

The study also gives the emergency program manager useful information to refine existing hurricane information programs by providing guidance on what to say, where to say it, and when to say it. **Appendix D** of the manual illustrates the first point (what to say), showing examples of ways to show risk, shelter and evacuation time information from the latest study effort for Lee County. This information, which was developed using an off-the-shelf desk top publishing computer program, can be made into transparencies for either an overhead projector or slide projector. The Behavioral Analysis also offers guidance on where to conduct community presentations. For example, if the Behavioral Analysis reveals that people living in medium hurricane risk areas are not planning to evacuate, then setting up speaking engagements in these areas may be in order. On the other hand, if people in low risk areas indicate they may evacuate when they shouldn't, then it may be worthwhile to point out the need for these people to stay in their homes. Such efforts may help to decrease clearance times in the future by reducing the number of vehicles on the highways. The Transportation Analysis results provide guidance on when to disseminate public information under real-time conditions. From this, prescripted public information statements can be developed that let those at risk know what to do, where to go, and how to get there.

A recent idea stemming from these work efforts is developing short video tape segments that can be used by local television stations to show people's risk, and combining this with published information in either a telephone directory or some other written mass media for further information on what to do. This approach offers a very powerful tool for conveying public information since people rely more on the visual media for information — and is yet another example of ways this information can be used to improve local hurricane public information programs.

Evacuation

The primary purpose of this annex is to establish procedures for relocating people to safe areas. This requires information that defines areas to evacuate and areas that are safe for evacuees to go. Controlling traffic flow between these areas is also an important factor to cover in this portion of the EOP.

The study provides key guidance for developing these procedures. The evacuation zone data from the Vulnerability Analysis defines the risk and non-risk areas by category storm. This is helpful in defining the amount and flow of traffic along evacuation routes to ensure orderly movement. For example, the results of the study were used by Lee County and the City of Sanibel to justify one way traffic on the causeway connecting Sanibel and Captiva Islands to mainland Lee County, and placing wreckers on each end of the causeway to handle stalled or wrecked vehicles. If the study also shows large areas at risk, then procedures to promote intercommunity evacuation may be necessary. The latest update from the Southwest Florida Regional Hurricane Evacuation Study contained information on intraregional evacuation times, which provides useful data on evacuation procedures necessary should a large hurricane threaten Southwest Florida.

The results of the Transportation Analysis can help in defining traffic control points, especially at identified "choke points" or critical links along the evacuation network. Lee County has used the critical link data from the Transportation Analysis to establish priorities on manning key intersections by city and county law enforcement agencies. Based on the results of this analysis, each intersection is assigned into one of three priority classes for allocating personnel and traffic barrier resources. Those intersections given the highest priority were outfitted with equipment on the traffic signal box that allows law enforcement officers to manually override the programmed timing of each turning movement within the intersection. This provides additional control of the intersection (assuming power is available) and reduces the physical strain on personnel having to direct traffic in the intersection.

The information can also be used to define or refine the purpose (and placement) of evacuation route signs along the highway network. The Vulnerability Analysis combined with the Behavioral Analysis can be useful tools in this decision making process. If the defined risk is great, then the signs could be used to guide evacuees to roads that

direct them inland. If the analysis shows that people want to stay closer to home (and assuming that the Vulnerability Analysis supports this preference), then the signs could be placed in a way that guides people to safe havens or shelters within the community.

Reception and Care (Shelters)

This part of the EOP governs mass care provisions for evacuees. It addresses housing, food and other needs both within the community and beyond it, should it be necessary.

The study offers a wealth of information for shelter planning. First of all, it identifies which shelters can and cannot be used by category hurricane, which is essential to those responsible for sheltering. **Appendix E** displays a page of a manual developed by Lee County to define a shelter's vulnerability to hurricane forces. Data from the Shelter Analysis portion of the study have been combined with the results of the FEMA and State of Florida sponsored Natural Hazards Shelter Survey to identify both the potential flooding and wind vulnerability of each building within the sheltering facility, which happens to be a public school. This manual has been provided to the local Red Cross Chapter, the school board, local law enforcement agencies and the Lee County amateur radio group to assist in manpower and resource planning. Not only does this eliminate the guesswork of facilities that can be used, it also identifies where shortfalls exist in shelter supply and resources. This can help determine additional resource needs so that sufficient effort can be made to obtain such resources, whether they be more facilities, equipment or manpower.

Another helpful piece of information for determining shelter resource needs comes from the Behavioral Analysis section. Depending upon the approach used to derive this information, the collected data may give insight on what types of people might use shelters more than others. Lee County, for example, has a large number of retired citizens living on fixed income and a small community of farm workers. Since recent behavioral studies have shown that older and less affluent evacuees tend to use public shelter more than other age or income groups, this information is useful for identifying what type or resources might be needed to have on hand at shelters. Also, older people may have a higher need for medical attention, which provides a basis for determining needs for medical resources. The HRS-Lee County Health Unit has used these conclusions to assign manpower and medical supplies to certain key shelters based on where potential clients live, who might evacuate, use of sheltering facility under varying storm scenarios, and location to support medical facilities such as hospitals.

The time history information from the Hazard Analysis also offers some useful data in determining how long people might have to stay in shelters based upon the direct affects of the hurricane. Part of the time history information identifies the strength and duration of hurricane induced winds that might threaten a community. This, in turn, can

help determine the minimum time that people might have to stay in shelters and be useful in determining mass care requirements that either can be provided or should be brought by those planning to use shelters.

Law Enforcement

The law enforcement portion of the EOP focuses on providing enough resources to maintain civil order under emergency conditions. Polices and procedures for maintaining security and order are also components of this element. Law enforcement agencies also play a key role in hurricane emergencies in warning affected populations of their potential risk. In many communities they also are responsible for the safety and security of those in detention centers such as prisons, jails and work camps. Having information available that defines resource and personnel needs will be important in developing this segment of the plan.

The hurricane evacuation study provides a number of ways that can promote plan development. Information from the Vulnerability Analysis can be used to identify detention centers where internees may require on site protective actions to reduce the safety threat or removal to a safer area. This data lays the framework for identifying, for example, how many vehicles and security personnel may be needed to evacuate specific facilities, safe detention facilities to move those at risk, and how much time might be needed to mobilize these resources.

A similar analysis can also be done to determine how many police or sheriff stations or substations might be at risk and how many might have to be evacuated to maintain normal law enforcement operations. It can also be used to develop some innovative ways to address the problem of reducing the vulnerability of such facilities. As an example, the Lee County Sheriff's Office has used this data to justify funding for a mobile command unit to serve as the district station for the Fort Myers Beach area rather than a fixed building. In a hurricane threat, this unit would be evacuated from the beach area so that it would be available to continue both emergency and regular law enforcement operations after the hurricane passed.

The Vulnerability Analysis can also provide guidance on the specific areas to broadcast evacuation instructions and the resources needed to do this. By using the risk areas identified by hurricane threat scenario, the area to be warned can be identified and assigned to specific law enforcement agencies within the community. This forms the basis for developing plans and procedures that identify warning districts by agency, the warning procedure to be enacted (i.e., door-to-door, announcements using vehicle public address system) and checklists that identify both the areas warned and how long it took to complete the warning.

The Shelter Analysis can be used to identify how many security personnel may be

needed to provide law enforcement presence at public shelters. This personnel resource need may vary according to the hurricane threat scenario if certain shelters will or will not be opened, and this information can be useful in determining manpower requirements. This then can be used to determine if additional shift staff are needed and what notification procedures may be needed to recall them to duty.

The Transportation Analysis offers important information for two key law enforcement responsibilities in a hurricane: traffic control and lane use modification. The analysis identifies critical links within the evacuation network where-traffic congestion may be high, based on the volume to capacity ratios developed from the trip assignment phase. These links, often intersections, are prime candidates for manned traffic control points. The number of links with high volume to capacity ratios can then be the basis for determining how many personnel will be needed and where they would be assigned. Taking this a step further, special procedures could be developed to promote smoother traffic flow through these critical links. This could include use of evacuation route signs, traffic barriers, manual control of traffic signal boxes, and establishing certain roadway links for one-way traffic movement. For example, Lee County has used this analysis to:

* Identify roads and intersections along the roadway network where evacuation route signs should be placed;

* Identifying which intersections would require traffic barriers to promote smoother evacuation flow;

* Identify intersections where law enforcement personnel could control the flow of traffic by overriding the automatic programming of traffic signal boxes and using pendents to manually control the length of the traffic signal red and green intervals; and

* Establishing the necessary procedures to develop one-way traffic movement on the Sanibel Causeway, a low-lying evacuation route providing the only access off for vulnerable populations living on two barrier islands.

As you can see, law enforcement agencies can gain a great deal of insight from this study on how their resources may be used during a hurricane emergency. This, in turn, can be used to develop plans and procedures that support the implementation of this EOP element. Examples include traffic control plans that cover traffic control point manning and operating procedures, use of barrier resources on selected routes or intersections, operational modification of lane usage, and even response to accidents and disabled vehicles. Warning procedures for risk populations, evacuation or safety plans for detention centers, securing evacuated areas, and procedures for shelter security can be developed based on this information.

Fire/Rescue

This element of the EOP discusses fire fighting and search and rescue during and after emergencies. Roles and responsibilities for these important aspects of emergency response are addressed in this element. For many communities, the emergency medical services program also is handled by this profession and policies and procedures may also be discussed. Like law enforcement, fire departments and districts may have a key role in providing evacuation instructions to threatened populations in hurricane emergencies. Having an idea of the resources necessary to carry out these responsibilities will be crucial to sound plan development.

The fire and emergency medical professions can gain the same direction from these studies as their counterparts from the law enforcement field. The Vulnerability Analysis can be used to identify which fire/EMS stations may have to be evacuated by hurricane threat scenario and which stations would not. This forms the basis for developing plans and procedures to relocate essential equipment and personnel. The analysis can also be used to determine suitable areas to stage search and rescue equipment to promote its availability after the storm. The resources needed to assist in the warning of threatened populations can be determined in the same manner as discussed in the Law Enforcement section of this manual. The Shelter Analysis can be the basis for determining the number of medical personnel needed to support first aid operations at shelters, if this is a responsibility assigned to EMS units within the community.

Health and Medical

This portion of the EOP covers medical care for threatened populations under differing emergency conditions. This includes procedures and policies for mobilizing medical resources, and public health problems in major emergencies. To develop such plans require an understanding of what is at risk so that medical resources can be identified.

The hurricane evacuation study has been used extensively to assist in defining the level of risk needed to develop these plans. The Vulnerability Analysis and Medical Institution Analysis has been used to identify hospitals, nursing homes and other medical facilities at risk to the hurricane flood scenarios presented in the study. As important, those hospitals, nursing homes, etc. that are not vulnerable to hurricane storm surge flooding can be identified. This forms the basis for identifying the numbers of patients at risk and the basis to develop plans and procedures for evacuating to other like institutions, establishing in place protection procedures for those patients who cannot be evacuated, reducing patient populations at hospitals that have to be evacuated through discharge to relatives, and transfer agreements spelling out what resources will be needed to evacuate threatened populations from one facility to another. Pinellas County, Florida has used this analysis to develop a pioneering effort to match evacuating institutions with

host institutions. Charlotte County, Florida used the analysis to develop a plan that moves the patients of a vulnerable one-story hospital to facilities in Highlands County, Florida, an inland county over fifty miles from the risk facility.

The Shelter Analysis is also useful for determining medical resource needs at public shelters. By identifying which sheltering facilities will be opened by hurricane threat scenario, the number of medical personnel can be identified before hand, which forms the basis for developing plans and procedures for mobilizing and assigning available personnel. If deficiencies exist as a result of this resource allocation exercise, then efforts can be made to recruit additional personnel to meet identified resource gaps. The HRS-Lee County Health Unit has used this information to assign doctors, nurses and supporting staff to public shelters.

Home Health Care agencies, an out-patient industry resulting from policy changes in Medicare, can use the study results to identify clients who are at risk to differing storm threats. From this they can assist clients develop evacuation plans as well as determine what resource needs the agency will need to continue the necessary level of care once the storm passes.

Perhaps the greatest potential application for these studies is in identifying the need for facilities to care for the elderly, infirm and handicapped or people with special needs (PSN). These studies have been used in Florida to justify the development of Special Care Units or PSN shelters. These facilities provide special care for evacuees with defined minor injuries or illnesses that don't require medical care or hospitalization. Identification of available facilities, potential population levels, resource needs and associated protocols for operation have been based on the results of these studies. More importantly, the data has provided the catalyst for getting the associated agencies together to deal with this problem. Examples of programs that have been developed in Florida include Pinellas, Sarasota, Manatee, Collier and Palm Beach counties, to name just a few. Lee County has used the data to identify public shelters that close to the community hospitals for potential locations for future Special Care Units.

The study also offers useful information for other health related issues. Power to water wells and sewer lift stations can be crucial to providing water and sewer service both during and after a hurricane. Public wells vulnerable to salt water flooding and sewer lift station power facilities can be identified through the Vulnerability Analysis so that steps can be taken to either protect these facilities or use alternate facilities if disruption takes place. For example, Lee County has identified water wells on emergency power and assigned these wells to provide water to a series of shelters based on location. Installing emergency generators to key sewer lift stations continues to be an on-going program in the county to ensure the minimum amount of disruption should power losses occur.

Identifying the number of potential water sources that are vulnerable can also serve another purpose. It can be helpful for determining the resources needed to conduct

water sampling analysis after the storm. The Lee County Environmental Lab has used this data to identify the potential resources needed to conduct such a large-scale analysis. Because of the number of water sources at risk, it was determined that the Lab would have to operate on a 24-hour basis to maintain an adequate turn-around time. Since electricity to operate the Lab may be out, the decision was made to provide emergency power to the facility. Whether or not the justification to expend funds to install an emergency generator to the Lab could have been made without the study results is debatable.

Emergency Transportation

Although not considered a "stand alone" element of the EOP, transportation agencies such as transit authorities and school districts can gain valuable insight for plan development to support evacuation movement. The Vulnerability and Medical/Institution Analyses help identify areas or facilities that may require transportation resources if they have to evacuate. Hospital, nursing home, detention center and other facility transportation requirements can be determined based on the facility's vulnerability and numbers of people needing transportation assistance. Specific allocation of resources to these facilities can be done based on this information.

Data on mass transit ridership patterns can be used in concert with the Vulnerability Analysis to determine areas within the community where emergency transportation resources should be focused, especially if such resources are limited. From this, area locations can be identified where busses could be staged to pick up those needing transportation to safe areas. This information then becomes the basis for developing manpower estimates to support emergency transportation operations (vehicle drivers, mechanics, dispatchers), resource needs (number of busses, fuel and oil needs), and procedures for mobilizing and staging the necessary resources (notification, communications, etc.).

Training

Training activities, particularly exercises and drills, are vital to any emergency plan's implementation. Without it, emergency staff lose the opportunity to simulate their assigned responsibilities. Plans cannot be evaluated to correct or improve procedures. Developing good exercises and drills, however, are time consuming and often times emergency management agencies with small staffs find it hard to budget enough time to develop the task.

The Hazards and Vulnerability Analyses can help reduce the time in developing hurricane exercise scenarios. Since the Maximum Envelopes of Water (MEOWS) define the community's risk to various hurricane scenarios, they can be used to define the exercise scenario because they graphically describe the aerial extent of damage. Hurricane

damage scenarios can be written and shown graphically using this information. Tables summarizing the time history analysis can be used to refine the hurricane damage scenario even further because they identify at selected points the depth of storm surge flooding and the wind speeds. One of the storm reference tracks chosen to determine the extent of storm surge flooding by the numerical storm surge model can be selected to be the storm track that forms the basis of the exercise. When combined with forecast error information from the National Hurricane Center, this can be a useful tool to train emergency personnel on what emergency actions should take place before the storm strikes the community, as well as explaining the uncertainty associated with hurricane forecasts.

Lee County has used this information to develop exercises not only to evaluate its own plans, but other agencies' hurricane preparedness plans as well. Exercise scenarios have been developed for a hotel/motel management group, a bank, the local telephone company, the Southwest Florida Regional Airport, and a nursing home so that these agencies could evaluate their own procedures.

A damage profile can be developed based on the data from these studies to evaluate hurricane recovery plans and procedures. From this, exercise messages can be developed that define problems that might be expected based on the profile and the defined exercise objectives.

Hazardous Materials

Although not written specifically with this hazard in mind, these studies can be helpful in determining potential hazardous materials accidents resulting from hurricanes. Used in combination with pre-fire plans and hazards analysis data from SARA, Title III programs, the Vulnerability Analysis can be the basis for an additional study to locate fixed hazardous materials sites that are exposed to hurricane wind and storm surge flooding forces. From this, a further analysis can be undertaken using the other data sources to determine which facilities have containers of chemicals or chemicals that would be harmful to the public should they be spilled or leaked. For example, propane or natural gas tanks vulnerable to storm surge flooding may leak when safety valves are corroded by salt water. Facilities storing or using chemicals that react with water, (such as chlorine, other acids or oxidizers, pesticides or Herbicides), could be harmful to the public should they come in contact with fresh or salt water. Based on this analysis, procedures could be developed to reduce potential spillages or leaks either through proper storage containment or removal procedures at these sites.

Recovery Planning

Developing a plan for hurricane recovery may be similar to putting together a menu for a new restaurant — you aren't quite sure on how many items should be on the menu or the proper balance or mixture. Obviously, there is no substitute for experience

in this particular field, whether it comes from your.own or the experience of others. The same holds true in hurricane recovery planning but it helps to have a guide, a market study if you will, that identifies the potential demand for your product — which in this case, is a recovery plan or process.

The property loss study can help you in a number of ways in developing the focus of the hurricane recovery plan. First of all, it identifies your community's physical, fiscal and economic loss from hurricanes. The tables, charts and figures summarizing losses by type of structure helps define this for you. You can identify how much of your community's housing may be affected, how many critical facilities (hospitals, fire and police stations, water and sewer facilities) may become inoperable, and how much of your community's economic base may be damaged.

This analysis can become the basis for estimating what may be needed to recover from such a disaster before it happens. For example, if much of your community's low income housing may be damaged by the hurricane, then temporary housing may become a critical resource need after the disaster. If your community's economic base may be destroyed (which in many coastal communities would be tourism), then low interest loan and grant programs will be a must to get these facilities going again. If large areas of community may be affected, disaster relief resource needs may be great which will require places and procedures to store, inventory and distribute large amounts of supplies and equipment.

The loss study can also provide you with guidance on developing priorities for recovery resources or put another way, what gets fixed first. For example, if many of the work places that support the community's economic base are at risk, then getting these facilities restored and people back to work may be the highest priority. On the other hand, if key public facilities are in harm's way which the community cannot be without, then this may become the key recovery priority. Whatever the case, the study can help define these priorities which then can become the policies that form the basis of your recovery plan.

The extent of the community's hurricane loss defined by the study can also help you determine the emergency organization needed to recover from such an event. This includes who should be involved and the actual structure needed to carry out the recovery process. This may vary from community to community based on the defined risk and potential loss. Many communities are now looking at establishing task forces to assist community leaders recover from hurricanes. The loss study can help identify if you need such a task force, and who should be on it according to what could be damaged and what may needed to repair, replace or restore it. If help from many agencies will be needed for the community to recover based on the loss scenarios, then the emergency organization structure needs to be developed to handle the coordination necessary to plan, procure and distribute the recovery services —whether it be fire, law enforcement, mass care relief or health related.

The property loss study often presents post-hurricane redevelopment activities into

discrete time periods. Past studies have used three periods: immediate emergency, short-range restoration and long-range reconstruction. This format may also be a good way to organize and discuss within the recovery plan the many activities your community may have to carry out to recover from a hurricane. Activities such as search and rescue, emergency mass care, reentry and damage assessment could be part of immediate emergency period. Debris removal and disposal, disaster relief assistance and hazard mitigation assessments may be short-range restoration activities. Repair or improvements to community infrastructure, community redevelopment, and revitalizing the community's overall economy may be issues to consider as long-range reconstruction activities.

The loss study can help in other ways in developing a recovery plan and implementing the recovery process. The damage scenarios presented can be summarized and used in the Situation section of your plan. Assumptions underlying the study may also be helpful in defining similar statements in the plan. The loss or damage curves compiled from empirical data may be helpful in damage assessment in coming up with an overall community dollar loss, using the percent of the structure damaged by type and comparing it to assessed values contained on property assessment records. Useful guidance can be gained in determining the needs and locations of Disaster Application Centers, recovery centers, emergency distribution centers and feeding/resting areas. An idea of the logistical resources needed and available for housing emergency workers can also be estimated (i.e., by determining what housing facilities such as hotels or motels may not be damaged according to the various loss scenarios).

Appendix F contains a general outline of the post-disaster plan that Lee County is currently developing for hurricanes. Sections of the outline marked with an asterisk are areas which were based upon data from the Southwest Florida Regional Hurricane Loss Study. The study, along with a number of other resources, was helpful in preparing the "menu of items" that Lee County may require to recover from a hurricane.

CHAPTER 5

HOW TO USE THE DATA - REDUCING FUTURE DISASTER POTENTIAL

Thus far, the manual has focused on ways the data from the hurricane evacuation and loss studies can be used to deal with the current hurricane situation. That is usually what an emergency program manager is paid to do — to develop emergency plans and procedures to guide the community's emergency response and recovery programs from disasters. In many cases, this work effort is more than enough to keep local emergency management programs busy for quite some time. Yet, such an effort only reacts to existing situations; it has little impact on future conditions.

More and more, there is an awareness that the way a community grows and develops can shape its vulnerability to hurricanes. Land use decisions, construction practices, transportation policies and economic development are factors that can influence a community's growth and development patterns. These factors are usually addressed by a community's planning, zoning or development review agencies, sometimes with little or no consideration to the hurricane hazard. A number of reasons can be presented to explain this, up to and including the lack of data defining the community's hurricane problem. With these two studies in hand, however, this is no longer the case. This section of the manual discusses how these studies can become a bridge for the emergency program manager to influence a community's growth policies through a local hazard mitigation program and thus, reduce future disaster potential.

Hazard Mitigation Policy

The strength these studies offer in developing a local hazard mitigation program is the same as for refining the local Emergency Operations Plan — it defines the community's hurricane problem. It identifies the levels of threat to be dealt with, which forms the basis for identifying the resources needed to respond to the various problems posed by the threats. It can also be used to identify the shortfalls in the local community's emergency efforts, which forms the basis for developing need statements to correct these problems. These are often called policy statements in that they establish direction for improving identified deficiencies. It can also identify what portion of the community's economic structure and tax base is at risk and what could be potentially lost or damaged should a hurricane strike, thereby becoming the basis for averting or avoiding such risk in the future through long term growth policies and practices.

Examples of how Lee County used these studies to develop policy statements are shown in **Appendix G.** In Lee County's case, the hurricane evacuation study pointed out the county's long evacuation times to even minimal hurricanes, a large deficiency in its public shelter supply to meet expected demand levels as defined by the Behavioral

Analysis, that most of the large hospitals and nursing homes were vulnerable to the defined hurricane threats, and that many elderly citizens are at risk and may need additional resources to assist them during an hurricane evacuation. These issues became the basis for goals, objectives and policies that identify resources and programs to deal with these problems. The loss study, along with other studies, gave the county an idea of the vulnerability of the community's revenue base. This became the basis for developing policies that reduced the future revenue base's risk to hurricanes, and establishing a revenue source for dealing both with the costs of repairing public facilities damaged by the storm and buying out damaged properties on a voluntary basis.

These policies are contained in the Lee County Comprehensive Plan. This document is a requirement for all communities within the State of Florida through state legislation, and guidance has been developed by the Florida Department of Community Affairs to deal with hurricane hazard mitigation. A community's comprehensive plan offers an excellent vehicle to include policies relating to hurricanes because it often provides the legal direction for governing how a community will grow into the future. Including emergency management policies into the plan can link these issues to the community's overall goals and objectives covering growth and development. If your community has such a planning structure, consider using it as a way to deal with your hurricane issues, using the studies as a vehicle for defining the issues.

Development Review

Another way these studies can help in developing a local hazard mitigation program is through the assumptions and methodology used in developing the data published in these work efforts. This, along with policy statements developed in the previously discussed section, can be used to create a mechanism for reviewing developments to determine their impact on the community's ability to deal with hurricane safety.

Maps developed from the Hazard and Vulnerability Analyses can be used to identify a new development's hurricane risk as defined by its location within one of the hurricane threat scenarios and the elevation of the development as shown on site plans. The dwelling unit occupancy factors and vehicle usage rates from the Transportation Analysis can be used to determine the number of people that may occupy the development once it is completed, which can be converted to the number of vehicles that might be used in a hurricane evacuation by multiplying the number of people derived from the dwelling unit occupancy factors by the vehicle usage rates. Assumptions derived from the Behavioral Analysis on public shelter usage rates can be used to determine the numbers of people the development may add to those in the community who may use public shelters in a hurricane evacuation. Using simple arithmetic and some help from your community's transportation or public works department, an idea of the increased evacuation times can be estimated as well as the potential impact on the community's shelter supply to house these additional people. This analysis can then be the basis for determin-

ing whether the development should be approved or what conditions need to be met to mitigate the hurricane impact before the development is approved.

Being part of the development review process within the community will enhance your ability to influence this process. This could be as simple as a preliminary review with the developer to point out hurricane related concerns or an established structure that is part of the zoning or development review process. Lee County has established an administrative staff review committee which is responsible for evaluating zoning amendment requests according to policies contained in the county's comprehensive plan. The committee reviews the development and makes recommendations that are brought before a hearing examiner who recommends approval or denial of the zoning change. If the recommendations become part of the conditions for approving the rezoning application, then the developer must comply with the recommendations.

Appendix H contains some examples of reviews done by Lee County Emergency Management in assessing developments through this committee structure. These reviews do three things: describe the specific risk to the development from the hurricane hazard; assess the impact to county public safety programs if the proposed development is built; and present recommendations to reduce or avoid the identified impacts. The review process, using assumptions, methodologies and findings from the Southwest Florida Hurricane Evacuation Study, determines the flooding and wind vulnerability where the proposed development is located, the number of people at risk, the additional vehicles to be used in evacuation, and what evacuation route restrictions may affect traffic flow to and from the proposed development. From this, the additional time needed to evacuate people is calculated and the impacts upon public shelter are also identified. A series of mitigation measures have been developed that are tied to the specific goals, objectives and polices contained in the Lee County Comprehensive Plan. Based on the analysis describing the development's impact, the appropriate measures are selected that would remedy the impacts.

Using these assessments within the review committee process, The Lee County Department of Public Safety has required development projects to:

* Require homeowner associations develop and implement hurricane public information programs to acquaint residents on their hurricane threat and prepared ness actions to take;

* Require hazard disclosure statements to make new residents aware of their vulnerability to hurricane forces;

* Require new hospitals to prepare a thorough hurricane evacuation plan before a certificate of occupancy is issued; and

* Require certain developments to make an in-lieu payment to the county to offset their impacts on public shelter supply. The funding is used to install

hurricane shutters on existing sheltering facilities to increase shelter space available to house evacuees.

Development Standards

Another way the assumptions and methodologies from these studies can be used to promote a local hazard mitigation program is through their use as standards for development. Many communities like Lee County have implemented or are looking at adopting a development standards ordinance that guides or instructs how new development will be built to receive development approval. If hurricane mitigation is included in your comprehensive plan, then this could be a way to address certain problems identified by the hurricane evacuation or loss study to alleviate these problems. For example, Lee County has used this development standards ordinance to require mobile home and recreational vehicle developments to provide on-site shelter for their residents. The formula used to determine the size of the shelter is based upon assumptions and calculations taken from the hurricane evacuation study. The total number of units in the development at build out is multiplied by a dwelling unit occupancy factor to obtain the number of people. This number is then multiplied by a seasonal occupancy factor, then the percentage rate of people who may use public shelter to come up with the number of people to build the shelter for. This number is then multiplied by a square footage factor for each person to come up with the gross square footage for the building.

Other factors could be included in a development standards ordinance to address hurricane related shelter problems. For example, an on-site shelter standard could be developed to which the building must be designed to in order to be approved. This could include shuttering and/or boarding windows, emergency generator requirements, food and water provisions, and other basic needs.

Points to Consider

Developing a local hurricane hazard mitigation program using these studies can require quite a lot of work over a period of time. It is also not without risk because it can thrust the emergency program manager into some "sticky" political situations. On the other hand, the paybacks can be tremendous because what it can do is make the hurricane problem one that community leaders must face on a daily basis. It can also build community support for your program that may make solutions to the community's hurricane problem easier to achieve. For those emergency program managers interested in developing such a program, here are two additional suggestions that may help, based upon Lee County's experience:

SEIZE THE MOMENT, BUT CHOOSE CAREFULLY - Options for dealing with growth and development issues are sometimes clarified through a single zoning case. In

the case of the hurricane, the opportunity may be a project that a number of community groups are resisting. It may be a development that community leaders may need a little help getting through. Whatever the case may be, **CHOOSE ONE THAT YOU CAN GAIN SOMETHING FROM.** Pointing out increases in hurricane evacuation times or additional burden on current public shelter supply maybe all that's needed to deny the project or rethink it. Community decision makers may also be more willing to consider hurricane mitigation if it helps gain development approval. Choosing the case to make your point will take some thought and a willingness to take a risk. But if it's reasonable and you can support your claim, then do it. Much can be gained from small successes, which can make larger gains more easier to achieve in the long run.

YOU WILL WIN SOME AND YOU WILL LOSE SOME - The point here is, don't give up if community leaders don't always see things your way. Many influences shape community policy and oftentimes they conflict, forcing compromise. After all, that's what politics is all about. Be persistent. Find new or different ways to sell your effort if one way doesn't work. Brief those who have supported you on what you are thinking about and ask for their advise.

CHAPTER 6

CONCLUSION

This manual has discussed ways in which the hurricane evacuation and loss study can be used to improve local emergency operations plans and programs. Examples of how the studies have been used to develop and maintain a local hazard mitigation program have also been presented to promote consideration of such a program in other communities. Again, the illustrations presented should not infer that this is the only way to use these studies to deal with your community's hurricane problem. They should be viewed as ways in which these studies have been used to address the hurricane problem and as a springboard for developing other thoughts and ideas that may work in your community. The main point to remember is that these studies are too valuable a resource to ignore in addressing what can be done to improve your community's emergency preparedness, response, recovery and mitigation programs to hurricanes.

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APPENDIX A
Response Storm Evaluation Work Sheet

RESPONSE STORM EVALUATION WORK SHEET

This Work Sheet will be completed each time a Marine Advisory containing storm probabilities that include **Fort Myers** is issued by the National Hurricane Center.

RESPONSE STORM _____

Marine Advisory #_____ (See attached forecast track analysis) Date_____ Time_____

Location: Lat._____ Long._____ Maximum Winds:_____ Speed of Movement_____
Direction of Movement:_____ Storm Category:_____

TASK	RESPONSE INDICATORS	ASSESSMENT Lee County	ASSESSMENT Hurr. Center
Is the Storm likely to affect Lee County?	1. County In Watch/Warning Area: Watch: Yes____ No____: From_____To_____ Warning: Yes_____ No : From_____ To_____ 2. Smallest probability ellipse that includes Lee County: 12-hour_____% ellipse _____none 24-hour_____% ellipse _____none 36-hour_____% ellipse _____none 48-hour_____% ellipse _____none 3. Probability for Fort Myers from the Public Advisory: Cumulative Total 24-hr probability _____% vs 30-40% _____ 36-hr probability _____% vs 20-25% _____ 48-hr probability _____% vs 13-18% _____	Very Likely ____ Somewhat Likely ____ Not Likely ____	____ ____ ____
When is the Storm likely to affect Lee County?	FORECAST TRACK / AVE. ERR. TRACK 1. Forecast Track Time Estimate: _____ _____ 2. Probability Time Est: _____ 3. Forecast Error Time Estimate: 50% prob. ellipse _____ _____ 60% prob. ellipse _____ _____ 70% prob. ellipse _____ _____ 90% prob. ellipse _____ _____	Time estimate ____	____
How intense is the storm likely to be when it affects Lee County?	Max Winds / SSHS / Forecast Error / SSHS 1. Curr. Intensity _____ ____ _____ ____ 2. 12-hr Intensity _____ ____ _____ ____ 3. 24-hr Intensity _____ ____ _____ ____ 4. 36-hr Intensity _____ ____ _____ ____ 5. 48-hr Intensity _____ ____ _____ ____ Ave. Intensity Error: (12 hr-10 mph, 24 hr-15 mph, 48 hr-21 mph)	Response Winds ____ SSUS Cat. ____	____ ____
How large is the storm likely to be when it affects Lee County?	Radius of Tropical Storm Winds (34kt/40mph): Current_____ 24-hr forecast_____ 36-hr forecast_____	Radius of Trop. Storm Winds ____	____
What type of storm approach is likely to affect Lee County?	1. Forecast Type: Landfalling(L)_____ Paralleling(P)_____ Crossing(C)_____ 2. Worst Case Type:_____	Response Type ____	____

RESPONSE STORM EVALUATION WORK SHEET (CONTINUED)
RESPONSE STORM_____

TASK	RESPONSE INDICATORS	ASSESSMENT
What level of evacuation is required to respond to this storm threat?	Reference Hurricane from 1987 S.W. Florida Hurricane Evacuation Plan Update_____ (See Table 2, p. II-8-5)	Evacuation Level:_____
What is the minimum evacuation time to respond to this storm threat?	1. Clearance Time:_____ Response Curve: Slow_____ Medium_____ Quick_____ Tourists: Yes_____ No_____ 2. Pre-landfall Hazard Time:_____ (radius of tropical storm winds divided by forecasted forward speed).	Minimum Evacuation Time:_____
What is the amount of time needed to mobilize resources to respond to this storm threat?	1. Time of Day: Night_____ Day_____ Holiday_____ 2. Day of Week: Weekday_____ Weekend_____ Holiday_____ 3. Available Time Left:_____	Preparation Time:_____ Time Left: _____ (Preparation Time plus Minimum Evacuation Time, then subtract total from previous WORK SHEET)
What response is necessary at this time?	1. Initiate\Continue Response Actions? Yes_____ (See Pre-Storm Response Guide) No_____ (Continue monitoring the storm) 2. Forecast Period for Decision Making? By_____ (Date/Time)	TDS Phase:_____

GUIDANCE/RULES

1. Is the Storm Likely to Affect Lee County? - To determine smallest probability ellipse, use the SPECIFIC TIME FORECAST/ FORECAST POSITIONS/ALL LEVELS options under STORM TRACKING In GDS40 for appropriate forecast positions. For Response Indicator #2, add the probability values from the appropriate time periods (starting with the 24-hr period) to determine the 36 & 48 hour probability values.

2. When is the Storm likely to Affect Lee County? - Use CALC, WORST CASE option to determine worst case track (Response Indicator #2). For paralleling storms, use CALC, CPA to determine closest point along forecast track. For all storms, use the Probability Time Estimate (Response Indicator #2) first for determining the Time Estimate value. For slow moving storms (5 kts or slower), use the 60% ellipse to determine Time Estimate. Use CALC, SUMMARY and refer to the Forecast CPA calculations to determine the Forecast Error Time Estimate.

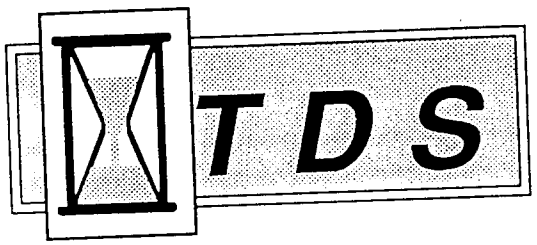
3. How Intense is the Storm Likely to be? - Use the SPECIFIC TIME FORECAST, FORECAST POSITION, ALL LEVELS options under STORM TRACKING in GDS40, then determine each specific wind forecast by forecast period using the WIND FORECAST option in the WIND Function. Use the wind speeds at the 60 and 70% Confidence Levels to determine the strength of the response storm.

4. How large will the Storm likely to be? - Refer to the Storm Printout List from GDS40 or the Marine Advisory to determine the radius of maximum winds, by forecast period. Use CALC, FORWARD SPEED to determine the hurricane's forward speed, by forecast period.

5. What is the minimum evacuation time to respond to this storm threat?

Response Curves: Use the Slow Response Curve if you plan to issue an evacuation order or strongly worded advisory and advanced warning times are long, if evacuation will take more than a 24 hours and most of the evacuation will occur during nighttime hours. Also consider this response curve if you are faced with an evacuation over a weekend. Use the Medium Response Curve if you plan to issue a recommended evacuation and moderately worded advisories, if evacuation will start early in the day (7:00 AM - 8:00 AM) and occur mostly in daylight hours. Also consider this curve if evacuees have to gather family members at different locations and have to go home before starting evacuation preparations (i.e., during a weekday after 8:00 AM and before 5:00 PM). Use the Quick Response Curve when faced with a worst case, late evacuation order; when advanced lead warning times don't exist, and the evacuation starts at night. Tourist Impact: Use the November clearance time estimates if evacuation will take place on a holiday, a weekend before mid-October, or for any time period after mid-October. Use the July clearance time estimates for a weekday evacuation occurring before mid-October. Pre-Landfall Hazards Time: From the CALC, CPA, use either the Forecast CPA or the Average Error CPA information to determine the time that gale force winds may affect the county, and add Preparation Time to determine Decision Time Frame.

APPENDIX B
Time Delineating Schedule (TDS)



TIME DELINEATING SCHEDULE (TDS) FOR STORM EMERGENCIES

PREPARED BY:

DAVID J. SANITER
LEE COUNTY DEPARTMENT OF PUBLIC SAFETY
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 398
2665 ORTIZ AVENUE
FORT MYERS, FLORIDA 33902-0398
(813) 337-2323

AN ENHANCED VERSION
DECEMBER 1990

The Time Delineating Schedule (TDS) was originally developed by Lee County staff members Mr. T. E. Dillon and Mr. David J. Saniter in 1982. Since then, numerous revisions and modifications have occurred due to past storm experiences of other communities and from our knowledge gained through the years implementing the TDS during storm emergencies.

TIME DELINEATING SCHEDULE (TDS)
An Overview

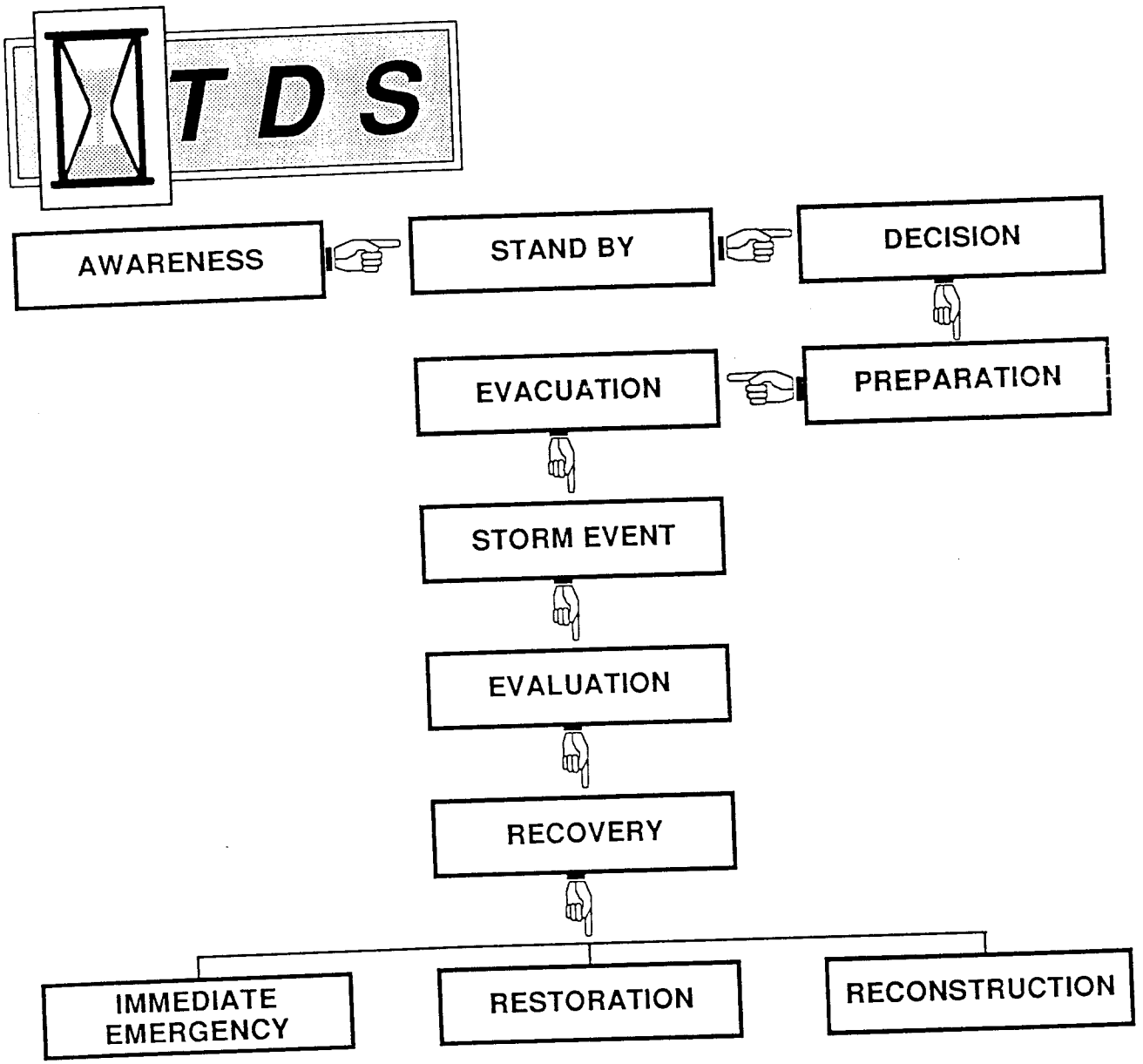
Government plays a major role in protecting life and property from both natural and technological hazards by developing emergency operation plans to guide a community's response to and recovery from disasters or emergencies. But just as a comprehensive plan requires a zoning ordinance and/or a development standards ordinance to implement policies governing a community's growth and development, so too does an emergency plan require a tool to steer the complicated decision-making process through a crisis. Such a tool must not only clarify what actions should be taken and when they should be taken, but also account for the uncertainty present under any emergency which is caused by the particular characteristics of the threatening hazards.

The tool which enables decision makers to implement the emergency planning effort in Lee County is called the Time Delineating Schedule or TDS. Developed by Lee County, TDS provides a step-by-step process to trigger actions by decision-makers in preparation for, response to, and if required, recovery from an emergency or disaster. It accomplishes this by defining ten distinct time periods that describe key phrases or objectives of the emergency. These phases, which are presented in the flow chart and an explanation on the preceding pages, describe a logical sequence to follow for implementing actions according to prescribed needs and priorities.

Specific actions are assigned to each phase that are designed not only to meet the intended objectives for that phase, but also to lay the foundation for the next set of actions required to meet the objectives of the following phase. Decision-makers review, analyze and implement those actions that must, or can be taken based on the threatening hazard's extent and magnitude, and on such constraints as the hazard's speed of onset. Because each phase and its actions serve as a building block for succeeding phases, TDS provides the decision-maker with a timetable for completing actions, while reducing the possibility of not implementing an action that may delay or hinder another action from taking place later on in the emergency.

The TDS concept consists of a manual describing the time delineating process, recommended actions for each phase, and a status of action checklist. Although originally designed for the hurricane threat, TDS can be used in other emergency situations by modifying the time frame for each phase according to the hazard's characteristics and length of the warning period.

In sum, TDS provides an umbrella for defining, guiding and documenting decision-makers actions through the various phases of an emergency. Its primary aim is to ensure that people and property are properly protected in time and that the necessary human and physical resources are in place to support such protective actions. It can be modified to account for the constratint of the hazard itself, the response time available, and other conditions which define the uncertainty of the decision-making environment. Finally, it is used to inform the public on actions the County has taken to reduce the exposure risk to hazardous effects.



PHASE	DESCRIPTION
☐ **AWARENESS**	A period of time, usually consisting of twelve (12) hours commencing at seventy-two (72) hours to approximately sixty (60) hours before extrapolated landfall. This is the notification period, during which appropriate agencies and organizations (public, quasi-public, and private) should be made aware of the situation.
☐ **STAND-BY**	A period of time, usually consisting of ten (10) hours commencing at sixty (60) hours to approximately forty-eight (48) hours before extrapolated landfall. This is the alert period for the acceleration of preparedness actions for emergency and vital services affected by the situation.
☐ **DECISION**	A period of time, usually consisting of three (3) hours commencing at forty-eight (48) hours to approximately thirty-six (36) hours before extrapolated landfall. During this period, the decision to evacuate must be reached and the possibility of the evacuation order be made public. This is the period during which the populace should take precautionary actions in order to cope with the threatening situation.
☐ **PREPARATION**	A period of time, usually consisting of nine (9) hours commencing at, forty-five (45) hours to approximately thirty-three (33) hours before extrapolated landfall. This is the re-analysis period, and the preparation time needed to place emergency personnel and resources into position for operations.

EVACUATION

A period of time commencing at that point (36 to 24 hours before extrapolated landfall) when Lee County officials determine and announce the official evacuation order, continuing until that point either prior to the estimated time of sustained tropical storm force winds (39 miles per hour), or prior to the estimated time of inundation (one-foot) of evacuation routes caused by either the storm surge or fresh water flooding. This is the commencement through completion of the relocation period; all evacuation activities must be completed.

STORM EVENT

A period of time, commencing with the arrival of sustained tropical storm force winds (39 miles per hour), or the inundation of primary evacuation routes, continuing until that point when the local government determines and issues the "ALL CLEAR" announcement. This is the in-place shelter period for the threatened populace, either sheltered in private homes or designated public buildings throughout the County.

EVALUATION

A period of time, consisting of several days to a couple of weeks commencing at that point when sustained winds decrease to forty miles per hour (40 mph) or below. This is the evaluation and assessment period, where Lee County officials initially assess and prioritize the emergency situation and/or generate requirements.

IMMEDIATE EMERGENCY

A period of time, lasting from a couple of weeks up to several months after the storm event. This is the first phase of the recovery period where Lee County public safety agencies and non-governmental organizations respond and provide immediate emergency assistance to prioritized requirements.

RESTORATION

A period of time, consisting of several months to a couple of years after the storm event. This is the second phase of the recovery period where Lee County officials coordinate the repair of the public infrastructure and primarily focus on social and economic activities that will return the community to pre-storm levels.

RECONSTRUCTION

A period of time, consisting of a couple of years to several years after the storm event. This is the last and longest phase of the recovery period where Lee County officials will focus on activities that will mitigate future storm damages.

PHASE	RESPONSE ACTIONS	NUMBER OF RESPONSE ACTIONS
Awareness	1-31	31
Stand-By	32-64	33
Decision	65-87	23
Preparation	88-100	13
Evacuation	101-108	8
Storm Event	109-111	3
Evaluation	112-120	9
Immediate Emergency	121-134	14
Restoration	135-159	25
Reconstruction	160-164	5

TIME DELINEATING SCHEDULE (TDS)

IF SITUATION WARRANTS — **6 RESPONSE ACTIONS**

P	☐	1.	Monitor hazardous weather conditions in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico.
P	☐	2.	Coordinate with the National Weather Service (NWS) concerning meteorological information availability.
p	☐	3.	Coordinate with the County' s consultant for meteorological services.
P	☐	4.	Coordinate with officials from the State Division of Emergency Management, local municipalities, surrounding counties, and other emergency-related officials.
p	☐	5.	Compile and transmit the GDS report (storm forecast) to appropriate agencies, organizations and groups via facsimile machine.
T	☐	6.	Disseminate hurricane preparedness information via the broadcast and print media outlets.

AWARENESS — **25 RESPONSE ACTIONS**

p	☐	7.	Activate the Lee County Emergency Operations Center (EOC) with essential personnel. Review assignments with County DEM staff.
P	☐	8.	Activate storm tracking and assessment system.
P	☐	9.	Establish liaison with appropriate governmental and non-governmental emergency-related officials, agencies and organizations.
P	☐	10.	Coordinate and disseminate all County public information activities.
P	☐	11.	Perform a hurricane vulnerability analysis of the threatening storm emergency and revise when Forecasts are issued by the NHC.
T	☐	12.	Establish and maintain a log of events and/or actions.
S	☐	13.	Alert and brief County Commissioners, appropriate administrative staff members and local municipalities on the threatening storm emergency.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P	☐	14.	Prepare Lee County EOC according to floor plan under emergency conditions.
P	☐	15.	Acquire extra telephones and facsimile machines. Test all EOC telephone equipment.
P	☐	16.	Activate storm messages on hold button of EOC telephone system.
T	☐	17.	Coordinate the proper placement of evacuation signage, as applicable
P	☐	18.	Activate the Phone Notification System (PNS), as applicable.
P	☐	19.	Issue the storm information report via the fax machine.
S	☐	20.	Begin exchanging meteorological information with the SWFR Airport Operations staff.
S	☐	21.	Prepare for the utilization of primary evacuation routes - make temporary repairs to existing road construction projects or prepare to delay start of any new projects.
S	☐	22.	**Request all County Department Directors to designate their personnel as essential and non-essential according to their storm emergency-related responsibilities or assignments.**
S	☐	23.	**Request all Department Directors to review and/or implement emergency plans for the protection of County facilities and equipment.**
S	☐	24.	Request Department Directors **to cancel all leaves for County personnel.**
P	☐	25.	Test EOC communications equipment.
P	☐	26.	Top off fuel tanks of emergency generators at EOC and monitor.
P	☐	27.	Test EOC emergency utility system (i.e., electricity, water, and sewer).
S	☐	28.	Issue public information statements, as applicable.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

T	☐	29.	Report actual tide and wind measurements to the National Weather Service (NWS).
T	☐	30.	Check the operability of the NOAA Weather Alert Radio transmitter and monitor.
S	☐	31.	Establish initial coordination with the assigned manager and coordinators of Lee County's Storm Information Hot-Line (SIHL) Center and brief staff.

STAND-BY ••••••••••••••**33 RESPONSE ACTIONS** ••••••••••••

S	☐	32.	Activate the public information officer (PIO).
P	☐	33.	Fuel all County vehicles and essential equipment to capacity.
P	☐	34.	Issue access clearance badges to EOC officials.
P	☐	35.	Establish emergency information phones in EOC and brief staff.
S	☐	36.	Notify E-911 answering points that the SIHL has been activated.
T	☐	37.	Notify EOC radio repair company of threatening storm emergency and potential service requirements.
S	☐	38.	Issue public information statements, as applicable.
T	☐	39.	Correct any deficiencies found in County facilities, vehicles and equipment utilized for emergency activities.
T	☐	40.	Secure a Lee County crane (or aerial ladder) to be on standby outside the EOC for communications tower emergency needs.
S	☐	41.	Schedule feeding and sleeping arrangements (including transportation) for EOC occupants.
S	☐	42.	Request that all County Department Directors brief employees of emergency responsibilities for both pre-storm and post-storm operations.
P	☐	43.	Implement interior and exterior security systems and plans for EOC.
P	☐	44.	Commence coordination of the traffic movement plan (i.e., control points & devices).

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

T	☐	45.	Report actual tide and wind measurements to the National Weather Service.
P	☐	46.	Commence coordination of the emergency public sheltering plan (i.e., designation, staffing and supplies). Activate Lee County School District, American Red Cross and State HRS officials.
P	☐	47.	Notify the Lee County Health Department to commence acquisition of nurses, doctors, portable toilets, and other supplies to support shelter operations.
S	☐	48.	Notify the Lee County Humane Society to initiate emergency procedures for the support of the pet/animal shelter.
T	☐	49.	Monitor traffic conditions.
T	☐	50.	Acquire a backup duplicating machine for the EOC.
P	☐	51.	Activate the Emergency Broadcast System (EBS).
P	☐	52.	Notify the RACES group of the threatening storm emergency.
P	☐	53.	Restrict the general public from entrance into the EOC.
P	☐	54.	Restrict recreational vehicles, trailered boats or campers to Sanibel and Captiva Islands.
S	☐	55.	Restrict visitors to Sanibel and Captiva Islands.
T	☐	56.	Advise the movement of all slow moving vehicles (less than 25 mph) from barrier islands and low-lying areas.
S	☐	57.	Advise boat owners to secure and prepare their property for severe weather conditions and for a possible marine evacuation of the coastal waters.
S	☐	58.	Advise island residents to secure their property for severe weather conditions and for a possible boat evacuation off coastal islands.
S	☐	59.	Advise construction companies to secure all construction sites of materials or equipment against displacement by wind forces.
T	☐	60.	Advise area businesses to secure their property against displacement by wind forces.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

S	☐	61.	Advise beach motel/hotel businesses of the potential storm emergency - evacuation may be required.
P	☐	62.	Advise and coordinate operations of drawbridges throughout the County.
P	☐	63.	Top off all County fuel dispensing tanks and position emergency power generators at locations.
P	☐	64.	Coordinate the establishment of an emergency worker shelter (i.e., designation, staffing, and supplies).

DECISION ••••••••••••••••• **23 ACTIONS** •••••••••••••••••

P	☐	65.	Advise EBS primary control station to relocate and operate out of EOC.
P	☐	66.	Coordinate with County constitutional officers on either closing or limiting County business and/or services.
P	☐	67.	Recommend or advise the Lee County School Board to close schools.
P	☐	68.	Recommend or advise private schools to close.
P	☐	69.	Transfer the SIHL to another designated Lee County office and brief staff.
P	☐	70.	Brief County Commissioners on the threatening storm emergency.
S	☐	71.	Advise early recommended evacuation of the barrier islands and low-lying areas - no emergency public shelters will be open.
S	☐	72.	Advise and coordinate a marine evacuation of the coastal waters.
S	☐	73.	Advise and coordinate evacuation of off-shore islands utilizing boats.
P	☐	74.	Activate shelter managers and officials to pre-determined locations.
P	☐	75.	Activate RACES members to pre-determined locations.
S	☐	76.	Notify the Humane Society (Animal Control) to be prepared to pick-up animals at emergency public shelters, as necessary.
S	☐	77.	Advise cancellation of public social events.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

S ☐ 78. Issue public information statements, as necessary.

T ☐ 79. Report actual tide and wind measurements to the National Weather Service.

T ☐ 80. Evaluate observed traffic situations and correct deficiencies.

P ☐ 81. Activate the traffic control plan:

P ☐ Traffic Control Points

S ☐ Traffic Control Devices

P ☐ 82. Coordinate emergency transportation requirements (i.e., vehicles, drivers, verification of people with special needs, and the designation of pick-up points).

S ☐ 83. Advise against visiting the islands.

P ☐ 84. Relocate essential emergency equipment and vehicles to pre-determined locations.

S ☐ 85. Notify tow-truck businesses of the potential storm emergency and pre-determine wrecker locations along critical evacuation routes.

P ☐ 86. Advise the Chairperson of the Board of County Commissioners to declare a state of local emergency for Lee County.

P ☐ 87. Coordinate and advise state of local emergency with the following:

P ☐ State Division of Emergency Management (DEM)

P ☐ National Hurricane Center (NHC)

P ☐ City of Cape Coral

P ☐ City of Fort Myers

P ☐ City of Sanibel

S ☐ Charlotte County

S ☐ Collier County

S ☐ Hendry County

T ☐ Glades County

T ☐ Sarasota County

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

PREPARATION ..... 13 RESPONSE ACTIONS

P ☐ 88. Establish and affirm communications with shelter and/or deployed emergency personnel.

T ☐ 89. Report tide and wind measurements to the National Weather Service.

P ☐ 90. Issue public information statements.

P ☐ 91. Disseminate emergency information, advisories and bulletins via the facsimile machine to surrounding counties, State DEM and other emergency-related agencies or organizations.

S ☐ 92. Evaluate traffic situations and correct deficiencies.

S ☐ 93. If determined applicable, restrict all traffic seeking access to Sanibel and Captiva Islands at intermittent periods to allow two and possibly three lanes to exit the Island.

S ☐ 94. If determined applicable, restrict all traffic seeking access to Pine Island/Matlacha at intermittent periods to allow two lanes to exit the Island.

S ☐ 95. If determined applicable, recommend Charlotte County to restrict all traffic seeking access to Gasparilla Island at intermittent periods to allow two lanes to exit the Island.

P ☐ 96. Coordinate with the State Division of Emergency Management (DEM) concerning the following items:

- P ☐ When the evacuation order will be issued by the State and the County.
- S ☐ Estimation of population-at-risk.
- S ☐ Number of shelters required inland.
- P ☐ State assistance needs:
  - P ☐ Law enforcement personnel
  - P ☐ Traffic control
  - P ☐ Security
  - P ☐ Shelter personnel

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P ☐ Accessibility of evacuation routes.

P ☐ Need for Governor to issue an executive order to support County operations.

P ☐ 97. Inform the State Division of Emergency Management (DEM) of the following protection actions:

P ☐ Evacuation
S ☐ Public Sheltering
P ☐ Road/Bridge Closures

P ☐ 98. Advise recommended evacuation of following residents:

P ☐ People with Special Needs
P ☐ People without Transportation
P ☐ Islands
P ☐ Low-Lying Areas
P ☐ Tourists
S ☐ Mobile Homes
S ☐ Manufactured Housing
S ☐ Recreational Vehicles (RV's)
S ☐ Campers
S

P ☐ 99. Advise and coordinate a recommended evacuation with surrounding counties.

P ☐ 100. Activate emergency transportation resources.

EVACUATION ••••••••••••8 RESPONSE ACTIONS ••••••••••••

P ☐ 101. Advise the Chairperson of the Board of County Commissioners to issue an evacuation order for areas vulnerable to life-threatening conditions.

P ☐ 102. Continue phasing of emergency public shelter openings and placement of shelter signs.

P ☐ 103. Maintain emergency public shelter communications.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P ☐ 104. Monitor emergency public shelter conditions and correct deficiencies.

P ☐ 105. Activate EOC emergency utility systems.

S ☐ 106. Advise and coordinate the shut-down of public and private utility systems.

P ☐ 107. Observe traffic situations and correct deficiencies.

P ☐ 108. Commence coordination of post-storm response planning activities:

S ☐ Search & Rescue
P ☐ Emergency Medical Care
S ☐ Care of Dead
S ☐ Security Check Points
P ☐ Return of Evacuees
S ☐ Emergency Regulations
S ☐ Preliminary Damage Assessment
S ☐ Portage Areas
P ☐ Procurement of Supplies
S ☐ Public Health Monitoring
S ☐ Assessment of Community Needs
S ☐ Emergency Relief Assistance
S ☐ Restoration of Critical Lifelines
S ☐ Removal of Debris
S ☐ Emergency Worker Stations
S ☐ Recovery Centers
S ☐ Building Moratoriums
S ☐ Recovery Task Force
S ☐ Staging Areas
S ☐ Emergency Distribution Center
T ☐ Federal Public Assistance

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

T ☐ Disaster Field Offices (DFOs)
T ☐ Disaster Application Centers (DACs)
T ☐ Presidential Declaration
T ☐ Temporary Housing
T ☐ EOC De-Briefing

STORM EVENT ••••••••••••3 RESPONSE ACTIONS ••••••••••••

P ☐ 109. Monitor storm characteristics.
P ☐ 110. Continue emergency public shelter communications.
P ☐ 111. Continue post-storm response planning activities.

EVALUATION ••••••••••••9 RESPONSE ACTIONS ••••••••••••

P ☐ 112. Determine if the primary threat still exists from appropriate agencies.

P ☐ 113. Conduct and coordinate the initial emergency assessment of situation.

S ☐ 114. Determine and prioritize emergency-generated requirements.

P ☐ 115. Re-establish and affirm communications with the following:

P ☐ Emergency Public Shelters
P ☐ Deployed Emergency Personnel
P ☐ State Division of Emergency Management (DEM)
P ☐ City of Cape Coral
P ☐ City of Fort Myers
P ☐ City of Sanibel
S ☐ Charlotte County
S ☐ Collier County
T ☐ Hendry County
T ☐ Glades County

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P ☐ 116. Re-mobilize emergency operational agencies, organizations and private resources.

S ☐ 117. Enact emergency resolutions, ordinances, suspensions of administrative rules and/or procedures.

S ☐ 118. Complete and transmit a General Emergency Incident Report to the State Division of Emergency Management (DEM).

P ☐ 119. Commence clearance of the runways of the SW Florida Regional and Lee County Airports.

S ☐ 120. If State damage assessment assistance is required:

P ☐ Appoint County/City personnel as guides.
S ☐ Arrange for transportation.
S ☐ Obtain maps of areas to be surveyed.

IMMEDIATE EMERGENCY ••••••••••••• **14 RESPONSE ACTIONS** •••••••••••••

P ☐ 121. Commence local emergency response to prioritize generated requirements.

p ☐ 122. Activate appropriate response plans:

P ☐ Care of the Injured and/or Dead
P ☐ Security Check Points
S ☐ Request Relief Assistance

S ☐ Food
P ☐ Water
T ☐ Clothing
P ☐ Shelter
T ☐ Crisis Counseling
T ☐ Emergency Loans/Grants

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P ☐ Restoration of Critical Lifelines:

P ☐ Electricity

P ☐ Water

S ☐ Transportation:

S ☐ Air

S ☐ Land

T ☐ Water

P ☐ Communications

p ☐ 123. Issue the "ALL CLEAR" announcement for designated areas.

P ☐ 124. Activate and mobilize the recovery task force and perform the following:

P ☐ Review damage reports and identify mitigation opportunities.

P ☐ Recommend emergency resolutions and ordinances pertaining to post-hurricane activities.

S ☐ Recommend changes to land development regulations.

P ☐ Formulate recommendations to guide community recovery.

S ☐ Formulate special committees and sub-committees to complete specific tasks.

P ☐ Initiate hazard mitigation projects and programs for state or federal funding.

P ☐ Participate in state and federal hazard mitigation efforts.

T ☐ Review emergency actions and recommend amendments to emergency plans and procedures.

S ☐ Appoint disaster recovery coordinator.

S ☐ Appoint economic recovery coordinator.

S ☐ Appoint hazard mitigation coordinator.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P	☐	125.	Issue public information announcements to the public giving emergency information.
P	☐	126.	Determine method of assessing damages.
P	☐	127.	Activate damage assessment teams.
P	☐	128.	Conduct and coordinate debris clearance.
T	☐	129.	Acquire appropriate permits or permission for debris removal and disposal.
P	☐	130.	Conduct and coordinate damage assessments.
P	☐	131.	Establish portage areas.
P	☐	132.	Acquire funds to purchase needed emergency resources.
P	☐	133.	Monitor public health conditions and correct deficiencies.
P	☐	134.	Evaluate the long-term commitment needed for capital facilities planning.

RESTORATION ••••••••••••25 RESPONSE ACTIONS••••••••••••

P	☐	135.	Perform assessment of community needs.
P	☐	136.	Coordinate emergency relief assistance.
P	☐	137.	Establish emergency worker stations and coordinate support activities.
P	☐	138.	Establish staging areas.
P	☐	139.	Establish recovery centers and coordinate support activities.
P	☐	140.	Establish emergency distribution centers and coordinate support activities.
S	☐	141.	Establish and maintain a designated Federal Public Assistance Office and coordinate activities.
P	☐	142.	Attend the public officials' briefing-Federal Public Assistance.
P	☐	143.	Complete the Federal Public Assistance-Notice of Interest Form.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

P ☐ 144. Enact a Resolution designating the Applicant's Agent for Federal/State Assistance.

P ☐ 145. Activate the appropriate members of the Damage Survey Team.

T ☐ 146. Collect and complete appropriate reports and submit summary to State DEM.

S ☐ 147. Collect and compile the following reports:

S ☐ Daily Activity

S ☐ Action/Event Logs

S ☐ Data on damage eligible for Federal reimbursement.

P ☐ 148. Provide assistance in the establishment and coordination of the Federal Damage Survey Reports.

T ☐ 149. Provide assistance in the establishment, staffing and operations of Disaster Field Offices (DFOs).

S ☐ 150. Provide assistance in the establishment, staffing and operations of Disaster Application Centers (DACs).

T ☐ 151. Provide assistance in the establishment of temporary housing sites.

P ☐ 152. Complete Federal Project Applications.

T ☐ 153. Complete the following:

T ☐ After Evacuation Report

T ☐ County Incident Profile Report

P ☐ 154. Critique the management of the storm emergency.

P ☐ 155. With assistance from State and Federal agencies, assess the County and its municipalities emergency management programs.

S ☐ 156. Provide assistance in the establishment and coordination of State/Federal hazard mitigation efforts.

S ☐ 157. Review and examine existing construction practices, future growth policies and development practices.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

S ☐ 158. Review and/or develop hazard mitigation policies and/or standards.

S ☐ 159. Propose local laws to mitigate hurricane hazard damages.

RECONSTRUCTION ••••••••••••5 RESPONSE ACTIONS ••••••••••••

P ☐ 160. Perform long-term activities or projects focused on improving or strengthening the community's economy.

P ☐ 161. Perform hazard mitigation projects or programs to reduce the community's hurricane susceptibility and vulnerability.

P ☐ 162. Repair, replace, modify or relocate public facilities in hazard-prone areas.

P ☐ 163. Develop and implement a redevelopment plan for hazard-prone areas that would minimize repeated exposure to life-threatening situations.

P ☐ 164. Implement a acquisition program to acquire storm-damage property in hazard-prone areas.

LEVEL OF PRIORITY: **P-Primary** **S-Secondary** **T-Tertiary**

APPENDIX C
Hurricane Information Contained in Fort Myers Telephone Directory

HURRICANE EVACUATION GUIDE

DECISION GUIDE FOR
HURRICANE EVACUATION.
SHOULD I EVACUATE?

AM I AT RISK?

You are at risk if:

- You live on the barrier or offshore islands.
- You live in a mobile home or recreational vehicle, even when threatened by a minimal hurricane.
- You live along a river, creek, saltwater canal or in a low-lying inland area.

IF YES

IF NO

HAVE I BEEN ADVISED OR ORDERED TO EVACUATE BY THE GOVERNOR OR LOCAL ELECTED OFFICIALS THROUGH RADIO, TV OR BY AN OFFICIAL REPRESENTATIVE OF THE COMMUNITY (LAW ENFORCEMENT OFFICERS, FIRE OFFICIALS)?

IF YES

PREPARE TO EVACUATE USING YOUR OWN PLAN OR THE FOLLOWING DEFCISION CHECKLIST FOR EVACUATION PLANNING.

IF NO

- Stay at home if your house is safe from potential flooding and able to withstand high winds.
- Stay tuned to local radio and TV for official advisories or bulletins.

OR

IF IN DOUBT OR STILL CONCERNED ABOUT YOUR SAFETY:

- Evacuate outside the threatened area as far ahead of time as possible.
- Stay with friends or relatives or at a hotel/motel safe from potential flooding.

GO TO DECISION CHECKLIST FOR EVACUATION PLANNING

Source: LEE COUNTY
DEPARTMENT OF
PUBLIC SAFETY
DIVISION OF
EMERGENCY MANAGEMENT

DECISION CHECKLIST FOR HURRICANE EVACUATION PLANNING

DOYOU HAVE CHILDREN?

Remember:

- Special diet and baby foods
- Baby equipment (bedding, diapers, etc.) birth certificates
- Toys
- Hobby materials
- Reading and drawing supplies

ARE YOU, OR IS ANYONE IN YOUR FAMILY, ILL OR DISABLED?

Remember:

- All prescription and other medicines
- Prosthetic devices
- Thermometer
- Emergency medical certification
- Eyeglasses
- Hearing aids
- Special diet foods
- Extra pillows and bedding

DOYOU HAVE PETS?

Remember:

- Pets are not permitted at shelters.
- Arrange accommodations at a kennel.
- Or take necessary precautions at home.

ARE YOU A HOMEOWNER OR RENTER?

Remember:

- Take important papers with you (insurance policies, property inventory, proof of residence).
- Turn off the water supply.
- Turn off air conditioner.
- Disconnect all electrical appliances except food storage.
- Shut off all gas appliances.
- Lock all doors and windows.

PROCEED TO PLANNED DESTINATION.

- Bring:
  —Personal hygiene items (soap, toothbrush and paste, deodorant, first aid kit, aspirin, etc.)
  —Items necessary at shelter (water, bedding, non-perishable food, flashlight, batteries, portable AM/FM radio, etc.)
- Eat something before you leave home.

ARE YOU WITHOUT A PLACE TO GO?

Remember:

- TV or radio broadcasts will inform you of designated emergency public shelters.

PROCEED TO PUBLIC EMERGENCY SHELTER.

Source: FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)
LEE COUNTY DEPARTMENT OF PUBLIC SAFETY DIVISION OF EMERGENCY MANAGEMENT
LEE COUNTY CHAPTER OF THE AMERICAN RED CROSS

SHELTERS & ROUTES FOR EVACUATION

EVACUATION ROUTES

Blue circular signs entitled "Evacuation Route" have been strategically placed along roadways throughout Lee County to direct the flow of traffic from vulnerable areas (barrier islands) and to assist those wishing to leave the County. Those persons leaving Lee County should avoid using roadways that parallel the Southwest Florida Coast.

GENERALIZED ELEVATIONS

The elevations shown on this map are intended to help you determine the general elevation where you live. The elevation ranges are in five-foot increments and represent ground elevations above mean sea level (msl).

For more specific information concerning the elevation of your residence, refer to your building/site plan for the structure's first-floor elevation.

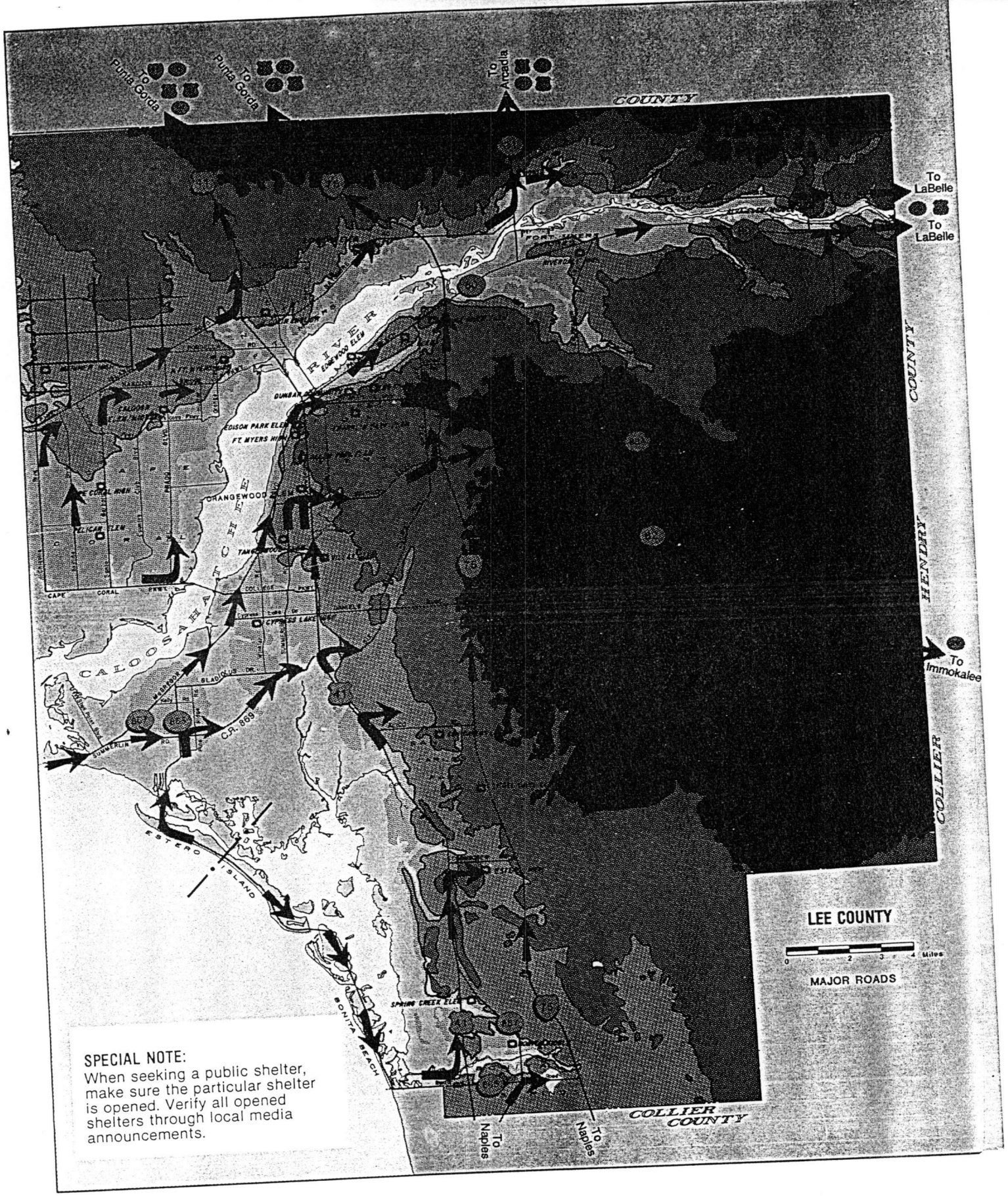
To determine your general elevation, locate your residence on the map using streets or other familiar landmarks. Use the Elevation Legend at the bottom of the map to determine the color shading that corresponds to the elevation range where you live.

You may be at risk if the elevation of your residence is lower than forecasted storm surge flooding levels issued by the National Weather Service or other official sources.

SHELTER USAGE

When conditions permit, seek other forms of refuge before going to a public shelter (such as: going to a hotel or motel away from the coast, staying with a friend or relative away from the coast, or going to a hotel/motel, friend or relative's house outside the county).

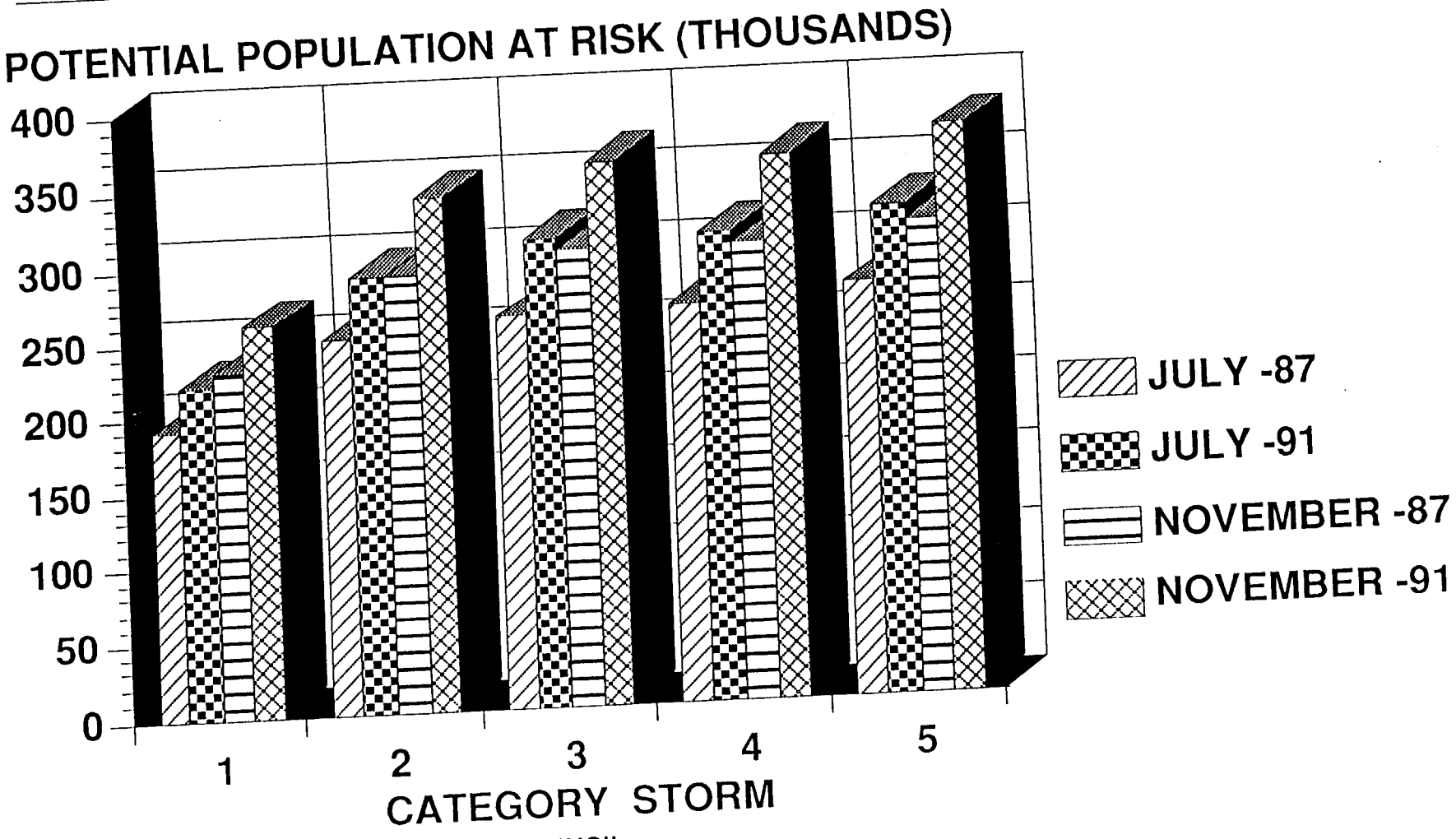
Source: LEE COUNTY DEPARTMENT OF PUBLIC SAFETY DIVISION OF EMERGENCY MANAGEMENT



SPECIAL NOTE:
When seeking a public shelter, make sure the particular shelter is opened. Verify all opened shelters through local media announcements.

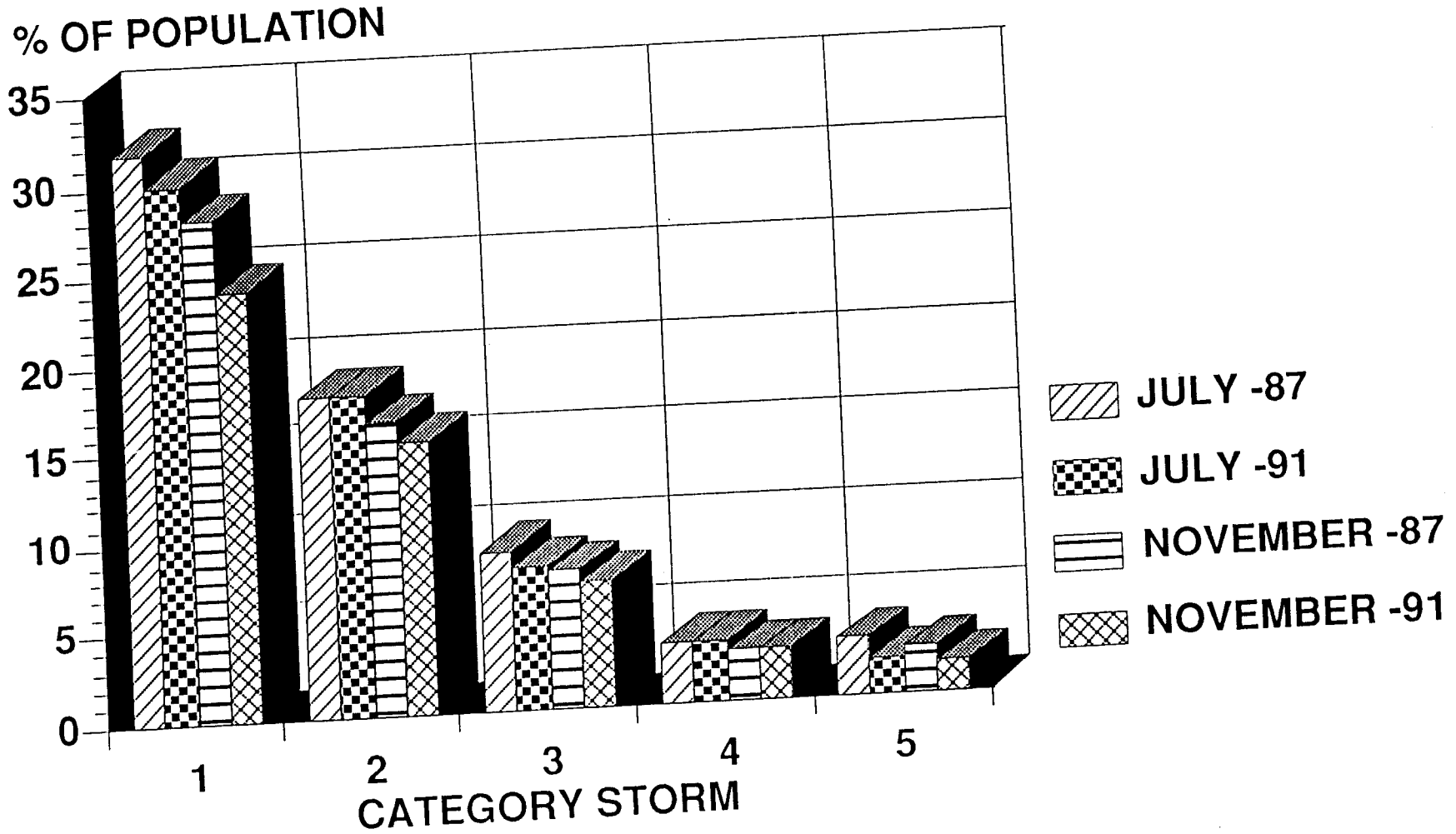
APPENDIX D
Sample Public Information Formats To Display Risk Information

POPULATION AT RISK TO HURRICANES BY CATEGORY STORM - BY SEASON 1987 - 1991

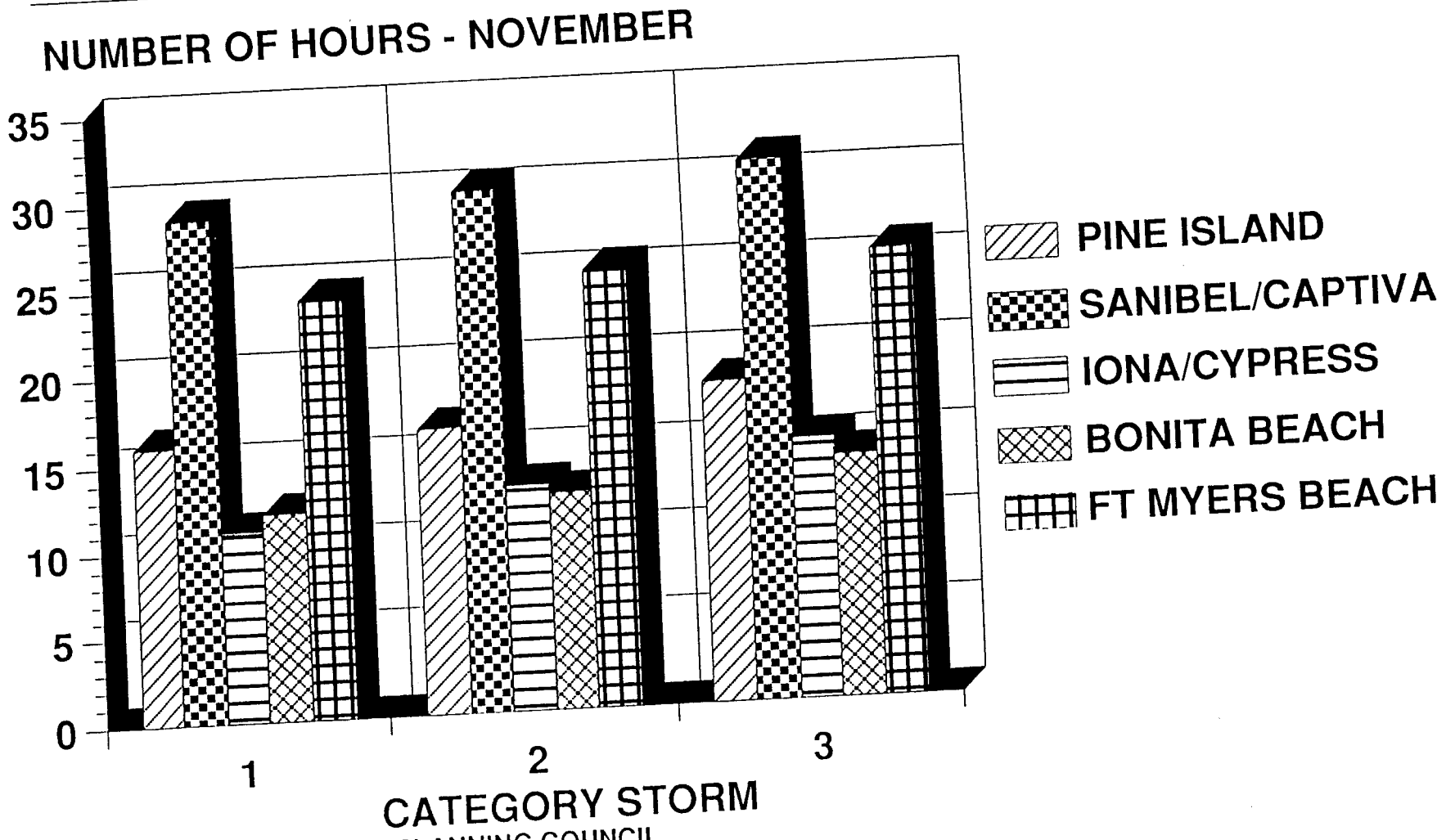


SOURCE: SWF REGIONAL PLANNING COUNCIL

% OF POPULATION AT RISK MET BY SHELTER SUPPLY, BY CATEGORY STORM & SEASON

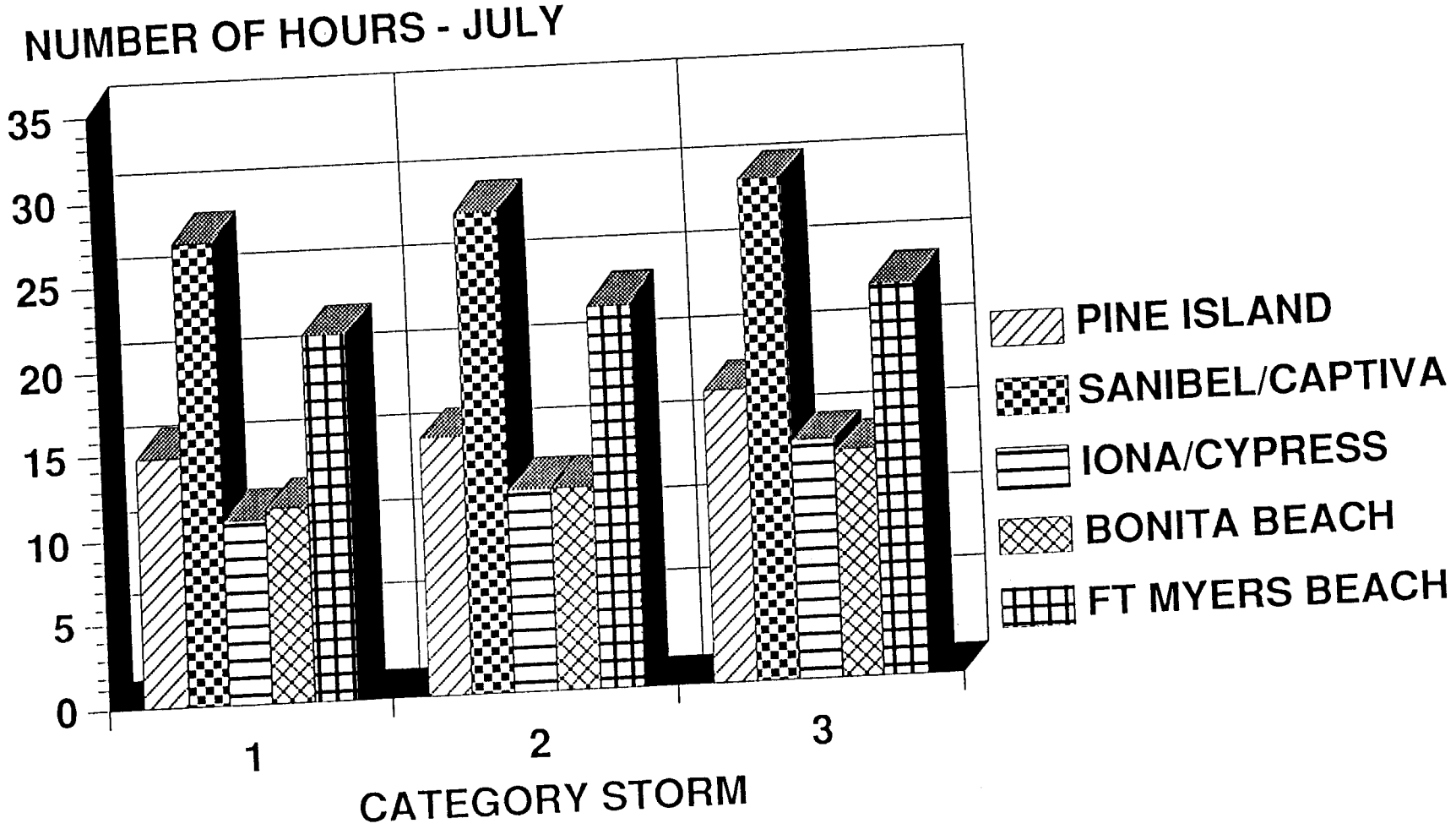


1991 EVACUATION TIMES FOR SELECTED COASTAL AREAS FOR NOVEMBER, BY CATEGORY STORM



SOURCE: SWF REGIONAL PLANNING COUNCIL

1991 EVACUATION TIMES FOR SELECTED COASTAL AREAS FOR JULY, BY CATEGORY STORM



SOURCE: SWF REGIONAL PLANNING COUNCIL

APPENDIX E

Sample Shelter Planning Data from the Lee County Emergency Public Shelter Resource Inventory/Availability Manual

EMERGENCY PUBLIC SHELTER RESOURCE INVENTORY/AVAILABILITY

(AS OF 10 / 89)

Lee COUNTY

FACILITY NUMBER	A-2 A-3
FACILITY USAGE CODE	FIVE
FACILITY CAPACITY	2,500
RACES ZONE	ORANGE
1st FLOOR ELEVATION (MSL)	18.0

NAME of FACILITY: ALVA ELEMENTARY/MIDDLE

PHYSICAL ADDRESS: Center Street & Church Avenue

CITY: ALVA ZIP: 33920

ACRES: 7.5 PARKING SPACES: 80

EMERGENCY POWER: [XX] YES [ ] NO

If yes, type: [XX] GENERATOR [ ] BATTERY

WATER SYSTEM: [ ] DEPENDENT

[XX] INDEPENDENT

WASTEWATER SYSTEM: [ ] DEPENDENT

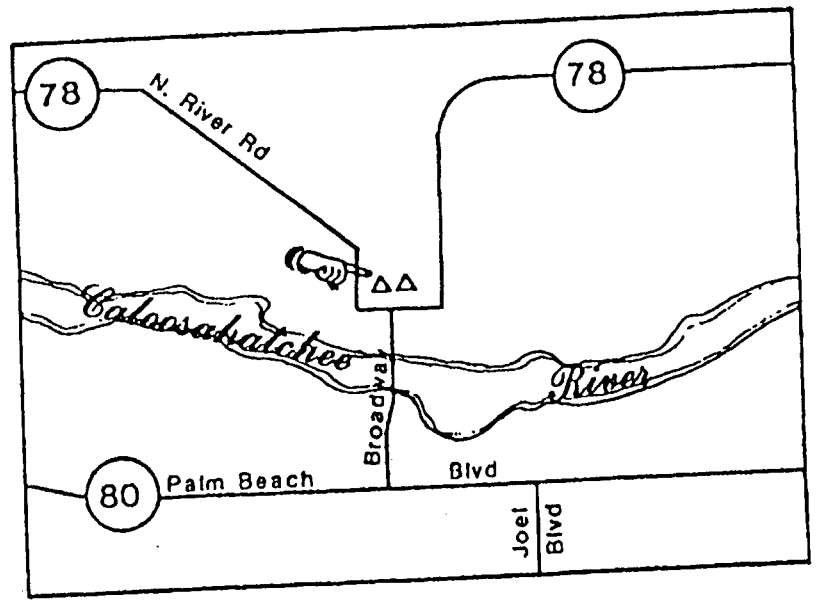
[XX] INDEPENDENT

KITCHEN AVAILABILITY: [ ] YES [XX] NO

This information has been compiled and edited by the Lee County Division of Emergency Management from the best available data sources.

COMMENTS:

Flooding - Usable to Category 5.
Wind - Crosshatched buildings should not be used because of frame and roof type.

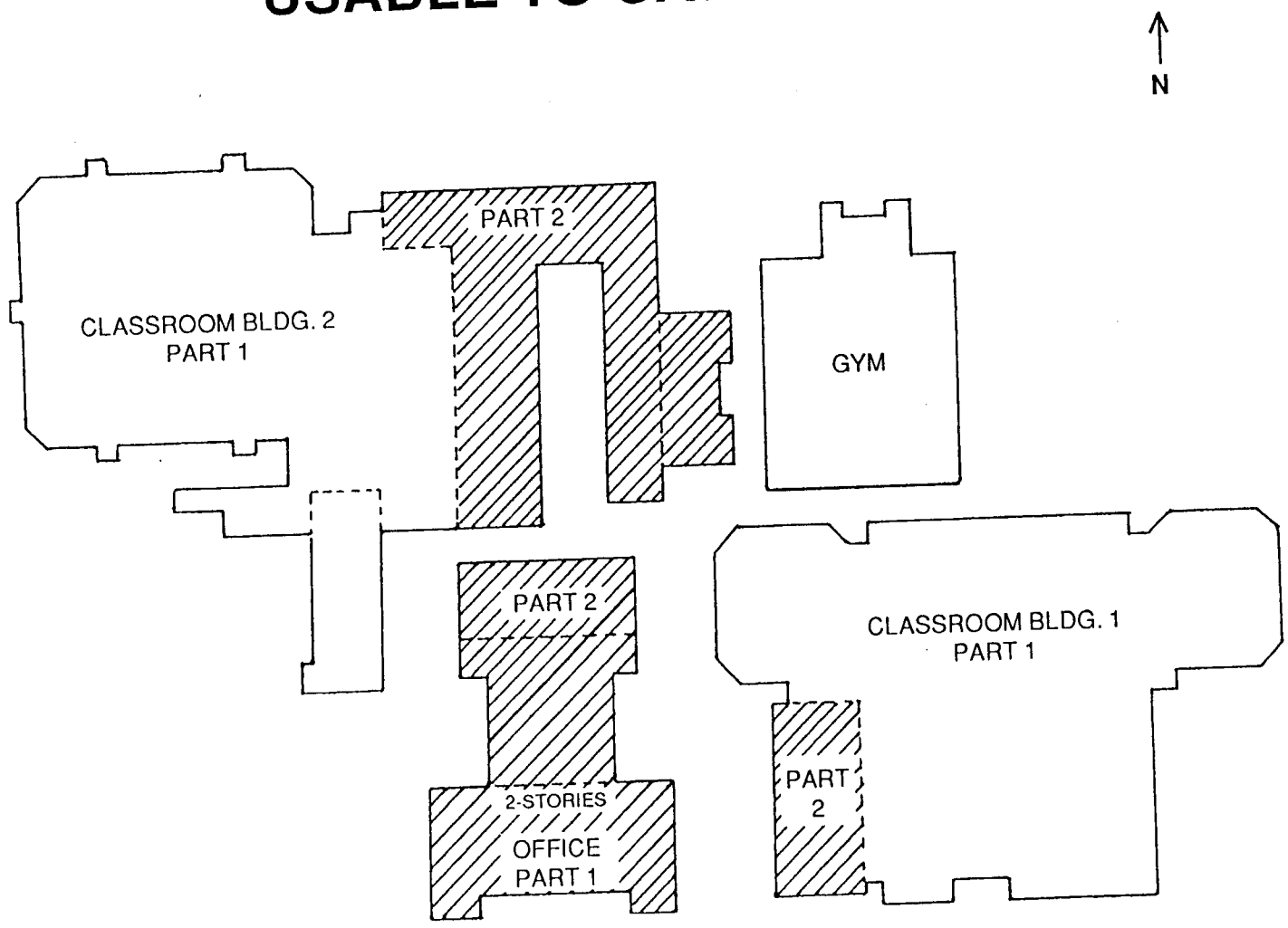


1/2

E-1

FACILITY NUMBER A–2 A–3

FLOODING - USABLE TO CATEGORY 5



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2

APPENDIX F
General Outline - Post Disaster Plan

LEE COUNTY, FLORIDA
GENERAL OUTLINE
POST-DISASTER STRATEGIC PLAN

CHAPTER THREE (Continued)

Page Number

CHAPTER FIVE (Continued)

Page Number

1.6.0 **CHAPTER SIX—REFERENCES**

CHAPTER SIX (Continued)

Page Number

CHAPTER SIX (Continued)

Page Number

LIST OF FIGURES

LIST OF MAPS

LEE COUNTY, FLORIDA
GENERAL OUTLINE
POST—DISASTER STRATEGIC PLAN

Page Number

Volume 2 **RECOVERY IMPLEMENTATION GUIDE**

CHAPTER THREE (Continued)

Page Number

LIST OF FIGURES

LIST OF MAPS

CHAPTER THREE (Continued)

Page Number

LEE COUNTY, FLORIDA
GENERAL OUTLINE
POST-DISASTER STRATEGIC PLAN

Page Number

Volume 3 **DOCUMENTS & SAMPLE INSTRUMENTS**

CHAPTER ONE (Continued)

- Policy on the Acquisition of Property Following A Severe Storm Event.

- Policy on Retaining a Facilitator for Coordination of Assistance from the Federal Government and State Agencies Available to Lee County Following A Severe Storm Event.

APPENDIX G
Lee County Comprehensive Plan Goals, Objectives and Policies Based on Hurricane Evacuation/Loss Studies

GOAL 72: **PEOPLE WITH SPECIAL NEEDS.** To assist in the emergency preparedness requirements of the county's elderly, frail, infirmed, or handicapped (people with special needs).

OBJECTIVE 72.1: By 1990, the county shall have mechanisms in place to assist people with special needs during an emergency.

POLICY 72.1.1: New hospital, nursing home, adult congregate living facility, or developmentally disabled projects shall prepare an emergency preparedness plan acceptable to the Director of the Lee County Division of Emergency Management prior to receiving a final development order.

POLICY 72 .1. 2: The county, in cooperation with other public agencies and service groups, shall examine efforts to assist in the emergency transportation needs of residents having limited mobility who do not reside in licensed institutions serving people with special needs.

POLICY 72 .1. 3: The county, in cooperation with other public agencies and service groups, shall attempt to provide basic medical services in selected emergency public shelters for people with special needs.

GOAL 7 9: **EVACUATION AND SHELTER :** To provide evacuation and shelter capabilities adequate to safeguard the public against the effects of hurricanes and tropical storms.

OBJECTIVE 79.1: EVACUATION. By 1995, evacuation times will be restored to 1987 levels using the 1987 Southwest Florida Regional Hurricane Plan Update as guidance; and by 2010, the clearance time portion of evacuation time will not exceed 18 hours.

POLICY 79.1.1: The county shall assess the impact of all new residential development upon the projected hurricane evacuation network and upon projected hurricane evacuation times, and shall require mitigation either through structural (on-site, off-site shelter) provisions or through non-structural methods or techniques.

POLICY 79.1.2 : By 1992, periodic updates of the hurricane evacuation portion of the Comprehensive Emergency Management Plan shall be coordinated with computer transportation modeling to identify critical roadway links.

POLICY 79.1.3: Critical roadway links causing congestion on evacuation routes for Category 1 through 3 hurricanes shall receive high priority for capital improvement expenditures.

POLICY 79.1.4: New or replacement bridges on evacuation routes spanning major or marked navigable waterways shall not be drawbridges except where a high span cannot physically be constructed.

OBJECTIVE 79.2: SHELTER. By 2010, adequate shelter space will be available for the population in the Hurricane Vulnerability Zone at risk under a Category 3 storm.

POLICY 79.2.1: By 1990, the percentage rate of the evacuation population to be used as the standard for in-county and on-site shelter demand shall be reevaluated by the Division of Emergency Management to update the best available behavioral response information, and this rate shall be used to set the target shelter capacity for 2010.

POLICY 79.2.2: By 1990, on-site shelter facilities shall be required by county development regulations for all residential developments located inside Category 2 and 3 but outside Category 1 areas of the Hurricane Vulnerability Zone, unless an impact fee or in-lieu payment (amount to be determined) is made to the county for off-site shelter provision. On-site shelter facilities shall be required for all mobile home and recreational vehicle developments located outside Category 1 areas unless impact fee or in-lieu payments are made.

POLICY 79.2.3: By 1990, all new residential, mobile home, and recreational vehicle developments inside Category 1 areas of the Hurricane Vulnerability Zone shall be required by county development regulations to make an impact fee or in-lieu payment to the county for off-site shelter provision.

POLICY 79.2.4: By 1990, on-site shelters shall be required to meet standards established by the county, including provision of adequate shelter space, elevation above Category 3 hurricane storm surge flooding levels,

adequate windproofing, glass protection, emergency power where needed, water supplies, and other basic needs.

POLICY 79.2.5: On-site shelters for the general public shall not be built on barrier or coastal islands.

POLICY 79.2.6: By 1990, the county shall determine the feasibility of evacuating residents from the Category 1 area to vertical shelters within residential, commercial, and industrial sites in the Category 2, 3, 4, and 5 areas of the Hurricane Vulnerability Zone.

POLICY 79.2.7: Upon adoption of Rule 9J-2, F.A.C., the county shall petition the Florida Department of Community Affairs to designate Lee County as a "special hurricane preparedness district" so that shelter alternatives not consistent with state-wide policies can be implemented.

GOAL 80: HAZARD MITIGATION. To provide through county plans, programs, and regulations means to minimize future property losses from tropical storms and hurricanes.

OBJECTIVE 80.1: DEVELOPMENT REGULATIONS. By 1990, all development regulations shall be reviewed and revised to require that the vulnerability of future development in the A-Zone (as defined by the Federal Emergency Management Agency) be reduced.

POLICY 80.1.1: Regulations and incentives will be examined for additional setbacks in critical erosion areas, conservation and enhancement of dunes and vegetation, floodproofing of utilities, and appropriate requirements for structural wind resistance and floodplain management.

POLICY 80.1.2: The county shall not permit new or expanded mobile home or recreational vehicle development on barrier islands or in Coastal High Hazard Areas (which include V-Zones as defined by the Federal Emergency Management Agency).

POLICY 80.1.3: By 1990, all new residential development of more than 50 units shall be required to provide continuing information to residents concerning hurricane evacuation and shelters, through the establishment of a homeowners' or residents' association.

POLICY 80.1.4: By 1990, all new residential development of more than 100 units shall be required to formulate an emergency hurricane preparedness plan; this plan is subject to the approval of the county's Division of Emergency Management.

OBJECTIVE 80.2: PUBLIC FUNDS. By 1990, the county shall establish a funding source to provide funds for hazard mitigation and disaster recovery needs.

POLICY 80.2.1: The county shall consider impact fees and/or a Hazard Mitigation MSTU to cover the public costs of hazard mitigation, floodproofing, evacuation, search and rescue, acquisition of hazard-prone property, reconstruction of public facilities, construction of (or improvements to existing or proposed) shelters, and similar needs.

HURRICANE LOSS STUDY

GOAL 75: PROTECTION OF LIFE AND PROPERTY. To protect human life and developed property from natural disasters.

OBJECTIVE 75.1: DEVELOPMENT IN HAZARD AREAS. Development (other than minor structures) within the V Zones shall not be allowed seaward of the Coastal Construction Control Line as it exists in 1988; new development on barrier islands shall be limited to densities that meet required evacuation standards; new development requiring seawalls for protection from coastal erosion shall not be permitted; and allowable densities for undeveloped areas within A Zone areas will be considered for reduction.

POLICY 75.1.1: Pending revisions to coastal construction control lines by the state, all development shall adhere to coastal setback criteria previously established by the county.

POLICY 75.1.2: After revisions to the coastal construction control lines, county policy regarding development seaward of these lines shall be reevaluated.

POLICY 75.1.3: Rezonings to allow higher densities shall not be permitted on barrier and coastal islands if the capacity of critical evacuation routes would thereby be exceeded (see Objective 79.1).

POLICY 75.1.4: Shoreline development in V Zones shall be protected from coastal erosion, wave action, and storms by vegetation, setbacks, and/or beach renourishment, rather than by seawalls or other hardened structures which tend to hasten beach erosion (see also policies under Objective 83.2).

POLICY 75.1.5: Through the Lee Plan amendment process, land use designations of undeveloped areas within the A Zone shall be

considered for reduced density categories (or assignment of minimum allowable densities where density ranges are permitted) in order to limit the future population exposed to coastal flooding and hurricane damage.

GOAL 76: LIMITATION OF PUBLIC EXPENDITURES IN HAZARD AREAS. To restrict public expenditures in areas particularly subject to repeated destruction by hurricanes, except to maintain required service levels, to protect existing residents, and to provide for recreation and open space uses.

OBJECTIVE 76.1: HAZARD AREA EXPENDITURES. By 1990, public expenditures in areas particularly subject to repeated destruction by hurricanes shall be limited to necessary repairs, public safety needs, services to existing residents, and recreation and open space uses.

POLICY 76.1.1: All further public expenditures made for new facilities on undeveloped barrier islands or within V zones shall require a finding by the county commission that such expenditures are necessary to maintain required service levels, to protect existing residents, or to provide for recreation and open space needs.

POLICY 76.1.2: No new causeways (public or private) shall be constructed to any islands.

POLICY 76.1.3: No new bridges shall be constructed to undeveloped barrier islands except where needed to achieve evacuation clearance time objectives on adjoining islands connected by existing bridges. In such a case, this plan shall be amended to insure that the ultimate development of all areas served by the new bridge is limited to levels which can safely be served by the new and existing bridges.

GOAL 81: POST-DISASTER REDEVELOPMENT. To provide for planning and decision-making to guide redevelopment during the response and recovery period following major emergencies, such as tropical storms and hurricanes.

OBJECTIVE 81.1: POST-DISASTER STRATEGIC PLAN. By 1990, the county shall formally establish post-disaster institutions and procedures to guide county actions following a natural or technological disaster.

POLICY 81.1.1: The plan shall establish a Recovery Task Force to work with state and federal emergency officials, assess damage, review emergency actions, prepare a redevelopment plan, and recommend needed changes to the Strategic Plan and to this comprehensive plan.

POLICY 81.1.2: The plan shall establish guidelines for determining priorities for the acquisition of stormdamaged property in hazard-prone areas.

POLICY 81.1.3: The plan shall establish principles for repairing, replacing, modifying, or relocating public facilities in hazard-prone areas.

POLICY 81.1.4: The applicable portions of the Comprehensive Emergency Management Plan shall be modified to comply with these policies, and shall contain step-by-step details for post-disaster recovery operations.

OBJECTIVE 81.2: POST-DISASTER ORDINANCE. By 1990, the county shall adopt an ordinance to implement (where necessary) the Post-Disaster Strategic Plan, and to provide regulations that may be needed following a natural or technological disaster.

POLICY 81.2.1: The ordinance shall provide for enactment of a temporary moratorium on rebuilding not immediately needed for the public health, safety, and welfare (e.g., to allow repairs to water, power, fire, police, and medical facilities; debris removal; stabilization or removal of structures in danger of collapsing; and minimal repairs to make dwellings habitable).

POLICY 81.2.2: The ordinance may incorporate a redevelopment plan for hazard-prone areas where such a plan would minimize repeated exposures to life-threatening situations.

POLICY 81.2.3: The ordinance shall implement the county buildback policy:

> Structures which have been damaged by fire or other natural forces to the extent that the cost of their reconstruction or repair exceeds 50% of the replacement cost of the structure may be reconstructed at (but not to exceed) the legally documented actual use, density, and intensity existing at the time of destruction, thereby allowing such structures to be rebuilt or replaced to the size, style, and type of their original construction, including their original square footage; provided, however, that the affected structure, as rebuilt or replaced, complies with all applicable federal and state regulations, local building and life safety regulations, and other local regulations which do not preclude reconstruction otherwise intended by this policy.

In accordance with this policy, the ordinance shall provide that:

1) Structures damaged less than 50% of their replacement cost at the time of damage can be rebuilt to their original condition, subject only to current building and life safety codes.

2) Structures damaged more than 50% of their replacement cost at the time of damage can be rebuilt to their original square footage and density, provided that they comply with:
   a) federal requirements for elevation above the 100-year flood level;
   b) building code requirements for floodproofing;
   c) current building and life safety codes;
   d) state Coastal Construction Control Lines; and
   e) any required zoning or other development regulations (other than density or intensity), unless compliance with such regulations would preclude reconstruction otherwise intended by the buildback policy.

3) The ordinance may establish blanket reductions in non-vital development regulations (e.g., buffering, open space, side setbacks, etc.) to minimize the need for individual variances or compliance determinations prior to reconstruction.

4) The ordinance may establish procedures to document actual uses, densities, and intensities, and compliance with regulations in effect at the time of construction, through such means as photographs, diagrams, plans, affidavits, permits, appraisals, tax records, etc.

5) No provision is made to redevelop property containing damaged structures for a more intense use or at a density higher than the original lawful density except where such higher density is permitted under current regulations.

GOAL 83: COASTAL AREAS. To conserve, maintain, and enhance the natural balance of ecological functions in the coastal area, with particular emphasis on the protection of beach and dune systems so as to retain their contribution to storm protection, natural resources, and economic development.

OBJECTIVE 83.1: COASTAL AREA IN GENERAL. Lee County shall manage of the coastal area to provide a balance among conservation of resources, public safety capabilities, and development.

POLICY 83.1.3: Construction of vehicular access to, and paved roads or commercial marinas on, undeveloped barrier islands shall be prohibited, as mandated by the Charlotte Harbor Management Plan.

OBJECTIVE 83.3: BEACH AND DUNE SYSTEMS. By 1991, Lee County shall establish a beach and dune management program which may include beach renourishment, sand budget analysis, storm surge modeling, tide and wave measurement, and appropriate development regulations.

APPENDIX H
Samples of Hurricane Mitigation Development Reviews

DATE: August 8, 1990

TO: Charles Gauthier, Principal Planner
Division of Zoning

FROM: David J. Saniter, Coordinator
Dept. of Public Safety

RE: **DEVELOPMENT OF COUNTY IMPACT (DCI)**
REVIEW AND RECOMMENDATIONS

Project: Emerald Pines
Request: Residential Planned Development (RPD)
Location: Subject property is located on the west side across from Plantation Subdivision, approximately 1/2 miles north of Daniels Road in Section 18, Township 45 South, Range 25 East, Lee County, Florida.
Petitioners: Tracy Bean; Bean, Whitaker, et al.
Case Number: 2077 (DCI)

1. HURRICANE VULNERABILITY

According to the National Weather Service's storm surge model 'SLOSH", (Sea, Lake and Overland Surges from Hurricanes), reflecting a composite of the maximum extent of flooding which may be caused for each hurricane category, this site is subject to flooding accordingly:

Category of Hurricane	Sustained Winds (MPH)	SLOSH Surge Height (Feet above MSL)
1	74-95	—
2	96-110	—
3	111-130	18.4
4	131-155	21.6
5	155+	23.6

Therefore, evacuation of this particular site may be necessary in a category three hurricane according to the information from the National Weather Service's storm surge model (SLOSH) when compared to the existing ground elevation range of 12.5 to 15.4 feet above MSL.

This proposed development, consisting of 54 single family units will generate an additional evacuating population of 126 persons, with an additional 58 vehicles utilized in the evacuation of this area. Calculations are provided below:

54 SF units x 2.4 persons/household x 97% occupancy rate = 126 persons

54 SF units x 97~ occupancy rate x 1.1 vehicles/occupied units = 58 vehicles

The ultimate point restricting evacuation is Daniels Road with an evacuation capacity of 938 vehicles per hour. Therefore, if this proposed development is generating 58 evacuating vehicles, the impact is 4 minutes to existing evacuation conditions for a category three hurricane.

According to the results of the behavior survey conducted by the Southwest Florida Regional Planning Council, twenty-four percent (24%) of the region's residents would utilize a public shelter. Another twenty-one percent (21%) of the potential evacuating population reported they do not know where they will go. When this figure is added to the twenty-four percent (24%) of the public users, there is a possibility that up to forty-five percent 45%) of the evacuees may be seeking public shelter. The public shelter needs for the proposed development are 57 spaces.

In essence, this proposed development will cause impacts on existing hurricane evacuation conditions upon a category three or greater hurricane.

2. **EMERGENCY MEDICAL SERVICE**

This proposed development site is within the area of jurisdiction in which service is provided by Lee County Emergency Medical Service (EMS). The Lee County EMS is a state-licensed advanced life support (ALS) provider and operates under the provisions of Chapter 401 of the Florida Statutes. The nearest response unit is stationed at the South Trail Fire Station (2100 Crystal Drive) and is approximately 1 road mile from the proposed development site. Under optimum conditions, the anticipated response time is 2-3 minutes.

However, response time cannot be guaranteed due to any number or combination of environmental and operational factors not limited to weather, traffic, road conditions and unit availability. This response time is within EMS standards (four minutes). In the event this unit is unavailable, response will be achieved from the nearest available unit or the helicopter ambulance from Page Field (operating from dawn to dusk — providing weather conditions permit).

3. **FIRE PROTECTION**

This site is within the area of jurisdiction in which service is provided by the South Trail Fire Protection and Rescue Service District.

4. **RECOMMENDATIONS**

The following recommendations are presented in order to mitigate future hurricane disaster potential and to insure comprehensive plan compliance:

A. **Hurricane Mitigation**

1. The applicant shall initiate the establishment of a homeowner's or residents' association to provide an educational program for hurricane preparedness. (Reference Goal 71, Objective 71.1, Policy 71.2; Goal 79, Objective 79.1, Policy 79.1.1; and Goal 80, Policies 80.1.3, 80.1.4; Lee County Comprehensive Plan - 1989).

2. The established homeowners' or residents' association shall maintain an education program for hurricane preparedness. The program shall consist of annually describing the risks of the hurricane hazards to the residents, as well as the actions to mitigate the dangers which these hazards present. (Reference Goal 71, Objective 71.1, Policy 71. 2;

Goal 79, Objective 79.1, Policy 79.1.1 and; Goal 80, Policies 80.1.3, 80.1.4; Lee County Comprehensive Plan - 1989).

3. The applicant shall make an impact fee or in-lieu payment to the County for off-site shelter provisions. The amount shall be based on the total of units permitted and shall be determined later upon County development regulations in accordance to Policies 79.2.1 and 79.2.2. (Reference Goal 71, Objective 71.1, Policy 71.1; Goal 79, Objective 79.1, Policy 79.1.1; and Goal 79, Objective 79.2, Policies 79.2.1, 79.2.2, 79.2.5; Lee County Comprehensive Plan - 1989).

B. **Emergency Medical Service**

1. The applicant shall provide for the emergency medical service impacts generated by the proposed development as defined by Lee County Ordinance 8915. (Reference Goal 43, Objective 45.3, Policies 45.3.1, 45.3.2; Lee County Comprehensive Plan 1989).

2. At the completion of development construction or each phase thereof, a development representative shall contact Lee County Emergency Medical Service to discuss:

   a. the designation of emergency helicopter landing zone(s); and

   b. the accessibility of the EMS unit. (Reference Goal 45, Objective 45.2; Lee County Comprehensive Plan - 1989).

C **Fire Protection**

1. The applicant shall provide for the fire protection impacts generated by the proposed development as defined by Lee County Ordinance 89-15. (Reference

Goal 43, Objective 43.1, Policies 43.1.4, 43.1.5, Objective 43.2, Policies 43.2.1, 43.2.2; and Goal 45, Objective 45.3, Policies 45.3.1, 45.3.2; Lee County Comprehensive Plan - 1989).

2. The applicant shall contact the respective fire protection district to discuss the proposed development in relation to the potential type, use and storage of hazardous materials which will be located on the premises. (Reference Goal 43, Objective 43.1, Policy 43.1.4; and Goal 73, Objective 73.1, Policies 73.1.5, 73.1.6; Lee County Comprehensive Plan - 1989).

References:
Lee County Comprehensive Plan - 1989
SW Florida Regional Hurricane Evacuation Plan - 1987
Lee County Ordinance 89-15

DJS:njb

cc: Roger Desjarlais, Director, Dept. of Public Safety

DATE: September 12, 1990

TO: Charles Gauthier, Principal Planner
Div. of Zoning

FROM: David J. Saniter, Coordinator
Div. of Emergency Mgmt.

RE: **DEVELOPMENT OF COUNTY IMPACT (DCI)**
REVIEW AND RECOMMENDATIONS

Project: Greenwood Village
Request: Residential Planned Development (RPD)
Commercial Planned Development (CDP)
Location: Subject property is located on the southeast intersection of Corkscrew Road and I-75, approximately 100 ft. south of the intersection of Corkscrew Road and Corkscrew Woodlands Boulevard in Section 35, Township 45 South, Range 25 East, Lee County, Florida.
Petitioners: David F. Davis
Case Number: 2008 (DCI)

I. HURRICANE VULNERABILITY

According to the National Weather Service's storm surge model SLOSH , reflecting a composite of the maximum extent of flooding which may be caused for each hurricane category, this site is subject to flooding accordingly:

Category of Hurricane	Sustained Winds (MPH)	SLOSH Surge Height (Feet above MSL)
1	74-95	—
2	96-110	—
3	111-130	w
4	131-155	19.9
5	155+	21.6

Therefore, evacuation of this particular site may be necessary in a category four hurricane according to the information from the National Weather Service's storm surge model (SLOSH) when compared to the existing ground elevation range of 13.5 to 17.3 feet above MSL.

This proposed development, consisting of 160 single family units will generate an additional evacuating population of 372 persons, with an additional 171 vehicles utilized in the evacuation of this area. Calculations are provided below:

160 SF units x 2.4 persons/household x 97% occupancy rate = 372 persons

160 SF units x 97~ occupancy rate x 1.1 vehicles/occupied units = 171 vehicles

The ultimate point restricting evacuation is Corkscrew Road with an evacuation capacity of 827 vehicles per hour. Therefore, if this proposed development is generating 171 evacuating vehicles, the impact is 12 minutes to existing evacuation conditions for a category four hurricane.

According to the results of the behavior survey conducted by the Southwest Florida Regional Planning Council, twenty-four percent (24~) of the region's residents would utilize a public shelter. Another twenty-one percent (21%) of the potential evacuating population reported they do not know where they will go. When this figure is added to the twenty-four percent (24%) of the public users, there is a possibility that up to forty-five percent (45%) of the evacuees may be seeking public shelter. The public shelter needs for the proposed development are 167 spaces.

In essence, this proposed development will cause impacts on existing hurricane evacuation conditions upon a category four or greater hurricane.

2. **EMERGENCY MEDICAL SERVICE**

This proposed development site is within the area of jurisdiction in which service is provided by Lee County Emergency Medical Service (EMS). The Lee County EMS is a state-licensed advanced life support (ALS) provider and operates under the provisions of Chapter 401 of the Florida Statutes. The nearest response unit is stationed at the San Carlos Fire Station (8013 Sanibel Blvd. SE) and is approximately 5 road miles from the proposed development site. Under optimum conditions, the anticipated response time is 7-9 minutes. However, response time cannot be guaranteed due to any number or combination of environmental and operational factors not

limited to weather, traffic, road conditions and unit availability. This response time is over EMS standards (four minutes). In the event this unit is unavailable, response will be achieved from the nearest available unit or the helicopter ambulance from Page Field (operating from dawn to dusk —providing weather conditions permit).

3. **FIRE PROTECTION**

This site is within the area of jurisdiction in which service is provided by the Estero Fire Protection and Rescue Service District.

4. **RECOMMENDATIONS**

The following recommendations are presented in order to mitigate future hurricane disaster potential and to insure comprehensive plan compliance:

A. **Hurricane Mitigation**

1. The applicant shall initiate the establishment of a homeowners' or residents' association to provide an educational program for hurricane preparedness. (Reference Goal 7 1 , Objective 7 1 .1 l Policy 7 1 . 2 ; Goal 79, Objective 79.1, Policy 79.1.1; and Goal 80, Policies 80 . 1 . 3, 80 . 1 . 4 ; Lee County Comprehensive Plan - 1989) .

2. The established homeowners ' or residents ' association shall maintain an education program for hurricane preparedness. The program shall consist of annually describing the risks of the hurricane hazards to the residents, as well as the actions to mitigate the dangers which these hazards present. (Reference Goal 71, Objective 71.1, Policy 71.2; Goal 79, Objective 79.1, Policy 79.1.1, and Goal 80, Policies 80 . 1 . 3, 80 . 1 . 4 ; Lee County Comprehensive Plan - 1989) .

3. The applicant shall formulate an emergency hurricane preparedness plan subject to the approval of the Lee County Division of Emergency Management. (Reference Goal 71, Objective 71.1, Policy 71.1.2; Goal 79, Objective 79.1, Policy 79.1.1 and Goal 80, Policy 80.1.4; Lee County Comprehensive Plan - 1989).

B. **Emergency Medical Service**

1. The applicant shall provide for the emergency medical service impacts generated by the proposed development as defined by Lee County Ordinance 89-15. (Reference Goal 43, Objective 45.3, Policies 45.3.1, 45.3.2; Lee County Comprehensive Plan - 1989).

2. At the completion of development construction or each phase thereof, a development representative shall contact Lee County Emergency Medical Service to discuss:

   a. the designation of emergency helicopter landing zone(s); and

   b. the accessibility of the EMS unit. (Reference Goal 45, Objective 45.2; Lee County Comprehensive plan - 1989).

C. **Fire Protection**

1. The applicant shall provide for the fire protection impacts generated by the proposed development as defined by Lee County Ordinance 89-15. (Reference Goal 43, Objective 43.1, Policies 43.1.4, 43.1.5, Objective 43.2, Policies 43.2.1, 43.2.2; and Goal 45, Objective 45.3, Policies 45.3.1, 45.3.2; Lee County Comprehensive Plan - 1989).

2. The applicant shall contact the respective fire protection district to discuss the proposed development in relation to the potential type, use and storage of hazardous materials which will be located on the premises. (Reference Goal 43, Objective 43.1, Policy 43.1.4; and Goal 73, Objective 73.1, Policies 73.1.5, 73.1.6; Lee County Comprehensive Plan - 1989).

References:
Lee County Comprehensive Plan - 1989
SW Florida Regional Hurricane Evacuation Plan - 1987
Lee County Ordinance 89-15

DJS:njb

DATE: April 12, 1990

TO: Mary Gibbs, Deputy Director
Div. of Zoning

FROM: David J. Saniter
Div. of Emergency Mgmt.

RE: **DEVELOPMENT OF COUNTY IMPACT (DCI) REVIEW AND RECOMMENDATIONS**

Project: Life Care Services
Request: Commercial Facilities Planned Development (CFPD)
Location: Subject property is located at 5841 West Riverside Drive in Section 17, Township 45 South, Range 24 East, Lee County, Florida.
Petitioners: Lori Dutri; Humphrey & Knott
Case Number: 1880 (DCI)

1. **HURRICANE VULNERABILITY**

According to the National Weather Service's storm surge model "SLOSH", reflecting a composite of the maximum extent of flooding which may be caused for each hurricane category, this site is subject to flooding accordingly:

Category of Hurricane	Sustained Winds (MPH)	SLOSH Surge Height (Feet above MSL)
1	74-95	9.8
2	96-110	12.2
3	111-130	16.7
4	131-155	20.1
5	155+	20.9

Therefore, evacuation of this area may be necessary in a category one or greater hurricane according to the information from the National Weather Service's storm surge model (SLOSH) when compared to the existing ground elevation range of 4.5 to 7.3 feet above MSL and the Flood Insurance Rate Map (FIRM) elevation of 8-10 feet (zone A-10).

2. **EMERGENCY MEDICAL SERVICE**

This proposed development site is within the area of jurisdiction in which service is provided by Lee County Emergency Medical Service (EMS). The Lee County EMS is a state-licensed advanced life support (ALS) provider and operates under the provisions of Chapter 401 of the Florida Statutes. The nearest response unit is stationed at the Iona-McGregor Fire Station (Winkler Road and McGregor Blvd.) and is approximately 2 road miles from the proposed development site. Under optimum conditions, the anticipated response time is 3-4 minutes. However, response time cannot be guaranteed due to any number or combination of environmental and operational factors not limited to weather, traffic, road conditions and unit availability. This response time is within current EMS standards (four minutes). In the event this unit is unavailable, response will be achieved from the nearest available unit or the helicopter ambulance from Page Field (operating from dawn to dusk — providing weather conditions permit).

3. **FIRE PROTECTION**

This site is within the area of jurisdiction in which service is provided by the Iona-McGregor Fire Protection & Rescue Service District.

4. **RECOMMENDATIONS**

The following recommendations are presented in order to mitigate future hurricane disaster potential and to insure comprehensive plan compliance:

A. **Hurricane Mitigation**

In the event an adult congregate living facility (ACLF) nursing home facility or multi-family use associated with a congregate care or health care facility is constructed, the following conditions are recommended:

1. The applicant shall prepare to the satisfaction of the Director of the Lee County Division of Emergency Management and, prior to receiving a certificate of occupancy, an emergency preparedness plan covering the following aspects:

(a) Duties and responsibilities
(b) Plan coordination and activation
(c) Warning and notification
(d) Evacuation of population off-site
(e) In-place sheltering
(f) Off-site sheltering
(g) Transportation
(h) Support Services for in-place and off-site shelter
(i) Security for property and patients sheltered off-site
(j) Training
(k) Communications
(l) Continuity of Patient Care on-site and off-site
(m) Damage Assessment
(n) Recovery

2. The emergency preparedness plan shall be approved annually by the Lee County Department of Public Safety.

3. The applicant shall establish and maintain an annually-updated program to educate staff in the matters of the hurricane threat, hurricane planning, evacuation and sheltering.

4. The applicant shall provide refuge space for its occupants on-site or off-site to the approval of the Director of the Lee County Division of Emergency Management. Any portion to be used as the refuge by the patients and staff shall have a minimum elevation of 16.7 feet above mean sea level. The building(s) shall also be constructed with as little exposed glass as possible and/or protected by storm shutters. The refuge shall contain emergency power, food, potable water, sanitation facilities, adequate ventilation, medical supplies and communications equipment in sufficient quantities to sustain the refuge for three (3) days. All emergency support facilities, water, power, sanitation , etc., shall be located at a minimum of 16.7 feet above mean sea level.

(Reference Goal 71, Objective 71.1, Policy 71.1.2, 71.1.4; Goal 72, Objective 72.1, Policy 72.1.1, 72.1.2; Goal 79, Objective 79.1, Policy 79.1.1; and Goal 79, Objective 79.2, Policies 79.2.2, 79.2.4; Lee County Comprehensive Plan - 1989).

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15. (Reference Goal 45, Objective 45.3, Policies 45.3.1,
mprehensive Plan - 1989).

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ility of the EMS unit. (Reference Goal 45, Objective 45.2;
Comprehensive Plan - 1989).

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pment as defined by Lee County Ordinance 89-15.
43, Objective 43.1, Policies 43.1.4, 43.1.5, Objective 43.2,
43.2.2; and Goal 45, Objective 45.3, Policies 45.3.1, 45.3.2;
nprehensive Plan - 1989).

shall contact the respective fire protection district to discuss the
elopment in relation to the type and use and storage of hazardous
h will be located on the premises. (Reference Goal 43, Objective
3.1.4; and Goal 73, Objective 73.1, Policies 73.1.5, 73.1.6;
Comprehensive Plan - 1989).

Comprehensive Plan - 1989
Regional Hurricane Evacuation Study, 1987
Ordinance 89-15

ept. of Public Safety