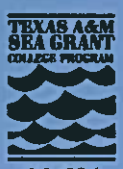
Hurricane Relocation Planning for Cameron and Willacy Counties

Safety

Carlton Ruch, DED
The Research Division
College of Architecture and Environmental Design
Texas A&M University



86-601

HURRICANE RELOCATION PLANNING

FOR

CAMERON AND WILLACY COUNTIES

by

Carlton Ruch, DED
Project Leader

Study Prepared by the Research Division,
College of Architecture and Environmental Design
Texas A&M University
College Station, Texas

September 1985

TAMU-SG-86-601

Project funded by the Governor's Division of Emergency Management, Austin, Texas. Publication of this report supported through the Institutional Grant NA83AA-D-00061 to Texas A&M University by the National Oceanic and Atmospheric Administration's Sea Grant Program, Department of Commerce.

This study is to be used as a **planning tool** or handbook for government officials. It is **not a policy document.** As such, when properly consulted, it may serve as a guide for providing officials with "worst case" situations so that they may determine when and how protective and/or evacuation measures should begin. It is designed for no other purpose.

$8.00
Order from:
Sea Grant College Program
Texas A&M University
College Station, Texas 77843-4115

TAMU-SG-86-601
September 1985
NA83AA-D-00061
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ACKNOWLEDGMENTS

This report is the result of the cooperative efforts of a number of people. The municipal and county advisory committee (see Introduction) made many significant contributions to the effort at several scheduled meetings.

At the regional advisory committee level, a number of persons deserve special mention: Rupert Gamble, Division of Emergency Management regional liaison officer, for his help in coordinating meetings and gathering information in the study region; Samuel Cox, Texas Department of Highways and Public Transportation, for information on highway elevations in the study area and other data; Helen Foehner, Executive Secretary of the West Cameron County Chapter of the American Red Cross, for serving as a contact person for the American Red Cross personnel involved in arranging survey training and coordinating the evacuation survey; Lt. Joseph Smith, Texas Department of Public Safety, for his cooperation on evacuation route planning; and Richard Hagan, National Weather Service, for his assistance in local area hurricane data.

At the state level, special thanks are extended to Robert Lansford, coordinator of the Governor's Division of Emergency Management, and Robert Halverson, assistant coordinator for operations, for their support and guidance.

The active involvement of Larry Mooney, Southern Regional Headquarters, National Weather Service, and the work of Brian Jarvinen, National

Hurricane Center research meteorologist, were helpful.

Credit needs to be given to the personnel of the Research Division of the College of Architecture and Environmental Design, along with others at Texas A&M University, who made contributions to the study. The survey analysis was done by Darrell Rials; the graphics by the Texas A&M Cartographic Service Unit; and the data point information by Darrell Rials, Linda Worlow, Diane Eyssell, Heyoung Chon and Scott Grissom. The copy was typed by Heyoung Chon and Diane Eyssell. Editing was done by William Broussard and by personnel of the Texas A&M Sea Grant College Program.

Along with my thanks to these people, I would also like to thank any others who, through some oversight, I may have omitted.

Carlton Ruch

Principal Investigator

September 1985

INTRODUCTION

The Governor's Division of Emergency Management has been active in preparing coastal areas for the impact of hurricanes. The Texas coast has been divided into five areas for study purposes: Brownsville, Corpus Christi, Matagorda, Houston-Galveston, and Lake Sabine. Three studies are anticipated for each coastal area--a relocation/evacuation study; a vulnerability analysis study; and a contingency planning study. All three studies have been completed for the Houston-Galveston and the Corpus Christi areas. Relocation/evacuation and vulnerabiltiy analysis studies are complete for the Lake Sabine area and this report represents the first study for the Brownsville area. Funding for the present study was made available by the State of Texas through the Governor's Division of Emergency Management.

Brochures based on this study are available through the Governor's Division of Emergency Management (DEM) or Sea Grant College Program at Texas A&M University. There also is a computer-based **ESTED-TX** program for Estimating Safe Time before Evacuation Decisions operated by the DEM (see Appendix E). Section Five, Evacuations, indicates how these times can be estimated manually along with Standard Operating Procedures (SOP) for figuring evacuation times manually found in Appendix D.

To ensure that the results of the study would be acceptable to the users, three advisory groups were established:

State and Subnational Advisory Committee

Robert Lansford, State Coordinator
Governor's Division of Emergency Management
Texas Department of Public Safety

Robert Halverson, Assistant Coordinator (Operations)
Governor's Division of Emergency Management
Texas Department of Public Safety

Larry Mooney
National Weather Service
Southern Regional Headquarters

Regional Advisory Committee

Rupert Gamble, Region 3 Liaison Officer
Governor's Division of Emergency Management
Texas Department of Public Safety
Corpus Christi, TX

Richard Hagan, Meteorologist in Charge
National Weather Service
Brownsville Area

Lt. Joseph R. Smith
Region 3
Texas Department of Public Safety
Harlingen, TX

Samuel Cox,
District 21
Texas Department of Highways and Public Transportation
Pharr, TX

Helen Foehner
The American Red Cross
West Cameron County Chapter
Harlingen, TX

Municipal and County Advisory Committee
(Representative Personnel at Meetings)

Ken Jones
Asst. Executive Director
Lower Rio Grande Valley Development Council
McAllen, TX

Felix Longoria, Coordinator
Raymondville-Willacy County
Emergency Management
Raymondville, TX

Lupita Cavazos
Lyford Emergency Management
Lyford, TX

Judge Moises Vela, Director
Cameron County Emergency Management
Brownsville, TX

George Gavito, Coordinator
Cameron County Emergency Management
Brownsville, TX

George Peck, Coordinator
Brownsville Emergency Management
Brownsville, TX

Wilmot Wolf, Coordinator
Harlingen Emergency Management
San Benito, TX

Kim Brady
La Feria Emergency Management
La Feria, TX

Bob Kooglar, Coordinator
Laguna Vista Emergency Management
Port Isabel, TX

Robert Harris, Coordinator
Port Isabel Emergency Management
Port Isabel, TX

Jose Raumus
Primera Emergency Management
Primera, TX

Dorothy Barnard, Coordinator
Rio Hondo Emergency Management
Rio Hondo, TX

John A. Adams
San Benito Emergency Management
San Benito, TX

Juan M. Perez, Coordinator
Santa Rosa Emergency Management
Santa Rosa, TX

Johnny P. Smith, Coordinator
South Padre Island Emergency Management
South Padre Island, TX

John Bridges
Rancho Viejo Emergency Management
Brownsville, TX

The two-county (Cameron and Willacy) study area consisted of 1,450 square miles. The 1980 census indicates a combined population of 227,000 persons.

Hurricanes are classified by wind speed ranges (see Appendix A). For the purpose of this report, we will consider the following types of hurricanes:

WIND SPEED (MPH)	TYPE HURRICANE
74- 95	A
96-110	B
111-130	C
131 and over	D

Table I-1[1] illustrates a chronology of hurricanes in the two counties during the 20th Century.

This study is primarily designed to provide data for making decisions about when evacuations need to be recommended. The information also can be used to update county and municipal plans and as a guide for the district disaster committee. The American Red Cross can also use it to determine shelter needs for particular areas. Table I-2 indicates these and other relationships.

---

[1]In this study, tables and figures are grouped at the end of each section or part.

The data to assist in decision making consist of the following key items:

Possible surge penetration for hurricanes of varying intensities. (See surge map inside back cover.)

Critical locations in the area are given along with data that will indicate road cutoff times by hurricane type for both surge penetration and wind intensity. This will be given in hours plus or minus anticipated time of storm center landfall. (See Appendix B.)

Areas subject to storm surge flooding (Evacuation Zones) and areas subject to damaging winds from major hurricanes (Contingency Zones) are shown along with the times it would take to evacuate these areas. (See fold-out map.)

The first section of this report describes the methodology used (**SLOSH** data, the survey and determination of evacuation times). The remaining sections are **SLOSH** Data, Zone Delineations, Survey Results and Evacuations.

TABLE I-1
HISTORY OF HURRICANE ACTIVITY IN THE STUDY AREA BY TYPE, 1900-1983

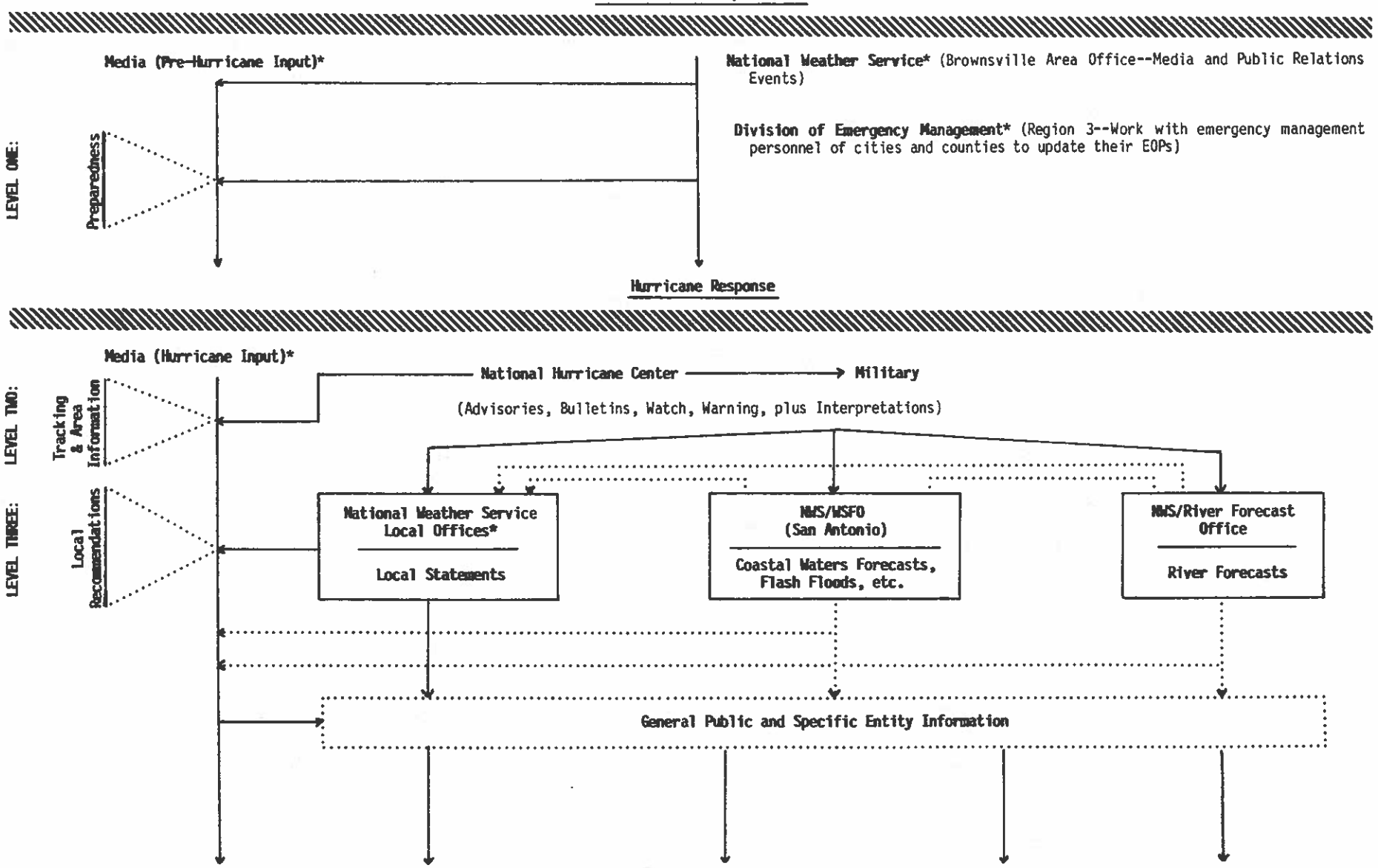
	COUNTY		NAME
YEAR	CAMERON	WILLACY	(ONLY AFTER 1950)
1909	B	(B)*	
1910	(B)	(B)	
1916	-	(C)	
1919	(D)	(D)	
1933	B,C	B,C	
1967	C	C	BEULAH
1980	C	C	ALLEN
1983	(A)	(A)	BARRY

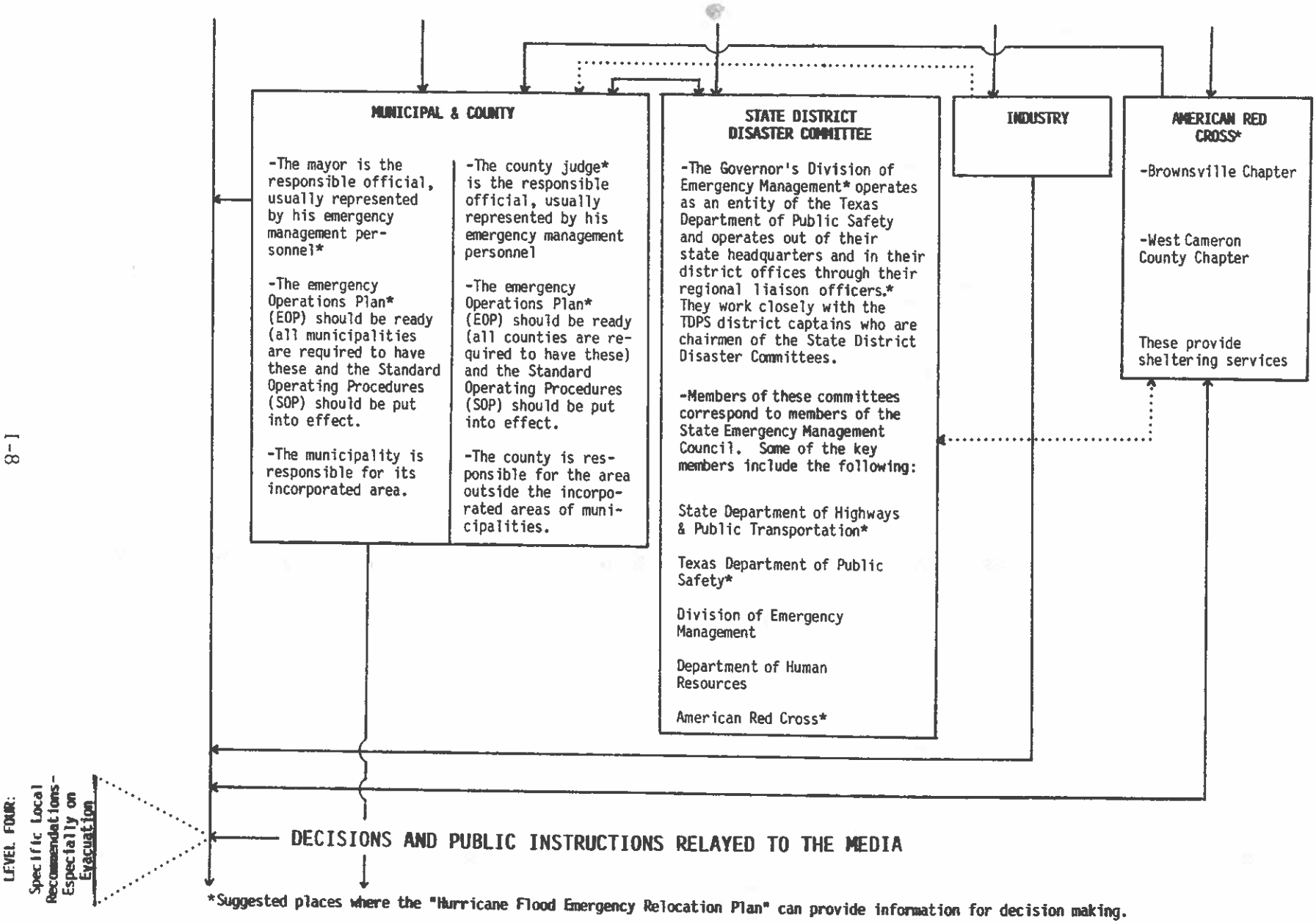
* ( ) Indicates Indirect Hit; All Others, Direct Hit. A=74-95 mph; B= 96-110 mph; C=111-130 mph; and D=131 mph and over.

SOURCE: Texas Architectural Research Center, Texas A&M University, College Station, Texas and Paul Herbert and Glenn Taylor, HURRICANE EXPERIENCE LEVELS OF COASTAL POPULATIONS FROM TEXAS TO MAINE, National Hurricane Center, Miami,1975.

TABLE I-2

HURRICANE RESPONSE AND "THE MODEL HURRICANE FLOOD EMERGENCY RELOCATION PLAN"





*Suggested places where the "Hurricane Flood Emergency Relocation Plan" can provide information for decision making.

SECTION ONE SUMMARY

METHODOLOGY

Three methodologies used in this study are discussed. These include the **SLOSH** computer model, a survey of area residents, and a determination of safe evacuation times. The **SLOSH** model simulates hurricane wind speeds and storm surge. The survey is used to estimate shelter needs, and the number of people evacuating along certain routes. Evacuation times are based on evacuation route capacities.

Section One
METHODOLOGY

Three primary methodologies are used in this study. **Part A** discusses the **SLOSH** computer model and how it simulates hurricane wind speeds and storm surge. **Part B** details the **survey** used to develop estimates of persons and vehicles leaving certain areas for particular destinations, as well as estimates of shelter needs. **Part C** indicates the methods used to determine **evacuation times.**

Part A: SLOSH

SLOSH (Sea, Lake and Overland Surges from Hurricanes) was developed for the Brownsville region in 1984. It is a computer model designed to project (or output) from given information (input data) the flow of surges over seas, lakes and land (taking into consideration water depths, land elevations and man-made constraints such as roads).

The input data for the model consist of:

> Initial meteorological conditions that define a hurricane in terms of time, storm location (latitude and longitude), storm intensity in millibars (ambient less central pressure of storm), and storm radius in statute miles (distance from storm center to maximum winds).
>
> Future storm conditions (at six-hour intervals out to 72 hours)[1] that provide information on location, intensity and

---

[1] A 36-hour mode is possible.

size. Implicit in the storm track is the storm location for landfall and the speed direction of storm movement.[2]

Initial water heights for the Gulf of Mexico. These levels are relative to mean sea level. An initial height of 1.0 feet above mean sea level was used for the simulated hurricane runs.

Based on this input, the **SLOSH** model numerically solves certain equations of motion to compute surge.[3] This surge is calculated on a computational polar grid (see Figure 1-1). Strategic placement of this grid over the Brownsville region allows for fine spacing of grid points over heavily populated areas and coarse spacing over the Gulf of Mexico. The grid consists of 54 squares at the top and 69 at the side. The model contains 3,726 (54 x 69) grid squares or data points. The initial

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[2]Additional technical details of the storm model are contained in Jelesnianski and Taylor, 1973: A Preliminary View of Storm Surges Before and After Storm Modifications. NOAA Technical Memorandum, ERL WMPO-3, Washington, D.C.

[3]The model numerically solves a set of partial differential equations of motion. Except for the additional inclusion of the finite amplitude effect and horizontal viscosity, the equations are given by Jelesnianski, Weather Review, 95, 740-756. Coefficients for surface drag, eddy viscosity and bottom slip are exactly the same as used in the SPLASH (Special Program to List the Amplitudes of Surges from Hurricanes) model by Jelesnianski, 1972: I. Landfall Storms. NOAA Technical Memorandum, NWS TDL-46, Washington, D.C. There is no calibration or tuning to force agreement between observed and computed surges, that is, the coefficients are universally set as constants, once and for all, and not varied locally for a particular geographical region. The model is used in a forecast mode; there is no requirement for input boundary values during surge activity (e.g., tide gauge readings or computed boundary surge values from an alternate surge model).

size of the grid square is 0.4 mile in the more critical areas and 3.9 miles at the extremities. This gives greater accuracy in the more critical areas and less accuracy in the Gulf of Mexico. Each grid point can be identified by coordinate numbers.

Using X and Y coordinates, 30 grid squares or data points were identified as critical areas requiring more detailed data. These grid points are listed in Table 1-1.

Based on the input data, **SLOSH** produces the following output:

A forward projection in time of the surge envelope[4] (penetration and height) at the time of landfall.

A composite of these surge envelopes that shows the maximum surge penetrations and heights for the entire time period.

For each of the 30 selected data points, **SLOSH** projects the surge height, wind speed and wind direction in 10-minute intervals for about 18 or more hours (depending on movement speed) before landfall and 12 hours after landfall.

Interpretation of the model output must be considered in view of the following constraints:

Given accurate input data for the storm's tract and meteorological parameters, the computed surges are estimated to be within plus or minus 20 percent of the observed water levels. That is, if surge is predicted to be 10 feet in a certain data point, the actual surge could range from 8 to 12 feet. With inaccurate forecasting of movement speed, direction, wind speed and point of landfall, the error level could be greater.

Terrain features of the Brownsville region were taken from quadrangular maps of the U.S. Geological Survey. Additionally, critical areas were field surveyed by National Hurricane Center personnel in 1983.

---

[4]The surge envelope is produced on nine pages of computer printouts that, when taped together, show the surge height for each of the 3,726 data points. The surge height for each point is then subtracted from the land elevation to give surge penetration and height.

The forecast water height for each grid point represents an average condition over a grid square. Water depths above ground level for specific areas of each grid must be determined from a knowledge of the terrain heights in each specific grid square.

The model does not consider:

Wind-generated waves;
Rainfall;
Astronomical tidal effects;[5]
River flooding.

The wind speeds indicated in the 10-minute intervals are 10-minute sustained winds. These sustained winds were translated into gusting by multiplying them by 1.69 for areas in proximity to the coast, and by 1.30 for inland areas.

Table 1-2 lists simulated storms run through **SLOSH.** Their tracks are displayed in Figure 1-2.

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[5]Interpretive methods for the critical data points address the astronomical tidal effects by adding 1.0 foot for high tide and subtracting 1.0 foot for low tide.

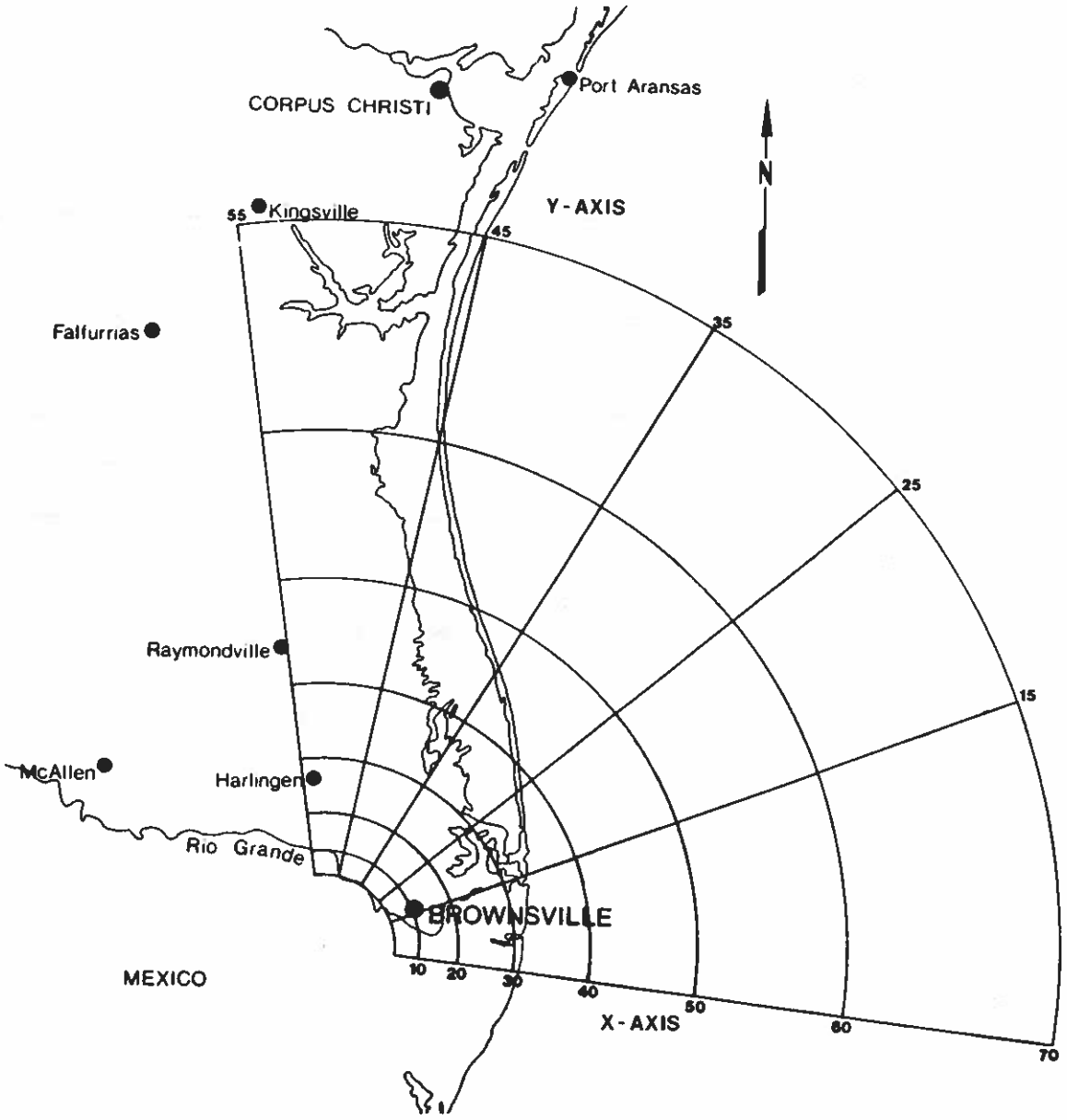

FIGURE 1-1: **POLAR GRID**

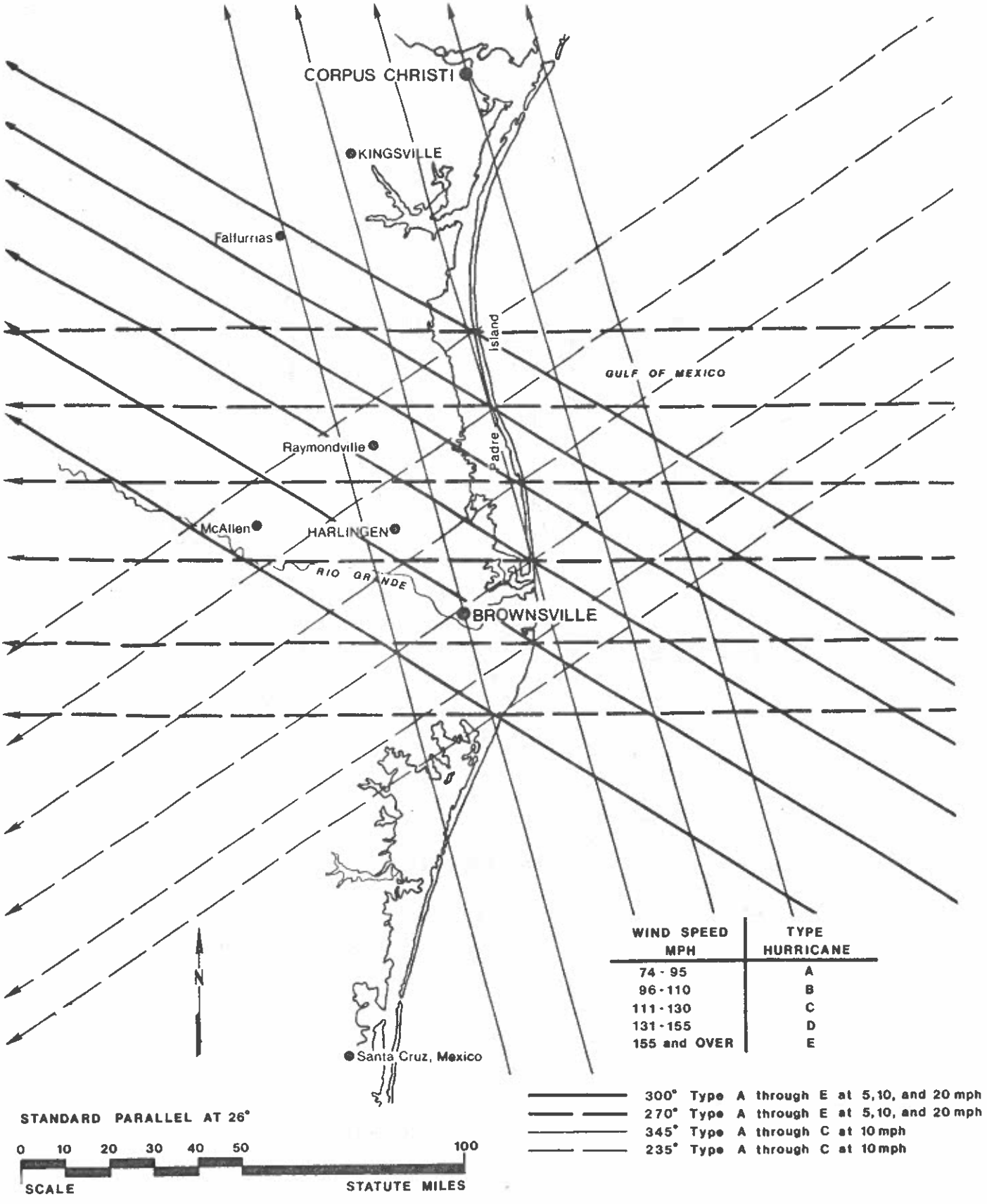

FIGURE 1-2: SIMULATED HURRICANE TRACKS

TABLE 1-1
SLOSH DATA POINTS

SLOSH DATA POINTS

Point Number	Code Name	X, Y	Grid Elevation	Location
1 E*	BOCH4	16, 34	-11	Boca Chica and 4
2 E&T*	SP100	21, 36	-18	South Padre Island and 100
3 E*	QI100	20, 35	- 8	Queen Isabella Causeway (100)
4 E*	PI100	21, 34	- 4	Port Isabel and 100
5 E*	BA100	23, 32	- 5	Laguna Heights and 100
6 E*	LV100	25, 31	- 4	Laguna Vista and 100
7 E*	PM497	42, 47	- 5	Port Mansfield and 497
8 E	SA1792	21, 32	5	Storage Area and 1792
9 E	BG1792	21, 28	- 1	Bahia Grande and 1792
10 E	BFH1792	20, 23	5	Brownsville Fishing Harbor and 1792
11 E	PB1792	21, 17	9	Port of Brownsville, Gas Storage, 1792
12 W	CCA	31, 31	13	Cameron County Airport and 510
13 W	BR77	23, 7	28	48 and 1847

TABLE 1-1 (continued)
SLOSH DATA POINTS

Point Number	Code Name	X, Y	Grid Elevation	Location
14 W&WS	BIA	18, 13	18	Brownsville International Airport Hwy 4/3068
15 W	1847A100	34, 20	23	Los Fresnos 1847 and 100
16 W	1847A510	36, 25	18	1847 and 510
17 W	RH1420	46, 31	23	Rio Hondo 1420/508/106
18 W	FL1420	47, 37	19	Floodway by Santa Monica 1420 and 1018
19 W	SP497	49, 43	22	San Perlita 497/3142/2209
20 W	SB77	45, 20	29	San Benito 77/83/510
21 W	HA77	54, 26	43	Harlingen 77/83
22 W	RA77	54, 43	28	Raymondville and 77
23 W	AR77	53, 57	23	Armstrong and 77
24 T	SGT	2, 32	-26	South Gulf Tides
25 T	MGT	35, 47	-33	Middle Gulf Tides
26 T	NGT	44, 60	-26	North Gulf Tides

TABLE 1-1 (continued)
SLOSH DATA POINTS

Point Number	Code Name	X, Y	Grid Elevation	Location
27 T	LMTCW	36, 43	- 1	Laguna Madre Tides-Cameron Willacy Boundary
28 L	LMTMR	45, 56	1	Laguna Madre Tides-Mesquite Rincon
29 L	ACC	39, 42	1	Mouth of Arroyo Colorado
30 L	BVS	33, 35	14	Buena Vista School

E - Evacuation routes subject to Surge
W - Evacuation routes only subject to Winds
T - Tides
L - Locations
E&T - Evacuation routes and Tides
W&WS - Evacuation routes and Hourly Sustained Wind Speeds
* - Higher Wind Gusting Ratios used for Coastal Areas

TABLE 1-2

SIMULATED SLOSH HURRICANES (213), BY MILES RIGHT OR LEFT OF MOUTH OF LOWER LAGUNA MADRE

POINT OF LANDFALL	MOVEMENT SPEEDS (MILES PER HOUR)	DIRECTION (IN DEGREES)	CATEGORIES (SAFFIR-SIMPSON SCALE)	RADII OF MAXIMUM WINDS	PRESSURE DROPS (MILLIBARS)	CUMULATIVE NUMBER OF RUNS
60 Right	10	235°	1, 2, 3	20, 20, 20	20, 40, 60	(3)
40 Right	10	235°	1, 2, 3	20, 20, 20	20, 40, 60	(6)
20 Right	10	235°	1, 2, 3	20, 20, 20	20, 40, 60	(9)
L Laguna Madre	10	235°	1, 2, 3	20, 20, 20	20, 40, 60	(12)
20 Left	10	235°	1, 2, 3	20, 20, 20	20, 40, 60	(15)
40 Left	10	235°	1, 2, 3	20, 20, 20	20, 40, 60	(18)
60 Right	5, 10, 20	270°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(33)
40 Right	5, 10, 20	270°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(48)
20 Right	5, 10, 20	270°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(63)
L Laguna Madre	5, 10, 20	270°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(78)
20 Left	5, 10, 20	270°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(93)
40 Left	5, 10, 20	270°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(108)
60 Right	5, 10, 20	300°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(123)
40 Right	5, 10, 20	300°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(138)
20 Right	5, 10, 20	300°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(153)
L Laguna Madre	5, 10, 20	300°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(168)
20 Left	5, 10, 20	300°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(183)
40 Left	5, 10, 20	300°	1, 2, 3, 4, 5	20, 20, 20, 20, 10	20, 40, 60, 80, 100	(198)
40 Right	10	345°	1, 2, 3	20, 20, 20	20, 40, 60	(201)
20 Right	10	345°	1, 2, 3	20, 20, 20	20, 40, 60	(204)
L Laguna Madre	10	345°	1, 2, 3	20, 20, 20	20, 40, 60	(207)
20 Left	10	345°	1, 2, 3	20, 20, 20	20, 40, 60	(210)
40 Left	10	345°	1, 2, 3	20, 20, 20	20, 40, 60	(213)

Part B: Survey

A copy of the survey questionnaire is shown as Figure 1-3, while the accompanying directions are reprinted as Figure 1-4. This telephone survey used a minimum number of questions to obtain the necessary information. The questionnaire was pretested for clarity. The sample was randomly selected from current telephone directories for the following communities. The number selected follows: Bayview (50), Brownsville (200), Harlingen (138), Laguna Heights (50), Laguna Vista (50), Los Fresnos (100), Lyford (30), Port Isabel (150), Port Mansfield (100), Raymondville (170), Rio Hondo (6), San Benito (56), San Perlita (50), and South Padre Island (100). This totaled 1,250 family units in the study area.

A training session was held to instruct volunteers on correct telephone interviewing techniques. To avoid a survey bias, attempts were made to reach each household at different time periods (morning, afternoon and evening or weekend) before it was labeled "unable to contact." Of the 1,250 telephone questionnaires, 1,011 were completed--a response rate of 80.9 percent.

Questionnaires were sorted by zones (to be discussed in Section 3). If response totals for any zone were small, they were averaged with those of contiguous areas to obtain an estimate. It was assumed that the values obtained for each zone were representative of that zone.

A computer program was written to evaluate the survey data. The following estimates were determined for each zone in the study area:

Percent of total households evacuating.

Percent of total households not evacuating but staying in local shelters.

Average number of vehicles per evacuating household.

Percent of total vehicles proceeding in each evacuation direction (see Figure 1-5 for direction of evacuation).

The total 1980 population and occupied household census counts projected to 1987 were then applied to the survey results to obtain the following estimates by census tract:[6]

Number of households evacuating.

Number of vehicles from evacuating households by direction of evacuation (see Figure 1-5 for direction of evacuation).

Number of persons staying in local shelters.

Number of persons seeking shelter, by specific cities.

---

[6]Projection data was interpolated from Rio Grande Valley of Texas: Valley Goals 2000, Rio Grande Valley Chamber of Commerce, 1983.

FIGURE 1-3: **EVACUATION SURVEY**

Attempts Made:

_____ Morning _____Afternoon _____ Evening or Weekend

EVACUATION SURVEY

Is this (telephone number)? *If a child answers, ask for a parent.*

* * * * * *

This is (name of person calling) from (organization or institution). We are making a survey to determine what people's intentions are regarding hurricane evacuation. This information will be used to help develop a long range evacuation plan for (name of county) county. Would you be willing to answer a few questions? *If "yes" proceed; if "no" thank them for their time and proceed to the next call.*

* * * * * * *

If the local authorities recommend that you evacuate, would you leave?

If "yes" ask *If "no" ask*

To what area would you evacuate? What would you do?

Would you plan to stay:

_____with friends

_____in a motel, or

_____in a shelter if available

What form of transportation would you use?

(if by own vehicle ask: Would you be taking more than one vehicle? Yes_____ No_____)

Conclude call and thank them for their time.

FIGURE 1-4: **SURVEY DIRECTIONS**

DIRECTIONS

1. Each telephone number should be called at least three times before it is placed in a no-answer category. One contact should be during a morning hour, one during an afternoon hour, and one during a night or weekend time. The order of morning, afternoon, and night or weekend can be changed to night, morning, afternoon, and so forth. If we do not follow this procedure, we will have a bias survey of people who are home at certain times of the day. Please check the forms to indicate each time contact was attempted. This will enable us to know that each non-contacted number was tried three different times.

2. The telephone number is the key to the proper source of information. Even if the name of the people at the telephone number is different, the number determines the correctness of the call.

3. The names on the questionnaires such as "Charles Black" or "John Doe" merely indicate the names as they are listed in the telephone directory. Do not ask for "Charles" or "John;" otherwise we will find out only what the males think. Rather, talk to the person answering the phone if possible (unless a child answers).

4. Try not to influence the answers people give. We are not interested in convincing them about what is right or wrong (at this point), but merely trying discover what they think. Otherwise the survey will be invalid.

5. What you are to ask on the phone is in normal type; directions are in italics.

6. If the family cannot speak English and can only understand Spanish, write SPANISH on the top of the questionnaire and return it. They will later be contacted by someone fluent in Spanish.

7. In the event of a hurricane in the Gulf of Mexico, do not make phone calls to an area under a hurricane "watch" or "warning."

8. The label on the questionnaire on front is coded as follows:

Name listed in Telephone Directory

Carlton Ruch
4304 Maywood
Bryan, Texas 77840

8453061

Telephone number

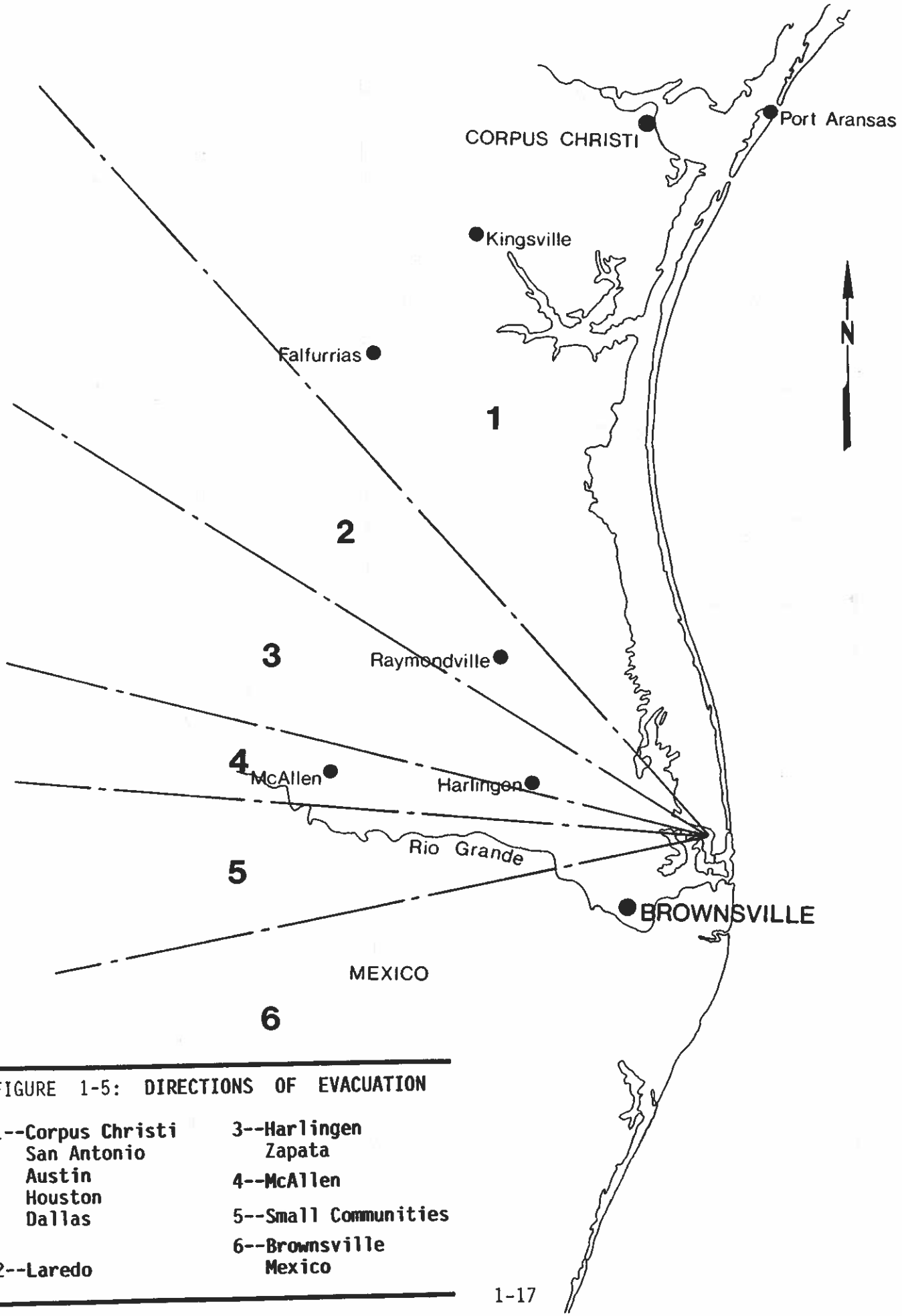

FIGURE 1-5: DIRECTIONS OF EVACUATION

1--Corpus Christi
San Antonio
Austin
Houston
Dallas

2--Laredo

3--Harlingen
Zapata

4--McAllen

5--Small Communities

6--Brownsville
Mexico

Part C: Evacuation Times

Evacuation times are based on estimates for evacuating vehicles to travel available routes to destinations beyond the hazardous area. These routes are indicated on the Evacuation and Contingency Zones fold-out map inside the back cover of this report.

The evacuation route capacity[7] estimates are based on a 20 percent reduction of the estimated route capacity under ideal conditions. The following capacity estimates were used (the quantities are vehicles per lane per hour in a single direction):

Freeway (limited access) facilities	1,600
Two-lane facilities (one lane in each direction)	800
Narrow or roads in poor condition	500-700

Overall operating speeds under evacuation conditions on freeways are assumed to be between 20 and 30 miles per hour in the absence of other constraints. Within this range, variations in operating speed would have no significant impact on lane capacity because vehicle spacing will "close up" as speed decreases.

After determining the route capacities, the number of vehicles (of persons indicating they would evacuate if it were recommended) that would need to traverse the route was divided by the route capacity for each evacuation zone (to be described later). This was done for hurricanes with winds of 130 mph or less. For hurricanes with winds exceeding 130 mph, the entire study area (Evacuation and Contingency

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[7]Evacuation route capacity is defined as the maximum number of vehicles that can pass over a given section of roadway during a given time period.

Zones) was considered as an integrated system. In this case the total number of vehicles the family units in the area would use in evacuating was divided by the hourly evacuation route capacity to arrive at an evacuation time.

The survey results were used in conjunction with projected 1987 population data to estimate the number of vehicles evacuating.

SECTION TWO SUMMARY

SLOSH DATA

SLOSH (Sea, Lake and Overland Surges from Hurricanes), developed for Brownsville in 1984, takes initial meteorological conditions, future storm conditions and initial water heights of the Gulf of Mexico to produce a forward projection in time of surge envelope, time of landfall and maximum surge penetrations. For 30 key data points (such as evacuation routes) surge heights and wind speeds are projected in detail. Data interpretation is subject to the constraints imposed by assumptions made in the analysis.

Section Two
SLOSH DATA

The **SLOSH** data presented in this section describe **wind and surge threats** posed by various types of hurricanes. The data should assist in necessary decision-making when hurricanes pose threats to the study area. There are three parts to this section. The first, **Part A**, contains the estimated **maximum surge penetration** possible for **various storm intensities. Part B** explains the **use of additional information supplied by selected data points.** Finally, **Part C** contains the **use of hourly tidal and gusting data.**

Part A: Maximum Surge Penetration

Maximum surge penetration for each wind speed classification represents a composite of simulated hurricanes with similar wind speeds. The windspeeds are grouped into four classifications: 74 to 95 mph; 96 to 110 mph; 111 to 130 mph; and 131 mph or greater. It is important to note that no single hurricane in any of these classifications will produce the maximum surge.

Surge lines are drawn from the midsections of grid squares. Surge penetration is shown when the average land elevation of a grid square is less than the **SLOSH**-projected surge elevation of that grid square. Since projected surge elevation can be plus or minus 20 percent of the

actual surge elevation, the surge line projections must be interpreted accordingly. A composite map of storm surge penetration by hurricane wind speed is inside the back cover of this report.

Part B: Data Points

More specific information has been extracted from selected **SLOSH** simulated hurricanes for 23 critical evacuation route locations from the 30 data points[1] (see Table 1-1 for a listing of data point locations). The 30 data points within the study area are displayed in a map inside the back cover of this report. Figure 2-1 shows the locations of data points outside the study area.

Appendix B contains one page of data for each of the 23 selected data points. Each page has decision-making information calculated for 73 different hurricane types. When a hurricane enters the Gulf, an estimate can be made of which of the 73 hurricane types it will most closely resemble. The interpretive information for that particular hurricane can then be used to obtain the general estimates required for initial decision-making.

The 73 key hurricane types displayed for each of the 23 selected data points in Appendix B are based on the following rationale:

> All hurricanes making landfall 40 miles left of the mouth of the lower Laguna Madre were disregarded due to the unreliable data. Only artificial grid square height and Gulf of Mexico depth were used for areas on the Mexican side of the Rio Grande. Real data were not available for SLOSH model development, and these artificial data resulted in inaccuracies for even the Texas side of the Rio Grande.

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[1]SLOSH Data Points 1 through 23.

With this constraint in effect the most accurate data for a worst case scenario for the Brownsville area would be hurricanes making landfall 20 miles left of the mouth of the lower Laguna Madre. From that point of impact two different directions were calculated (270° and 300°) for four different forward movement speeds (5 mph, 10 mph, 15 mph and 20 mph). This resulted in eight hurricanes for each wind speed category.

The wind speed categories normally would be classified according to the Saffir-Simpson scale of:

74- 95 mph
96-110 mph
111-130 mph
131-155 mph
Over 155 mph

The simulated hurricanes indicated that, for some conditions, hurricanes with wind speeds of 131 to 155 mph produced greater surge conditions than hurricanes with wind speeds in excess of 155 mph. This anomaly was caused by the smaller radius of maximum winds (10 miles) for hurricanes with wind speeds in excess of 155 mph than was used for hurricanes with wind speeds of 131 to 155 mph (20 miles). Wind speeds in excess of 155 mph do not permit the development of as large a radius of maximum winds. As a result of this anomaly, data were generated for both wind speed categories (131-155 mph and 155-plus mph) and then collapsed into one category (131 mph and over), using the maximum conditions for both categories.

To consider the effects of a hurricane making landfall further north along the Texas coast, the same analysis was made for hurricanes impacting 60 miles right of the mouth of the lower Laguna Madre as was used for landfall 20 miles left.

Because of the potential of hurricanes following the coastline, parallel moving hurricanes were considered. The worst case paralleling hurricanes for the Brownsville area were selected. For hurricanes heading north northwest (345°) it was a point of impact at the mouth of the lower Laguna Madre, while for hurricanes heading southwest (235°) the point of landfall was 20 miles left of the mouth of the lower Laguna Madre. Hurricanes paralleling the coastline, according to personnel of the National Hurricane Center, cannot achieve sustained winds in excess of 130 mph.

The following types of data are given for each hurricane (see Appendix B):

The number of hours before (or after, in a few cases) the time of landfall when wind gusts (50 to 55 mph) could tip trucks, buses, vans or recreational vehicles, along with the direction the wind would be blowing at that point in time. Also, the estimated number of hours these gusting conditions would continue if the forward movement speed is constant. The identical information is then repeated for the wind gust conditions (65 to 70 mph) that could tip automobiles.

The number of hours before (or after, in a few cases) the time of landfall when storm surge can block egress routes. These times are given for low tide, MSL and high tide conditions.

The maximum high tide surge that can be anticipated at that location. The elevation at that point is subtracted from maximum high tide surge to obtain the surge above ground level.

The following cautions are given at the beginning of Appendix B:

Caution 1: Wave action and rainfall not included in calculations.

Caution 2: Errors of plus or minus 20 percent possible for peak surges with accurate initial data. For estimating, this error range can be generalized to other data.

Caution 3: Forward movement speeds of 15 mph are based on averaging the 10 mph and the 20 mph conditions.

High and low tide calculations were based on a 1.0 foot increase above mean sea level and a 1.0 foot decrease from mean sea level. Since tides vary at different times and in different places, actual estimates for low or high tide variations should be adjusted accordingly. An example follows:

	Data Based on Tidal Variation of 1.0 foot	Actual Tidal Variation of .5 feet
Low Tide Flooding FTOL	-2.0 (hours)	-3.0
MSL Flooding FTOL	-4.0 (hours)	-4.0
High Tide Flooding FTOL	-6.0 (hours)	-5.0
Maximum High Tide Surge	10 feet	9.5

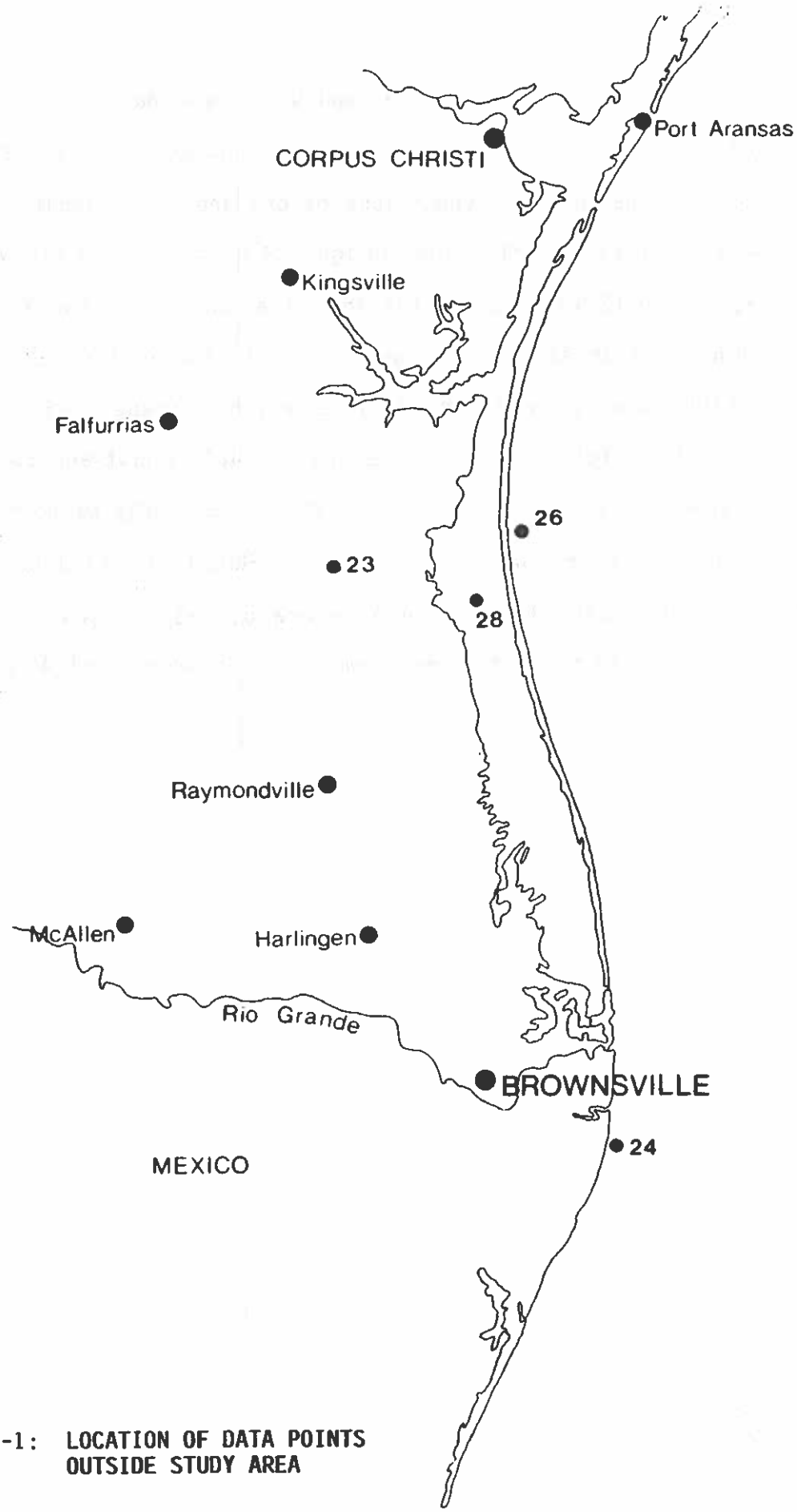


FIGURE 2-1: **LOCATION OF DATA POINTS OUTSIDE STUDY AREA**

Part C: Hourly Tidal and Wind Speed Data

To have a perspective of a hurricane's impact. It is useful to know the anticipated tidal conditions before and after landfall. Data in Appendix C lists hourly tidal height 24 hours before (or when the data began) and 12 hours after the anticipated time of landfall. The maximum highest anticipated surge above MSL also is indicated. This information is displayed for 14 different hurricanes (with varying intensities) for four data points along the Gulf Coast and two in the lower Laguna Madre. Each data point can give an array of hourly surge conditions for its respective location. Hourly tidal data is also given for the mouth of the Arroyo Colorado, as are sustained wind speeds on an hourly basis for the Brownsville International Airport.

SECTION THREE SUMMARY

ZONE DELINEATIONS

Two types of zones are identified--Evacuation and Contingency. Evacuation zones are those areas threatened by storm surge penetration, while Contingency Zones are those areas threatened by considerable wind damage from hurricanes with winds in excess of 130 mph. Zones are delineated by roads, shoreline, or county and municipal boundaries.

Section Three
ZONE DELINEATIONS

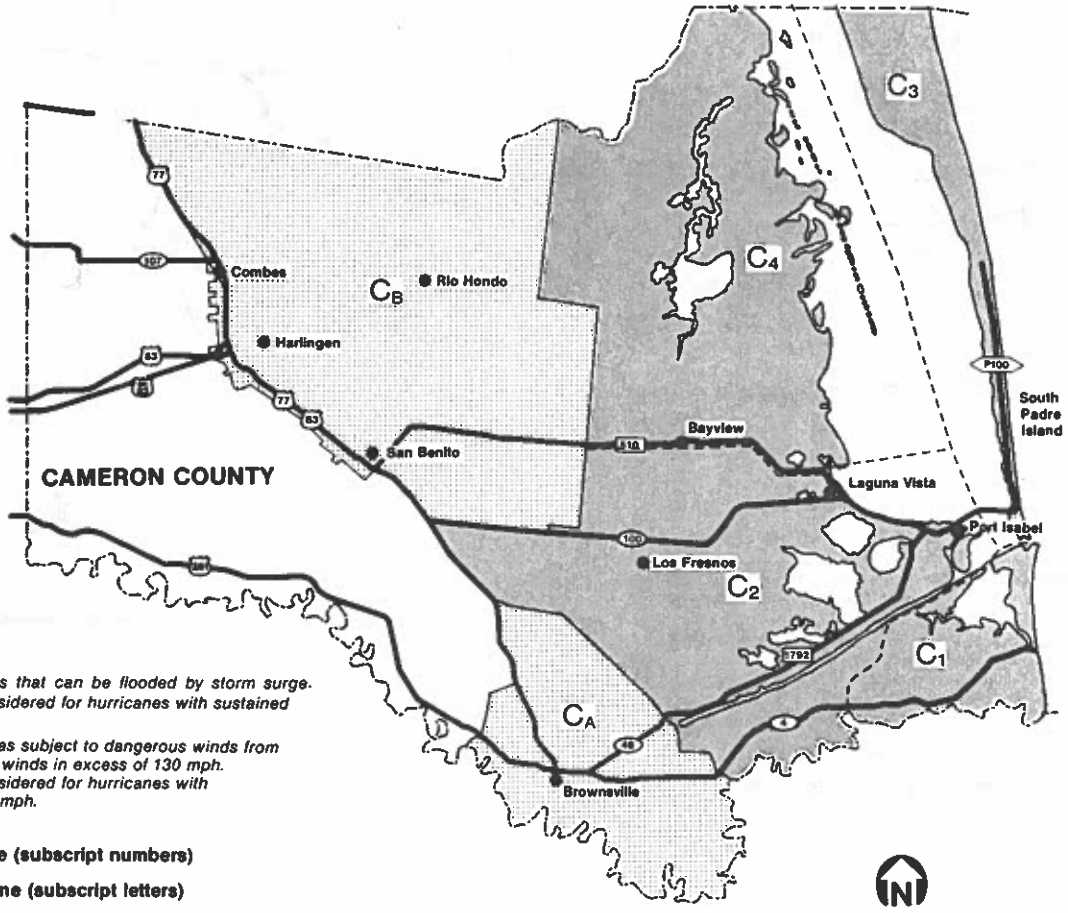
This section contains a **rationale for zone delineations (Part A)**, the **zone delineations** themselves **(Part B)**, and a **boundary description** of these zones **(Part C)**.

Part A: Rationale

Zone delineation identifies areas threatened by hurricane winds and storm surge. Once the threatened areas are identified, zones are delineated on the basis of roads, shorelines, or county and municipal boundaries.

There are two types of zones--Evacuation and Contingency. Evacuation Zones are those areas that could be penetrated by storm surge. Contingency Zones are those areas that could experience considerable wind damage from hurricanes with sustained winds exceeding 130 mph. Figures 3-1 and 3-2 illustrate the location, by county, of these zones (Part B). A fold-out map bound inside the back cover is a composite of both counties.

Part B: Zone Delineations



Evacuation Zones: *Areas that can be flooded by storm surge. Evacuation should be considered for hurricanes with sustained winds up to 130 mph.*

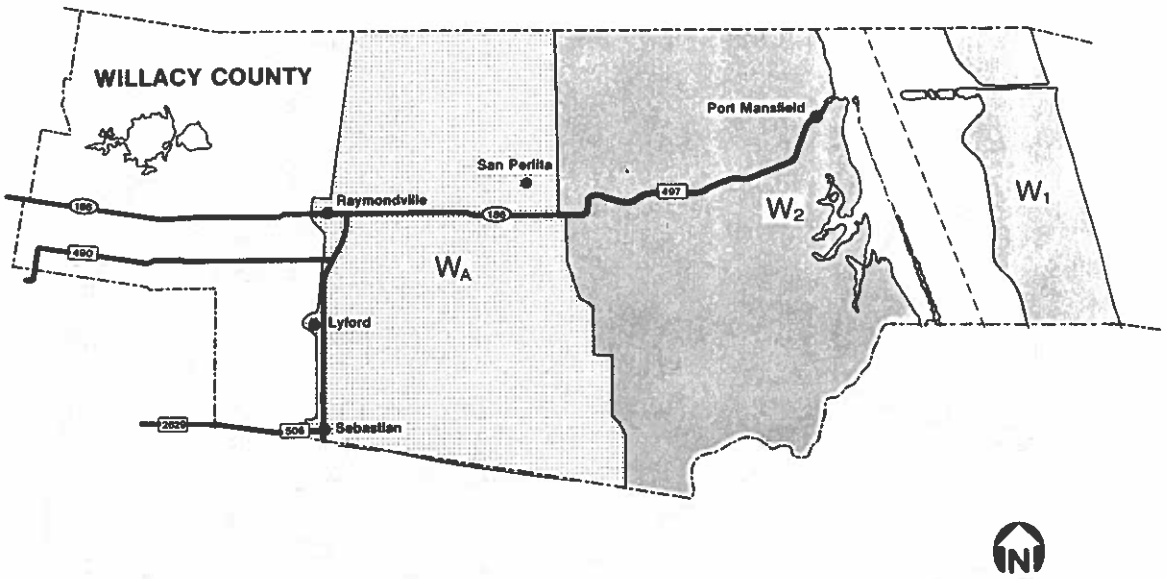
Contingency Zones: *Areas subject to dangerous winds from hurricanes with sustained winds in excess of 130 mph. Evacuation should be considered for hurricanes with sustained winds over 130 mph.*

Evacuation Zone (subscript numbers)

Contingency Zone (subscript letters)

Evacuation Routes

0 5 10 MILES



Evacuation Zones: *Areas that can be flooded by storm surge. Evacuation should be considered for hurricanes with sustained winds up to 130 mph.*

Contingency Zones: *Areas subject to dangerous winds from hurricanes with sustained winds in excess of 130 mph. Evacuation should be considered for hurricanes with sustained winds over 130 mph.*

Evacuation Zone (subscript numbers)

Contingency Zone (subscript letters)

Evacuation Routes

Part C: Boundary Descriptions

CAMERON COUNTY

EVACUATION ZONES

ZONE C_1:

The northern boundary begins at the Brownsville Ship Channel .30 mile north of Clark Island. East along Brownsville Ship Channel to .50 mile past the east shore of Brazos Island.

The eastern boundary begins .50 mile past the east shore of Brazos Island on Brownsville Ship Channel. South along Gulf of Mexico to where Boca Chica Island east shoreline ends on the Rio Grande.

The southern boundary begins where Boca Chica Island east shoreline ends on the Rio Grande. West along the Rio Grande to .25 mile south of where an unpaved road branches north from Highway 4.

The western boundary begins at the Rio Grande .25 mile south of where an unpaved road branches north from Highway 4. Northeast along this unpaved road to the Brownsville Ship Channel. Northeast along the Brownsville Ship Channel to .30 mile north of Clark Island.

ZONE C_2:

The northern boundary begins where Highway 77 and Highway 100 meet. East on Highway 100 to Highway 1575. North .55 mile on Highway 1575 to Whipple Road. East on Whipple Road to Highway 1847. North on Highway 1847 to Highway 510. East on Highway 510 to the Laguna Vista City boundary. Slightly northeast, approximately 6 miles, to .75 mile east of the Gulf Intracoastal Waterway, 4 miles northeast from the intersection of Highway 100 and Highway 1792.

The eastern boundary begins at a point in the Laguna Madre .75 mile east of the Gulf Intracoastal Waterway, 4 miles northeast from the intersection of Highway 100 and Highway 1792. Southeast along the Laguna Madre to the Brownsville Ship Channel .30 mile north of Clark Island.

The southeastern boundary begins at Brownsville Ship Channel .30 mile north of Clark Island. Southwest along the Brownsville Ship Channel to an unpaved road. Southwest along this unpaved road to Rio Grande .25 mile south of Highway 4. Southwest along the Rio Grande to one mile east of the intersection of Highway 4 and Highway 1419.

The southwestern boundary begins at Rio Grande one mile east of the intersection of Highway 4 and Highway 1419. Northwest to Highway 4, then west .30 mile on Highway 4 to Oklahoma Avenue, then north on Oklahoma Avenue to Travis Road, and then west on Travis Road to Highway 511. Northwest on Highway 511 to Highway 77, then northwest on Highway 77 to Highway 100.

ZONE C_3:

The northern boundary begins where the Sand and Mud Flats begin on Willacy-Cameron county line. East along Willacy-Cameron county line to Gulf of Mexico .50 mile east of the Padre Island shoreline.

The eastern boundary begins .50 mile east of the Padre Island shoreline on Willacy-Cameron county line. South along Gulf of Mexico to the tip of Brazos Island on the Brownsville Ship Channel.

The southern boundary begins at the tip of Brazos Island on the Brownsville Ship Channel. West along the Brownsville Ship Channel to .30 mile north of Clark Island.

The western boundary begins at the Brownsville Ship Channel .30 mile north of Clark Island. North along the Laguna Madre to where the Sand and Mud Flats begin on the Willacy-Cameron county line.

ZONE C_4:

The northern boundary begins where the Willacy-Cameron county line and Olmito North Road meet. East, northeast, and then east along the Willacy-Cameron county line to where the Sand and Mud Flats begin.

The eastern boundary begins where the Sand and Mud Flats begin on the Willacy-Cameron county line.

Southeast approximately 21 miles along Laguna Madre to a point .75 mile east of the Gulf Intracoastal Waterway, 4 miles northeast from the intersection of Highway 100 and Highway 1792.

The southern boundary begins at a point in the Laguna Madre .75 mile east of the Gulf Intracoastal Waterway, 4 miles northeast from the intersection of Highway 100 and Highway 1792. Southwest across Laguna Madre to the northern boundary of Laguna Vista. South .25 mile along the western boundary of Laguna Vista to Highway 510. West on Highway 510 to Highway 1847.

The western boundary begins where Highway 510 intersects with Highway 1847. North on Highway 1847 to Highway 106, then west on Highway 106 to Olmito North Road, and then north on Olmito North Road to Willacy-Cameron county line.

CONTINGENCY ZONES

ZONE C_A:

The northeastern boundary begins where Highway 77 and Highway 511 meet. Southeast, and then south on Highway 511 to Travis Road. East on Travis Road to Oklahoma Avenue, then south on Oklahoma Avenue to Highway 4. East .30 mile on Highway 4, then southeast to the Rio Grande.

The eastern and southwestern boundary begins at the Rio Grande. South, west, and then northwest along the Rio Grande to Flor De Mayo Road.

The western boundary begins where the Rio Grande and Flor De Mayo Road meet. Northeast along Flor De Mayo Road to Highway 3248. North and Northeast on Highway 3248 to Highway 77. North on Highway 77 to Highway 511.

ZONE C_B:

The northern boundary begins where Willacy-Cameron county line and Highway 77 meet. East, north and then northeast along the Willacy-Cameron county line to Olmito North Road.

The eastern boundary begins where Willacy-Cameron county line and Olmito North Road meet. South on Olmito North Road to Highway 106. East on Highway 106 to Highway 1847, and then south on Highway 1847 to Whipple Road.

The southern boundary begins where Highway 1847 and Whipple Road meet. West on Whipple Road to Highway 1575. South on Highway 1575 to Highway 100, and then west on Highway 100 to Highway 77.

The southwestern boundary begins where Highway 100 and Highway 77 meet. Northwest on Highway 77 to the city boundary line of San Benito. Follow San Benito city boundary line southwest until it meets Highway 77 again. Northwest on Highway 77 to the city boundary line of Harlingen. Follow Harlingen city boundary line southwest until it meets Highway 448. Northwest on Highway 448 to Highway 77. Northwest on Highway 77 to Willacy-Cameron county line.

WILLACY COUNTY

EVACUATION ZONES

ZONE W_1:

The northern boundary begins one mile west of where Willacy-Kenedy county line crosses the western boundary of Padre Island National Seashore. East along the Willacy-Kenedy county line .50 mile past the eastern boundary of Padre Island National Seashore.

The eastern boundary begins .50 mile past the eastern boundary of Padre Island National Seashore. Southeast along Gulf of Mexico to the Willacy-Cameron county line.

The southern boundary begins at the Willacy-Cameron county line. West along the Willacy-Cameron county line to Laguna Madre where the Sand and Mud Flats end.

The western boundary begins where the Sand and Mud Flats end on the Willacy-Cameron county line. Northwest along Laguna Madre to Willacy-Kenedy county line.

ZONE W_2:

The northern boundary begins at the Willacy-Kenedy county line approximately 8.5 miles east of Highway 77. East along the Willacy-Kenedy county line to one mile west of the western boundary of Padre Island National Seashore.

The eastern boundary begins at the Willacy-Kenedy county line one mile west of the western boundary of Padre Island National Seashore. Southeast along Laguna Madre to where the Sand and Mud Flats begin on Willacy-Cameron county line.

The southern boundary begins where the Sand and Mud Flats begin on Willacy-Cameron county line. West, southwest, and then west along the Willacy-Cameron county line to Highway 1420.

The western boundary begins where Willacy-Cameron county line crosses Highway 1420. North on Highway 1420 to Highway 497. West .50 mile on Highway 497 to the road one mile east of Highway 2209. North along this road to its end. Due north from the end of the road approximately 5 miles to the Willacy-Kenedy county line approximately eight and a half miles east of Highway 77.

CONTINGENCY ZONES

ZONE W_A:

The northern boundary begins where Willacy-Kenedy county line crosses Highway 77. East approximately 8.5 miles along the Willacy-Kenedy county line.

The eastern boundary begins at the Willacy-Kenedy county line. South approximately 5 miles to the road one mile east of Highway 2209, then south along this road to Highway 497. East along Highway 497 to Highway 1420. South along Highway 1420 to the Willacy-Cameron county line.

The southern boundary begins where Highway 1420 crosses the Willacy-Cameron county line. West along the Willacy-Cameron county line to the city boundary line of Sebastian.

The western boundary begins where the Willacy-Cameron county line and city boundary line of Sebastian meet. North and then east along the western city boundary line to Highway 448. North along Highway 448 to the city boundary line of Lyford. Northwest, north, and then east along the western city boundary line of Lyford to Highway 448. North along Highway 448 to Raymondville city boundary line. West, north, and then east around western city boundary line to Highway 448. North along Highway 448 to Highway 77, then to the Willacy-Kenedy county line.

SECTION FOUR SUMMARY

SURVEY RESULTS

The survey sample was randomly selected from the most current telephone directories. The data were analyzed to estimate the number, based on 1987 population estimates, of households evacuating, households staying in local shelters, number of vehicles per evacuating household, and total vehicles using certain routes to evacuate. Most people in Cameron and Willacy counties choose to evacuate to Corpus Christi, San Antonio, Austin, Houston or Dallas. The data were also used to determine the percent of population needing shelter in certain areas for moderate-type hurricanes.

Section Four
SURVEY RESULTS

The results of the survey (described in **Section One METHODOLOGY**) are divided into the **potential number of vehicles evacuating (Part A)** and **where people will be seeking shelter (Part B).**

Part A: Potential Number of Evacuating Vehicles

In order to determine evacuation times, estimates need to be made on the number of vehicles that will be using the available evacuation routes for each zone. Two estimates were made for each zone. One uses only the percentage of those who indicated they would evacuate if so advised, and one uses 100 percent evacuation.

It should be noted that vehicle estimates are based on 1987 population projections. The information can be seen by county in Tables 4-1 and 4-2. The indicated directions are based on trip destinations identified in the behavioral survey (See Figure 1-5). Primary destinations indicated by the directions are:

1. Corpus Christi, San Antonio, Austin, Houston, and Dallas
2. Laredo
3. Harlingen
4. McAllen
5. Small communities
6. Brownsville and Mexico

TABLE 4-1

POTENTIAL NUMBER OF EVACUATING VEHICLES BY ZONE/DIRECTION FOR CAMERON COUNTY AS INDICATED IN THE SURVEY

EVAC ZONES	EVAC RATE	VEHICLES PER H.H.	1	2	3	4	5	6	TOTALS
C_1	97%	1.50	17 (17)*	4 (4)	18 (19)	19 (20)	2 (2)	20 (21)	80 (83)
C_2	83%	1.46	779 (933)	297 (356)	1,039 (1,244)	1,050 (1,259)	25 (30)	247 (296)	3,437 (4,118)
C_3	97%	1.51	143 (148)	38 (39)	158 (164)	166 (171)	15 (16)	173 (178)	693 (716)
C_4	65%	1.50	216 (334)	54 (83)	54 (84)	216 (334)	0 0	54 (83)	594 (918)
SUB-TOTALS			1,155 (1,432)	393 (482)	1,269 (1,511)	1,451 (1,784)	42 (48)	494 (578)	4,804 (5,835)
CONTINGENCY ZONES									
C_A	36%	1.14	10,031 (27,734)	1,848 (5,109)	792 (2,189)	528 (1,460)	0 0	1,848 (5,108)	15,047 (41,600)
C_B	56%	1.21	10,996 (19,564)	4,189 (7,453)	3,404 (6,056)	1,833 (3,261)	0 0	262 (466)	20,684 (36,800)
SUB-TOTALS			21,027 (47,298)	6,037 (12,562)	4,196 (8,245)	2,361 (4,721)	0 0	2,110 (5,574)	35,731 (78,400)
GRAND TOTALS			22,182 (48,730)	6,430 (13,044)	5,465 (9,756)	3,812 (6,505)	42 (48)	2,604 (6,152)	40,535 (84,235)

* "( )" Indicates a 100 Percent Evacuation Figure.

TABLE 4-2

POTENTIAL NUMBER OF EVACUATING VEHICLES BY ZONE/DIRECTION FOR WILLACY COUNTY AS INDICATED IN THE SURVEY

EVAC ZONES	EVAC RATE	VEHICLES PER H.H.	1	2	3	4	5	6	TOTALS
W_1		--	-- --	-- --	-- --	-- --	-- --	-- --	-- --
W_2	98%	1.60	228 (233)*	140 (143)	38 (39)	70 (71)	0 (0)	0 (0)	476 (486)
CONTINGENCY ZONES									
W_A	48%	1.11	1,984 (4,127)	647 (1,347)	283 (589)	0 (0)	0 (0)	0 (0)	2,914 (6,063)
GRAND TOTALS			2,212 (4,360)	787 (1,490)	321 (628)	70 (71)	-- --	-- --	3,390 (6,549)

* "( )" Indicates a 100 Percent Evacuation Figure.

Part B: Shelter Data

The information on shelter requirements resulting from the survey should be useful for The American Red Cross and other groups providing shelters. The data in this section merely indicate the intention of survey respondents to seek shelter in various areas. No consideration was given to the availability of shelters in these areas or to the advisability of seeking shelter in these areas.

The number of persons seeking shelter was based on 1987 population projections. These figures do not include persons who indicated that they would seek shelter with friends or in a motel, but only those who indicated that they would plan to stay in a public shelter in that area if available.

The estimated number of persons seeking shelter, by county and zone, are displayed in Tables 4-3 and 4-4. The categories indicated are described below:

> Number of persons seeking local shelter: This is based on the percentage of non-evacuating households who indicated that they would stay in local shelters.
>
> Number of persons seeking shelter in cities in study area: This is based on the percentage of evacuating households who indicated they would stay in shelters in cities in the study area.
>
> Number of persons seeking shelter outside the study area: This is based on the percentage of evacuating households who indicated that they would stay in shelters in cities outside the study area.

The shelter requirements for the key cities are indicated at the bottom of these tables by source (local, from evacuation zones and from contingency zones).

A composite of these tables for all counties is displayed in Table 4-5. An indication of the number of persons who would seek shelter in cities outside the study area is shown in Table 4-6.

These figures indicate sheltering needs for moderate-type hurricanes. For hurricanes with winds in excess of 130 mph, it would be anticipated that fewer people would seek local shelter or shelter in some other city in the study area because of the hazard of remaining in these areas. At the same time, a hurricane with winds in excess of 130 mph could generate a virtual 100 percent evacuation of the study area, which would increase the number of persons seeking shelter in cities outside the study area.

TABLE 4-3
EVACUATION RATES AND SHELTER DEMAND FOR CAMERON COUNTY

ZONES	PERCENT EVACUATING	NUMBER PERSONS SEEKING LOCAL SHELTERS	NUMBER PERSONS SEEKING SHELTER IN CITIES IN STUDY AREA	NUMBER PERSONS SEEKING SHELTER OUTSIDE STUDY AREA
C_1	97	-	9	3
C_2	83	465	328	255
C_3	97	-	46	15
C_4	65	-	39	39
SUBTOTAL		465	422	312
C_A	36	25,418	356	2,136
C_B	56	16,506	2,818	3,755
SUBTOTAL		41,924	3,174	5,891
GRAND TOTAL		42,389	3,596	6,203

KEY CITY SHELTER REQUIREMENTS	NUMBER LOCAL PERSONS	NUMBER PERSONS FROM EVACUATION ZONES	NUMBER PERSONS FROM CONTINGENCY ZONES	TOTAL SHELTER REQUIREMENTS
Bayview	--	-	-	--
Brownsville	25,418	-	-	25,418
Harlingen	11,521	365	3,281	15,167
Laguna Heights	51	-	-	51
Laguna Vista	28	-	-	28
Los Fresnos	140	-	-	140
Port Isabel	246	-	-	246
San Benito	4,985	57	-	5,042
South Padre Island	--	-	-	--
TOTALS	42,389	422	3,281	46,092

TABLE 4-4
EVACUATION RATES AND SHELTER DEMAND FOR WILLACY COUNTY

ZONES	PERCENT EVACUATING	NUMBER PERSONS SEEKING LOCAL SHELTERS	NUMBER PERSONS SEEKING SHELTER IN CITIES IN STUDY AREA	NUMBER PERSONS SEEKING SHELTER OUTSIDE STUDY AREA
W_1	--	--	--	--
W_2	98	--	--	--
W_A	48	4,351	107	212
GRAND TOTAL		4,351	107	212

KEY CITY SHELTER REQUIREMENTS	NUMBER LOCAL PERSONS	NUMBER PERSONS FROM EVACUATION ZONES	NUMBER PERSONS FROM CONTINGENCY ZONES	TOTAL SHELTER REQUIREMENTS
Lyford	522	-	-	522
Port Mansfield	-	-	-	-
Raymondville	3,655	-	-	3,655
San Perlita	174	-	-	174
TOTALS	4,351	-	-	4,351

TABLE 4-5
COMPOSITE SHELTER DEMAND
FOR TWO-COUNTY AREA

COUNTY	NUMBER PERSONS SEEKING LOCAL SHELTERS	NUMBER PERSONS SEEKING SHELTER IN CITIES IN STUDY AREA	NUMBER PERSONS SEEKING SHELTER OUTSIDE STUDY AREA
WILLACY			
EVAC ZONE	-	-	-
CONTIN ZONE	4,351	107	212
TOTAL	4,351	107	212
CAMERON			
EVAC ZONE	465	422	312
CONTIN ZONE	41,924	3,174	5,891
TOTAL	42,389	3,596	6,203
TOTAL AREA			
EVAC ZONE	465	422	309
CONTIN ZONE	46,275	3,281	6,103
TOTAL	46,740	3,703	6,415

TABLE 4-6
NUMBER OF PERSONS SEEKING SHELTER IN CITIES OUTSIDE STUDY AREA

CITY	FROM CONTINGENCY ZONES	FROM EVACUATION ZONES	TOTAL
CARRIZO SPRINGS	53	39	92
HOUSTON	356	--	356
LAREDO	1,462	36	1,498
LUBBOCK	53	--	53
MCALLEN	825	73	898
RIO GRANDE CITY	469	--	469
SAN ANTONIO	1,348	146	1,494
MEXICO	1,537	18	1,555

SECTION FIVE SUMMARY

EVACUATIONS

Evacuation times are based on estimates for evacuating vehicles to travel available routes to areas not threatened by the hurricane. Road capacities are reduced by 20 percent and operating speeds are assumed to be 20-30 mph to accommodate for the less than ideal conditions of hurricane evacuation. The estimated number of evacuating vehicles is based on survey results and projected 1987 population data. A method was then developed to allow local officials to determine the safe time (before roads are closed due to flooding, etc.) remaining before an evacuation decision must be made. The method can also be used on most microcomputers through the program **ESTED-TX.**

Section Five
EVACUATIONS

Part A in this section details **evacuation times for zones, Part B** discusses **evacuation routes and capacities,** and **Part C** indicates how these evacuation times can be used to **estimate the time when evacuation may need to be recommended.**

Part A: Evacuation Times for Zones

Table 5-1 indicates the minimum time (in hours) required to evacuate vehicles within each evacuation and contingency zone both for partial (evacuation zones only) and for complete evacuation (for evacuation and contingency zones).

The partial evacuation figures are for hurricanes with winds of 130 mph or less, while the total evacuation is for hurricanes with winds in excess of 130 mph.

Two cautions must be made about calculating minimum evacuation times. First, the minimum times assume the full use of evacuation routes over the entire evacuation period. If one route develops a backlog of vehicles, evacuees will choose or be directed to alternative routes. Or, if routes are not fully used at the beginning of the evacuation period, the total time required will be greater. Second, the calculations assume that there are no other vehicles on the roadway traveling in the same direction as the evacuating vehicles.

Part B: Principal Evacuation Routes and Capacities

This part includes a description of the principal evacuation routes and route capacities. The Evacuation and Contingency Zone Map in the back of this report illustrates the principal evacuation routes of the highway network.

Only the evacuation zones would need to be evacuated for hurricanes with winds of 130 mph or less, and evacuation times account only for those who indicated that they would evacuate if so advised. Each zone was considered individually, with times based on the number of evacuating vehicles divided by the hourly capacity of principal evacuation routes.

The major evacuation routes for each zone are:

C_1 TX 4

C_2 (Since C_3 evacuates before C_2 both are treated as having the same evacuation routes--see C_3.)

C_3 TX 100 and TX 48

C_4 FM 510

W_1 (All vehicles would need to pass through C_3; see above.)

W_2 FM 497

Calculations of the times for each zone were as follows:

Zone C_1 would have an estimated 80 vehicles evacuating on TX 4, which has an estimated hourly capacity of 500 vehicles. The evacuation time was set at .5 hours for this limited number of vehicles, despite the fact that TX 4 is in poor condition.

In zone C_2 the primary center of population, Port Isabel, evacuates after South Padre Island. Hence, zones C_2 and C_3 have to be considered as one unit served by TX 100 and TX 48. The hourly capacity for these two routes was figured at about 800 vehicles per hour for each highway for a total of 1,600 vehicles per hour. The estimated number of evacuating

vehicles from these two zones was 4,130 (C_2 at 3,437 and C_3 at 693). Added to these 4,130 vehicles are the seasonal visitors to South Padre Island. It is estimated that there are 3.5 tourists per vehicle and that during June, July and August there are 25,000 tourists; during September and October, 12,000 tourists; and during November, 3,000 tourists. This produces an estimated 7,143 vehicles for June, July and August (25,000/3.5), 3,429 vehicles (12,000/3.5) for September and October and 857 vehicles (3,000/3.5) for November. Adding these seasonal vehicles to the 4,130 residential vehicles gives a total of 11,273 vehicles (4,130 + 7,143) for June, July and August; 7,559 (4,130 + 3,429) for September and October; and 4,987 (4,130 + 857) for November. Dividing these vehicles by the hourly route capacity the evacuation times (rounded to the nearest half hour) are 7.0 hours for June, July and August (11,273/1,600); 4.5 hours for September and October (7,559/1,600); and 3.0 hours for November (4,987/1,600). It should be noted that in an extreme emergency it is possible to have two outbound lanes on TX 100 which could lead to an additional 800 vehicles per hour evacuation capacity. This could reduce the evacuation time by one-third. However, it was felt by the local advisory group that this option should not be figured into the evacuation times, but reserved for an extreme emergency condition.

Zone C_4 would have an estimated 594 vehicles evacuating. The primary evacuation route is FM 510 with an hourly capacity of 800 vehicles per hour. This would lead to an estimated 1.0 hour evacuation time.

Zone W_1 has no development. However, if any vehicles come from zone W_1 in the future, they would still need to go through zone C_3. Therefore, W_1 was considered to have the same times as zone C_3.

Zone W_2 has 476 evacuating vehicles (see Table 4-2). These vehicles would use FM 497 with an estimated 800 vehicles per hour capacity. Therefore, the evacuation time was estimated to be .5 hours.

In the event of a hurricane with winds in excess of 130 mph, the evacuation time was calculated for total evacuation of both evacuation and contingency zones. All zones in the area were treated as a unit. The total number of vehicles evacuating was then divided by the total hourly route capacity of all the evacuation routes.

In calculating the total hourly evacuation route capacity, all acceptable inland routes were used. Since all of the routes extend inland from U.S. 83-77 we assumed the full capacity of all egress routes since U.S. 83-77 can be used to distribute the traffic for full utilization. It should be noted that U.S. 77 was not used as an evacuation route because it interferes with the Corpus Christi area evacuation, has many low spots subject to early flooding and has a large section in Kenedy County with inadequate emergency aid. The routes and their hourly capacities off U.S. 83-77 are:

Route	Capacity
U.S. 281	800
BR 83 (374)	800
U.S. 83	3,200
TX 107	800
FM 506 to FM 2629 to FM 1925	700 (Narrow)
FM 490	700 (Narrow)
TX 186 to FM 1017	800
	7,800

The total number of evacuating vehicles for a total evacuation is 90,784 (Cameron 84,235 plus Willacy 6,549--see Tables 4-1 and 4-2). Adding to this number the additional tourist vehicles from South Padre Island for June, July and August (7,143) results in 97,927; for September and October (3,429) results in 94,213; and for November (857) results in 91,641. Dividing these vehicles by 7,800 (the hourly evacuation route capacity) the results, rounded to the half hour, are 12.5 hours (97,927/7,800); 12.0 hours (94,213/7,800) and 11.5 hours (91,641/7,800).

It should be noted that rather than using U.S. 77 to proceed north, routes farther inland, such as U.S. 281 and TX 186 to FM 1017 to TX 16, are recommended.

Part C: Use of Evacuation Time to Estimate When to Recommend an Evacuation

After it has been determined that, because of potential surge penetrations or potential high winds, it may be necessary to recommend an evacuation in various zones, it is important to know when that decision must be made.

The amount of safe time remaining should be calculated for each hurricane advisory issued after the hurricane enters the Gulf of Mexico, since each advisory brings new information.

For instance, the evacuation time for zone C_3 is 12.5 hours in June, July and August for hurricanes with sustained winds in excess of 130 mph. The idea is to determine, after each advisory is issued, how much safe time remains before it would be too late to get the people evacuated before evacuation routes are blocked either by wind gusting or storm surge flooding. **The following steps can be used to figure the remaining safe time for zone C_3:**

Step One: Calculate the number of hours it would take for the eye of the hurricane to cross land 20 miles to the left of the mouth of the lower Laguna Madre (the location that can produce the maximum conditions for that zone). For example, if the eye of the hurricane is 400 miles from that point and is moving at 10 mph, it would be 40 hours.

Step Two: Determine which data point or points in Appendix B controls the potential evacuation route blockage by either wind or surge for that zone. In this particular case, it would be data points 2 and 3 for surge (these are points on evacuation routes out of the area) and points 2 and 3 for wind.

Step Three: Locate information on the particular hurricane that most closely resembles the one in the Gulf of Mexico. This may be done by locating the particular wind speed ranges on the left hand side. For a hurricane with sustained winds of 135 mph the fourth wind range would be used (131-over mph). Next, check at the top to find the applicable column. Three conditions determine which column to use: (1) direction of movement to point of landfall in degrees; (2) location of impact; and (3) forward movement speed in mph (5, 10, 15, 20).

Step Four: Locate the specific information that applies to that particular hurricane. For a hurricane moving at 10 mph with a wind speed of 135 mph moving directly west (270°) truck-tipping gusting conditions would begin approximately 13.5 hours before landfall and car-tipping gusting would begin approximately 10.0 hours before landfall (data points 2 and 3).

Step Five: In order to have 12.5 hours evacuation time before the route is blocked (which can take place 10.0 hours before time of landfall for car-tipping gusting), the 10.0 hours (or the truck-tipping gusting time, or the surge flooding time for low, MSL or high tide conditions) should be added to the 12.5 hours. This gives a total of 22.5 hours.

Step Six: Since people do not begin evacuation as soon as the decision to recommend one is made, three hours are added to the 22.5 hours (for a total of 25.5 hours) to provide time for the decision to be communicated to people and for people to get packed and begin evacuating.

Step Seven: The 25.5 hours is then subtracted from the estimated 40 hours before the hurricane would make landfall. This would leave 14.5 hours before a decision would need to be made before it would be too late. In this case, you would wait for the next advisory and refigure the safe time remaining.

Standard operating procedures (SOP) for estimating the safe time remaining before a decision to evacuate needs to be made after each advisory is issued can be found in Appendix D. A description of the **ESTED-TX** computer program that figures these times is in Appendix E.

TABLE 5-1

EVACUATION TIMES* BY ZONES IN HOURS

COUNTY AND ZONE	PARTIAL EVACUATION OF EVACUATION ZONES**			TOTAL EVACUATION OF EVACUATION AND CONTINGENCY ZONES		
	June July Aug	Sept Oct	Nov	June July Aug	Sept Oct	Nov
CAMERON						
C_A	--	--	--	12.5	12.0	11.5
C_B	--	--	--	12.5	12.0	11.5
C_1	.5	.5	.5	12.5	12.0	11.5
C_2	7.0	4.5	3.0	12.5	12.0	11.5
C_3	7.0	4.5	3.0	12.5	12.0	11.5
C_4	1.0	1.0	1.0	12.5	12.0	11.5
WILLACY						
W_A	--	--	--	12.5	12.0	11.5
W_1	7.0	4.5	3.0	12.5	12.0	11.5
W_2	.5	.5	.5	12.5	12.0	11.5

* Evacuation time is the estimated number of hours it would take for all evacuating vehicles in a zone to reach safe areas using available evacuation routes.

** Evacuation of those indicating on the survey they would evacuate if so advised.

APPENDIX A
HURRICANE CATEGORIES

(Developed by Herbert Saffir, Dade County, Florida, consulting engineer, and Dr. Robert H. Simpson, former National Hurricane Center Director.)

FORCE ONE--Winds of 74 to 95 miles per hour. Damage primarily to shrubbery, trees, foliage, unanchored mobile homes and, possibly, poorly constructed signs.

OR--Storm surge 4 to 5 feet above normal. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorages torn from moorings.

FORCE TWO--Winds of 96 to 110 miles per hour. Considerable damage to shrubbery and tree foliage, some trees blown down. Major damage to exposed mobile homes and poorly constructed signs. Some damage to roofs, windows and doors. No major damage to buildings.

OR--Storm surge 6 to 8 feet above normal. Coastal roads and low-lying escape routes cut by rising water two to four hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded and small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.

FORCE THREE--Winds of 111 to 130 miles per hour. Foliage torn from trees, large trees blown down. Practically all poorly constructed signs blown down and mobile homes destroyed. Some damage to roofs, windows and doors and some structural damage to small buildings.

OR--Storm surge 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed. Larger structures battered by waves and floating debris. Low-lying escape routes cut by rising water three to five hours before hurricane center arrives. Flat terrain five feet or less above sea level flooded eight miles inland or more. Evacuation of low-lying residences within several blocks of shoreline possibly required.

FORCE FOUR--Winds of 131 to 155 miles per hour. Shrubs and trees blown down, all signs down. Extensive damage to roofs, windows and doors. Complete destruction of mobile homes.

OR--Storm surge 13 to 18 feet above normal. Flat terrain 10 feet or less above sea level flooded as far as six miles inland. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes cut by rising water three to five hours before hurricane center arrives. Major erosion of beaches. Massive evacuation of all residences within 500 yards of shore possibly required, and of single-story residences on low ground within two miles of shore.

FORCE FIVE--Winds greater than 155 miles per hour. Shrubs and trees blown down and complete destruction of mobile homes. Extensive shattering of glass in windows and doors and complete failure of roofs on many residences and industrial buildings. Small buildings overturned or blown away.

OR--Storm surge greater than 18 feet above normal. Major damage to lower floors of all structures less than 15 feet above sea level within

500 yards of shore. Low-lying escape routes cut by rising water three to five hours before hurricane center arrives. Massive evacuation of low-lying residential areas within 5 to 10 miles of shore possibly required.

APPENDIX B
KEY DATA POINTS BY HURRICANE TYPE

An interpretation of the data point information can be found in **Part B: Data Points** of Section Two, SLOSH Data. The locations of the 23 key data points included in this appendix are displayed in a map located on the inside of the back cover. Details of these points are also indicated in Table 1-1.

The following cautions should be kept in mind when interpreting the data in this appendix:

Caution 1: Wave action and rainfall are not included in calculations.

Caution 2: Errors of plus or minus 20 percent are possible for peak surges with accurate initial data. For estimating, this error range can be generalized to other data.

Caution 3: Forward movement speeds of 15 mph are based on averaging the 10 mph and the 20 mph conditions.

Interpretive items to remember are:

FTOL stands for From Time Of Landfall.

Time is recorded in hour and half-hour units.

Maximum high tide surge is given in feet.

NC stands for Not Calculable.

1 E Boca Chica and 4

BOCA CHICA AND 4 (BOCH4) — ELEVATION: 3.4 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-11.5	-6.0	-5.0	-3.5	-10.0	-5.0	-4.0	-3.0	-	-	-	-	-15.5	-7.5	-5.5	-3.5	-6.5	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.5	11.5	9.0	6.5	19.0	11.0	8.5	6.0	-	-	-	-	12.0	5.0	3.0	1.0	11.5	11.5
65-70 MPH W GUSTS FTOL	-7.5	-4.0	-3.0	-2.5	-6.0	-3.0	-2.5	-1.5	-	-	-	-	-	-	-	-	-4.5	-5.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	11.5	7.0	6.5	6.0	7.5	6.5	5.0	3.5	-	-	-	-	-	-	-	-	6.5	7.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	NC	-0.5	-	-	NC	-0.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-6.5	-3.0	-2.5	-2.0	-5.5	-3.0	-2.0	-1.5	-	-	-	-	-	-	-	-	-3.5	-2.5
MAXIMUM HIGH TIDE SURGE	3.9	4.3	4.3	4.4	3.7	4.1	4.3	4.5	-	-	-	-	-	-	-	-	3.7	4.4
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-18.0	-9.0	-7.0	-5.0	-16.5	-8.5	-6.5	-4.5	-15.5	-7.5	-6.0	-4.0	-24.0	-12.0	-9.0	-6.0	-9.5	-10.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	29.0	16.5	14.0	12.0	28.0	16.0	12.5	9.0	21.5	11.0	8.0	5.0	28.5	14.5	10.5	7.0	16.5	16.5
65-70 MPH W GUSTS FTOL	-13.0	-6.5	-5.0	-3.5	-11.0	-5.5	-4.5	-3.0	-4.0	-	-	-	-17.5	-8.5	-6.5	-4.0	-7.0	-7.5
DIRECTION OF WIND	NW	N	N	N	N	N	N	N	SW	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	21.0	11.5	10.5	9.5	20.0	11.0	9.0	6.5	2.5	-	-	-	17.0	7.5	5.5	3.0	12.0	12.0
LOW TIDE FLOODING FTOL	-4.5	-2.5	-2.0	-1.5	-3.5	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-2.5	-2.0
M.S.L. FLOODING FTOL	-8.0	-4.0	-3.0	-2.0	-7.0	-3.5	-2.5	-1.5	-	-	-	-	-	-	-	-	-4.5	-3.0
HIGH TIDE FLOODING FTOL	-12.5	-5.5	-4.5	-3.0	-11.0	-5.5	-4.0	-2.5	-	-	-	-	-	-	-	-	-6.5	-5.0
MAXIMUM HIGH TIDE SURGE	5.9	6.8	6.8	6.9	5.6	6.2	6.6	7.0	-	-	-	-	-	-	-	-	5.5	6.0
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-23.0	-11.5	-9.0	-6.0	-21.5	-11.0	-8.0	-5.5	-21.5	-11.0	-8.0	-5.5	-29.5	-15.0	-11.0	-7.5	-12.0	-12.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	NW	NW	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	37.5	20.5	17.0	13.5	37.0	20.5	15.5	11.0	30.5	16.0	11.5	7.0	36.5	19.0	14.0	9.5	20.5	20.5
65-70 MPH W GUSTS FTOL	-16.5	-8.5	-6.5	-4.5	-15.0	-7.5	-6.0	-4.0	-13.5	-6.5	-5.0	-3.0	-22.5	-11.0	-8.5	-5.5	-9.0	-9.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	27.5	15.0	13.0	11.0	26.5	15.0	11.5	8.0	17.5	9.0	6.5	4.0	25.5	12.5	9.5	6.0	15.0	15.0
LOW TIDE FLOODING FTOL	-8.5	-4.0	-3.0	-2.0	-7.0	-3.5	-2.5	-1.5	-	-	-	-	-	-	-	-	-4.5	-3.5
M.S.L. FLOODING FTOL	-11.0	-5.0	-4.0	-2.5	-10.0	-4.5	-3.5	-2.0	-	-	-	-	-	-	-	-	-6.0	-4.5
HIGH TIDE FLOODING FTOL	-17.0	-7.5	-5.5	-3.5	-15.0	-7.0	-5.0	-3.0	-	-	-	-	-21.5	-	-	-	-8.5	-6.5
MAXIMUM HIGH TIDE SURGE	8.3	9.0	9.1	9.2	7.8	8.4	8.6	8.8	-	-	-	-	3.6	-	-	-	7.3	9.1
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-27.0	-13.5	-10.5	-7.0	-25.5	-13.0	3.0	-6.5	-26.5	-13.0	-10.0	-6.5	-34.0	-17.0	-13.0	-8.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	-	-
DURATION IN HOURS	42.0	22.5	18.5	14.5	41.5	22.5	17.0	11.5	35.5	18.0	13.0	7.5	30.0	21.0	16.0	10.5	-	-
65-70 MPH W GUSTS FTOL	-20.0	-10.0	-7.5	-5.0	-18.0	-9.0	-7.0	-4.5	-18.0	-9.0	-6.5	-4.5	-26.0	-13.0	-10.0	-6.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.0	16.0	14.0	11.5	30.5	16.0	12.5	8.5	22.0	11.0	9.0	6.5	29.0	15.0	11.0	7.5	-	-
LOW TIDE FLOODING FTOL	-11.0	-5.0	-3.5	-2.5	-9.5	-4.5	-3.0	-2.0	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-14.0	-6.5	-4.5	-3.0	-12.0	-5.5	-4.0	-2.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-21.0	-9.0	-6.5	-4.0	-19.0	-8.5	-6.0	-3.5	-12.5	-	-	-	-26.0	-10.5	NC	-	-	-
MAXIMUM HIGH TIDE SURGE	10.3	11.3	11.3	11.2	9.7	10.3	10.6	11.0	3.4	-	-	-	4.2	3.7	NC	-	-	-

2 E South Padre Island and 100

SOUTH PADRE ISLAND AND 100 (SP100) — ELEVATION: 3.5 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-11.0	-6.0	-4.5	-3.5	-9.0	-4.5	-3.5	-2.5	-	-	-	-	-16.0	-8.0	-6.0	-4.0	-6.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.5	10.5	9.5	19.0	7.0	6.5	6.0	-	-	-	-	15.0	6.5	4.5	2.5	11.5	11.5
65-70 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.5	-4.5	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-3.5	-5.0
DIRECTION OF WIND	N	N	N	N	NE	NE	NE	NE	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	11.0	6.5	6.5	6.0	9.0	6.5	5.0	4.0	-	-	-	-	-	-	-	-	3.0	7.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-5.5	-3.0	-2.5	-2.0	-2.5	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-2.5	-3.0
MAXIMUM HIGH TIDE SURGE	3.8	4.2	4.3	4.4	3.6	3.9	4.2	4.5	-	-	-	-	-	-	-	-	3.6	4.4
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-18.0	-9.0	-7.0	-5.0	-15.5	-8.0	-6.0	-4.0	-16.5	-8.0	-6.0	-4.0	-24.0	-12.0	-9.0	-6.0	-9.0	-10.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	29.0	16.0	14.0	12.0	27.5	16.0	12.5	9.0	23.0	12.5	9.0	5.5	29.5	15.0	11.0	7.5	16.0	16.5
65-70 MPH W GUSTS FTOL	-12.5	-6.5	-5.0	-3.5	-10.0	-5.0	-4.0	-2.5	-9.0	-4.0	-3.0	-1.5	-17.5	-9.0	-6.5	-4.5	-6.5	-7.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.5	10.5	9.5	19.0	11.0	8.5	6.5	11.0	4.5	2.5	0.5	19.0	9.0	6.5	4.0	11.5	12.0
LOW TIDE FLOODING FTOL	-4.0	-2.5	-2.0	-1.5	-	-1.5	-1.0	-0.5	-	-	-	-	-	-	-	-	-	-2.5
M.S.L. FLOODING FTOL	-7.5	-3.5	-3.0	-2.0	-5.5	-3.0	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.0	-4.0
HIGH TIDE FLOODING FTOL	-12.5	-5.5	-4.5	-3.0	-10.0	-4.5	-3.5	-2.0	-	-	-	-	-	-	-	-	-5.5	-6.0
MAXIMUM HIGH TIDE SURGE	5.8	6.5	6.6	6.8	5.3	6.0	6.4	6.9	-	-	-	-	-	-	-	-	5.3	6.9
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-22.5	-11.5	-9.0	-6.0	-20.5	-10.5	-8.0	-5.5	-22.5	-11.0	-8.5	-5.5	-29.5	-14.5	-11.0	-7.5	-11.5	-12.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	37.0	20.5	17.0	13.5	36.5	20.0	15.5	10.5	32.0	17.0	12.5	8.5	37.5	19.5	14.5	10.0	20.5	20.5
65-70 MPH W GUSTS FTOL	-16.5	-8.5	-6.5	-4.5	-14.0	-7.0	-6.0	-4.5	-15.0	-7.5	-5.5	-3.5	-22.5	-11.0	-8.5	-5.5	-8.0	-9.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	27.0	15.0	13.0	11.0	25.5	14.5	11.5	9.0	20.0	10.0	7.5	5.0	26.0	13.5	10.0	6.5	15.0	16.0
LOW TIDE FLOODING FTOL	-8.0	-4.0	-3.0	-2.0	-6.0	-3.0	-2.5	-1.5	-	-	-	-	-	-	-	-	-4.0	-4.0
M.S.L. FLOODING FTOL	-11.0	-5.0	-4.0	-2.5	-9.0	-4.5	-3.0	-2.0	-	-	-	-	-	-	-	-	-5.5	-5.0
HIGH TIDE FLOODING FTOL	-16.0	-7.5	-5.5	-3.5	-13.5	-6.5	-4.5	-3.0	-	-	-	-	-21.5	-8.5	NC	-	-7.5	-7.0
MAXIMUM HIGH TIDE SURGE	7.7	8.8	8.9	9.1	7.1	8.0	8.4	8.9	-	-	-	-	3.8	3.6	NC	-	7.0	9.3
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-27.0	-13.5	-10.5	-7.0	-24.5	-12.5	-9.5	-6.5	-27.0	-13.5	-10.0	-6.5	-33.5	-17.0	-12.5	-8.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	NW	NW	NW	NW	N	N	N	N	-	-
DURATION IN HOURS	42.0	19.5	17.0	14.0	31.5	19.5	15.5	11.5	37.0	16.5	13.0	9.5	41.0	21.0	16.0	11.0	-	-
65-70 MPH W GUSTS FTOL	-19.5	-10.0	-7.5	-5.0	-17.0	-8.5	-6.5	-4.5	-19.0	-9.5	-7.5	-5.5	-26.0	-13.0	-9.5	-6.5	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.5	14.5	13.0	11.5	29.5	14.5	11.5	8.5	23.5	10.5	9.0	7.0	30.0	15.0	11.5	8.0	-	-
LOW TIDE FLOODING FTOL	-10.0	-5.0	-4.0	-2.5	-8.5	-4.0	-3.0	-1.5	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-14.0	-6.5	-4.5	-3.0	-11.0	-5.5	-4.0	-2.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-20.0	-9.0	-6.5	-4.0	-17.0	-8.0	-6.0	-3.5	15.0	-	-	-	-25.5	-11.0	-7.0	-3.5	-	-
MAXIMUM HIGH TIDE SURGE	9.4	10.8	10.8	10.8	8.8	9.6	9.9	10.2	3.7	-	-	-	4.5	4.1	3.8	3.6	-	-

3 E Queen Isabella Causeway (100)

QUEEN ISABELLA CAUSEWAY (100) (QI100) — ELEVATION: 4.3 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-11.0	-6.0	-4.5	-3.5	-9.0	-5.0	-4.0	-2.5	-	-	-	-	-15.5	-7.5	-6.0	-4.0	-6.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.5	10.5	9.5	19.0	11.0	8.5	6.0	-	-	-	-	14.0	6.0	4.0	2.5	11.5	11.5
65-70 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.5	-5.0	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.0	-5.0
DIRECTION OF WIND	N	N	N	N	NE	NE	NE	NE	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	11.0	7.0	6.5	6.0	8.0	6.5	5.0	4.0	-	-	-	-	-	-	-	-	3.5	7.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-17.5	-9.0	-7.0	-5.0	-15.5	-8.0	-6.0	-4.0	-16.0	-8.0	-6.0	-4.0	-24.0	-12.0	-9.0	-6.0	-9.0	-10.0
DIRECTION OF WIND	NW	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	28.5	16.0	14.0	11.5	27.5	16.0	12.5	9.0	22.5	12.0	8.5	5.5	29.0	15.0	11.0	7.5	16.5	16.5
65-70 MPH W GUSTS FTOL	-12.5	-6.5	-5.0	-3.5	-10.5	-5.5	-4.0	-3.0	-8.0	-3.5	NC	-	-17.5	-8.5	-6.5	-4.5	-6.5	-7.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.5	11.5	10.5	9.5	19.0	11.0	8.5	6.5	9.5	3.5	NC	-	18.5	8.5	6.0	3.5	11.5	12.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-4.5	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-3.0
HIGH TIDE FLOODING FTOL	-7.0	-3.0	-2.5	-1.5	-4.5	-2.0	-1.5	-0.5	-	-	-	-	-	-	-	-	-2.5	-4.0
MAXIMUM HIGH TIDE SURGE	5.8	5.8	5.7	5.6	5.1	5.2	5.1	5.0	-	-	-	-	-	-	-	-	4.7	6.1
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-22.5	-11.5	-9.0	-6.0	-20.5	-10.5	-8.0	-5.5	-22.0	-11.0	-8.5	-5.5	-29.0	-14.5	-11.0	-7.5	-11.5	12.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	NE	NW
DURATION IN HOURS	37.0	20.5	17.0	13.5	36.5	20.0	15.5	10.5	31.5	16.5	12.5	8.5	37.0	19.0	14.5	9.5	20.5	20.5
65-70 MPH W GUSTS FTOL	-16.5	-8.5	-6.5	-4.5	-14.0	-7.0	-5.5	-3.5	-14.0	-7.0	-5.5	-3.5	-22.5	-11.0	-8.5	-5.5	-8.5	-9.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	27.0	15.0	13.0	11.0	26.0	14.5	11.0	8.0	18.0	10.0	7.0	4.5	26.0	13.5	10.0	6.5	15.0	15.5
LOW TIDE FLOODING FTOL	-6.5	-3.0	-2.0	-1.5	-4.0	-1.5	-1.0	-0.5	-	-	-	-	-	-	-	-	-2.5	-3.5
M.S.L. FLOODING FTOL	-8.5	-3.5	-3.0	-2.0	-6.5	-2.5	-1.5	-0.5	-	-	-	-	-	-	-	-	-3.5	-4.5
HIGH TIDE FLOODING FTOL	-11.0	-5.0	-3.5	-2.5	-8.5	-3.5	-2.5	-1.5	-	-	-	-	-	-	-	-	-4.5	-5.5
MAXIMUM HIGH TIDE SURGE	6.7	8.6	8.7	8.8	6.8	7.6	7.8	8.0	-	-	-	-	-	-	-	-	6.3	9.2
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-27.0	-13.5	-10.0	-7.0	-24.5	-12.5	-9.5	-6.5	-27.0	-13.5	-10.0	-6.5	-33.5	-16.5	-12.5	-8.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	NW	NW	NW	NW	NW	N	N	N	-	-
DURATION IN HOURS	42.0	22.5	18.0	14.0	41.5	22.5	17.0	11.5	37.0	18.5	13.5	8.0	40.5	21.0	16.0	11.0	-	-
65-70 MPH W GUSTS FTOL	-19.5	-10.0	-7.5	-5.0	-17.5	-9.0	-6.5	-4.5	-18.5	-9.0	-7.0	-4.5	-26.0	-13.0	-9.5	-6.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.5	16.0	13.5	11.5	29.5	16.0	12.5	8.5	23.5	12.0	9.5	7.5	29.5	15.0	11.5	7.5	-	-
LOW TIDE FLOODING FTOL	-9.0	-4.0	-3.0	-2.0	-7.0	-3.0	-2.0	-1.0	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-11.5	-5.0	-3.5	-2.5	-9.0	-3.5	-2.5	-1.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-14.0	-6.0	-4.5	-3.0	-11.5	-5.0	-3.5	-2.0	-	-	-	-	-18.5	-8.0	-5.5	-3.0	-	-
MAXIMUM HIGH TIDE SURGE	9.7	11.1	11.1	11.2	8.8	9.7	10.0	10.2	-	-	-	-	5.1	4.8	4.6	4.5	-	-

4 E Port Isabel and 100

PORT ISABEL AND 100 (PI100) — ELEVATION: 6.5 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-11.0	-5.5	-4.5	-3.5	-9.0	-4.5	-3.5	-2.5	-	-	-	-	-15.0	-7.5	-5.5	-3.5	-6.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.5	10.5	9.5	19.0	11.0	8.5	6.0	-	-	-	-	13.5	6.0	4.0	2.0	11.5	11.0
65-70 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.5	-4.5	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.0	-5.0
DIRECTION OF WIND	N	N	N	N	NE	NE	NE	NE	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	10.5	6.5	6.5	6.0	8.0	6.5	5.0	4.0	-	-	-	-	-	-	-	-	3.0	7.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-17.5	-9.0	-7.0	-5.0	-15.5	-8.0	-6.0	-4.0	-16.0	-8.0	-6.0	-4.0	-23.5	-11.5	-9.0	-6.0	-9.0	-10.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	28.5	16.0	14.0	12.0	27.5	16.0	12.5	9.0	22.5	12.0	8.5	5.5	29.0	15.0	11.0	7.0	16.0	16.5
65-70 MPH W GUSTS FTOL	-12.0	-6.0	-5.0	-3.5	-10.0	-5.0	-4.0	-2.5	-8.0	-3.5	NC	-	-17.0	-8.5	-6.5	-4.0	-6.5	-7.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.5	10.5	9.5	19.0	11.0	8.5	6.5	10.0	4.0	NC	-	18.0	8.5	6.0	3.5	11.5	12.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-22.5	-11.5	-8.5	-6.0	-20.0	-10.0	-8.0	-5.5	-22.0	-11.0	-8.0	-5.5	-27.0	-14.5	-11.0	-7.0	-11.5	-12.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	NE	NW
DURATION IN HOURS	37.0	20.5	17.0	13.5	36.5	20.0	15.5	11.0	31.5	16.5	12.5	8.5	37.0	19.0	14.5	9.5	20.5	20.5
65-70 MPH W GUSTS FTOL	-16.0	-8.0	-6.5	-4.5	-14.0	-7.0	-5.5	-3.5	-14.5	-7.0	-6.0	-4.5	-22.0	-11.0	-8.0	-5.5	-8.5	-9.5
DIRECTION OF WIND	NW	N	N	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	27.0	15.0	13.0	11.0	26.0	14.5	11.0	8.0	19.5	10.0	7.5	5.5	25.5	13.0	9.5	6.5	15.0	15.0
LOW TIDE FLOODING FTOL	-	-0.5	-0.5	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-1.5
M.S.L. FLOODING FTOL	-3.5	-1.5	-1.0	-0.5	-	-0.5	0.0	0.5	-	-	-	-	-	-	-	-	-	-2.0
HIGH TIDE FLOODING FTOL	-5.5	-2.5	-1.5	-1.0	-3.5	-1.5	-0.5	0.0	-	-	-	-	-	-	-	-	-2.0	-3.0
MAXIMUM HIGH TIDE SURGE	8.1	8.7	8.6	8.6	7.3	7.8	7.8	7.7	-	-	-	-	-	-	-	-	6.9	9.6
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-26.5	-13.5	-10.0	-7.0	-24.5	-12.5	-9.5	-6.5	-26.5	-13.0	-10.0	-6.5	-33.0	-16.5	-12.5	-8.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	NW	NW	NW	NW	NW	N	N	N	-	-
DURATION IN HOURS	42.0	22.5	17.5	13.0	41.0	22.5	17.0	11.5	36.5	18.5	13.5	8.0	40.5	21.0	16.0	11.0	-	-
65-70 MPH W GUSTS FTOL	-19.0	-9.5	-7.5	-5.0	-17.0	-8.5	-6.5	-4.5	-18.5	-9.0	-7.0	-4.5	-25.5	-12.5	-9.5	-6.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.5	16.0	13.0	10.5	29.5	16.0	12.0	8.5	23.0	12.0	9.5	7.5	29.0	15.0	11.5	7.5	-	-
LOW TIDE FLOODING FTOL	-5.0	-2.0	-1.5	-1.0	-3.0	-1.5	-1.0	-0.5	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-6.5	-3.0	-2.0	-1.5	-4.5	-2.0	-1.0	-0.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-8.0	-3.5	-2.5	-1.5	-6.5	-2.5	-1.5	-0.5	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	10.3	12.0	12.0	12.0	9.5	10.2	10.5	10.7	-	-	-	-	-	-	-	-	-	-

5 E Laguna Heights and 100

LAGUNA HEIGHTS AND 100 (BA100) — ELEVATION: 9.7 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-10.0	-5.5	-4.5	-3.5	-8.5	-4.5	-3.5	-2.5	-	-	-	-	-14.0	-7.0	-5.0	-3.5	-5.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.0	10.0	9.5	18.5	11.0	8.5	6.0	-	-	-	-	13.0	5.5	3.5	2.0	11.0	11.5
65-70 MPH W GUSTS FTOL	-5.5	-3.0	-2.5	-2.0	-4.0	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-3.5	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	10.0	6.5	6.5	6.5	7.5	6.5	5.0	4.0	-	-	-	-	-	-	-	-	3.0	7.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-16.5	-8.5	-6.5	-4.5	-14.5	-7.5	-5.5	-4.0	-15.5	-7.5	-6.0	-4.0	-22.5	-11.5	-8.5	-5.5	-9.0	-10.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	28.5	16.0	14.0	12.0	27.5	16.0	12.5	9.0	22.5	12.0	9.0	5.5	28.0	14.5	11.0	7.0	16.0	16.5
65-70 MPH W GUSTS FTOL	-11.5	-6.0	-4.5	-3.5	-9.5	-5.0	-3.5	-2.5	-7.5	-3.5	NC	-	-16.0	-8.0	-6.0	-4.0	-6.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.5	10.5	9.5	18.0	11.0	8.5	6.5	10.0	4.5	NC	-	17.5	8.5	6.0	3.5	11.5	12.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-21.5	-11.0	-8.5	-5.5	-19.5	-10.0	-7.5	-5.0	-21.5	-10.5	-8.0	-5.5	-28.0	-14.0	-10.5	-7.0	-11.5	-12.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	NE	NW
DURATION IN HOURS	37.0	20.5	17.0	13.5	36.0	20.0	15.5	11.0	31.5	16.5	12.5	8.5	36.5	18.5	14.0	9.5	20.5	20.5
65-70 MPH W GUSTS FTOL	-15.5	-8.0	-6.0	-4.5	-13.5	-7.0	-5.0	-3.5	-13.5	-7.0	-5.0	-3.5	-21.0	-10.5	-8.0	-5.0	-8.0	-9.0
DIRECTION OF WIND	NW	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.5	15.0	13.0	11.0	25.5	14.5	11.0	8.0	19.0	10.0	7.0	4.5	25.0	13.0	9.5	6.0	15.0	15.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.5
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.7
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-26.0	-13.0	-10.0	-6.5	-23.5	-12.0	-9.0	-6.0	-26.0	-13.0	-9.5	-6.5	-32.5	-16.0	-12.0	-8.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	-	-
DURATION IN HOURS	41.5	22.0	18.0	14.0	41.0	22.5	17.0	11.5	36.5	18.5	14.0	10.0	40.0	20.5	15.5	11.0	-	-
65-70 MPH W GUSTS FTOL	-18.5	-9.5	-7.0	-5.0	-16.5	-8.5	-6.5	-4.0	-17.5	-9.0	-6.5	-4.5	-24.5	-12.5	-9.5	-6.0	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.5	16.0	13.5	11.5	30.0	16.0	12.0	8.5	22.5	12.0	9.0	6.0	28.5	14.5	11.0	7.5	-	-
LOW TIDE FLOODING FTOL	-	-0.5	-0.5	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-2.0	-1.0	-0.5	-0.5	0.0	0.0	0.0	0.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-3.0	-1.5	-1.0	-0.5	-2.5	-0.5	-0.5	0.0	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	11.7	13.3	13.3	13.2	10.7	11.2	11.3	11.4	-	-	-	-	-	-	-	-	-	-

6 E Laguna Vista and 100

LAGUNA VISTA AND 100 (LV100) — ELEVATION: 11.0 FT

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-8.0	-4.0	-3.0	-2.0	-	-	-	-	-13.5	-6.5	-5.0	-3.0	-5.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.0	10.0	9.5	18.0	11.5	8.5	6.0	-	-	-	-	13.0	5.5	3.5	2.0	11.0	11.0
65-70 MPH W GUSTS FTOL	-5.0	-3.0	-2.5	-2.0	-3.5	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-3.5	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	NC	NE	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	9.5	6.5	6.5	6.5	7.0	6.5	5.0	4.0	-	-	-	-	-	-	-	-	3.0	6.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-16.0	-8.5	-6.5	-4.5	-14.0	-7.5	-5.5	-4.0	-15.0	-7.5	-5.5	-3.5	-22.0	-11.0	-8.5	-5.5	-8.5	-9.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	28.0	16.0	14.0	12.0	27.5	16.0	12.5	9.0	22.5	12.0	9.0	5.5	28.0	14.5	10.5	7.0	16.0	16.0
65-70 MPH W GUSTS FTOL	-11.0	-5.5	-4.5	-3.5	-9.0	-4.5	-3.5	-2.5	-7.5	-3.5	-2.5	-1.5	-15.5	-8.0	-6.0	-4.0	-6.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.0	10.0	9.5	17.0	11.0	8.5	6.5	10.5	4.5	3.0	1.5	17.5	8.5	6.0	3.5	11.0	11.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-21.0	-11.0	-8.5	-5.5	-19.0	-9.5	-7.5	-5.0	-21.0	-10.5	-8.0	-5.0	-27.5	-14.0	-10.5	-7.0	-11.0	-12.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	36.5	20.0	16.5	13.5	36.0	20.0	15.5	10.5	31.5	16.5	12.5	8.5	36.0	19.0	14.0	9.5	20.5	20.0
65-70 MPH W GUSTS FTOL	-15.0	-7.5	-6.0	-4.0	-13.0	-6.5	-5.0	-3.5	-13.5	-6.5	-5.0	-3.0	-20.5	-10.0	-7.5	-5.0	-8.0	-9.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.0	14.5	12.5	11.0	25.5	14.5	11.0	8.0	18.0	10.0	7.5	4.5	24.5	12.5	9.5	6.0	15.0	14.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.4
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-25.5	-13.0	-9.5	-6.5	-23.0	-11.5	-9.0	-6.0	-25.5	-12.5	-9.5	-6.5	-32.0	-16.0	-12.0	-8.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	-	-
DURATION IN HOURS	40.5	22.5	18.0	14.0	41.0	22.0	17.0	11.5	36.5	18.5	14.0	10.0	40.0	20.5	15.5	10.5	-	-
65-70 MPH W GUSTS FTOL	-18.0	-9.0	-7.0	-5.0	-16.0	-8.0	-6.0	-4.0	-17.5	-8.5	-6.5	-4.5	-24.0	-12.0	-9.0	-6.0	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.0	16.0	13.5	11.5	29.5	16.0	12.5	8.5	23.0	12.0	9.0	6.0	28.0	14.5	11.0	7.5	-	-
LOW TIDE FLOODING FTOL	-	-0.5	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-0.5	-0.5	-0.5	0.0	-	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-2.0	-1.0	-0.5	-0.5	-0.5	0.0	0.5	0.5	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	12.5	14.0	14.0	14.1	11.5	12.2	12.5	12.8	-	-	-	-	-	-	-	-	-	-

7 E Port Mansfield and 497

PORT MANSFIELD AND 497 (PM497) — ELEVATION: 7.0 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-2.0	-2.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	-10.0	-5.0	-4.0	-2.5	-12.5	-6.5	-5.0	-3.0	-2.0	-5.5
DIRECTION OF WIND	NE	N	N	N	NE	NE	NE	NE	NW	NW	NW	NW	NW	N	N	N	NE	N
DURATION IN HOURS	9.5	7.0	7.5	8.0	13.5	9.5	7.5	5.5	18.0	9.5	7.0	4.5	20.0	10.0	7.5	5.0	9.5	7.0
65-70 MPH W GUSTS FTOL	-	-	-	-	-	2.0	1.0	0.5	-5.5	-2.5	-2.0	-1.5	-8.0	-4.0	-3.0	-2.0	0.0	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	NW	NW	NW	NW	NW	NW	NW	NW	NE	-
DURATION IN HOURS	-	-	-	-	-	3.0	3.0	3.0	8.5	3.5	2.5	1.0	10.0	4.5	3.0	1.5	2.5	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-11.5	-6.0	-5.0	-4.0	-8.0	-4.5	-3.5	-2.5	-16.5	-8.5	-6.5	-4.0	-17.0	-9.5	-7.5	-5.0	-5.5	-9.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	N	N	N	N	NE	NW
DURATION IN HOURS	22.0	13.5	12.0	11.0	23.0	14.0	11.0	8.5	27.5	15.0	11.5	8.0	28.5	15.5	12.0	8.5	15.0	14.5
65-70 MPH W GUSTS FTOL	-4.5	-2.5	-2.5	-2.0	-2.5	-1.5	-1.0	-1.0	-11.5	-5.5	-4.5	-3.0	-14.0	-7.0	-5.5	-3.5	-2.5	-6.0
DIRECTION OF WIND	N	N	N	N	NE	NE	NE	NE	NW	NW	NW	NW	NW	N	N	N	NE	N
DURATION IN HOURS	10.0	7.5	7.5	7.5	11.0	8.5	7.0	5.5	18.5	10.5	8.0	5.5	20.0	11.0	8.5	5.5	6.0	8.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-17.5	-9.0	-7.0	-5.0	-13.5	-7.0	-5.5	-3.5	-21.5	-11.0	-8.0	-5.5	-24.0	-12.0	-9.0	-6.0	-8.0	-12.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	N	N	N	N	NE	NW
DURATION IN HOURS	31.5	18.0	15.5	13.0	32.0	18.5	14.5	10.5	36.0	19.5	15.0	10.0	37.0	20.0	15.0	10.5	19.5	18.5
65-70 MPH W GUSTS FTOL	-10.0	-5.0	-4.5	-3.5	-6.5	-3.5	-3.0	-2.0	-15.5	-7.5	-6.0	-4.0	-18.0	-9.0	-7.0	-4.5	-4.5	-8.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	N	N	N	N	NE	NW
DURATION IN HOURS	19.0	11.5	10.5	10.0	21.0	13.0	10.0	7.5	25.5	14.0	10.5	7.0	27.0	14.5	11.0	7.5	14.0	12.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-22.0	-11.0	-8.5	-6.0	-17.5	-9.0	-7.0	-4.5	-26.0	-13.0	-10.0	-6.5	-28.5	-14.0	-10.5	-7.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	N	N	N	N	-	-
DURATION IN HOURS	37.0	20.0	16.5	13.5	36.5	21.0	16.0	11.0	41.0	21.5	16.5	11.5	32.0	21.5	16.5	11.5	-	-
65-70 MPH W GUSTS FTOL	-13.5	-7.0	-5.5	-4.0	-10.0	-5.0	-4.0	-2.5	-18.5	-9.5	-7.0	-4.5	-21.0	-10.5	-8.0	-5.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	N	N	N	N	-	-
DURATION IN HOURS	23.0	12.5	11.5	10.0	25.0	14.5	11.0	8.0	29.5	15.0	11.5	8.0	30.5	16.0	12.0	8.0	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

8 E Storage Area and 1792

STORAGE AREA AND 1792 (SA1792) — ELEVATION: 6.4 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-6.0	-3.5	-3.0	-2.5	-4.5	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.0	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	10.5	6.5	6.5	6.5	7.0	6.5	5.0	4.0	-	-	-	-	-	-	-	-	3.0	6.5
65-70 MPH W GUSTS FTOL	-	-1.5	-1.5	-1.5	-	-1.0	-1.0	-0.5	-	-	-	-	-	-	-	-	-	-2.5
DIRECTION OF WIND	-	N	N	N	-	NE	NE	NE	-	-	-	-	-	-	-	-	-	N
DURATION IN HOURS	-	2.0	2.0	2.0	-	1.5	1.5	1.5	-	-	-	-	-	-	-	-	-	3.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-11.5	-6.0	-5.0	-3.5	-10.0	-5.0	-4.0	-2.5	-7.0	-3.0	NC	-	-16.5	-8.0	-6.0	-4.0	-6.5	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.5	10.5	9.5	18.5	11.0	8.5	6.5	8.5	3.0	NC	-	17.5	8.0	5.5	3.5	11.5	12.0
65-70 MPH W GUSTS FTOL	-8.0	-4.0	-3.5	-2.5	-6.5	-3.5	-2.5	-2.0	-	-	-	-	-10.0	-	-	-	-5.0	-5.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	W	-	-	-	NE	NW
DURATION IN HOURS	14.0	8.0	7.5	7.0	10.0	8.0	6.0	4.5	-	-	-	-	4.5	-	-	-	8.5	8.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-15.5	-8.0	-6.0	-4.5	-14.0	-7.0	-5.5	-3.5	-13.5	-6.5	-5.0	-3.5	-21.5	-10.5	-8.0	-5.5	-8.5	-9.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.0	15.0	13.0	11.0	26.0	14.5	11.0	8.0	18.5	9.5	7.0	4.5	25.0	13.0	9.5	6.0	15.0	15.0
65-70 MPH W GUSTS FTOL	-11.5	-6.0	-4.5	-3.5	-10.0	-5.0	-4.0	-2.5	-7.0	-3.0	NC	-	-16.5	-8.0	-6.0	-4.0	-6.5	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.5	11.0	10.0	9.0	19.5	11.0	8.5	6.0	8.0	3.5	NC	-	17.0	8.5	6.0	3.5	11.5	11.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0 6.7	0.0 7.3
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-19.0	-9.5	-7.5	-5.0	-17.0	-8.5	-6.5	-4.5	-17.5	-9.0	-6.5	-4.5	-25.0	-12.5	-9.5	-6.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.5	16.0	13.5	11.5	29.5	16.0	12.5	8.5	22.5	12.0	9.0	6.0	28.5	14.5	11.0	7.5	-	-
65-70 MPH W GUSTS FTOL	-14.5	-7.0	-5.5	-4.0	-12.5	-6.5	-5.0	-3.0	-12.0	-6.0	-4.5	-3.0	-20.0	-10.0	-7.5	-5.0	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	23.0	12.5	11.0	10.0	22.5	12.5	9.5	6.5	13.0	7.0	5.5	3.5	21.5	10.5	8.0	5.5	-	-
LOW TIDE FLOODING FTOL	-2.0	-0.5	0.0	0.0	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-2.0	-0.5	-0.5	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-4.5	-1.5	-1.0	0.0	-1.5	0.0	0.5	0.5	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	11.1	12.6	12.3	12.0	8.9	7.2	7.0	6.8	-	-	-	-	-	-	-	-	-	-

9 E Bahia Grande and 1792

BAHIA GRANDE AND 1972 (BG1792) — ELEVATION: 5.9 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-5.5	-3.0	-2.5	-2.0	-4.5	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.0	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	10.0	6.5	6.5	6.5	6.5	5.5	4.5	4.0	-	-	-	-	-	-	-	-	6.0	7.0
65-70 MPH W GUSTS FTOL	-	-1.0	-1.0	-1.0	-	-0.5	-0.5	-0.5	-	-	-	-	-	-	-	-	-	-2.0
DIRECTION OF WIND	-	N	N	N	-	NE	NE	NE	-	-	-	-	-	-	-	-	-	N
DURATION IN HOURS	-	2.0	2.0	2.0	-	1.0	1.0	1.0	-	-	-	-	-	-	-	-	-	3.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-11.0	-5.5	-4.5	-3.5	-9.5	-5.0	-4.0	-2.5	-4.5	-0.5	NC	-	-15.0	-7.5	-5.5	-3.5	-6.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	SW	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.0	10.0	9.5	13.5	11.0	8.5	6.5	6.0	0.5	NC	-	15.5	7.0	5.0	3.0	11.5	11.5
65-70 MPH W GUSTS FTOL	-7.5	-4.0	-3.5	-2.5	-6.5	-3.5	-2.5	-1.5	-	-	-	-	-	-	-	-	-5.0	-5.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	12.5	8.0	7.5	7.5	8.5	8.0	6.0	4.5	-	-	-	-	-	-	-	-	8.5	8.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-15.0	-7.5	-6.0	-4.0	-13.5	-7.0	-5.0	-3.5	-12.5	-6.0	-4.5	-3.0	-20.5	-10.0	-7.5	-5.0	-8.5	-8.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.5	15.0	13.0	11.0	26.0	15.0	11.5	8.0	17.5	9.0	6.5	4.0	24.0	12.0	9.0	6.0	15.0	15.0
65-70 MPH W GUSTS FTOL	-11.0	-5.5	-4.5	-3.5	-9.5	-5.0	-3.5	-2.5	-5.0	-1.5	NC	-	-15.0	-7.5	-5.5	-3.5	-6.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	SW	NC	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.0	10.0	9.5	19.5	11.0	8.5	6.0	5.5	1.5	NC	-	15.5	7.5	5.0	3.0	11.5	11.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.1
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-18.0	-9.0	-7.0	-5.0	-16.5	-8.5	-6.5	-4.5	-16.5	-8.0	-6.0	-4.0	-24.5	-12.0	-9.0	-6.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.0	16.0	14.0	11.5	30.0	16.0	12.5	8.5	21.0	11.0	8.0	5.5	28.0	14.0	10.5	7.0	-	-
65-70 MPH W GUSTS FTOL	-13.5	-7.0	-5.5	-4.0	-12.0	-6.0	-4.5	-3.0	-10.5	-5.0	-4.0	-2.5	-19.0	-9.5	-7.0	-4.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	23.0	12.5	11.0	10.0	22.5	12.5	9.5	7.0	12.5	6.0	4.5	3.0	20.0	10.0	7.5	5.0	-	-
LOW TIDE FLOODING FTOL	-1.0	0.0	0.5	1.0	0.5	1.5	NC	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-1.5	0.0	0.5	1.0	0.0	1.0	NC	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-1.5	0.0	0.5	1.0	-0.5	1.0	NC	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	12.3	13.6	13.1	12.6	9.6	8.2	NC	-	-	-	-	-	-	-	-	-	-	-

10 E Brownsville Fishing Harbor and 1792

BROWNSVILLE FISHING HARBOR AND 1792 (BFH1792) — ELEVATION: 5.5 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-5.0	-3.0	-2.5	-2.0	-4.5	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.0	-3.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	7.5	6.5	6.5	6.5	5.5	3.5	3.5	3.5	-	-	-	-	-	-	-	-	6.0	7.0
65-70 MPH W GUSTS FTOL	-	-1.0	-1.0	-1.0	-	-0.5	-0.5	-0.5	-	-	-	-	-	-	-	-	-	-2.0
DIRECTION OF WIND	-	N	N	N	-	NE	NC	N	-	-	-	-	-	-	-	-	-	N
DURATION IN HOURS	-	1.5	1.5	1.5	-	1.0	1.0	1.0	-	-	-	-	-	-	-	-	-	2.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-10.5	-5.5	-4.5	-3.0	-9.5	-5.0	-3.5	-2.5	-	-	-	-	-14.0	-6.5	-5.0	-3.0	-6.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.0	11.0	10.0	9.5	12.0	11.0	8.5	6.5	-	-	-	-	13.0	5.5	3.5	2.0	11.5	11.5
65-70 MPH W GUSTS FTOL	-7.0	-3.5	-3.0	-2.5	-6.5	-3.0	-2.5	-1.5	-	-	-	-	-	-	-	-	-5.0	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	11.0	8.0	7.5	7.0	8.0	7.5	6.0	4.5	-	-	-	-	-	-	-	-	8.0	8.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-14.5	-7.5	-5.5	-4.0	-13.5	-6.5	-5.0	-3.5	-11.0	-5.5	-4.0	-2.5	-19.5	-9.5	-7.5	-5.0	-8.5	-8.0
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.0	15.0	13.0	11.0	26.0	14.5	11.0	8.0	15.5	8.0	5.5	3.5	22.5	11.5	8.5	5.5	14.5	14.5
65-70 MPH W GUSTS FTOL	-10.5	-5.5	-4.5	-3.0	-9.5	-5.0	-3.5	-2.5	-	-	-	-	-14.0	-6.5	-5.0	-3.0	-6.5	-6.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	-	-	-	-	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	20.0	11.0	10.0	9.5	19.5	11.0	8.5	6.0	-	-	-	-	13.5	6.0	4.0	2.0	11.0	11.0
LOW TIDE FLOODING FTOL	0.0	1.5	2.0	3.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	1.5
M.S.L. FLOODING FTOL	-0.5	1.5	2.0	2.5	1.5	5.0	NC	-	-	-	-	-	-	-	-	-	-	1.0
HIGH TIDE FLOODING FTOL	-0.5	1.0	1.5	2.0	1.5	3.5	NC	-	-	-	-	-	-	-	-	-	-	0.5
MAXIMUM HIGH TIDE SURGE	10.1	9.9	9.4	9.0	9.0	6.7	NC	-	-	-	-	-	-	-	-	-	-	10.0
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-17.5	-9.0	-7.0	-4.5	-16.5	-8.5	-6.5	-4.0	-15.5	-7.5	-5.5	-3.5	-23.5	-11.5	-9.0	-6.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.0	16.0	13.5	11.5	29.5	16.0	12.5	8.5	20.0	10.5	8.0	5.0	25.5	13.5	10.0	6.0	-	-
65-70 MPH W GUSTS FTOL	-13.0	-6.5	-5.0	-3.5	-12.0	-6.0	-4.5	-3.0	-9.0	-4.5	-3.0	-2.0	-18.0	-9.0	-6.5	-4.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	23.0	12.5	11.0	9.5	22.5	12.0	9.5	6.5	10.5	5.0	4.0	2.5	19.0	9.5	7.5	5.5	-	-
LOW TIDE FLOODING FTOL	-1.5	0.5	1.0	1.5	-1.5	1.0	NC	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-1.5	0.5	1.0	1.5	-1.5	1.0	2.5	4.0	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-2.0	0.0	0.5	1.0	-2.0	0.5	1.0	1.5	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	12.4	12.5	11.9	11.2	11.3	10.2	8.6	7.0	-	-	-	-	-	-	-	-	-	-

11 E Port of Brownsville, Gas Storage, 1792

PORT OF BROWNSVILLE, GAS STORAGE, 1792 (PB1792) ELEVATION: 11.1 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-4.5	-2.5	-2.0	-1.5	-4.0	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-3.5	-3.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	6.5	6.0	5.0	3.5	5.5	3.0	2.5	2.0	-	-	-	-	-	-	-	-	5.0	6.5
65-70 MPH W GUSTS FTOL	-	-0.5	-0.5	-0.5	-	-0.5	-0.5	-0.5	-	-	-	-	-	-	-	-	-	-1.5
DIRECTION OF WIND	-	N	N	N	-	N	N	N	-	-	-	-	-	-	-	-	-	N
DURATION IN HOURS	-	1.5	1.5	1.5	-	1.0	1.0	1.0	-	-	-	-	-	-	-	-	-	2.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-9.0	-4.5	-3.5	-2.5	-	-	-	-	-12.0	-5.5	NC	-	-6.5	-6.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	-	-	-	-	W	W	NC	-	NE	NW
DURATION IN HOURS	18.5	11.0	10.0	9.5	11.5	11.0	8.5	6.0	-	-	-	-	10.0	3.5	NC	-	11.0	11.5
65-70 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.0	-6.0	-3.0	-2.0	-1.5	-	-	-	-	-	-	-	-	-5.0	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	9.0	8.0	7.0	6.5	7.5	4.0	4.0	4.5	-	-	-	-	-	-	-	-	8.0	8.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-13.5	-7.0	-5.5	-4.0	-13.0	-6.5	-5.0	-3.5	-10.0	-4.5	-3.5	-2.0	-18.5	-9.0	-7.0	-4.5	-8.5	-7.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.0	14.5	12.5	11.0	15.5	14.5	11.0	8.0	14.0	7.0	5.0	3.0	21.0	10.5	7.5	5.0	14.5	14.5
65-70 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-9.0	-4.5	-3.5	-2.5	-	-	-	-	-12.0	-5.5	NC	-	-6.5	-5.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	-	-	-	-	W	W	NC	-	NE	NW
DURATION IN HOURS	19.5	11.0	10.0	9.5	11.5	11.0	8.5	6.0	-	-	-	-	10.5	4.0	NC	-	11.0	11.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-17.0	-8.5	-6.5	-4.5	-16.0	-8.0	-6.0	-4.0	-14.5	-7.0	-5.5	-3.5	-22.5	-11.0	-8.5	-5.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.0	16.0	14.0	11.5	29.5	16.0	12.5	8.5	18.5	10.0	7.5	5.0	28.5	13.0	9.5	6.5	-	-
65-70 MPH W GUSTS FTOL	-12.5	-6.0	-5.0	-3.5	-11.5	-6.0	-4.5	-3.0	-7.5	-3.5	-2.5	-1.5	-16.5	-8.0	-6.0	-4.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	23.0	12.5	11.0	10.0	22.0	12.5	9.5	7.0	8.5	4.5	3.5	2.0	17.5	8.5	6.5	4.0	-	-
LOW TIDE FLOODING FTOL	1.5	4.0	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	1.0	3.5	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	1.0	3.5	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	15.4	13.6	NC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

12 W Cameron County Airport and 510

CAMERON COUNTY AIRPORT AND 510 (CCA) — ELEVATION: 15.6 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-3.5	-2.0	-2.0	-1.5	-2.5	-1.5	-1.0	-1.0	-	-	-	-	-	-	-	-	-2.5	-3.5
DIRECTION OF WIND	N	N	N	N	N	NE	NE	NE	-	-	-	-	-	-	-	-	NE	NW
DURATION IN HOURS	7.5	5.5	6.0	6.0	6.0	5.5	4.5	4.0	-	-	-	-	-	-	-	-	3.0	5.5
65-70 MPH W GUSTS FTOL	-	-	-	-	-	0.5	0.0	0.0	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	1.0	1.5	2.0	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-7.5	-4.0	-3.0	-2.0	-8.0	-4.0	-3.0	-1.5	-14.5	-7.0	-5.5	-3.5	-5.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.0	10.5	10.0	9.5	15.5	10.5	8.5	6.5	12.0	6.0	4.0	2.5	17.5	10.5	7.0	3.5	11.0	11.0
65-70 MPH W GUSTS FTOL	-6.0	-3.0	-2.5	-2.0	-4.5	-2.0	-1.5	-1.0	-	-	-	-	-9.0	-5.5	NC	-	-3.5	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	W	NW	NC	-	NE	NW
DURATION IN HOURS	11.0	7.5	7.0	7.0	8.5	7.0	5.5	4.5	-	-	-	-	7.0	7.0	NC	-	7.5	7.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-13.5	-7.0	-5.5	-4.0	-11.5	-6.0	-4.5	-3.0	-13.5	-6.5	-5.0	-3.0	-19.5	-9.5	-7.5	-5.0	-7.5	-8.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	W	W	W	NW	NW	NC	N	NE	NW
DURATION IN HOURS	25.0	14.5	12.5	11.0	25.0	14.5	11.0	8.0	20.5	10.5	8.0	5.5	24.5	12.5	9.5	6.5	14.5	14.5
65-70 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-7.5	-4.0	-3.0	-2.0	-8.0	-4.0	-3.0	-1.5	-14.5	-7.5	-5.5	-3.5	-5.5	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	18.0	10.5	10.0	9.0	18.0	11.0	8.5	6.0	11.0	6.0	4.0	2.5	17.0	8.5	6.0	4.0	11.0	10.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-17.0	-8.5	-6.5	-4.5	-14.5	-7.5	-5.5	-4.0	-17.0	-8.5	-6.5	-4.0	-23.0	-11.5	-8.5	-5.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	29.0	15.5	13.5	11.5	29.0	16.0	12.0	8.5	23.0	12.5	9.5	6.5	28.0	14.5	11.0	7.5	-	-
65-70 MPH W GUSTS FTOL	-12.0	-6.0	-5.0	-3.5	-10.0	-5.5	-4.0	-2.5	-11.5	-6.0	-4.5	-3.0	-18.0	-9.0	-6.5	-4.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	21.5	11.5	10.5	9.5	21.0	12.0	9.5	6.5	15.5	8.0	6.0	4.0	20.5	10.5	8.0	5.0	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

13 W 48 and 1847

48 AND 1847 (8R77) — ELEVATION: 30.3 FT.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-3.5	-2.0	-1.5	-1.5	-3.0	-1.5	-1.5	-1.0	-	-	-	-	-	-	-	-	-3.0	-2.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	5.5	3.5	3.5	3.0	5.0	3.0	2.5	1.5	-	-	-	-	-	-	-	-	4.0	6.5
65-70 MPH W GUSTS FTOL	-	0.0	-0.5	-0.5	-	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	-0.5
DIRECTION OF WIND	-	N	N	N	-	N	N	N	-	-	-	-	-	-	-	-	-	N
DURATION IN HOURS	-	1.0	1.0	1.0	-	0.5	0.5	1.0	-	-	-	-	-	-	-	-	-	1.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-8.5	-4.5	-3.5	-2.5	-8.5	-4.0	-3.0	-2.0	-	-	-	-	-7.5	-	-	-	-6.5	-5.0
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	-	-	-	-	W	-	-	-	N	NW
DURATION IN HOURS	12.5	11.0	10.0	9.0	11.0	10.5	8.5	6.0	-	-	-	-	3.5	-	-	-	11.0	11.0
65-70 MPH W GUSTS FTOL	-5.5	-3.0	-2.5	-2.0	-5.0	-2.5	-2.0	-1.5	-	-	-	-	-	-	-	-	-4.5	-3.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	8.0	7.5	5.5	4.0	7.5	4.0	4.0	4.5	-	-	-	-	-	-	-	-	7.0	8.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-12.5	-6.5	-5.0	-3.5	-12.0	-6.0	-4.5	-3.0	-8.0	-4.0	-3.0	-2.0	-16.5	-8.0	-6.0	-4.0	-8.5	-7.0
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.0	14.5	12.5	11.0	15.5	14.5	10.5	7.0	12.5	6.5	4.5	3.0	19.0	9.5	6.5	4.0	14.0	14.5
65-70 MPH W GUSTS FTOL	-8.5	-4.5	-3.5	-2.5	-8.5	-4.0	-3.0	-2.0	-	-	-	-	-8.0	-	-	-	-6.5	-5.0
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	-	-	-	-	W	-	-	-	N	NW
DURATION IN HOURS	18.5	11.0	10.0	9.0	11.5	11.0	8.5	6.0	-	-	-	-	4.5	-	-	-	10.0	11.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-15.5	-8.0	-6.0	-4.5	-15.0	-7.5	-6.0	-4.0	-13.0	-6.5	-4.5	-3.0	-21.0	-10.5	-8.0	-5.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	29.5	16.5	14.0	11.5	29.5	16.0	12.0	8.5	17.0	9.0	7.0	4.5	23.5	12.0	9.0	6.0	-	-
65-70 MPH W GUSTS FTOL	-11.5	-5.5	-4.5	-3.5	-11.0	-5.5	-4.0	-2.5	-6.0	-2.5	-2.0	-1.0	-14.5	-7.0	-5.5	-3.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	22.5	12.5	11.0	10.0	22.0	12.5	9.5	6.5	7.0	3.5	2.5	1.5	15.5	7.5	5.5	3.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

14 W Brownsville International Airport Hwy 4/3068

BROWNSVILLE INTERNATIONAL AIRPORT AND HWY4/306 (BIA) ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-4.0	-2.5	-2.0	-1.5	-4.0	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-3.5	-3.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	6.0	3.5	3.5	3.0	5.5	3.0	2.5	2.0	-	-	-	-	-	-	-	-	5.0	6.5
65-70 MPH W GUSTS FTOL	-	-0.5	-0.5	-0.5	-	-0.5	-0.5	-0.5	-	-	-	-	-	-	-	-	-	-1.0
DIRECTION OF WIND	-	N	N	N	-	N	N	N	-	-	-	-	-	-	-	-	-	N
DURATION IN HOURS	-	1.5	1.5	1.5	-	0.5	1.0	1.0	-	-	-	-	-	-	-	-	-	2.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-9.0	-4.5	-3.5	-2.5	-	-	-	-	-10.0	-3.5	NC	-	-6.5	-5.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	-	-	-	-	W	W	NC	-	NE	NW
DURATION IN HOURS	13.0	11.0	10.0	9.5	11.5	11.0	8.5	6.0	-	-	-	-	6.5	0.5	NC	-	11.0	11.0
65-70 MPH W GUSTS FTOL	-6.0	-3.0	-2.5	-2.0	-6.0	-3.0	-2.5	-1.5	-	-	-	-	-	-	-	-	-5.0	-4.0
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	8.5	7.5	6.0	4.0	7.5	4.0	4.5	4.5	-	-	-	-	-	-	-	-	7.5	8.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-13.5	-7.0	-5.5	-4.0	-13.0	-6.5	-5.0	-3.5	-8.5	-4.0	-3.0	-2.0	-17.5	-9.0	-6.5	-4.5	-8.5	-7.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	26.0	15.0	13.0	11.0	15.5	14.5	11.0	8.0	12.5	6.5	4.5	3.0	20.5	10.0	7.0	4.5	14.5	14.5
65-70 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-9.0	-4.5	-3.5	-2.5	-	-	-	-	-10.5	-4.0	NC	-	-6.5	-5.5
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	-	-	-	-	W	W	NC	-	N	NW
DURATION IN HOURS	19.5	11.0	10.0	9.0	11.5	11.0	8.5	6.0	-	-	-	-	7.0	2.0	NC	-	11.0	11.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-16.5	-8.5	-6.5	-4.5	-16.0	-8.0	-6.0	-4.0	-13.5	-6.5	-5.0	-3.0	-22.0	-11.0	-8.0	-5.5	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	30.0	16.0	14.0	11.5	29.5	16.0	12.5	8.5	17.0	9.0	7.0	4.5	24.5	12.5	9.0	5.0	-	-
65-70 MPH W GUSTS FTOL	-12.0	-6.0	-5.0	-3.5	-11.5	-6.0	-4.5	-3.0	-6.5	-3.0	-2.0	-1.0	-16.0	-8.0	-6.0	-4.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	22.5	12.5	11.0	10.0	22.0	12.5	9.5	6.5	7.5	3.5	2.5	1.5	16.5	8.0	6.5	4.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

15 W Los Fresnos 1847 and 100

LOS FRESNOS 1847 AND 100 (1847A100) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-2.5	-1.5	-1.5	-1.5	-2.0	-1.0	-1.0	-0.5	-	-	-	-	-	-	-	-	-2.5	-2.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	7.0	6.0	6.0	6.5	5.0	3.0	2.5	2.0	-	-	-	-	-	-	-	-	4.5	6.0
65-70 MPH W GUSTS FTOL	-	0.5	0.0	0.0	-	0.5	0.0	0.0	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	N	N	N	-	NE	NC	N	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	0.5	0.5	0.5	-	0.5	0.5	1.0	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-8.5	-4.5	-3.5	-2.5	-7.5	-3.5	-3.0	-2.0	-4.0	-1.5	NC	-	-11.5	-5.5	-4.0	-2.5	-5.5	-5.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NC	N	N	NW
DURATION IN HOURS	17.0	11.0	10.0	9.0	11.5	13.0	9.5	6.5	7.5	3.5	NC	-	13.0	5.5	3.5	2.0	10.5	10.5
65-70 MPH W GUSTS FTOL	-5.0	-2.5	-2.0	-2.0	-4.0	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-3.5	-3.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	9.5	7.5	7.0	7.0	7.5	10.0	7.0	4.5	-	-	-	-	-	-	-	-	7.0	7.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-12.5	-6.5	-5.0	-3.5	-11.0	-5.5	-4.5	-3.0	-10.5	-5.0	-4.0	-2.5	-17.5	-8.5	-6.5	-4.0	-7.5	-7.5
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	25.0	14.5	12.5	11.0	16.0	14.5	10.5	7.0	17.0	9.0	6.5	4.5	21.5	11.0	8.0	5.0	14.0	14.0
65-70 MPH W GUSTS FTOL	-8.0	-4.0	-3.5	-2.5	-7.0	-3.5	-3.0	-2.0	-4.0	-1.5	NC	-	-11.5	-5.5	-4.0	-2.5	-5.5	-5.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	-	NW	NW	NW	NW	N	NW
DURATION IN HOURS	18.0	10.5	10.0	9.0	11.5	11.0	9.0	7.0	6.5	3.0	NC	-	12.5	6.0	4.0	2.5	10.5	10.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-15.5	-8.0	-6.0	-4.5	-14.0	-7.0	-5.5	-3.5	-14.5	-7.0	-5.5	-3.5	-21.0	-10.5	-8.0	-5.0	-	-
DIRECTION OF WIND	NW	NW	NW	NW	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	29.0	16.0	14.0	11.5	29.0	16.0	12.5	8.5	20.5	11.0	8.5	5.5	25.5	13.0	8.5	6.5	-	-
65-70 MPH W GUSTS FTOL	-11.0	-5.5	-4.5	-3.5	-10.0	-5.0	-4.0	-2.5	-9.0	-4.5	-3.0	-2.0	-15.5	-8.0	-6.0	-4.0	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	21.5	12.0	11.0	10.0	21.0	12.5	9.5	6.5	11.5	6.0	4.5	3.0	17.5	9.0	6.5	4.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

16 W 1847 and 510

1847 AND 510 (1847A510)																ELEVATION: N.A.					
CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-2.5	-1.5	-1.5	-1.5	-1.5	-1.0	-1.0	-0.5	-	-	-	-	-	-	-	-	-2.0	-2.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	N
DURATION IN HOURS	7.5	6.0	6.0	6.5	5.0	3.5	3.5	4.0	-	-	-	-	-	-	-	-	3.5	5.5
65-70 MPH W GUSTS FTOL	-	-	-	-	-	1.0	0.5	0.0	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	0.0	0.5	1.0	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-8.0	-4.5	-3.5	-2.5	-7.0	-3.5	-2.5	-2.0	-6.0	-2.5	-2.0	-1.0	-12.5	-6.0	-4.5	-3.0	-5.0	-5.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	17.0	10.5	10.0	9.0	11.5	10.5	8.5	6.0	10.5	5.0	3.5	2.0	15.0	7.0	5.0	3.0	10.5	11.0
65-70 MPH W GUSTS FTOL	-4.5	-2.5	-2.0	-1.5	-3.5	-2.0	-1.5	-1.0	-	-	-	-	-	-	-	-	-3.5	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	9.5	7.5	7.0	7.0	7.5	4.5	4.5	4.5	-	-	-	-	-	-	-	-	7.0	7.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-12.0	-6.0	-5.0	-3.5	-10.5	-5.5	-4.0	-3.0	-11.5	-5.5	-4.0	-2.5	-17.5	-9.0	-6.5	-4.5	-7.0	-7.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	24.5	14.0	12.5	11.0	25.0	14.5	11.0	8.0	19.0	10.0	7.5	5.0	22.5	11.5	8.5	5.5	14.0	14.0
65-70 MPH W GUSTS FTOL	-8.0	-4.0	-3.5	-2.5	-7.0	-3.5	-2.5	-2.0	-6.0	-2.5	-2.0	-1.0	-12.5	-6.0	-4.5	-3.0	-5.0	-5.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	18.0	10.5	10.0	9.0	12.0	11.0	8.5	6.0	9.0	4.0	3.0	2.0	14.5	7.0	5.0	3.0	10.5	10.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-15.5	-8.0	-6.0	-4.5	-14.0	-7.0	-5.5	-3.5	-15.5	-7.5	-5.5	-3.5	-21.5	-10.5	-8.0	-5.5	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	29.0	15.5	13.5	11.5	29.0	16.0	12.5	8.5	22.0	12.0	9.0	6.0	26.0	13.5	10.5	7.0	-	-
65-70 MPH W GUSTS FTOL	-11.0	-5.5	-4.5	-3.5	-9.5	-4.5	-3.5	-2.5	-10.0	-5.0	-3.5	-2.5	-16.0	-8.0	-6.0	-4.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	21.0	11.5	10.5	9.5	20.5	12.0	9.5	6.5	13.5	6.0	5.0	3.5	18.5	9.5	7.0	4.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

17 W Rio Hondo 1420/508/106

RIO HONDO 1420/508/106 (RH1420) ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	1.5	0.0	0.0	-0.5	1.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-0.5	-
DIRECTION OF WIND	NE	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	-
DURATION IN HOURS	3.0	4.5	5.0	6.0	3.5	3.5	3.5	3.5	-	-	-	-	-	-	-	-	2.5	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	0.5	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	1.0	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-5.5	-3.0	-2.5	-2.0	-4.5	-2.5	-2.0	-1.5	-6.5	-3.0	-2.5	-1.5	-11.0	-5.5	-4.0	-2.5	-4.0	-5.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	14.5	9.5	9.5	9.0	11.0	10.0	8.0	6.0	12.5	7.0	5.0	3.5	15.5	8.0	5.5	3.5	9.5	9.5
65-70 MPH W GUSTS FTOL	-2.0	-1.0	-1.0	-1.0	-1.0	-0.5	-0.5	-0.5	-0.5	-	-	-	-4.5	-	-	-	-2.0	-2.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	-	-	-	W	-	-	-	N	N
DURATION IN HOURS	7.0	6.0	6.5	6.5	6.0	4.5	4.5	4.5	2.0	-	-	-	4.5	-	-	-	6.0	3.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-10.0	-5.0	-4.0	-3.0	-8.5	-4.5	-3.5	-2.0	-11.0	-5.5	-4.0	-2.5	-16.0	-8.0	-6.0	-4.0	-6.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	23.0	13.5	12.0	10.5	23.5	14.0	11.0	7.5	20.5	11.0	8.5	5.5	23.0	12.0	9.0	6.0	13.5	13.0
65-70 MPH W GUSTS FTOL	-5.5	-3.0	-2.5	-2.0	-4.5	-2.5	-2.0	-1.0	-6.5	-3.0	-2.5	-1.5	-11.0	-5.5	-4.0	-2.5	-4.0	-5.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	15.5	9.5	9.0	8.5	12.0	10.5	8.0	6.0	12.5	6.5	5.0	3.5	14.5	7.5	5.5	3.5	9.5	9.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-13.5	-7.0	-5.5	-4.0	-11.5	-6.0	-4.5	-3.0	-15.0	-7.5	-5.5	-3.5	-19.5	-10.0	-7.5	-5.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	27.0	15.0	13.0	11.5	27.5	16.0	12.0	8.5	25.0	13.0	10.0	7.0	25.5	14.0	10.5	7.0	-	-
65-70 MPH W GUSTS FTOL	-8.5	-4.5	-3.5	-3.0	-7.0	-3.5	-3.0	-2.0	-10.0	-5.0	-3.5	-2.5	-14.5	-7.0	-5.5	-3.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	19.0	10.5	10.0	9.5	17.0	12.0	9.0	6.5	15.5	8.5	6.5	4.5	18.0	9.5	7.0	4.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

18 W Floodway by Santa Monica 1420 and 1018

FLOODWAY BY SANTA MONICA 1420 AND 1018 (FL1420) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-	1.5	2.5	4.0	2.5	1.0	0.5	0.0	-	-	-	-	-	-	-	-	0.0	-
DIRECTION OF WIND	-	NE	NE	NE	NE	NE	NE	NE	-	-	-	-	-	-	-	-	N	-
DURATION IN HOURS	-	4.5	3.0	1.0	2.5	4.0	4.0	3.5	-	-	-	-	-	-	-	-	2.0	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	1.0	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	1.5	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-5.0	-2.5	-2.5	-2.0	-3.5	-2.0	-1.5	-1.0	-7.5	-4.0	-3.0	-2.0	-11.5	-5.5	-4.5	-3.0	-3.5	-5.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	N	NW
DURATION IN HOURS	13.5	9.0	8.5	8.5	11.5	10.0	8.0	6.0	14.0	8.0	6.0	4.0	16.5	9.0	6.5	4.0	9.0	9.0
65-70 MPH W GUSTS FTOL	0.0	-0.5	-0.5	-0.5	0.0	0.0	0.0	0.0	-3.0	-1.5	-1.0	-0.5	-6.5	-3.0	-2.5	-1.5	-1.5	-2.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	N
DURATION IN HOURS	4.5	5.0	5.0	5.5	5.5	5.5	5.0	4.5	7.0	4.0	3.0	1.5	9.0	4.5	3.0	1.5	5.5	2.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-9.5	-5.0	-4.0	-3.0	-7.5	-4.0	-3.0	-2.0	-12.0	-6.0	-4.5	-3.0	-16.0	-8.0	-6.0	-4.0	-5.5	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	21.5	13.0	11.5	10.5	22.5	14.0	10.5	7.5	22.0	12.5	9.5	6.5	27.5	12.5	9.5	6.5	13.5	12.5
65-70 MPH W GUSTS FTOL	-4.5	-2.5	-2.5	-2.0	-3.5	-2.0	-1.5	-1.0	-7.5	-3.5	-3.0	-2.0	-11.5	-5.5	-4.0	-2.5	-3.0	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	13.5	8.5	8.5	8.5	13.5	10.0	8.0	6.0	15.0	8.0	6.0	4.0	16.0	8.5	6.0	4.0	9.5	8.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-13.0	-6.5	-5.5	-4.0	-10.5	-5.5	-4.0	-3.0	-15.5	-7.5	-6.0	-4.0	-19.5	-9.5	-7.5	-5.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	26.0	14.5	13.0	11.0	26.5	15.5	12.0	8.5	26.0	13.5	10.5	7.5	27.0	14.5	11.0	7.5	-	-
65-70 MPH W GUSTS FTOL	-8.0	-4.0	-3.5	-2.5	-6.0	-3.0	-2.5	-1.5	-10.5	-5.5	-4.0	-2.5	-14.5	-7.0	-5.5	-3.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	17.0	10.0	9.5	9.0	17.5	12.0	9.0	6.5	18.0	10.0	7.5	5.0	19.5	10.0	7.5	5.0	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

19 W San Perlita 497/3142/2209

SAN PERLITA 497/3142/2209 (SP497) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-	-	-	-	-	1.5	1.0	0.5	-1.5	-0.5	NC	-	-3.0	-	-	-	1.0	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	W	W	NC	-	NW	-	-	-	N	-
DURATION IN HOURS	-	-	-	-	-	4.0	3.5	3.5	5.0	2.0	NC	-	5.0	-	-	-	2.0	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	1.5	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	1.5	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-3.0	-2.0	-1.5	-1.5	-1.5	-1.0	-1.0	-0.5	-8.5	-4.0	-3.0	-2.0	-11.0	-5.5	-4.0	-2.5	-2.5	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	N	N
DURATION IN HOURS	10.0	7.5	7.5	8.0	10.5	9.0	7.5	6.0	15.5	9.5	7.0	5.0	17.0	9.5	7.0	5.0	8.0	7.5
65-70 MPH W GUSTS FTOL	-	1.5	NC	-	2.5	1.0	0.5	0.0	-4.5	-2.0	-1.5	-1.0	-7.0	-3.5	-2.5	-1.5	-0.5	-
DIRECTION OF WIND	-	NE	NC	-	NE	NE	NE	NE	W	W	NC	NW	NW	NW	NW	NW	N	-
DURATION IN HOURS	-	0.5	NC	-	2.0	4.5	4.5	4.5	9.0	5.5	4.0	3.0	10.5	5.5	4.0	2.5	4.0	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-8.0	-4.0	-3.5	-3.0	-5.5	-3.0	-2.5	-1.5	-12.5	-6.0	-4.5	-3.0	-15.5	-7.5	-6.0	-4.0	-4.5	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	NE	NW
DURATION IN HOURS	19.0	12.0	11.0	10.0	21.0	13.5	10.5	7.5	23.5	13.0	10.0	7.0	24.5	13.5	10.0	7.0	13.0	11.5
65-70 MPH W GUSTS FTOL	-2.5	-1.5	-1.5	-1.5	-1.5	-1.0	-0.5	-0.5	-8.5	-4.0	-3.0	-2.0	-11.0	-5.5	-4.0	-2.5	-2.5	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	N	N
DURATION IN HOURS	9.0	7.0	7.0	7.5	12.5	9.5	7.5	5.5	16.5	9.5	7.0	5.0	17.5	9.5	7.0	4.5	9.5	6.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-11.5	-6.0	-5.0	-3.5	-9.0	-4.5	-3.5	-2.5	-15.5	-8.0	-6.0	-4.0	-18.5	-9.5	-7.0	-4.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NC	N	-	-
DURATION IN HOURS	23.5	13.0	12.0	10.5	25.5	15.0	11.5	8.0	27.5	14.5	11.0	8.0	25.5	15.0	11.0	7.5	-	-
65-70 MPH W GUSTS FTOL	-6.0	-3.5	-3.0	-2.5	-4.5	-2.5	-2.0	-1.0	-11.0	-5.5	-4.0	-2.5	-14.0	-7.0	-5.0	-3.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	12.0	8.5	8.0	8.0	16.0	11.0	8.5	6.0	20.0	11.0	8.0	5.5	20.0	11.0	8.0	5.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

20 W San Benito 77/83/510

SAN BENITO 77/83/510 (SB77) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-1.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-	-	-	-	-	-	-	-	-1.0	-1.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	N
DURATION IN HOURS	5.0	5.5	5.5	6.0	4.0	3.0	2.5	2.0	-	-	-	-	-	-	-	-	3.0	5.0
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	0.5	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	N	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	1.0	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.5	-5.5	-3.0	-2.0	-1.5	-3.5	-1.5	-1.0	-0.5	-9.5	-4.5	-3.5	-2.0	-4.5	-5.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	15.5	10.5	9.5	9.0	10.5	10.0	8.0	6.0	8.0	4.5	3.0	1.5	12.0	5.5	3.5	1.5	10.0	10.0
65-70 MPH W GUSTS FTOL	-3.0	-1.5	-1.5	-1.5	-2.5	-1.0	-1.0	-0.5	-	-	-	-	-	-	-	-	-3.0	-3.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	NW
DURATION IN HOURS	8.0	7.0	7.0	7.0	6.5	4.0	4.0	4.5	-	-	-	-	-	-	-	-	6.0	6.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-9.5	-5.5	-4.5	-3.0	-9.5	-5.0	-3.5	-2.5	-9.5	-4.5	-3.5	-2.5	-15.5	-7.5	-6.0	-4.0	-7.0	-7.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	23.0	14.0	12.5	10.5	15.5	14.5	11.0	8.0	17.0	9.5	7.0	4.5	20.5	10.5	8.0	5.0	13.5	13.5
65-70 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.0	-5.5	-3.0	-2.0	-1.5	-3.5	-1.5	-1.0	-0.5	-9.5	-4.5	-3.5	-2.0	-4.5	-4.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	17.0	10.5	9.5	9.0	11.0	11.0	8.5	6.0	7.0	4.0	2.5	1.5	11.0	5.5	3.5	2.0	9.5	9.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-14.0	-7.0	-5.5	-4.0	-12.5	-6.5	-5.0	-3.0	-13.5	-6.5	-5.0	-3.5	-19.5	-9.5	-7.5	-5.0	-	-
DIRECTION OF WIND	NW	NW	NC	N	N	N	N	N	W	W	NC	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	28.0	15.5	13.5	11.5	28.0	16.0	12.0	8.5	21.5	11.5	8.5	6.0	24.0	12.5	9.5	6.5	-	-
65-70 MPH W GUSTS FTOL	-9.0	-4.5	-4.0	-3.0	-8.0	-4.0	-3.0	-2.0	-8.0	-4.0	-3.0	-2.0	-14.0	-7.0	-5.0	-3.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	20.0	11.5	10.5	9.5	14.5	12.0	9.5	6.5	12.0	6.5	5.0	3.5	16.0	8.0	6.0	4.0	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

21 W Harlingen 77/83

HARLINGEN 77/83 (HA77) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	1.5	0.5	0.0	0.0	1.5	0.5	0.5	0.0	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	3.0	5.0	5.5	6.0	3.0	2.5	2.0	2.0	-	-	-	-	-	-	-	-	-	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	1.0	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	1.0	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-5.0	-2.5	-2.5	-2.0	-4.0	-2.0	-1.5	-1.0	-4.0	-2.0	-1.5	-1.0	-8.5	-4.0	-3.0	-2.0	-4.0	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	14.0	10.0	9.5	9.0	9.0	9.0	7.5	6.0	9.5	5.5	4.0	2.5	12.0	5.5	4.0	2.0	9.0	9.5
65-70 MPH W GUSTS FTOL	-1.0	-1.0	-1.0	-0.5	-0.5	-0.5	-0.5	-0.5	-	-	-	-	-	-	-	-	-1.5	-1.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	-	-	-	-	-	-	-	-	N	N
DURATION IN HOURS	6.5	6.0	6.0	6.5	5.0	4.0	4.0	4.5	-	-	-	-	-	-	-	-	5.0	5.0
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-9.0	-4.5	-4.0	-3.0	-8.0	-4.0	-3.0	-2.0	-9.0	-4.5	-3.5	-2.0	-14.0	-7.0	-5.0	-3.5	-6.0	-6.5
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	23.0	13.5	12.0	10.5	15.5	14.0	16.0	17.5	18.5	10.0	7.5	5.0	20.0	10.5	7.5	5.0	13.0	13.0
65-70 MPH W GUSTS FTOL	-5.0	-2.5	-2.0	-2.0	-4.0	-2.0	-1.5	-1.0	-4.0	-2.0	-1.5	-1.0	-8.5	-4.0	-3.0	-2.0	-3.5	-4.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	N	NW
DURATION IN HOURS	15.0	10.0	9.5	9.0	10.5	10.5	8.0	6.0	9.0	5.5	4.0	2.5	11.0	5.5	3.5	2.0	8.5	8.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-12.5	-6.5	-5.0	-3.5	-11.0	-5.5	-4.0	-3.0	-13.0	-6.5	-5.0	-3.0	-18.0	-9.0	-6.5	-4.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	27.5	15.5	13.5	11.0	27.0	16.0	12.0	8.5	23.0	12.0	9.0	6.5	23.5	12.5	9.5	6.5	-	-
65-70 MPH W GUSTS FTOL	-7.5	-4.0	-3.0	-2.5	-6.5	-3.5	-2.5	-1.5	-7.5	-3.5	-3.0	-2.0	-12.5	-6.0	-4.5	-3.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	W	W	W	W	NW	NW	NW	NW	-	-
DURATION IN HOURS	19.0	11.0	10.5	9.5	14.0	12.0	9.0	6.5	13.0	7.5	5.5	4.0	15.5	8.0	6.0	4.0	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

22 W Raymondville and 77

RAYMONDVILLE AND 77 (RA77) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-	-	-	-	-	2.0	1.5	1.0	-0.5	0.0	NC	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	W	W	NC	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	3.5	3.5	4.0	3.5	1.5	-	-	-	-	-	-	-	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	1.5	-	-	-	-	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	-	-	-	-	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	1.5	-	-	-	-	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-1.5	-1.0	-1.0	-1.0	-1.0	-0.5	-0.5	-0.5	-7.0	-3.5	-2.5	-1.5	-9.5	-4.5	-3.5	-2.5	-2.0	-3.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	N	N
DURATION IN HOURS	8.5	7.0	7.5	8.0	9.5	9.5	7.5	6.0	15.0	9.0	7.0	5.0	16.0	9.0	6.5	4.5	7.5	6.0
65-70 MPH W GUSTS FTOL	-	-	-	-	-	1.0	1.0	0.5	-3.0	-1.5	-1.0	-0.5	-5.0	-2.5	-2.0	-1.0	0.0	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	W	W	NC	NW	NW	NW	NW	NW	N	-
DURATION IN HOURS	-	-	-	-	-	4.0	4.0	4.0	7.5	5.0	4.0	2.5	8.5	5.0	3.5	2.0	3.5	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-6.5	-3.5	-3.0	-2.5	-5.0	-2.5	-2.0	-1.5	-11.0	-5.5	-4.0	-3.0	-14.0	-7.0	-5.0	-3.5	-4.0	-6.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	N	NW
DURATION IN HOURS	18.0	11.5	11.0	10.0	15.5	13.5	10.5	7.5	23.0	13.0	10.0	7.0	23.5	12.5	9.5	6.5	13.0	10.5
65-70 MPH W GUSTS FTOL	-1.5	-1.0	-1.0	-1.0	-0.5	-0.5	-0.5	-0.5	-7.0	-3.5	-2.5	-1.5	-9.5	-4.5	-3.5	-2.5	-2.0	-3.0
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	N	N
DURATION IN HOURS	8.0	6.5	7.0	7.5	11.5	9.5	7.5	5.5	16.0	9.0	7.0	4.5	16.0	8.5	6.5	4.5	8.5	4.5
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-10.0	-5.5	-4.5	-3.5	-8.0	-4.0	-3.0	-2.0	-14.5	-7.0	-5.5	-3.5	-17.0	-8.5	-6.5	-4.5	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	22.5	13.5	12.0	10.5	25.0	15.5	11.5	8.0	27.0	14.5	11.0	8.0	27.0	14.5	11.0	7.5	-	-
65-70 MPH W GUSTS FTOL	-5.0	-2.5	-2.5	-2.0	-3.5	-2.0	-1.5	-1.0	-10.0	-5.0	-3.5	-2.5	-12.5	-6.0	-4.5	-3.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	-	-
DURATION IN HOURS	10.5	7.0	7.5	8.0	15.5	11.5	9.0	6.5	19.5	10.5	8.0	5.5	19.0	10.5	7.5	5.0	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

23 W Armstrong and 77

ARMSTRONG AND 77 (AR77) — ELEVATION: N.A.

CATEGORIES	270 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH				270 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				300 DEGREE, 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH				345 DEGREE, AT MOUTH OF LOWER LAGUNA MADRE	235 DEGREE, 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH
	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	5MPH	10MPH	15MPH	20MPH	10MPH	10MPH
WIND RANGE 74-95 MPH																		
50-55 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	2.5	-2.5	-1.5	-1.0	-1.0	-2.5	-1.5	-1.0	-0.5	-	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	NW	NW	NW	NW	N	N	N	N	-	-
DURATION IN HOURS	-	-	-	-	-	-	NC	2.0	5.0	3.0	2.5	1.5	5.0	3.0	2.0	1.5	-	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	-	-	-	0.0	0.0	0.0	-	-	-	-	-	-
DIRECTION OF WIND	-	-	-	-	-	-	-	-	-	N	N	N	-	-	-	-	-	-
DURATION IN HOURS	-	-	-	-	-	-	-	-	-	0.5	0.5	1.0	-	-	-	-	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 96-110 MPH																		
50-55 MPH W GUSTS FTOL	-	-	-	-	-	2.5	1.5	1.0	-8.0	-4.0	-3.0	-2.0	-8.0	-4.0	-3.0	-2.0	1.0	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	NW	NW	NW	NW	N	N	N	N	N	-
DURATION IN HOURS	-	-	-	-	-	6.5	5.5	5.0	11.0	10.5	8.5	6.0	11.5	10.0	8.0	6.0	5.0	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	-	NC	2.0	-4.5	-2.5	-2.0	-1.0	-4.0	-2.5	-2.0	-1.0	3.5	-
DIRECTION OF WIND	-	-	-	-	-	-	NC	NE	NW	NW	NW	NW	N	N	N	N	N	-
DURATION IN HOURS	-	-	-	-	-	-	NC	2.5	7.5	4.0	4.0	4.5	7.5	4.0	4.0	4.0	1.0	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 111-130 MPH																		
50-55 MPH W GUSTS FTOL	-	-0.5	-0.5	-0.5	1.5	0.0	0.0	0.0	-11.5	-6.0	-4.5	-3.0	-12.0	-6.0	-4.5	-3.0	-1.0	-3.5
DIRECTION OF WIND	-	N	N	N	NE	NE	NE	NE	NW	NW	NW	NW	N	N	N	N	NE	N
DURATION IN HOURS	-	4.0	3.5	3.0	13.0	11.0	8.5	6.5	25.0	14.5	11.0	7.5	25.0	14.5	11.0	7.5	12.0	2.0
65-70 MPH W GUSTS FTOL	-	-	-	-	-	3.5	2.5	1.0	-8.0	-4.0	-3.0	-2.0	-8.0	-4.0	-3.0	-2.0	1.0	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	NW	NW	NW	NW	N	N	N	N	N	-
DURATION IN HOURS	-	-	-	-	-	5.0	4.5	4.0	11.0	11.0	8.5	6.0	17.5	10.5	8.5	6.5	9.5	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND RANGE 131-OVER MPH																		
50-55 MPH W GUSTS FTOL	-5.0	-3.0	-2.5	-2.5	-3.0	-1.5	-1.5	-1.0	-15.0	-7.5	-6.0	-5.0	-15.0	-7.5	-5.5	-4.0	-	-
DIRECTION OF WIND	N	N	N	N	N	N	N	N	NW	NW	NW	NW	N	N	N	N	-	-
DURATION IN HOURS	6.5	6.0	5.5	5.0	18.5	13.0	10.0	7.0	29.0	16.0	12.5	9.5	29.0	16.0	12.0	8.5	-	-
65-70 MPH W GUSTS FTOL	-	-	-	-	-	3.5	2.0	0.5	-10.5	-5.0	-4.0	-2.5	-10.5	-5.5	-4.0	-2.5	-	-
DIRECTION OF WIND	-	-	-	-	-	NE	NE	NE	NW	NW	NW	NW	N	N	N	N	-	-
DURATION IN HOURS	-	-	-	-	-	5.0	5.0	5.0	21.5	12.0	9.5	6.5	21.0	12.0	9.0	6.5	-	-
LOW TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M.S.L. FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIGH TIDE FLOODING FTOL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM HIGH TIDE SURGE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C
HOURLY SURGE AND WIND CONDITIONS

See **Part C: Hourly Tidal and Wind Speed Data** of Section Two, **SLOSH DATA** for a description of this appendix.

Contents of Appendix C

Hourly tidal approaches to the Gulf of Mexico coastline at four locations, plus two in the Laguna Madre by hurricane type (C-2 through C-28)

Locations

Data Point Name	Data Point Number
South Gulf Tides	24
South Padre Island	2
Middle Gulf Tides	25
North Gulf Tides	26
Laguna Madre Tides - Cameron Willacy Boundary	27
Laguna Madre Tides - Mesquite Rincon	28

Hurricane Types

Point of Impact	Direction	Forward Movement Speed	Wind Speed	Page
20 Miles L of Lower Laguna Madre Mouth	270o	5,10,20	74-95 mph	C-3
			96-110 mph	C-4
			111-130 mph	C-5
			131-155 mph	C-6
			Over 155 mph	C-7

(continued on next page)

Hurricane Types (continued)

Point of Impact	Direction	Forward Movement Speed	Wind Speed	Page
20 Miles L of Lower Laguna Madre Mouth	300o	5,10,20	74-95 mph	C-8
			96-110 mph	C-9
			111-130 mph	C-10
			131-155 mph	C-11
			Over 155 mph	C-12
60 Miles R of Lower Laguna Madre Mouth	270o	5,10,20	74-95 mph	C-13
			96-110 mph	C-14
			111-130 mph	C-15
			131-155 mph	C-16
			Over 155 mph	C-17
60 Miles R of Lower Laguna Madre Mouth	300o	5,10,20	74-95 mph	C-18
			96-110 mph	C-19
			111-130 mph	C-20
			131-155 mph	C-21
			Over 155 mph	C-22
Mouth of Lower Laguna Madre	345o	10	74-95 mph	C-23
			96-110 mph	C-24
			111-130 mph	C-25
20 Mile L of Lower Laguna Madre Mouth	235o	10	74-95 mph	C-26
			96-110 mph	C-27
			111-130 mph	C-28

Hourly tidal approach to Mouth of Arroyo Colorado (Data Point 29) on page C-29 through C-33.

Hourly sustained winds are given for five wind speed classifications for the Brownsville Airport (Data Point 14) on pages C-34 through C-38.

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL
20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Hours Flue or Minus Time of Landfall	Movement Speed	5MPH							10MPH							20MPH						
	Direction, Windspeed	270°						74-95 MPH	270°						74-95 MPH	270°						74-95 MPH
		South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides	Cameron Willacy Boundary	Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides	Cameron Willacy Boundary	Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides	Cameron Willacy Boundary	Mesquite Rincon
-24		1.3	1.3	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-23		1.3	1.3	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-22		1.3	1.3	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-21		1.4	1.3	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-20		1.4	1.4	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-19		1.4	1.4	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-18		1.4	1.4	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-17		1.5	1.4	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-16		1.5	1.4	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-15		1.6	1.4	1.3	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-14		1.6	1.5	1.3	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-13		1.7	1.5	1.3	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-12		1.7	1.5	1.3	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-11		1.8	1.6	1.3	1.0	1.0	1.0	1.0	1.2	1.2	1.3	1.3	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0
-10		1.9	1.6	1.3	1.0	1.0	1.0	1.0	1.3	1.3	1.4	1.4	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0	1.0
- 9		2.0	1.7	1.4	1.0	1.0	1.0	1.0	1.4	1.4	1.5	1.6	1.0	1.0	1.0	1.2	1.2	1.3	1.3	1.0	1.0	1.0
- 8		2.2	1.7	1.4	1.0	1.0	1.0	1.0	1.4	1.5	1.6	1.7	1.0	1.0	1.0	1.2	1.3	1.4	1.4	1.0	1.0	1.0
- 7		2.3	1.7	1.4	1.0	1.0	1.0	1.0	1.5	1.6	1.7	1.9	1.0	1.0	1.0	1.3	1.4	1.5	1.5	1.0	1.0	1.0
- 6		2.4	1.8	1.4	1.0	1.0	1.0	1.0	1.6	1.7	1.9	2.2	1.0	1.0	1.0	1.4	1.5	1.6	1.6	1.0	1.0	1.0
- 5		2.6	1.8	1.4	1.0	1.0	1.0	1.0	1.8	1.9	2.2	2.5	1.0	1.0	1.0	1.5	1.6	1.7	1.7	1.0	1.0	1.0
- 4		2.7	1.8	1.4	1.0	1.0	1.0	1.0	2.0	2.2	2.5	2.9	1.0	1.0	1.0	1.6	1.7	1.8	1.8	1.0	1.0	1.0
- 3		2.6	1.8	1.4	1.0	1.0	1.0	1.0	2.3	2.5	2.9	3.2	1.0	1.0	1.0	1.7	1.8	1.9	1.9	1.0	1.0	1.0
- 2		2.8	1.8	1.4	1.0	1.0	1.0	1.0	2.6	2.9	3.2	3.1	1.0	1.0	1.0	1.8	1.9	2.0	2.0	1.0	1.0	1.0
- 1		2.8	1.8	1.4	1.0	1.0	1.0	1.0	2.8	3.2	3.1	2.7	1.0	1.0	1.0	1.9	2.0	2.1	2.1	1.0	1.0	1.0
0		2.6	1.7	1.4	1.0	1.0	1.0	1.0	2.8	3.1	2.7	2.3	1.0	1.0	1.0	2.0	2.1	2.1	1.8	1.0	1.0	1.0
+ 1		2.3	1.7	1.4	1.0	1.0	1.0	1.0	2.6	2.7	2.3	1.9	1.0	1.0	1.0	2.1	1.8	1.6	1.4	1.0	1.0	1.0
+ 2		1.9	1.7	1.4	1.0	1.0	1.0	1.0	2.3	2.3	1.9	1.6	1.0	1.0	1.0	1.8	1.6	1.4	1.4	1.0	1.0	1.0
+ 3		1.5	1.9	1.4	1.0	1.0	1.0	1.0	1.9	1.9	1.6	1.4	1.0	1.0	1.0	1.6	1.4	1.3	1.3	1.0	1.0	1.0
+ 4		1.3	1.7	1.5	1.1	1.0	1.0	1.0	1.6	1.6	1.4	1.3	1.0	1.0	1.0	1.4	1.3	1.2	1.2	1.0	1.0	1.0
+ 5		1.0	1.6	1.4	1.1	1.0	1.0	1.0	1.4	1.4	1.3	1.1	1.0	1.0	1.0	1.3	1.2	1.1	1.1	1.0	1.0	1.0
+ 6		0.8	1.5	1.4	1.1	1.0	1.0	1.0	1.2	1.3	1.1	1.0	1.0	1.0	1.0	1.2	1.1	1.0	1.0	1.0	1.0	1.0
+ 7		0.7	1.4	1.4	1.1	1.0	1.0	1.0	1.1	1.2	1.0	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.0	1.0
+ 8		0.7	1.5	1.4	1.1	1.0	1.0	1.0	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.0	1.0
+ 9		0.6	1.5	1.4	1.1	1.0	1.0	1.0	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.0	1.0
+10		0.6	1.4	1.4	1.2	1.0	1.0	1.0	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.0	1.0
+11		0.6	1.3	1.3	1.2	1.0	1.0	1.0	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.0	1.0
+12		0.7	1.3	1.3	1.2	1.0	1.0	1.0	1.1	1.1	1.0	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.0	1.0
MAX		2.8	1.9	1.5	1.2	1.0	1.0	1.0	1.5	1.5	1.2	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.0

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 270° 96-110 MPH

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.6	1.6	1.5	1.4	1.0	1.0												
-23	1.6	1.6	1.5	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.7	1.7	1.6	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.7	1.7	1.6	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.8	1.8	1.6	1.4	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0						
-19	1.8	1.8	1.7	1.4	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.0	1.0	1.0
-18	1.9	1.9	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	1.9	2.0	1.8	1.5	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	2.0	2.1	1.8	1.5	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	2.1	2.1	1.9	1.5	1.0	1.0	1.3	1.3	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	2.2	2.2	1.9	1.6	1.0	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	2.3	2.4	2.0	1.6	1.0	1.0	1.4	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	2.5	2.5	2.1	1.6	1.0	1.0	1.4	1.5	1.5	1.4	1.0	1.0	1.1	1.2	1.2	1.1	1.0	1.0
-11	2.7	2.7	2.2	1.6	1.0	1.0	1.5	1.6	1.5	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-10	2.9	2.9	2.2	1.7	1.0	1.0	1.6	1.7	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
- 9	3.1	3.1	2.3	1.7	1.0	1.0	1.7	1.8	1.7	1.5	1.0	1.0	1.2	1.2	1.3	1.2	1.0	1.0
- 8	3.4	3.3	2.4	1.7	1.0	1.0	1.8	1.9	1.8	1.5	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0
- 7	3.7	3.6	2.5	1.8	1.0	1.0	1.9	2.1	2.0	1.6	1.0	1.0	1.3	1.3	1.4	1.3	1.0	1.0
- 6	4.0	3.9	2.6	1.8	1.0	1.0	2.2	2.4	2.1	1.7	1.0	1.0	1.4	1.4	1.4	1.3	1.0	1.0
- 5	4.3	4.2	2.6	1.8	1.0	1.0	2.5	2.8	2.3	1.7	1.0	1.0	1.4	1.6	1.6	1.4	1.0	1.0
- 4	4.4	4.4	2.7	1.8	1.0	1.1	3.0	3.3	2.6	1.8	1.0	1.0	1.6	1.8	1.8	1.6	1.0	1.0
- 3	4.5	4.6	2.7	1.8	1.0	1.1	3.7	4.1	2.8	1.9	1.0	1.0	2.0	2.4	2.2	1.8	1.0	1.0
- 2	4.5	4.6	2.7	1.8	1.0	1.1	4.3	4.8	3.1	2.0	1.0	1.0	3.0	3.7	2.9	2.0	1.0	1.0
- 1	4.2	4.5	2.6	1.8	1.0	1.1	4.8	5.4	3.2	2.0	1.0	1.0	4.2	5.7	3.5	2.2	0.8	1.0
0	3.8	4.2	2.5	1.8	1.0	1.1	4.8	5.3	3.1	1.9	1.0	1.0	4.7	5.7	3.6	2.2	0.4	1.0
+ 1	3.0	3.7	2.4	1.8	1.0	1.1	3.8	4.4	2.7	1.9	1.0	1.0	3.6	4.5	2.9	1.9	0.1	1.0
+ 2	2.1	2.9	2.3	1.8	1.1	1.2	2.9	3.2	2.2	1.7	1.0	1.1	2.8	3.4	2.2	1.6	0.0	1.0
+ 3	1.5	2.4	2.1	1.8	1.1	1.2	2.2	2.3	1.8	1.7	1.1	1.1	2.3	2.9	2.2	1.7	0.1	1.0
+ 4	0.9	1.9	2.0	1.7	1.2	1.2	1.6	1.6	1.6	1.6	1.2	1.1	1.9	2.3	2.1	2.0	0.2	1.0
+ 5	0.5	1.5	1.8	1.8	1.2	1.3	1.1	1.1	1.3	1.5	1.2	1.2	1.3	1.6	1.5	1.6	0.4	1.0
+ 6	0.2	1.2	1.7	1.6	1.4	1.4	0.6	0.7	1.1	1.4	1.5	1.3	0.9	1.0	1.1	1.3	1.2	1.1
+ 7	0.1	1.1	1.6	1.6	1.5	1.4	0.4	0.5	1.0	1.3	1.6	1.3	0.7	0.8	1.1	1.5	1.4	1.1
+ 8	0.1	1.0	1.6	1.5	1.6	1.5	0.3	0.5	1.0	1.3	1.8	1.3	0.5	0.6	1.0	1.4	1.5	1.2
+ 9	0.1	1.0	1.5	1.6	1.7	1.5	0.2	0.5	1.0	1.3	1.9	1.3	0.4	0.4	0.7	1.0	1.7	1.2
+10	0.1	0.9	1.4	1.4	1.8	1.5	0.2	0.5	1.0	1.2	1.9	1.3	0.3	0.3	0.6	0.8	1.8	1.3
+11	0.2	1.0	1.3	1.3	1.9	1.5	0.2	0.5	1.0	1.2	1.9	1.3	0.3	0.4	0.8	1.1	1.8	1.3
+12	0.3	1.0	1.3	1.4	1.9	1.5	0.2	0.6	1.1	1.2	1.8	1.3	0.4	0.6	1.0	1.2	1.8	1.3
MAX	4.8	4.8	2.9	1.9	1.9	1.5	5.1	5.5	3.2	2.0	1.9	1.3	4.8	5.8	3.7	2.3	1.8	1.3

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	270° 111-130 MPH																	
Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.6	1.9	1.8	1.5	1.0	1.0												
-23	1.7	1.9	1.8	1.5	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.7	2.0	1.8	1.6	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.8	2.1	1.9	1.6	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0						
-20	1.8	2.1	2.0	1.6	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0						
-19	1.9	2.2	2.0	1.7	1.0	1.0	1.2	1.2	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	2.0	2.3	2.1	1.7	1.0	1.0	1.2	1.3	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	2.1	2.4	2.2	1.7	1.0	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	2.1	2.6	2.2	1.8	1.0	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	2.2	2.7	2.3	1.8	1.0	1.0	1.4	1.5	1.5	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	2.4	2.8	2.4	1.8	1.0	1.0	1.5	1.6	1.6	1.4	1.0	1.0	1.1	1.2	1.2	1.1	1.0	1.0
-13	2.5	3.0	2.5	1.9	1.0	1.0	1.5	1.6	1.6	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-12	2.7	3.2	2.6	1.9	1.0	1.0	1.6	1.7	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-11	2.8	3.5	2.8	2.0	1.0	1.0	1.7	1.8	1.8	1.6	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0
-10	3.1	3.8	2.9	2.0	1.0	1.0	1.8	2.0	1.9	1.6	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0
- 9	3.4	4.1	3.0	2.1	1.0	1.0	2.0	2.2	2.1	1.7	1.0	1.0	1.3	1.3	1.4	1.3	1.0	1.0
- 8	3.8	4.5	3.2	2.1	1.0	1.0	2.1	2.4	2.2	1.8	1.0	1.0	1.4	1.4	1.4	1.3	1.0	1.0
- 7	4.2	5.0	3.3	2.1	1.0	1.0	2.4	2.7	2.4	1.9	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0
- 6	4.7	5.4	3.4	2.2	0.9	1.0	2.7	3.1	2.7	2.0	1.0	1.0	1.5	1.6	1.6	1.5	1.0	1.0
- 5	5.2	5.9	3.6	2.2	0.8	1.0	3.2	3.7	3.0	2.1	1.0	1.0	1.6	1.8	1.8	1.6	1.0	1.0
- 4	5.6	6.3	3.7	2.2	0.5	1.0	4.0	4.5	3.3	2.2	0.9	1.0	1.8	2.2	2.2	1.8	1.0	1.0
- 3	5.9	6.5	3.7	2.2	0.2	1.0	5.0	5.6	3.7	2.3	0.8	1.0	2.3	3.0	2.8	2.1	1.0	1.0
- 2	6.0	6.6	3.6	2.2	0.1	1.0	6.0	6.7	4.1	2.4	0.5	1.0	3.9	4.9	3.7	2.5	0.9	1.0
- 1	5.8	6.5	3.6	2.2	0.0	1.0	6.7	7.5	4.3	2.5	0.1	1.1	5.7	7.4	4.8	2.8	0.4	1.0
0	5.4	6.1	3.4	2.2	0.0	1.0	7.0	7.6	4.1	2.4	0.0	1.1	6.5	8.0	5.0	2.9	0.0	1.0
+ 1	4.4	5.1	3.1	2.1	0.0	1.0	5.3	6.2	3.5	2.2	0.2	1.1	4.9	6.3	3.9	2.3	0.5	1.0
+ 2	3.4	4.0	2.7	2.0	0.1	1.1	3.9	4.0	2.4	2.0	0.3	1.2	3.6	4.4	2.7	1.7	0.7	1.1
+ 3	2.4	3.0	2.3	1.8	0.3	1.1	2.6	2.6	1.8	1.5	0.6	1.2	2.9	3.7	2.4	1.9	1.3	1.1
+ 4	1.6	2.2	2.1	1.9	0.5	1.1	1.8	1.7	1.5	1.8	1.6	1.3	2.2	2.8	2.4	2.0	1.7	1.1
+ 5	1.0	2.7	1.9	1.8	1.7	1.1	1.0	1.0	1.3	1.7	2.1	1.4	1.5	1.7	1.6	1.7	2.0	1.3
+ 6	0.6	1.4	1.8	1.8	2.1	1.1	0.6	0.6	1.0	1.5	2.5	1.5	0.7	0.9	1.1	1.2	2.3	1.3
+ 7	0.3	1.0	1.7	1.8	2.2	1.2	0.1	0.3	0.9	1.3	2.7	1.5	0.5	0.5	0.9	1.6	2.7	1.4
+ 8	0.2	1.0	1.6	1.7	2.3	1.2	-0.1	0.3	1.0	1.5	2.7	1.5	0.2	0.4	0.9	1.5	2.8	1.4
+ 9	0.1	0.9	1.6	1.7	2.4	1.3	-0.1	0.2	1.1	1.5	2.7	1.5	0.0	0.2	0.6	1.1	2.7	1.4
+10	0.1	0.9	1.5	1.6	2.4	1.3	-0.3	0.2	1.0	1.2	2.7	1.5	-0.1	0.1	0.6	0.7	2.7	1.4
+11	0.1	0.9	1.5	1.5	2.6	1.4	-0.1	0.3	1.0	1.2	2.6	1.5	0.0	0.2	0.7	1.2	2.6	1.4
+12	0.2	1.0	1.4	1.5	2.6	1.5	-0.2	0.4	1.2	1.3	2.6	1.5	0.1	0.5	1.1	1.2	2.6	1.4
MAX	6.5	6.7	3.8	2.3	2.6	1.9	7.3	7.8	4.4	2.5	2.7	1.5	6.6	8.1	5.0	2.9	2.8	1.4

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	270°						131-155 MPH											
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
	SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour																	
-24	1.8	2.1	2.0	1.7	1.0	1.0												
-23	1.9	2.2	2.1	1.7	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	2.0	2.3	2.1	1.7	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0						
-21	2.0	2.4	2.2	1.8	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0						
-20	2.1	2.5	2.3	1.8	1.0	1.0	1.2	1.2	1.3	1.2	1.0	1.0						
-19	2.2	2.6	2.3	1.9	1.0	1.0	1.2	1.3	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	2.3	2.7	2.4	1.9	1.0	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	2.4	2.9	2.5	1.9	1.0	1.0	1.4	1.4	1.5	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	2.5	3.1	2.6	2.0	1.0	1.0	1.4	1.5	1.6	1.4	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0
-15	2.6	3.2	2.8	2.1	1.0	1.0	1.5	1.6	1.7	1.5	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0
-14	2.8	3.4	2.9	2.1	1.0	1.1	1.6	1.7	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-13	3.0	3.7	3.0	2.2	1.0	1.1	1.7	1.8	1.8	1.6	1.0	1.0	1.2	1.2	1.3	1.2	1.0	1.0
-12	3.2	4.0	3.2	2.2	1.0	1.1	1.8	1.9	1.9	1.7	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0
-11	3.4	4.3	3.4	2.3	0.9	1.1	1.9	2.1	2.1	1.7	1.1	1.0	1.3	1.3	1.3	1.3	1.0	1.0
-10	3.8	4.7	3.5	2.3	0.8	1.1	2.1	2.3	2.2	1.8	1.1	1.0	1.3	1.4	1.4	1.3	1.0	1.0
- 9	4.2	5.2	3.7	2.4	0.8	1.2	2.2	2.5	2.4	1.9	1.1	1.0	1.4	1.4	1.5	1.4	1.0	1.0
- 8	4.7	5.7	3.9	2.5	0.8	1.2	2.5	2.8	2.6	2.0	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0
- 7	5.3	6.3	4.1	2.5	0.8	1.3	2.8	3.2	2.9	2.2	1.1	1.0	1.5	1.6	1.7	1.5	1.0	1.0
- 6	6.0	6.9	4.3	2.6	0.4	1.4	3.2	3.7	3.2	2.3	1.0	1.0	1.6	1.8	1.8	1.6	1.0	1.0
- 5	6.6	7.5	4.4	2.6	0.2	1.4	3.9	4.5	3.6	2.5	1.0	1.0	1.7	2.0	2.1	1.8	1.0	1.0
- 4	7.2	8.0	4.6	2.6	0.1	1.6	5.0	5.6	4.1	2.6	0.9	1.0	2.0	2.5	2.5	2.1	1.1	1.0
- 3	7.6	8.3	4.6	2.6	0.2	1.7	6.3	7.2	4.7	2.8	0.8	1.1	2.7	3.6	3.3	2.5	1.0	1.0
- 2	7.3	8.4	4.6	2.6	0.3	1.9	7.9	8.4	5.1	2.9	0.3	1.1	4.8	6.1	4.6	3.0	0.9	1.0
- 1	7.6	8.2	4.5	2.6	0.7	2.0	8.7	9.4	5.4	2.9	0.2	1.1	7.0	9.0	5.9	3.4	0.1	1.0
0	6.7	7.9	4.2	2.6	1.5	1.9	8.4	9.7	5.4	2.8	0.8	1.2	8.1	9.8	6.1	3.5	0.2	1.1
+ 1	5.2	6.2	3.6	2.3	2.6	2.0	7.0	8.0	4.1	2.6	2.6	1.3	6.1	8.0	4.6	2.7	1.9	1.1
+ 2	3.7	3.8	2.2	1.8	2.7	2.0	4.4	3.8	1.9	1.8	3.6	1.4	4.2	4.6	2.4	1.6	3.5	1.1
+ 3	2.5	2.7	1.8	1.2	2.9	2.0	2.7	2.1	1.0	1.1	3.8	1.5	2.9	3.5	1.8	1.2	3.7	1.2
+ 4	1.5	2.2	2.1	2.0	3.0	2.0	2.1	1.7	1.6	1.5	4.0	1.6	2.6	3.0	2.5	2.1	3.8	1.3
+ 5	0.7	1.3	1.7	1.9	3.2	2.0	1.0	0.9	1.4	2.1	4.1	1.7	1.6	1.7	1.6	2.1	4.0	1.4
+ 6	0.1	0.7	1.2	1.2	3.3	2.0	0.3	-0.1	0.5	0.9	4.1	1.7	0.5	0.5	0.5	0.8	4.1	1.5
+ 7	-0.2	0.3	1.2	1.3	3.4	2.0	-0.1	-0.4	0.4	0.8	4.0	1.7	0.3	0.2	0.4	0.9	4.1	1.5
+ 8	-0.2	0.8	1.7	1.9	3.4	2.0	-0.4	0.1	1.2	1.6	3.9	1.7	0.0	0.4	1.1	1.7	4.0	1.5
+ 9	-0.2	0.9	1.8	2.1	3.4	2.0	-0.1	0.2	1.4	1.9	3.8	1.7	0.3	0.2	0.9	1.4	3.9	1.5
+10	-0.2	0.9	1.4	1.3	3.3	2.0	-0.5	0.0	1.0	0.9	3.7	1.7	-0.3	-0.2	0.2	0.4	3.8	1.5
+11	-0.1	0.9	1.3	1.3	3.3	2.0	-0.3	0.1	0.8	0.8	3.6	1.7	-0.1	0.0	0.5	0.8	3.7	1.5
+12	0.0	1.1	1.7	2.0	3.3	2.0	-0.3	0.4	1.5	1.7	3.5	1.7	0.1	0.4	1.4	1.6	3.6	1.5
MAX	8.9	8.4	4.8	2.7	3.4	2.0	9.0	9.8	5.7	3.0	4.1	1.7	8.7	9.8	6.4	3.5	4.1	1.5

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 270° Over 155 MPH

Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hours	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.4	1.5	1.4	1.3	1.0	1.0												
-23	1.4	1.5	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.4	1.5	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.4	1.6	1.5	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.5	1.6	1.5	1.3	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0						
-19	1.5	1.7	1.5	1.3	1.0	1.0	1.1	1.2	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-18	1.5	1.7	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0
-17	1.6	1.8	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.6	1.8	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.7	1.9	1.7	1.4	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.8	2.0	1.7	1.4	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.8	2.1	1.8	1.5	1.0	1.0	1.3	1.4	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	1.9	2.2	1.9	1.5	1.0	1.0	1.4	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-11	2.0	2.4	1.9	1.5	1.0	1.0	1.4	1.5	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-10	2.2	2.6	2.0	1.5	1.0	1.0	1.5	1.5	1.5	1.3	1.0	1.0	1.1	1.2	1.2	1.1	1.0	1.0
- 9	2.3	2.8	2.1	1.5	1.0	1.0	1.5	1.6	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
- 8	2.6	3.1	2.1	1.6	0.9	1.0	1.6	1.7	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
- 7	2.9	3.5	2.2	1.6	0.9	1.0	1.7	1.9	1.7	1.5	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0
- 6	3.4	3.9	2.3	1.6	0.9	1.0	1.9	2.1	1.9	1.5	1.0	1.0	1.3	1.3	1.3	1.3	1.0	1.0
- 5	4.1	4.5	2.5	1.6	0.9	1.0	2.2	2.4	2.0	1.6	1.0	1.0	1.3	1.4	1.4	1.3	1.0	1.0
- 4	4.9	5.1	2.5	1.6	0.8	1.0	2.6	3.0	2.3	1.6	1.0	1.0	1.4	1.6	1.6	1.4	1.0	1.0
- 3	5.9	5.8	2.6	1.6	0.8	1.0	3.5	3.9	2.5	1.7	1.0	1.0	1.6	2.0	1.9	1.6	1.0	1.0
- 2	6.9	6.3	2.6	1.6	0.7	1.1	4.9	5.2	2.8	1.8	1.0	1.0	2.4	3.1	2.4	1.8	1.0	1.0
- 1	8.3	6.4	2.5	1.6	0.7	1.1	7.0	6.7	3.0	1.8	1.0	1.0	5.0	5.9	3.1	1.9	1.0	1.0
0	8.7	6.0	2.3	1.5	0.7	1.1	10.0	7.6	3.0	1.7	1.0	1.0	11.1	8.0	3.6	2.0	1.0	1.0
+ 1	4.5	3.9	0.8	1.4	0.7	1.1	2.2	5.0	2.4	1.6	1.0	1.0	3.5	6.0	3.0	1.9	1.0	1.0
+ 2	2.9	2.2	1.1	1.2	0.8	1.1	1.6	0.8	0.2	1.1	1.0	1.0	1.5	1.2	0.9	1.1	1.1	1.0
+ 3	1.9	1.8	1.7	0.8	0.9	1.1	1.8	1.7	0.3	0.1	1.2	1.0	1.9	2.6	0.9	0.3	1.2	1.0
+ 4	1.2	1.5	1.2	2.0	1.1	1.1	1.2	1.6	2.4	2.1	1.5	1.0	1.6	2.4	2.8	2.3	1.1	1.0
+ 5	0.7	0.8	1.0	1.5	1.2	1.1	0.9	0.6	0.9	1.9	1.7	1.0	0.9	1.2	1.0	1.9	1.4	1.0
+ 6	0.4	0.7	1.4	1.0	1.3	1.2	0.4	0.3	0.5	0.0	1.8	1.0	0.3	0.4	0.4	-0.2	1.6	1.0
+ 7	0.1	0.6	1.6	1.4	1.3	1.3	0.6	0.1	0.8	1.5	2.0	1.0	0.3	0.4	0.6	1.4	1.8	1.0
+ 8	0.2	1.0	1.7	1.8	1.4	1.3	0.4	0.8	1.6	1.5	2.0	1.0	0.5	1.0	1.6	1.6	2.0	1.0
+ 9	0.2	0.9	1.3	1.7	1.4	1.4	0.7	0.5	1.0	2.0	2.0	1.0	0.8	0.4	0.7	1.8	2.0	1.0
+10	0.2	1.0	1.5	1.2	1.5	1.4	-0.4	0.3	1.1	0.3	2.0	1.0	-0.2	0.2	0.7	-0.2	2.0	1.0
+11	0.3	1.1	1.6	1.4	1.5	1.4	1.1	0.7	0.7	1.0	2.0	1.0	1.4	0.6	0.3	0.9	1.9	1.0
+12	0.4	1.1	1.6	1.9	1.6	1.4	-0.5	0.4	1.7	2.1	2.0	1.0	-0.5	0.4	1.6	2.2	1.9	1.0
MAX	9.5	6.5	2.7	2.1	1.7	1.4	10.5	7.6	3.1	3.1	2.0	1.0	11.1	8.0	3.7	3.7	2.0	1.0

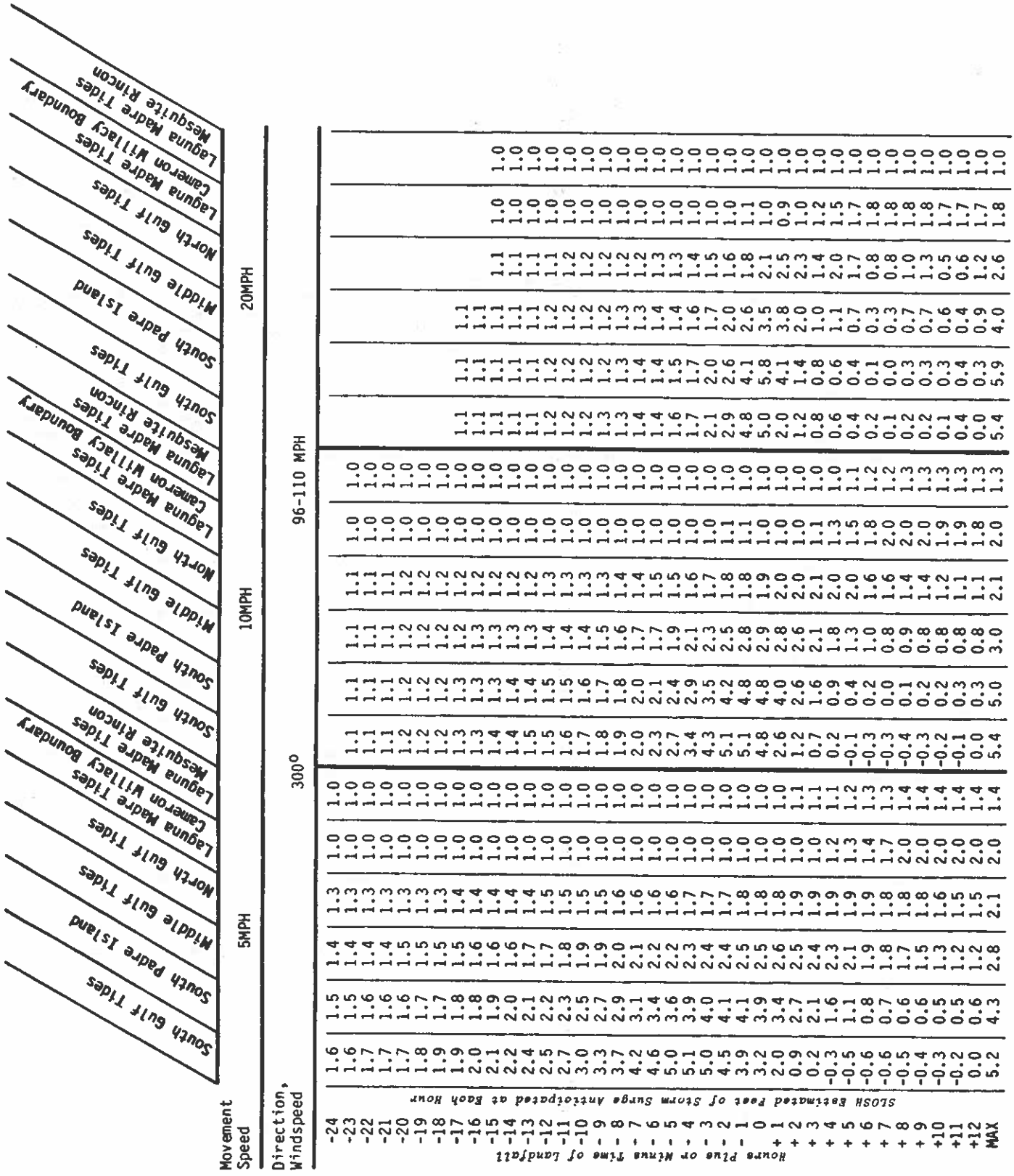
HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 300° 74-95 MPH

Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.3	1.3	1.2	1.1	1.0	1.0												
-23	1.3	1.3	1.2	1.1	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.0						
-22	1.3	1.3	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.4	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.4	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-19	1.4	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-18	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-17	1.5	1.4	1.3	1.2	1.0	1.0	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-16	1.5	1.4	1.3	1.2	1.0	1.0	1.2	1.2	1.1	1.1	1.0	1.0	1.1	1.1	1.1	1.0	1.0	1.0
-15	1.5	1.4	1.3	1.2	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.6	1.5	1.3	1.2	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.7	1.5	1.4	1.2	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	1.7	1.6	1.4	1.2	1.0	1.0	1.3	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-11	1.8	1.6	1.4	1.2	1.0	1.0	1.3	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-10	2.0	1.7	1.4	1.3	1.0	1.0	1.3	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
- 9	2.1	1.8	1.5	1.3	1.0	1.0	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
- 8	2.3	1.9	1.5	1.3	1.0	1.0	1.5	1.4	1.3	1.2	1.0	1.0	1.2	1.2	1.1	1.1	1.0	1.0
- 7	2.5	2.0	1.5	1.3	1.0	1.0	1.5	1.5	1.3	1.2	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
- 6	2.7	2.1	1.6	1.3	1.0	1.0	1.7	1.6	1.4	1.2	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
- 5	2.9	2.3	1.6	1.3	1.0	1.0	1.9	1.7	1.4	1.3	1.0	1.0	1.3	1.3	1.2	1.2	1.0	1.0
- 4	2.9	2.4	1.6	1.3	1.0	1.0	2.2	1.9	1.5	1.3	1.0	1.0	1.4	1.4	1.3	1.2	1.0	1.0
- 3	2.9	2.4	1.7	1.3	1.0	1.0	2.6	2.2	1.6	1.3	1.0	1.0	1.6	1.5	1.4	1.3	1.0	1.0
- 2	2.6	2.5	1.7	1.4	1.0	1.0	3.0	2.5	1.8	1.4	1.0	1.0	2.0	1.8	1.5	1.3	1.0	1.0
- 1	2.3	2.5	1.7	1.4	1.0	1.0	3.0	2.8	1.9	1.4	1.0	1.0	2.9	2.6	1.8	1.4	1.0	1.0
0	2.0	2.4	1.7	1.4	1.1	1.0	2.5	2.8	1.9	1.5	1.0	1.0	2.9	3.4	2.3	1.6	1.1	1.0
+ 1	1.5	2.2	1.7	1.4	1.1	1.0	1.8	2.5	1.9	1.5	1.1	1.0	1.5	2.5	2.4	1.8	1.1	1.0
+ 2	1.0	1.9	1.8	1.5	1.1	1.0	1.1	1.8	1.8	1.5	1.1	1.0	1.1	1.2	1.5	1.7	1.1	1.0
+ 3	0.7	1.7	1.8	1.5	1.1	1.0	0.8	1.4	1.7	1.6	1.1	1.0	0.9	0.9	1.0	1.3	1.1	1.0
+ 4	0.4	1.4	1.8	1.5	1.1	1.0	0.6	1.0	1.5	1.6	1.1	1.0	0.8	0.8	1.1	1.6	1.1	1.0
+ 5	0.3	1.2	1.6	1.6	1.1	1.0	0.4	0.7	1.2	1.6	1.1	1.0	0.6	0.6	0.8	1.4	1.2	1.0
+ 6	0.2	1.0	1.6	1.5	1.2	1.0	0.3	0.6	1.1	1.5	1.2	1.0	0.5	0.5	0.6	1.0	1.2	1.0
+ 7	0.2	0.9	1.5	1.6	1.2	1.0	0.3	0.5	1.0	1.5	1.2	1.0	0.5	0.5	0.7	0.9	1.2	1.0
+ 8	0.2	0.9	1.5	1.6	1.2	1.0	0.3	0.5	1.0	1.4	1.3	1.0	0.6	0.6	0.8	1.0	1.2	1.0
+ 9	0.2	0.8	1.3	1.5	1.3	1.0	0.3	0.5	0.9	1.3	1.3	1.0	0.5	0.6	0.8	1.1	1.2	1.0
+10	0.3	0.8	1.3	1.4	1.3	1.0	0.3	0.5	0.9	1.2	1.3	1.0	0.5	0.6	0.8	0.8	1.2	1.0
+11	0.4	0.8	1.2	1.4	1.3	1.0	0.4	0.6	0.9	1.1	1.3	1.0	0.7	0.6	0.7	0.8	1.2	1.0
+12	0.4	0.8	1.1	1.4	1.4	1.0	0.4	0.6	0.9	1.1	1.3	1.0	0.5	0.6	0.5	1.1	1.2	1.0
MAX	3.1	2.6	1.9	1.7	1.4	1.0	3.1	2.9	1.9	1.6	1.3	1.0	3.1	3.5	2.5	1.8	1.2	1.0

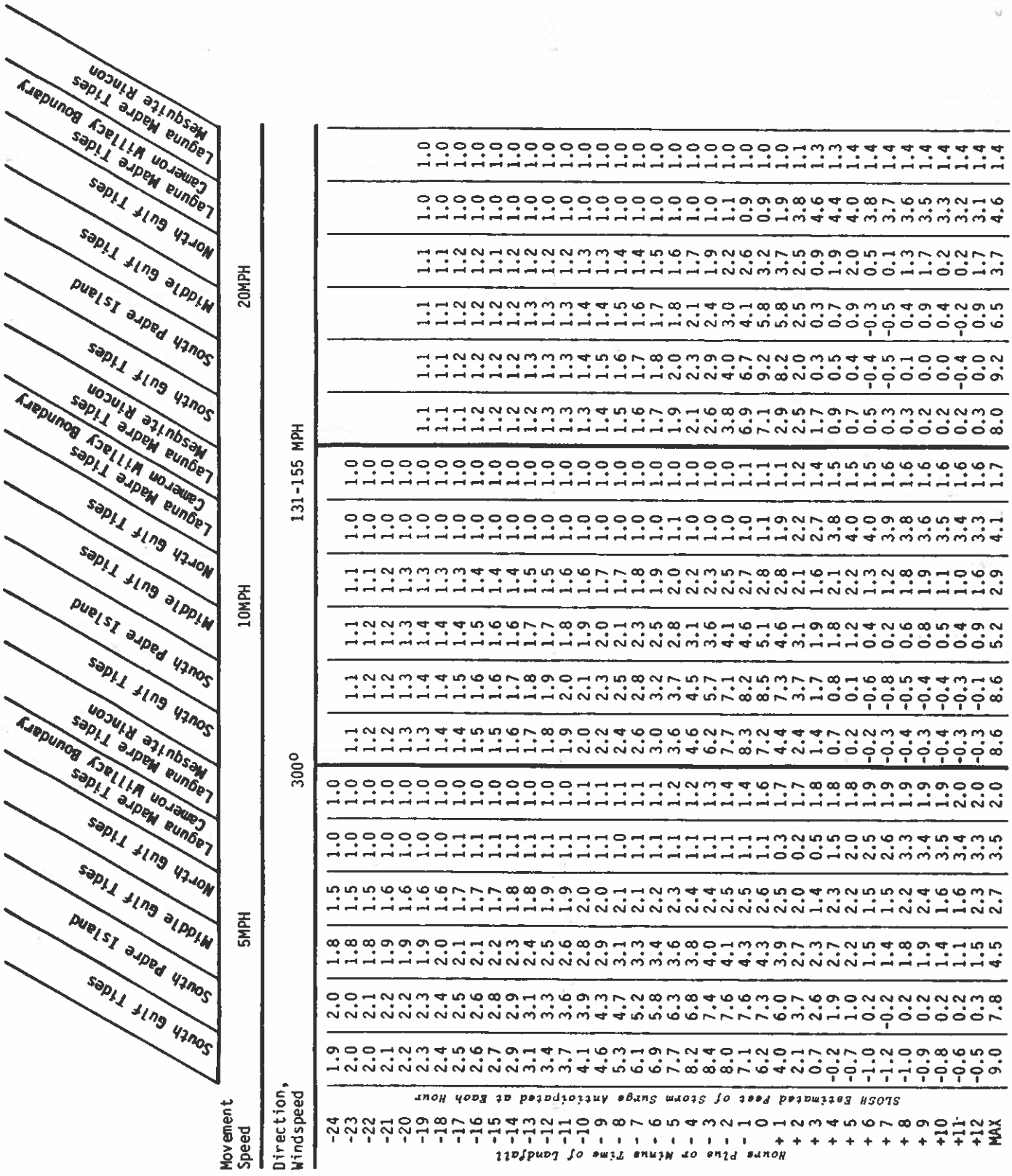
HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL
20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE



HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	300° 111-130 MPH																	
Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.7	1.7	1.6	1.4	1.0	1.0												
-23	1.7	1.8	1.6	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.8	1.8	1.6	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.8	1.9	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0						
-20	1.9	1.9	1.7	1.5	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0						
-19	2.0	2.0	1.7	1.5	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	2.0	2.0	1.7	1.5	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	2.1	2.1	1.8	1.5	1.0	1.0	1.4	1.4	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	2.2	2.2	1.9	1.5	1.0	1.0	1.5	1.5	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	2.3	2.3	1.9	1.6	1.0	1.0	1.5	1.5	1.4	1.3	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0
-14	2.4	2.4	2.0	1.6	1.0	1.0	1.6	1.6	1.4	1.3	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
-13	2.6	2.6	2.0	1.6	1.0	1.0	1.7	1.6	1.5	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-12	2.8	2.7	2.1	1.7	1.1	1.0	1.8	1.7	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-11	3.0	2.9	2.2	1.7	1.1	1.0	1.9	1.8	1.6	1.4	1.0	1.0	1.2	1.3	1.2	1.2	1.0	1.0
-10	3.3	3.2	2.3	1.7	1.1	1.0	2.0	1.9	1.7	1.5	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0
- 9	3.7	3.5	2.4	1.8	1.1	1.0	2.1	2.0	1.8	1.5	1.0	1.0	1.3	1.4	1.3	1.3	1.0	1.0
- 8	4.2	3.8	2.5	1.8	1.1	1.0	2.3	2.2	1.9	1.6	1.0	1.0	1.4	1.4	1.4	1.3	1.0	1.0
- 7	4.8	4.1	2.7	1.9	1.1	1.0	2.6	2.4	2.0	1.6	1.0	1.0	1.4	1.5	1.4	1.3	1.0	1.0
- 6	5.4	4.6	2.8	1.9	1.1	1.0	3.0	2.7	2.1	1.7	1.0	1.0	1.5	1.6	1.5	1.4	1.0	1.0
- 5	5.9	5.0	3.0	2.0	1.0	1.1	3.6	3.1	2.3	1.8	1.0	1.0	1.7	1.8	1.6	1.5	1.0	1.0
- 4	6.4	5.4	3.1	2.0	1.0	1.1	4.6	3.8	2.6	1.9	1.1	1.0	1.9	2.0	1.8	1.5	1.0	1.0
- 3	6.5	5.7	3.2	2.1	1.0	1.1	6.1	4.7	2.9	2.0	1.0	1.0	2.2	2.4	2.1	1.7	1.0	1.0
- 2	6.2	6.0	3.3	2.1	1.0	1.1	7.5	5.8	3.3	2.1	1.0	1.0	3.1	3.3	2.5	1.9	1.1	1.0
- 1	5.6	6.0	3.4	2.1	1.0	1.2	7.3	6.7	3.6	2.3	1.0	1.0	5.4	5.4	3.3	2.2	1.1	1.0
0	4.8	5.7	3.4	2.2	1.1	1.2	5.9	6.7	4.0	2.3	1.0	1.0	5.7	7.7	4.7	2.6	0.9	1.0
+ 1	3.5	5.0	3.4	2.2	1.1	1.2	3.5	5.5	3.7	2.5	1.0	1.1	2.8	6.0	5.1	3.2	0.9	1.0
+ 2	2.1	3.9	3.1	2.2	1.1	1.3	1.3	3.2	3.3	2.2	1.2	1.1	1.9	2.2	2.8	2.8	1.8	1.0
+ 3	1.0	2.8	2.8	2.0	1.2	1.4	0.5	1.7	2.4	2.2	1.5	1.2	1.3	0.8	1.0	1.5	2.7	1.2
+ 4	0.3	1.9	2.6	2.1	1.3	1.5	-0.3	0.7	2.0	2.1	1.9	1.3	0.9	0.5	0.8	1.8	2.9	1.2
+ 5	-0.2	1.2	2.3	2.1	1.6	1.5	-0.6	0.1	1.3	2.2	2.5	1.4	0.6	0.3	0.7	1.8	2.9	1.3
+ 6	-0.5	0.8	2.1	2.1	2.0	1.6	-0.9	-0.2	1.1	1.8	2.9	1.4	0.5	-0.1	0.0	0.9	2.9	1.3
+ 7	-0.6	0.4	1.9	2.1	2.4	1.6	-0.9	-0.4	0.7	1.8	3.0	1.4	0.3	-0.3	0.0	0.5	2.8	1.3
+ 8	-0.6	0.3	1.7	2.0	2.9	1.6	-1.0	-0.3	0.9	1.6	2.9	1.4	0.3	0.0	0.3	0.9	2.7	1.3
+ 9	-0.6	0.2	1.6	2.0	3.0	1.7	-0.8	-0.3	0.7	1.6	2.8	1.4	0.3	-0.1	0.6	1.3	2.6	1.3
+10	-0.6	0.3	1.4	1.9	3.0	1.7	-0.8	-0.2	0.7	1.3	2.8	1.4	0.3	0.1	0.5	0.6	2.6	1.3
+11	-0.4	0.3	1.3	1.8	3.0	1.7	-0.5	-0.1	0.7	1.1	2.7	1.4	0.3	0.0	0.2	0.4	2.5	1.3
+12	-0.3	0.3	1.2	1.7	2.8	1.7	-0.4	0.0	0.7	1.2	2.6	1.4	0.2	0.0	0.7	1.3	2.4	1.3
MAX	7.0	6.1	3.6	2.3	3.0	1.7	7.7	7.0	4.1	2.5	3.0	1.4	6.2	7.9	5.1	3.3	3.0	1.3

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL
20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE



HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	300°						Over 155 MPH											
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.4	1.4	1.3	1.2	1.0	1.0												
-23	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.5	1.5	1.3	1.2	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0						
-19	1.5	1.5	1.3	1.2	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-18	1.5	1.5	1.4	1.2	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	1.6	1.6	1.4	1.3	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.6	1.6	1.4	1.3	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.7	1.7	1.4	1.3	1.0	1.0	1.2	1.3	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.8	1.7	1.5	1.3	1.0	1.0	1.3	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.9	1.8	1.5	1.3	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	2.0	1.9	1.6	1.3	1.0	1.0	1.3	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-11	2.1	2.0	1.6	1.3	1.0	1.0	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-10	2.2	2.1	1.7	1.4	1.0	1.0	1.4	1.4	1.3	1.2	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0
- 9	2.5	2.3	1.7	1.4	1.0	1.0	1.5	1.5	1.4	1.3	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
- 8	2.8	2.5	1.8	1.4	1.0	1.0	1.6	1.6	1.4	1.3	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
- 7	3.2	2.8	1.9	1.4	1.0	1.0	1.7	1.7	1.5	1.3	1.0	1.0	1.2	1.3	1.2	1.2	1.0	1.0
- 6	3.8	3.1	2.0	1.5	1.0	1.0	1.8	1.9	1.6	1.4	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0
- 5	4.8	3.5	2.1	1.5	1.0	1.0	2.0	2.1	1.7	1.4	1.0	1.0	1.4	1.4	1.3	1.2	1.0	1.0
- 4	6.0	4.0	2.2	1.5	1.0	1.0	2.4	2.4	1.8	1.4	1.0	1.0	1.5	1.5	1.4	1.3	1.0	1.0
- 3	7.4	4.6	2.3	1.5	1.0	1.0	3.3	2.9	2.0	1.5	1.0	1.0	1.7	1.7	1.5	1.3	1.0	1.0
- 2	8.5	5.2	2.4	1.6	1.0	1.0	5.3	4.0	2.3	1.6	1.0	1.0	2.1	2.2	1.8	1.5	1.0	1.0
- 1	8.8	5.7	2.4	1.6	1.0	1.0	8.0	5.5	2.6	1.7	1.0	1.0	4.3	3.4	2.2	1.6	1.0	1.0
0	7.4	5.8	2.4	1.6	1.0	1.0	9.0	6.9	3.0	1.8	1.0	1.0	10.0	7.4	3.1	1.8	1.0	1.0
+ 1	2.8	4.1	2.1	1.5	1.0	1.0	2.0	4.9	2.7	1.7	1.0	1.0	0.9	5.3	4.1	2.2	0.9	1.0
+ 2	0.9	2.6	1.2	1.3	1.0	1.0	1.0	2.3	1.1	1.4	1.0	1.0	1.0	1.4	0.4	2.2	0.9	1.0
+ 3	0.1	2.2	1.5	0.9	1.0	1.0	0.9	1.2	1.4	0.5	1.0	1.0	1.2	0.0	0.8	-1.0	1.3	1.0
+ 4	-0.3	1.7	2.0	2.0	1.1	1.0	0.7	0.8	1.7	2.5	1.3	1.0	1.0	1.0	1.6	3.3	1.9	1.0
+ 5	-0.6	0.9	1.6	1.6	1.1	1.0	0.3	0.2	1.0	1.7	1.6	1.0	0.6	0.3	0.8	1.5	2.1	1.0
+ 6	-0.6	0.6	1.3	1.3	1.4	1.0	0.1	0.0	0.4	0.9	2.2	1.0	0.6	0.5	-0.3	0.1	2.1	1.0
+ 7	-0.7	0.4	1.7	1.6	1.7	1.1	-0.1	-0.2	0.9	1.2	2.3	1.0	0.0	-0.3	0.7	0.2	2.0	1.0
+ 8	-0.5	0.6	1.8	2.0	2.2	1.1	0.2	0.3	0.9	1.9	2.2	1.0	0.6	0.7	0.5	1.6	2.0	1.0
+ 9	-0.4	0.5	1.8	2.0	2.4	1.2	0.2	0.1	1.0	1.7	2.2	1.0	0.6	0.2	1.4	1.8	1.9	1.0
+10	-0.3	0.5	1.3	1.5	2.5	1.3	0.2	0.2	0.5	0.8	2.1	1.0	0.6	0.5	0.2	0.1	1.9	1.0
+11	-0.2	0.5	1.4	1.7	2.5	1.3	0.1	0.2	0.7	1.1	2.1	1.0	0.4	0.4	0.8	0.1	1.9	1.0
+12	-0.1	0.6	1.4	2.1	2.5	1.3	0.3	0.3	0.9	1.8	2.0	1.0	0.8	0.1	0.7	2.2	1.8	1.0
MAX	9.3	5.9	2.5	2.2	2.5	1.3	9.5	7.1	3.1	2.6	2.3	1.0	10.0	8.2	4.1	3.6	2.1	1.0

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 270° 74-95 MPH

Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hours	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.2	1.3	1.3	1.2	1.0	1.0												
-23	1.2	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.2	1.3	1.3	1.3	1.0	1.0	1.0	1.1	1.1	1.1	1.0	1.0						
-21	1.2	1.3	1.3	1.3	1.0	1.0	1.0	1.1	1.1	1.1	1.0	1.0						
-20	1.3	1.3	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-19	1.3	1.3	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-18	1.3	1.4	1.4	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-17	1.3	1.4	1.5	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0
-16	1.3	1.4	1.5	1.4	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.0	1.0
-15	1.3	1.4	1.5	1.5	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.3	1.4	1.6	1.5	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.3	1.4	1.6	1.6	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	1.3	1.4	1.7	1.7	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-11	1.3	1.4	1.7	1.8	1.0	1.0	1.2	1.2	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-10	1.3	1.4	1.7	1.9	1.0	1.0	1.2	1.2	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
- 9	1.3	1.4	1.7	2.0	1.0	1.0	1.2	1.3	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
- 8	1.3	1.4	1.7	2.1	1.0	1.0	1.2	1.3	1.4	1.4	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0
- 7	1.3	1.3	1.7	2.2	1.1	1.0	1.2	1.3	1.5	1.5	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0
- 6	1.2	1.2	1.6	2.4	1.1	1.0	1.2	1.3	1.5	1.6	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0
- 5	1.2	1.1	1.5	2.5	1.1	1.0	1.2	1.3	1.6	1.8	1.0	1.0	1.1	1.2	1.3	1.2	1.0	1.0
- 4	1.1	1.0	1.3	2.7	1.0	1.0	1.2	1.3	1.6	2.1	1.0	1.0	1.1	1.2	1.3	1.3	1.0	1.0
- 3	1.0	0.9	1.1	2.7	1.0	1.0	1.1	1.2	1.6	2.4	1.1	1.0	1.1	1.2	1.4	1.5	1.0	1.0
- 2	1.0	0.8	0.9	2.7	1.0	1.1	1.1	1.1	1.4	2.8	1.1	1.0	1.1	1.2	1.6	2.0	1.0	1.0
- 1	0.9	0.7	0.8	2.6	1.0	1.1	1.0	1.0	1.1	3.0	1.1	1.0	1.1	1.1	1.5	2.9	1.1	1.0
0	0.8	0.6	0.6	2.5	1.0	1.1	1.0	0.9	1.0	2.8	1.1	1.0	1.0	0.9	1.1	3.4	1.0	1.0
+ 1	0.7	0.5	0.5	2.2	1.0	1.1	1.0	0.8	0.9	2.4	1.0	1.0	0.9	0.9	1.0	2.3	0.9	1.0
+ 2	0.7	0.4	0.4	2.0	1.0	1.1	0.9	0.8	0.9	1.9	1.0	1.0	1.0	1.0	1.1	1.5	0.9	1.1
+ 3	0.6	0.4	0.4	1.7	1.0	1.1	0.9	0.8	0.9	1.6	0.9	1.1	1.0	1.1	1.1	1.4	0.9	1.1
+ 4	0.5	0.3	0.4	1.5	0.9	1.1	0.9	0.8	0.8	1.3	0.9	1.2	1.0	0.9	1.0	1.3	0.9	1.1
+ 5	0.5	0.3	0.4	1.3	0.9	1.1	0.9	0.7	0.7	1.1	0.9	1.3	1.0	1.0	0.9	0.9	0.9	1.1
+ 6	0.4	0.3	0.4	1.2	0.9	1.1	0.8	0.7	0.7	1.0	0.9	1.3	1.0	0.9	0.8	0.8	0.9	1.1
+ 7	0.4	0.2	0.4	1.1	0.9	1.1	0.8	0.7	0.7	0.9	0.9	1.3	0.9	0.8	0.8	1.1	0.9	1.1
+ 8	0.4	0.3	0.4	1.1	0.9	1.1	0.8	0.7	0.7	0.9	0.9	1.3	0.9	1.0	1.0	1.0	0.9	1.1
+ 9	0.3	0.2	0.4	1.0	0.8	1.1	0.7	0.6	0.6	0.8	0.9	1.3	1.1	1.0	0.8	0.7	0.9	1.1
+10	0.3	0.3	0.5	0.9	0.8	1.1	0.7	0.6	0.6	0.8	0.9	1.3	0.7	0.7	0.6	0.8	0.9	1.1
+11	0.3	0.3	0.5	1.0	0.8	1.3	0.7	0.6	0.7	0.9	0.9	1.3	0.8	0.8	0.9	1.0	0.8	1.1
+12	0.3	0.3	0.5	1.0	0.8	1.4	0.7	0.6	0.7	0.9	0.9	1.3	1.0	1.0	1.0	0.9	0.8	1.1
MAX	1.4	1.5	1.7	2.8	1.1	1.4	1.2	1.3	1.6	3.0	1.1	1.3	1.1	1.2	1.6	3.5	1.1	1.1

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 270° 96-110 MPH

Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed: 5MPH

Hours	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.4	1.5	1.5	1.4	1.0	1.0
-23	1.4	1.5	1.6	1.5	1.0	1.0
-22	1.4	1.5	1.6	1.5	1.0	1.0
-21	1.4	1.6	1.6	1.5	1.0	1.0
-20	1.5	1.6	1.7	1.6	1.0	1.0
-19	1.5	1.6	1.8	1.6	1.0	1.0
-18	1.5	1.7	1.8	1.7	1.0	1.0
-17	1.5	1.7	1.9	1.7	1.0	1.0
-16	1.6	1.7	2.0	1.8	1.0	1.0
-15	1.6	1.8	2.0	1.9	1.0	1.0
-14	1.6	1.8	2.1	2.0	1.1	1.0
-13	1.6	1.8	2.2	2.2	1.1	1.0
-12	1.6	1.8	2.3	2.3	1.1	1.0
-11	1.6	1.8	2.4	2.5	1.1	1.1
-10	1.6	1.8	2.4	2.7	1.1	1.1
- 9	1.6	1.7	2.4	2.9	1.1	1.1
- 8	1.5	1.7	2.4	3.2	1.1	1.1
- 7	1.5	1.5	2.3	3.5	1.1	1.1
- 6	1.4	1.4	2.2	3.9	1.1	1.1
- 5	1.3	1.2	1.9	4.2	1.1	1.3
- 4	1.1	0.9	1.6	4.4	1.1	1.6
- 3	1.0	0.7	1.2	4.6	1.1	1.8
- 2	0.9	0.4	0.8	4.6	1.1	1.8
- 1	0.7	0.2	0.4	4.4	1.1	1.9
0	0.5	0.0	0.1	4.0	1.1	2.0
+ 1	0.4	-0.2	-0.1	3.5	1.0	2.0
+ 2	0.3	-0.3	-0.1	2.8	1.0	2.0
+ 3	0.2	-0.4	-0.2	2.3	1.0	1.9
+ 4	0.0	-0.4	-0.2	1.7	0.9	1.8
+ 5	0.0	-0.5	-0.2	1.4	0.9	1.8
+ 6	-0.2	-0.5	-0.2	1.1	0.9	1.7
+ 7	-0.2	-0.5	-0.2	0.9	0.9	1.8
+ 8	-0.3	-0.5	-0.2	0.9	0.9	1.7
+ 9	-0.3	-0.5	-0.1	0.8	0.8	1.7
+10	-0.3	-0.4	0.0	0.8	0.8	1.6
+11	-0.3	-0.3	0.0	0.8	0.8	1.6
+12	-0.3	-0.3	0.1	0.9	0.8	1.6
MAX	1.8	1.9	2.5	4.8	1.2	2.0

Movement Speed: 10MPH

Hours	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24						
-23	1.1	1.1	1.1	1.1	1.0	1.0
-22	1.1	1.1	1.1	1.1	1.0	1.0
-21	1.1	1.1	1.1	1.1	1.0	1.0
-20	1.1	1.1	1.1	1.1	1.0	1.0
-19	1.1	1.1	1.2	1.2	1.0	1.0
-18	1.1	1.1	1.2	1.2	1.0	1.0
-17	1.1	1.2	1.2	1.2	1.0	1.0
-16	1.1	1.2	1.3	1.2	1.0	1.0
-15	1.2	1.2	1.3	1.3	1.0	1.0
-14	1.2	1.3	1.4	1.3	1.0	1.0
-13	1.2	1.3	1.4	1.3	1.0	1.0
-12	1.2	1.3	1.4	1.4	1.0	1.0
-11	1.2	1.4	1.5	1.4	1.0	1.0
-10	1.3	1.4	1.6	1.5	1.0	1.0
- 9	1.3	1.4	1.6	1.6	1.0	1.0
- 8	1.3	1.5	1.7	1.7	1.1	1.0
- 7	1.3	1.5	1.9	1.9	1.1	1.0
- 6	1.3	1.5	2.0	2.2	1.1	1.0
- 5	1.3	1.5	2.1	2.5	1.1	1.0
- 4	1.3	1.4	2.2	3.1	1.1	1.0
- 3	1.2	1.3	2.1	3.9	1.1	1.1
- 2	1.1	1.1	1.7	4.6	1.1	1.1
- 1	1.0	0.8	1.2	5.1	1.0	1.1
0	0.9	0.6	0.8	4.8	1.0	1.2
+ 1	0.8	0.6	0.7	3.9	1.0	1.2
+ 2	0.8	0.6	0.8	2.9	0.9	1.2
+ 3	0.8	0.6	0.7	2.2	0.8	1.1
+ 4	0.8	0.5	0.6	1.5	0.8	1.1
+ 5	0.7	0.5	0.5	1.1	0.8	1.5
+ 6	0.6	0.4	0.4	0.8	0.8	1.6
+ 7	0.6	0.4	0.3	0.7	0.8	1.6
+ 8	0.5	0.3	0.3	0.6	0.8	1.6
+ 9	0.5	0.3	0.3	0.6	0.8	1.6
+10	0.5	0.3	0.3	0.6	0.8	1.6
+11	0.4	0.3	0.3	0.6	0.8	1.6
+12	0.4	0.3	0.4	0.7	0.8	1.6
MAX	1.3	1.5	2.2	5.1	1.1	1.6

Movement Speed: 20MPH

Hours	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24						
-23						
-22						
-21						
-20						
-19	1.0	1.1	1.1	1.0	1.0	1.0
-18	1.0	1.1	1.1	1.1	1.0	1.0
-17	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.1	1.1	1.1	1.1	1.0	1.0
-12	1.1	1.1	1.2	1.1	1.0	1.0
-11	1.1	1.1	1.2	1.1	1.0	1.0
-10	1.1	1.2	1.2	1.2	1.0	1.0
- 9	1.1	1.2	1.2	1.2	1.0	1.0
- 8	1.2	1.2	1.3	1.2	1.0	1.0
- 7	1.2	1.2	1.3	1.3	1.0	1.0
- 6	1.2	1.2	1.3	1.3	1.0	1.0
- 5	1.2	1.3	1.4	1.4	1.0	1.0
- 4	1.1	1.3	1.5	1.6	1.0	1.0
- 3	1.1	1.3	1.7	1.9	1.1	1.0
- 2	1.1	1.3	2.0	2.8	1.1	1.0
- 1	1.0	1.1	1.9	4.7	1.1	1.0
0	0.8	0.7	1.0	5.8	1.1	1.0
+ 1	0.8	0.6	0.9	3.6	0.9	1.0
+ 2	1.0	1.1	1.2	2.1	0.8	1.2
+ 3	1.0	1.1	1.2	1.8	0.8	1.3
+ 4	0.9	0.8	1.0	1.6	0.8	1.4
+ 5	1.0	1.0	0.9	0.8	0.9	1.4
+ 6	1.0	0.9	0.7	0.5	0.9	1.4
+ 7	0.8	0.6	0.6	1.1	0.9	1.4
+ 8	0.8	0.9	1.0	0.9	0.9	1.4
+ 9	1.2	1.0	0.7	0.4	0.9	1.4
+10	0.5	0.3	0.3	0.6	0.9	1.4
+11	0.7	0.7	0.7	0.9	0.9	1.4
+12	1.0	1.1	1.0	0.8	0.9	1.4
MAX	1.2	1.3	2.0	5.9	1.1	1.4

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 270° 111-130 MPH

Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hours	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.5	1.7	1.8	1.6	1.0	1.0												
-23	1.6	1.7	1.8	1.7	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.6	1.8	1.9	1.7	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.6	1.8	1.9	1.7	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.6	1.8	2.0	1.8	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0						
-19	1.7	1.9	2.1	1.9	1.1	1.0	1.1	1.1	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	1.7	2.0	2.2	2.0	1.1	1.0	1.1	1.2	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	1.8	2.0	2.3	2.1	1.1	1.0	1.1	1.2	1.3	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.8	2.1	2.4	2.2	1.1	1.0	1.2	1.3	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.8	2.1	2.5	2.4	1.1	1.0	1.2	1.3	1.4	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.9	2.2	2.7	2.5	1.1	1.1	1.2	1.4	1.5	1.4	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0
-13	1.9	2.2	2.8	2.7	1.1	1.1	1.3	1.4	1.5	1.5	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0
-12	1.9	2.2	2.9	2.9	1.1	1.1	1.3	1.4	1.6	1.5	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0
-11	1.9	2.2	3.0	3.2	1.1	1.1	1.3	1.5	1.7	1.6	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-10	1.9	2.2	3.1	3.5	1.1	1.1	1.3	1.5	1.8	1.7	1.1	1.0	1.2	1.2	1.3	1.2	1.0	1.0
- 9	1.8	2.1	3.1	3.9	1.2	1.1	1.4	1.6	1.9	1.8	1.1	1.0	1.2	1.2	1.3	1.3	1.0	1.0
- 8	1.7	2.0	3.1	4.4	1.2	1.2	1.4	1.6	2.1	2.0	1.1	1.0	1.2	1.3	1.4	1.3	1.0	1.0
- 7	1.7	1.8	3.0	4.9	1.2	1.2	1.4	1.7	2.3	2.3	1.1	1.0	1.2	1.3	1.4	1.4	1.0	1.0
- 6	1.5	1.5	2.7	5.3	1.2	1.6	1.4	1.7	2.5	2.7	1.1	1.0	1.2	1.3	1.5	1.4	1.0	1.0
- 5	1.4	1.2	2.3	5.8	1.1	2.0	1.4	1.7	2.7	3.3	1.1	1.1	1.2	1.3	1.5	1.5	1.0	1.0
- 4	1.2	0.9	1.8	6.2	1.1	2.0	1.3	1.6	2.8	4.1	1.1	1.1	1.1	1.3	1.7	1.8	1.1	1.0
- 3	1.0	0.5	1.2	6.5	1.1	2.4	1.2	1.4	2.7	5.3	1.1	1.1	1.1	1.3	2.0	2.3	1.1	1.0
- 2	0.7	0.1	0.6	6.5	1.1	2.9	1.1	1.1	2.1	6.4	1.4	1.4	1.0	1.3	2.4	3.7	1.2	1.0
- 1	0.5	-0.3	0.0	6.2	1.3	3.0	0.9	0.7	1.2	7.1	1.1	1.6	0.9	1.0	2.2	6.5	1.2	1.0
0	0.3	-0.6	-0.4	5.7	1.2	3.1	0.8	0.4	0.6	6.8	1.1	1.8	0.7	0.5	0.9	8.1	1.2	1.1
+ 1	0.1	-0.8	-0.7	4.7	1.2	3.1	0.7	0.4	0.6	5.4	1.0	1.8	0.6	0.4	0.9	4.8	1.0	1.1
+ 2	-0.1	-0.9	-0.7	3.6	1.1	3.0	0.8	0.5	0.6	3.6	0.9	1.7	1.0	1.1	1.4	2.4	0.8	1.4
+ 3	-0.2	-1.0	-0.9	2.7	1.0	2.9	0.7	0.4	0.5	2.5	0.8	1.6	1.0	1.1	1.2	2.0	0.8	1.5
+ 4	-0.5	-1.2	-0.8	2.0	1.0	2.8	0.7	0.3	0.4	1.7	0.8	2.0	0.8	0.7	0.9	1.8	0.8	1.6
+ 5	-0.4	-1.1	-0.8	1.4	0.9	2.6	0.7	0.3	0.3	1.1	0.8	2.0	1.1	1.1	0.9	0.7	0.8	1.6
+ 6	-0.7	-1.2	-0.8	1.1	0.9	2.5	0.5	0.2	0.1	0.7	0.8	2.0	1.0	0.9	0.5	0.1	0.8	1.6
+ 7	-0.7	-1.2	-0.8	0.9	0.9	2.3	0.5	0.1	0.0	0.5	0.7	2.0	0.6	0.3	0.4	1.1	0.9	1.6
+ 8	-0.9	-1.2	-0.7	0.8	0.8	2.2	0.3	0.1	0.0	0.5	0.7	1.9	0.7	0.9	1.0	0.8	0.9	1.6
+ 9	-0.8	-1.1	-0.6	0.7	0.8	2.2	0.4	0.0	0.0	0.4	0.7	1.9	1.4	1.1	0.6	0.2	0.9	1.6
+10	-0.9	-1.1	-0.6	0.7	0.7	2.2	0.2	-0.1	-0.1	0.4	0.7	1.9	0.3	0.0	0.0	0.5	0.9	1.6
+11	-0.9	-1.0	-0.4	0.7	0.7	2.2	0.2	-0.1	0.0	0.5	0.7	1.9	0.6	0.5	0.5	0.9	0.9	1.6
+12	-0.8	-0.8	-0.2	0.7	0.7	2.2	0.2	0.0	0.2	0.5	0.7	1.9	1.2	1.2	1.2	0.7	0.9	1.6
MAX	2.1	2.3	3.2	6.7	1.3	3.1	1.4	1.7	2.8	7.2	1.5	2.0	1.2	1.3	2.4	8.3	1.3	1.6

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

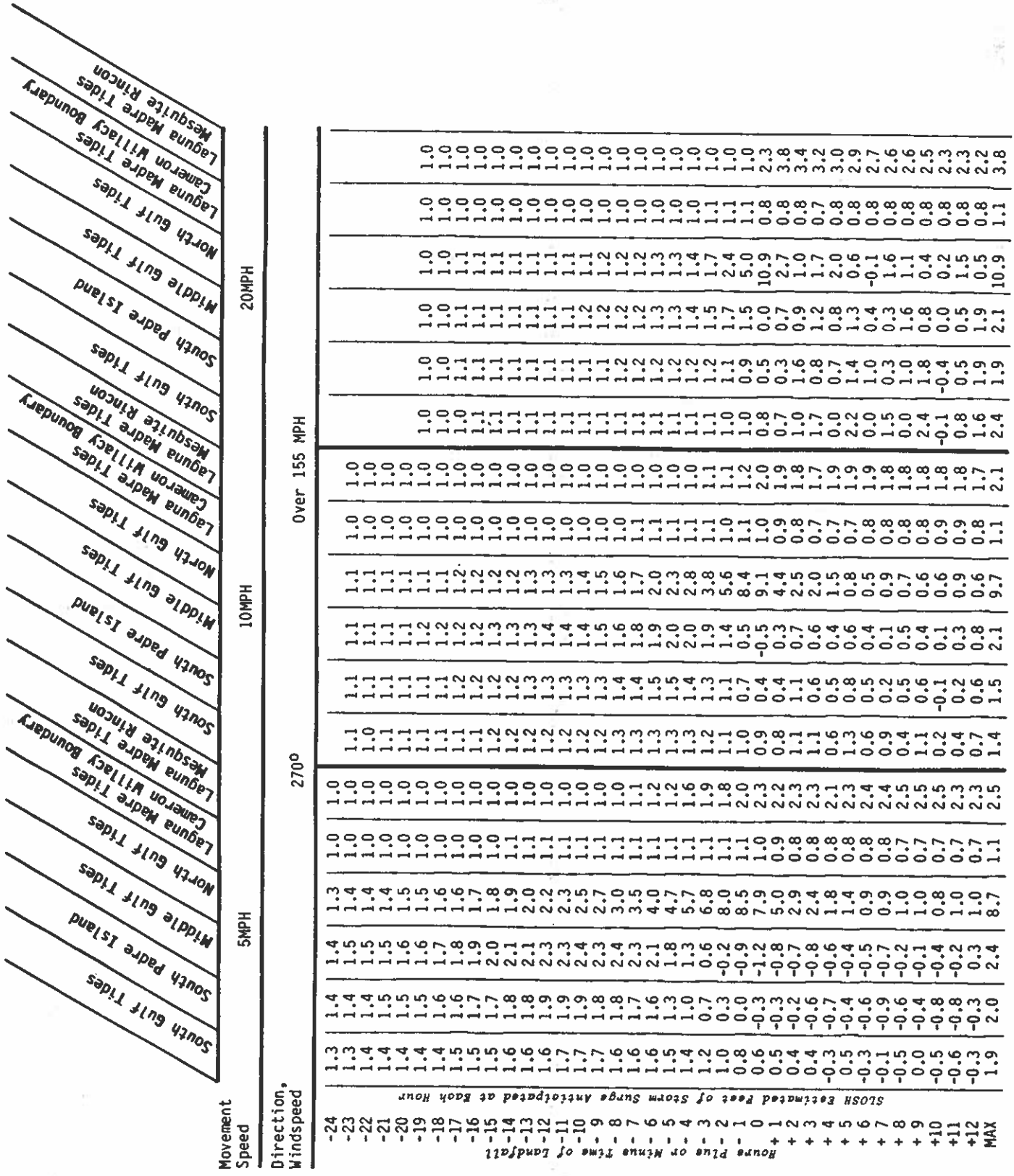
Direction, Windspeed: 270° 131-155 MPH

Hours Plus or Minus Time of Landfall

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hour	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.6	1.9	2.0	1.8	1.1	1.0												
-23	1.7	1.9	2.1	1.9	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.8	2.0	2.2	1.9	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.8	2.0	2.2	2.0	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.8	2.1	2.3	2.0	1.1	1.0	1.1	1.1	1.2	1.2	1.0	1.0						
-19	1.9	2.2	2.5	2.2	1.1	1.0	1.1	1.2	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	1.9	2.3	2.6	2.3	1.1	1.0	1.1	1.2	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	2.0	2.3	2.7	2.4	1.1	1.1	1.2	1.3	1.4	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	2.0	2.4	2.8	2.6	1.1	1.1	1.2	1.3	1.5	1.4	1.0	1.0	1.1	1.1	1.4	1.1	1.0	1.0
-15	2.1	2.5	3.0	2.8	1.1	1.1	1.2	1.4	1.5	1.5	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0
-14	2.1	2.5	3.2	3.0	1.2	1.1	1.3	1.5	1.6	1.5	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0
-13	2.1	2.6	3.3	3.2	1.3	1.1	1.3	1.5	1.7	1.6	1.1	1.0	1.1	1.2	1.2	1.2	1.0	1.0
-12	2.2	2.6	3.5	3.6	1.3	1.1	1.3	1.5	1.8	1.7	1.1	1.0	1.2	1.2	1.3	1.2	1.0	1.0
-11	2.2	2.6	3.7	4.0	1.3	1.2	1.4	1.6	1.9	1.8	1.1	1.0	1.2	1.2	1.3	1.3	1.0	1.0
-10	2.1	2.5	3.8	4.4	1.2	1.2	1.4	1.7	2.0	1.9	1.1	1.0	1.2	1.2	1.3	1.3	1.0	1.0
- 9	2.1	2.4	3.8	4.9	1.2	1.2	1.4	1.7	2.2	2.1	1.1	1.0	1.2	1.3	1.4	1.3	1.0	1.0
- 8	2.0	2.3	3.8	5.5	1.2	1.6	1.4	1.8	2.4	2.3	1.1	1.0	1.2	1.3	1.4	1.4	1.0	1.0
- 7	1.8	2.0	3.7	6.2	1.2	2.0	1.5	1.9	2.7	2.7	1.1	1.0	1.2	1.3	1.5	1.5	1.0	1.0
- 6	1.7	1.7	3.3	6.8	1.2	2.1	1.5	1.9	2.9	3.2	1.2	1.0	1.2	1.3	1.6	1.5	1.1	1.0
- 5	1.5	1.3	2.8	7.4	1.2	2.0	1.4	1.9	3.2	4.0	1.2	1.1	1.2	1.3	1.7	1.7	1.1	1.0
- 4	1.2	0.8	2.1	8.0	1.3	2.2	1.4	1.8	3.3	5.2	1.3	1.1	1.1	1.2	1.8	1.9	1.1	1.0
- 3	0.9	0.3	1.3	8.3	1.2	2.6	1.2	1.5	3.2	6.7	1.4	1.1	1.1	1.2	2.2	2.6	1.2	1.0
- 2	0.6	-0.3	0.4	8.3	1.2	2.9	1.1	1.1	2.4	8.2	1.5	1.4	1.0	1.1	2.8	4.4	1.2	1.1
- 1	0.3	-0.7	-0.4	7.9	1.2	3.5	0.8	0.5	1.2	9.0	1.5	2.0	1.0	0.8	2.5	8.2	1.4	1.1
0	0.0	-1.2	-1.0	7.3	1.1	3.5	0.6	0.2	0.5	8.6	1.5	2.1	0.5	0.3	1.0	9.7	1.4	2.1
+ 1	-0.2	-1.2	-1.0	5.7	1.2	3.8	0.7	0.4	0.7	6.7	1.4	2.1	0.4	0.4	1.0	6.6	1.0	3.5
+ 2	-0.2	-1.1	-1.1	3.5	1.1	3.7	1.0	0.6	0.7	3.6	1.0	2.0	1.1	1.2	1.6	2.2	0.9	3.7
+ 3	-0.3	-1.5	-1.4	2.5	1.1	3.4	0.8	0.4	0.3	2.4	0.9	2.3	1.3	1.2	1.1	1.9	0.8	3.5
+ 4	-0.9	-1.7	-1.3	2.1	1.0	3.1	0.6	0.2	0.3	1.8	0.8	2.3	0.5	0.5	1.0	2.1	0.8	3.1
+ 5	-0.4	-1.2	-0.8	1.4	1.0	2.9	1.0	0.6	0.5	1.1	0.7	2.2	1.6	1.5	1.3	0.8	0.8	2.9
+ 6	-0.9	-1.4	-1.1	0.4	1.0	2.8	0.6	0.3	0.0	0.2	0.6	2.1	1.1	1.2	1.0	-0.2	0.8	2.8
+ 7	-1.0	-1.8	-1.4	0.4	0.9	2.5	0.4	-0.3	-0.4	0.2	0.7	2.1	0.4	0.3	0.1	1.0	0.8	2.7
+ 8	-1.2	-1.5	-0.8	0.8	0.6	2.4	0.3	0.1	0.1	0.6	0.7	2.0	1.0	1.0	1.3	1.0	0.9	2.6
+ 9	-0.7	-1.0	-0.4	0.8	0.5	2.3	0.8	0.3	0.3	0.4	0.7	2.0	1.9	1.5	1.0	0.1	0.9	2.5
+10	-1.2	-1.4	-0.9	0.5	0.6	2.3	0.2	-0.2	-0.4	0.2	0.7	1.9	0.2	-0.1	-0.5	0.3	0.9	2.5
+11	-1.3	-1.6	-0.9	0.6	0.6	2.2	0.0	-0.5	-0.3	0.3	0.7	1.9	0.5	0.4	0.3	0.7	0.9	2.4
+12	-1.0	-0.8	0.0	0.9	0.6	2.2	0.4	0.2	0.4	0.6	0.7	1.8	1.5	1.5	1.5	1.0	0.9	2.3
MAX	2.4	2.7	3.9	8.5	1.5	3.8	1.5	1.9	3.3	9.1	1.6	2.3	1.9	1.8	2.8	10.1	1.5	3.7

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE



HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	300° 74-95 MPH																	
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.4	1.4	1.4	1.3	1.0	1.0												
-23	1.4	1.5	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.4	1.5	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.5	1.5	1.5	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-20	1.5	1.5	1.5	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-19	1.5	1.5	1.5	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-18	1.5	1.6	1.6	1.4	1.0	1.0	1.1	1.2	1.2	1.1	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0
-17	1.5	1.6	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.5	1.6	1.7	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.4	1.6	1.7	1.5	1.0	1.0	1.2	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.4	1.6	1.8	1.5	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.4	1.5	1.8	1.6	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	1.3	1.5	1.9	1.6	1.0	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-11	1.2	1.4	1.9	1.7	1.1	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-10	1.2	1.3	2.0	1.8	1.1	1.0	1.3	1.4	1.5	1.3	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0
- 9	1.1	1.2	2.0	1.9	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
- 8	1.0	1.0	2.0	2.0	1.1	1.0	1.4	1.5	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
- 7	0.9	0.9	1.9	2.2	1.2	1.0	1.3	1.5	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
- 6	0.8	0.8	1.7	2.3	1.2	1.0	1.3	1.5	1.8	1.6	1.1	1.0	1.2	1.3	1.3	1.2	1.0	1.0
- 5	0.7	0.6	1.5	2.4	1.2	1.1	1.2	1.4	1.9	1.8	1.1	1.0	1.3	1.4	1.4	1.3	1.0	1.0
- 4	0.6	0.5	1.3	2.6	1.1	1.1	1.1	1.2	1.9	2.0	1.1	1.0	1.3	1.5	1.6	1.4	1.0	1.0
- 3	0.6	0.4	1.0	2.6	1.1	1.2	1.0	0.9	1.7	2.3	1.1	1.0	1.2	1.5	1.8	1.6	1.0	1.0
- 2	0.5	0.4	0.8	2.6	1.1	1.2	0.9	0.7	1.3	2.6	1.2	1.0	1.1	1.2	2.0	2.0	1.1	1.0
- 1	0.4	0.3	0.6	2.5	1.0	1.2	0.8	0.6	0.9	2.8	1.1	1.0	0.9	0.8	1.5	2.8	1.1	1.0
0	0.4	0.3	0.5	2.3	1.0	1.2	0.8	0.5	0.6	2.5	1.1	1.0	0.8	0.7	0.7	3.0	1.0	1.0
+ 1	0.3	0.2	0.4	2.0	1.0	1.2	0.7	0.5	0.5	2.0	1.0	1.0	0.8	0.7	0.5	1.5	0.9	1.0
+ 2	0.3	0.2	0.3	1.7	1.0	1.2	0.7	0.4	0.5	1.4	1.0	1.0	0.9	0.7	0.7	1.1	1.0	1.0
+ 3	0.3	0.2	0.3	1.5	1.0	1.2	0.6	0.5	0.5	1.2	0.9	1.0	0.8	0.8	0.8	1.0	0.9	1.0
+ 4	0.2	0.2	0.3	1.2	0.9	1.1	0.6	0.4	0.5	0.9	0.9	1.0	0.8	0.7	0.6	0.7	0.9	1.0
+ 5	0.2	0.2	0.3	1.0	0.9	1.1	0.6	0.4	0.4	0.7	0.9	1.0	0.7	0.5	0.6	0.7	0.9	1.0
+ 6	0.2	0.2	0.3	0.9	0.9	1.1	0.5	0.4	0.5	0.7	0.9	1.0	0.7	0.7	0.7	0.6	0.9	1.0
+ 7	0.3	0.2	0.3	0.8	0.9	1.1	0.5	0.4	0.5	0.7	0.9	1.0	0.8	0.7	0.7	0.8	0.9	1.0
+ 8	0.3	0.3	0.3	0.7	0.9	1.1	0.5	0.5	0.5	0.6	0.8	1.0	0.5	0.6	0.7	0.8	0.9	1.0
+ 9	0.3	0.3	0.3	0.7	0.9	1.1	0.5	0.4	0.5	0.6	0.8	1.0	0.9	0.7	0.7	0.6	0.9	1.0
+10	0.3	0.3	0.4	0.7	0.9	1.1	0.5	0.5	0.6	0.7	0.8	1.0	0.6	0.6	0.7	0.8	0.8	1.0
+11	0.3	0.4	0.4	0.7	0.9	1.0	0.5	0.5	0.6	0.7	0.8	1.0	0.7	0.7	0.8	1.0	0.8	1.0
+12	0.4	0.4	0.4	0.7	0.9	1.0	0.5	0.6	0.7	0.7	0.8	1.0	0.8	0.8	0.9	0.8	0.8	1.0
MAX	1.6	1.6	2.1	2.7	1.2	1.2	1.4	1.5	2.0	2.8	1.2	1.0	1.3	1.5	2.0	3.2	1.1	1.0

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 300° 96-110 MPH

Hours Plus or Minus Time of Landfall / SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.8	1.9	1.7	1.5	1.0	1.0												
-23	1.8	1.9	1.8	1.5	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.9	2.0	1.8	1.5	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.9	2.0	1.9	1.6	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0						
-20	1.9	2.1	2.0	1.6	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0						
-19	1.9	2.1	2.0	1.7	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	2.0	2.1	2.1	1.7	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	1.9	2.2	2.2	1.8	1.1	1.0	1.3	1.3	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.9	2.2	2.3	1.9	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.9	2.2	2.4	1.9	1.1	1.0	1.4	1.5	1.5	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.8	2.1	2.5	2.0	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0	1.1	1.2	1.2	1.1	1.0	1.0
-13	1.7	2.1	2.7	2.2	1.1	1.0	1.5	1.6	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-12	1.6	2.0	2.8	2.3	1.1	1.0	1.5	1.7	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-11	1.5	1.8	2.9	2.4	1.1	1.1	1.6	1.8	1.8	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-10	1.3	1.6	3.0	2.6	1.2	1.1	1.6	1.9	1.9	1.6	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0
- 9	1.1	1.4	3.1	2.9	1.3	1.1	1.7	2.0	2.1	1.7	1.1	1.0	1.3	1.3	1.3	1.3	1.0	1.0
- 8	0.9	1.1	3.1	3.1	1.3	1.1	1.7	2.0	2.2	1.9	1.1	1.0	1.3	1.4	1.4	1.3	1.0	1.0
- 7	0.7	0.8	2.9	3.4	1.3	1.2	1.6	2.0	2.5	2.0	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0
- 6	0.5	0.5	2.6	3.7	1.3	1.3	1.5	1.9	2.7	2.3	1.1	1.0	1.4	1.5	1.6	1.4	1.0	1.0
- 5	0.4	0.2	2.1	4.0	1.3	1.4	1.3	1.7	2.9	2.6	1.2	1.0	1.4	1.7	1.8	1.6	1.0	1.0
- 4	0.2	0.0	1.6	4.2	1.3	1.8	1.1	1.3	2.9	3.1	1.2	1.0	1.4	1.8	2.1	1.8	1.1	1.0
- 3	0.0	-0.3	1.1	4.4	1.3	2.0	0.9	0.8	2.5	3.7	1.3	1.1	1.3	1.8	2.6	2.2	1.1	1.0
- 2	-0.1	-0.4	0.6	4.4	1.3	2.2	0.7	0.4	1.7	4.4	1.3	1.1	1.1	1.4	3.0	3.0	1.2	1.0
- 1	-0.2	-0.5	0.1	4.1	1.2	2.2	0.6	0.2	0.8	4.7	1.2	1.2	0.8	0.6	2.0	4.7	1.3	1.0
0	-0.3	-0.6	-0.2	3.7	1.2	2.1	0.5	0.0	0.2	4.2	1.1	1.3	0.6	0.3	0.3	5.1	1.1	1.1
+ 1	-0.4	-0.7	-0.4	3.1	1.1	2.1	0.4	-0.1	0.0	3.0	1.1	1.3	0.7	0.3	0.1	2.0	1.0	1.0
+ 2	-0.5	-0.7	-0.4	2.3	1.0	2.0	0.3	-0.1	0.0	1.9	1.0	1.2	0.7	0.5	0.4	1.3	0.9	1.1
+ 3	-0.5	-0.7	-0.4	1.8	1.0	1.8	0.3	-0.1	0.0	1.2	0.9	1.1	0.7	0.5	0.6	0.9	0.9	1.2
+ 4	-0.6	-0.7	-0.4	1.2	1.0	1.6	0.1	-0.2	0.0	0.7	0.9	1.1	0.7	0.5	0.2	0.5	0.9	1.2
+ 5	-0.5	-0.6	-0.4	0.8	0.9	1.5	0.1	-0.2	-0.1	0.5	0.8	1.2	0.5	0.1	0.3	0.4	0.9	1.2
+ 6	-0.5	-0.5	-0.3	0.6	0.9	1.4	0.0	-0.1	0.1	0.3	0.8	1.3	0.6	0.5	0.4	0.3	0.9	1.2
+ 7	-0.4	-0.5	-0.3	0.5	0.9	1.3	0.1	-0.1	0.1	0.3	0.8	1.4	0.7	0.4	0.4	0.6	0.9	1.2
+ 8	-0.5	-0.4	-0.3	0.4	0.9	1.2	0.0	-0.1	0.1	0.3	0.8	1.3	0.1	0.2	0.5	0.6	0.9	1.2
+ 9	-0.4	-0.3	-0.2	0.4	0.8	1.2	0.0	0.0	0.2	0.3	0.8	1.3	0.8	0.6	0.4	0.3	0.9	1.2
+10	-0.3	-0.2	-0.1	0.4	0.8	1.2	0.0	0.1	0.3	0.4	0.8	1.3	0.3	0.3	0.5	0.6	0.9	1.2
+11	-0.3	-0.1	-0.1	0.4	0.8	1.2	0.0	0.2	0.3	0.5	0.7	1.3	0.4	0.4	0.6	0.9	0.9	1.2
+12	-0.2	-0.1	0.0	0.5	0.8	1.1	0.1	0.2	0.4	0.5	0.7	1.3	0.6	0.7	0.7	0.5	0.9	1.2
MAX	2.1	2.2	3.2	4.5	1.5	2.2	1.7	2.0	3.0	4.7	1.3	1.4	1.5	1.9	3.0	5.5	1.3	1.2

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	300° 111-130 MPH																	
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	2.2	2.3	2.1	1.7	1.1	1.0												
-23	2.2	2.4	2.2	1.8	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	2.3	2.4	2.3	1.8	1.1	1.0	1.1	1.2	1.2	1.1	1.0	1.0						
-21	2.3	2.5	2.4	1.9	1.1	1.0	1.2	1.2	1.2	1.2	1.0	1.0						
-20	2.4	2.6	2.5	1.9	1.1	1.0	1.2	1.3	1.3	1.3	1.0	1.0						
-19	2.4	2.6	2.6	2.0	1.1	1.0	1.3	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	2.4	2.7	2.7	2.1	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	2.4	2.7	2.8	2.2	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0	1.1	1.1	1.2	1.1	1.0	1.0
-16	2.4	2.8	3.0	2.3	1.1	1.0	1.5	1.6	1.6	1.5	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
-15	2.3	2.8	3.1	2.4	1.2	1.1	1.6	1.7	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
-14	2.2	2.7	3.3	2.6	1.2	1.1	1.6	1.8	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-13	2.1	2.6	3.5	2.7	1.2	1.1	1.7	1.9	1.9	1.6	1.0	1.0	1.2	1.3	1.3	1.2	1.0	1.0
-12	1.9	2.5	3.8	2.9	1.2	1.1	1.8	2.0	2.0	1.7	1.1	1.0	1.3	1.3	1.3	1.2	1.0	1.0
-11	1.7	2.2	4.0	3.2	1.3	1.2	1.9	2.1	2.2	1.8	1.1	1.0	1.3	1.3	1.3	1.2	1.0	1.0
-10	1.4	1.9	4.1	3.5	1.4	1.3	1.9	2.3	2.3	1.9	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0
- 9	1.2	1.5	4.2	3.8	1.3	1.4	2.0	2.4	2.6	2.1	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0
- 8	0.9	1.1	4.1	4.2	1.4	1.6	2.0	2.5	2.9	2.3	1.1	1.0	1.5	1.5	1.5	1.4	1.0	1.0
- 7	0.6	0.7	3.9	4.6	1.4	1.8	1.9	2.5	3.2	2.5	1.2	1.0	1.5	1.6	1.6	1.5	1.0	1.0
- 6	0.3	0.2	3.4	5.1	1.4	1.8	1.7	2.4	3.6	2.9	1.3	1.0	1.5	1.7	1.8	1.6	1.0	1.0
- 5	0.0	-0.2	2.7	5.5	1.3	1.9	1.5	2.0	4.0	3.4	1.3	1.0	1.6	1.9	2.1	1.8	1.1	1.0
- 4	-0.2	-0.6	1.9	5.9	1.3	2.0	1.2	1.5	4.0	4.1	1.4	1.1	1.6	2.1	2.6	2.2	1.1	1.0
- 3	-0.5	-0.9	1.1	6.1	1.2	2.4	0.9	0.8	3.3	5.1	1.4	1.2	1.4	2.2	3.4	2.7	1.2	1.0
- 2	-0.7	-1.2	0.3	6.1	1.1	2.7	0.6	0.2	2.0	6.1	1.3	1.4	1.1	1.5	4.0	4.0	1.4	1.0
- 1	-0.9	-1.4	-0.4	5.8	1.1	2.9	0.4	-0.3	0.6	6.5	1.2	1.9	0.6	0.4	2.5	6.5	1.5	1.1
0	-1.1	-1.5	-0.8	5.2	1.1	3.0	0.2	-0.5	-0.2	5.8	1.3	2.1	0.4	-0.1	-0.1	7.1	1.1	1.2
+ 1	-1.2	-1.6	-1.0	4.1	1.1	3.1	0.1	-0.6	-0.5	4.0	1.4	2.0	0.5	0.1	-0.3	2.5	1.0	1.1
+ 2	-1.2	-1.5	-1.1	2.9	1.1	2.9	0.0	-0.6	-0.4	2.2	1.0	1.7	0.6	0.3	0.3	1.4	1.0	1.1
+ 3	-1.2	-1.5	-1.1	2.0	1.1	2.7	0.0	-0.6	-0.4	1.2	1.0	1.4	0.6	0.4	0.6	0.8	0.9	1.3
+ 4	-1.4	-1.5	-1.1	1.2	1.0	2.5	-0.2	-0.7	-0.4	0.5	0.9	1.3	0.7	0.2	-0.1	0.3	0.9	1.3
+ 5	-1.2	-1.3	-1.0	0.7	1.0	2.3	-0.2	-0.6	-0.5	0.2	0.9	1.2	0.3	-0.2	0.1	0.2	0.9	1.3
+ 6	-1.3	-1.3	-1.0	0.4	0.9	2.1	-0.4	-0.6	-0.4	0.0	0.8	1.2	0.5	0.4	0.2	-0.2	0.9	1.3
+ 7	-1.1	-1.2	-1.0	0.2	0.8	2.0	-0.3	-0.6	-0.3	0.0	0.7	1.3	0.6	0.1	0.1	0.5	0.9	1.3
+ 8	-1.2	-1.0	-0.9	0.1	0.8	2.0	-0.5	-0.5	-0.3	0.0	0.7	1.4	-0.3	-0.2	0.3	0.5	0.9	1.3
+ 9	-1.0	-0.9	-0.8	0.1	0.8	2.0	-0.4	-0.4	-0.2	0.0	0.7	1.3	0.9	0.5	0.2	-0.1	0.9	1.3
+10	-1.0	-0.8	-0.7	0.1	0.8	2.0	-0.4	-0.3	-0.1	0.1	0.7	1.3	0.0	-0.1	0.2	0.5	0.9	1.3
+11	-0.9	-0.7	-0.6	0.1	0.8	1.8	-0.4	-0.2	0.1	0.3	0.6	1.3	0.1	0.1	0.4	0.9	0.9	1.3
+12	-0.7	-0.5	-0.5	0.2	0.8	1.8	-0.3	-0.1	0.2	0.3	0.6	1.3	0.6	0.7	0.7	0.3	0.9	1.2
MAX	2.7	2.8	4.4	6.4	1.4	3.1	2.0	2.6	4.1	6.6	1.5	2.1	1.6	2.2	4.0	7.7	1.6	1.3

HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 300° 131-155 MPH

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	2.5	2.7	2.5	2.0	1.1	1.0												
-23	2.6	2.8	2.6	2.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.0						
-22	2.7	2.9	2.7	2.1	1.1	1.0	1.2	1.2	1.2	1.2	1.0	1.0						
-21	2.8	3.0	2.8	2.1	1.1	1.0	1.2	1.3	1.3	1.3	1.0	1.0						
-20	2.8	3.1	2.9	2.2	1.1	1.0	1.3	1.4	1.4	1.4	1.0	1.0						
-19	2.9	3.2	3.1	2.3	1.1	1.0	1.4	1.5	1.5	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-18	2.9	3.3	3.2	2.4	1.1	1.1	1.4	1.5	1.6	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	2.9	3.3	3.4	2.6	1.2	1.1	1.5	1.6	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-16	2.9	3.4	3.6	2.7	1.2	1.1	1.6	1.8	1.8	1.6	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
-15	2.8	3.4	3.8	2.9	1.2	1.1	1.7	1.9	1.9	1.6	1.1	1.0	1.2	1.2	1.2	1.9	1.0	1.0
-14	2.7	3.3	4.1	3.1	1.3	1.2	1.8	2.0	2.0	1.7	1.1	1.0	1.3	1.3	1.3	1.2	1.0	1.0
-13	2.5	3.2	4.4	3.3	1.3	1.2	1.9	2.1	2.1	1.8	1.1	1.0	1.3	1.3	1.3	1.3	1.0	1.0
-12	2.2	3.0	4.7	3.6	1.4	1.3	2.0	2.3	2.3	1.9	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0
-11	2.0	2.7	5.0	3.9	1.4	1.6	2.1	2.5	2.5	2.0	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0
-10	1.6	2.2	5.2	4.3	1.4	1.8	2.2	2.7	2.8	2.2	1.1	1.0	1.5	1.5	1.5	1.4	1.0	1.0
- 9	1.2	1.8	5.3	4.7	1.4	1.9	2.3	2.9	3.1	2.4	1.2	1.0	1.5	1.6	1.6	1.5	1.0	1.0
- 8	0.9	1.2	5.2	5.2	1.4	1.8	2.3	3.0	3.5	2.7	1.2	1.0	1.6	1.7	1.7	1.5	1.0	1.0
- 7	0.5	0.6	4.9	5.9	1.5	1.9	2.2	3.0	3.9	3.0	1.3	1.0	1.6	1.8	1.8	1.6	1.0	1.0
- 6	0.0	0.0	4.3	6.5	1.6	2.0	2.0	2.9	4.5	3.5	1.3	1.1	1.7	1.9	2.0	1.8	1.1	1.0
- 5	-0.3	-0.6	3.3	7.1	1.9	2.2	1.7	2.4	5.0	4.2	1.4	1.1	1.7	2.2	2.4	2.1	1.1	1.0
- 4	-0.6	-1.1	2.3	7.6	2.3	2.9	1.2	1.6	5.0	5.2	1.4	1.2	1.7	2.5	3.1	2.5	1.1	1.0
- 3	-1.1	-1.6	1.1	7.8	2.4	3.5	0.8	0.7	4.2	6.5	1.4	1.4	1.5	2.5	4.1	3.3	1.2	1.0
- 2	-1.3	-2.0	0.2	7.8	2.3	3.6	0.4	-0.1	2.4	7.9	1.6	1.9	1.0	1.7	5.0	5.0	1.5	1.1
- 1	-1.5	-2.3	-0.9	7.4	2.0	3.3	0.2	-0.7	0.5	8.4	1.4	3.7	0.5	0.2	3.0	8.3	1.6	1.3
0	-1.8	-2.5	-1.6	6.6	1.8	3.3	-0.1	-1.0	-0.7	7.4	1.3	3.4	0.2	-0.5	-0.5	8.9	1.2	2.8
+ 1	-1.9	-2.3	-1.4	4.9	1.8	3.2	-0.1	-0.9	-0.6	4.7	1.4	3.3	0.5	-0.1	-0.4	2.7	0.9	3.0
+ 2	-1.8	-2.0	-1.5	2.7	1.5	3.1	-0.1	-0.8	-0.6	1.9	1.3	2.9	0.7	0.4	0.3	1.1	1.0	2.8
+ 3	-1.8	-2.0	-1.6	1.7	1.0	3.0	-0.1	-0.9	-0.7	0.8	1.0	2.5	0.5	0.5	0.5	0.6	1.0	2.6
+ 4	-2.1	-2.1	-1.5	1.3	0.9	2.8	-0.5	-1.0	-0.7	0.6	1.0	2.3	0.7	0.1	-0.2	0.4	1.0	2.5
+ 5	-1.5	-1.5	-1.0	0.6	0.9	2.4	-0.2	-0.7	-0.2	0.2	1.0	2.2	0.5	-0.2	0.2	0.3	1.0	2.4
+ 6	-1.7	-1.4	-1.2	-0.2	0.9	2.3	-0.5	-0.7	-0.5	-0.5	0.9	2.1	0.5	0.6	0.1	-0.7	1.0	2.3
+ 7	-1.6	-1.7	-1.4	-0.2	0.8	2.1	-0.6	-1.0	-0.6	-0.2	0.9	2.1	0.6	-0.3	0.1	0.4	0.9	2.2
+ 8	-1.7	-1.3	-0.9	0.2	0.8	2.1	-0.9	-0.7	-0.1	0.2	0.9	2.0	-0.7	-0.3	0.5	0.8	0.9	2.2
+ 9	-1.0	-0.7	-0.5	0.2	0.9	2.0	-0.3	-0.2	0.1	0.0	0.8	2.0	1.4	0.9	0.4	-0.2	0.9	2.2
+10	-1.4	-1.0	-0.9	-0.1	0.9	2.0	-0.7	-0.6	-0.3	0.0	0.8	2.1	-0.3	-0.4	0.0	0.3	0.9	2.2
+11	-1.4	-1.1	-1.0	0.0	0.8	2.0	-0.8	-0.6	-0.2	0.2	0.8	2.0	-0.2	-0.3	0.2	0.9	0.9	2.1
+12	-0.9	-0.4	-0.3	0.3	0.8	2.0	-0.3	0.1	0.5	0.4	0.8	2.0	0.8	1.0	1.1	0.3	0.8	2.1
MAX	3.2	3.5	5.7	8.3	2.4	3.7	2.3	3.1	5.1	8.5	1.6	3.8	1.8	2.6	5.0	9.7	1.7	3.1

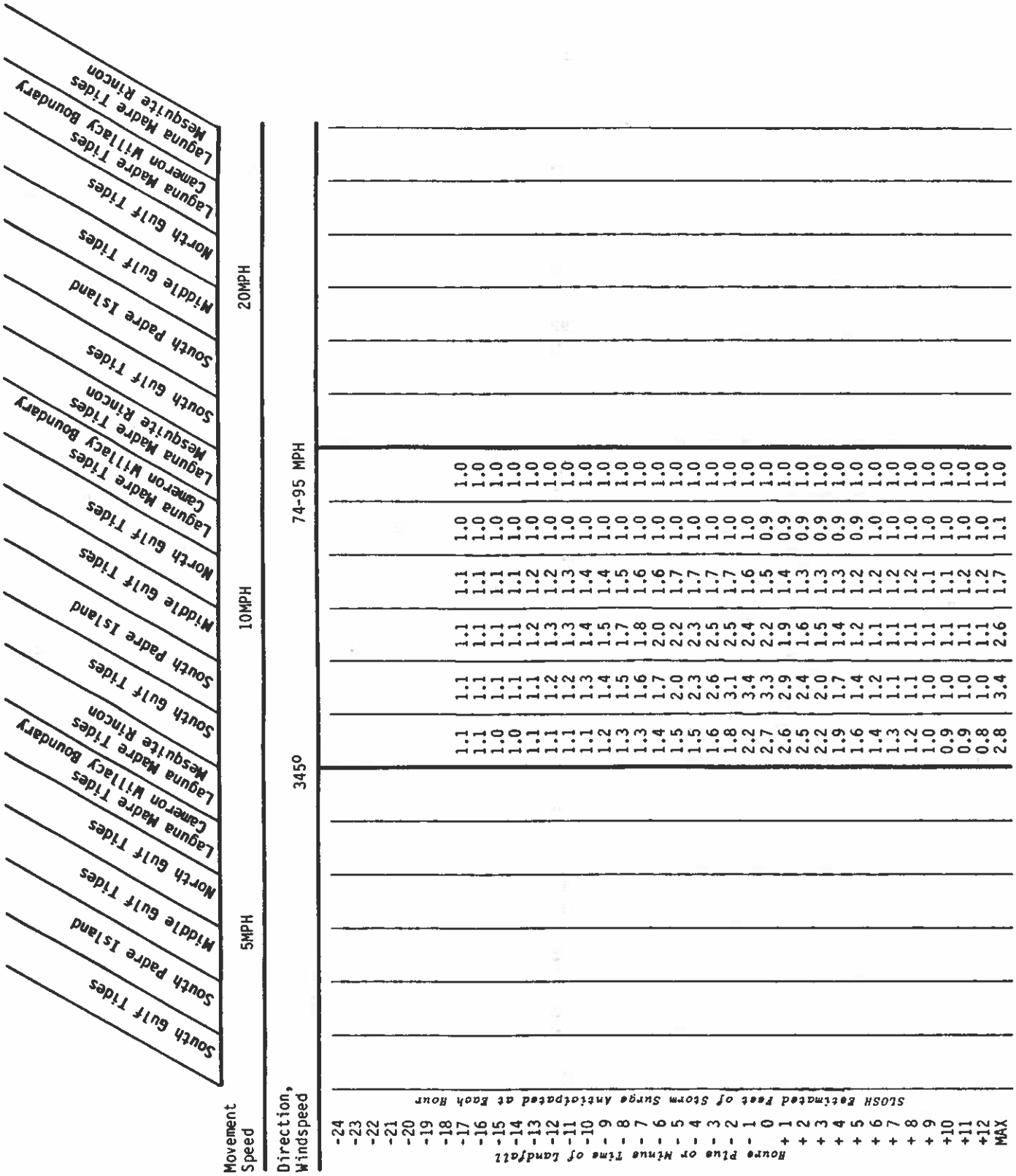
HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 60 MILES RIGHT, MOUTH OF LOWER LAGUNA MADRE

Direction, Windspeed: 300° Over 155 MPH

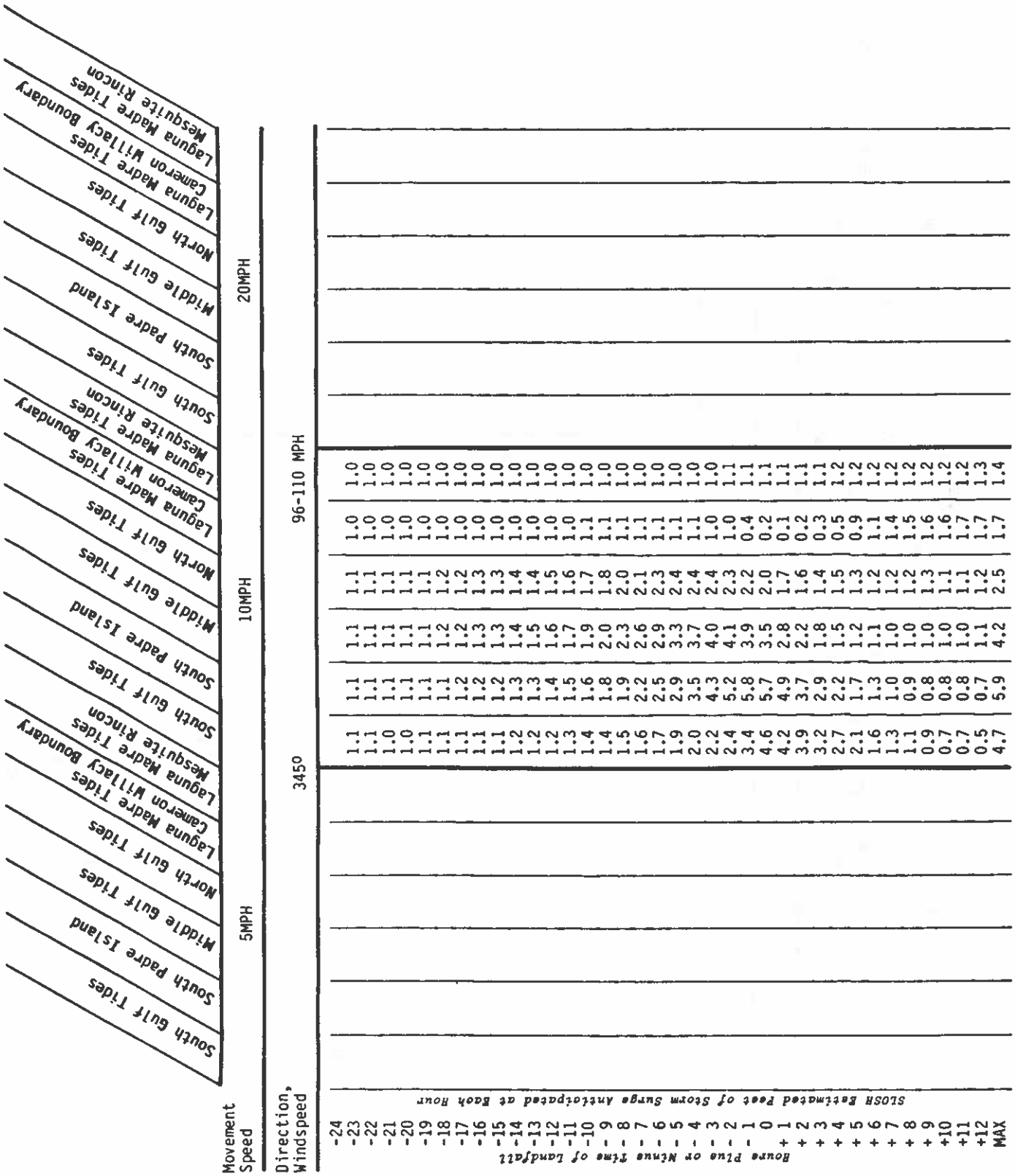
SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5MPH						10MPH						20MPH					
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24	1.7	1.7	1.6	1.4	1.0	1.0												
-23	1.7	1.8	1.6	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-22	1.7	1.8	1.7	1.4	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0						
-21	1.8	1.9	1.7	1.5	1.0	1.0	1.1	1.2	1.2	1.2	1.0	1.0						
-20	1.9	1.9	1.8	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0						
-19	1.9	1.9	1.9	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-18	1.8	2.0	1.9	1.6	1.0	1.0	1.2	1.3	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-17	1.8	2.0	2.0	1.6	1.0	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-16	1.8	2.0	2.1	1.7	1.1	1.0	1.3	1.3	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-15	1.8	2.0	2.2	1.8	1.1	1.0	1.3	1.4	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-14	1.8	2.0	2.3	1.9	1.1	1.0	1.4	1.4	1.4	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-13	1.7	2.0	2.5	2.0	1.1	1.0	1.4	1.5	1.5	1.3	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0
-12	1.6	1.9	2.6	2.1	1.1	1.0	1.5	1.6	1.5	1.4	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
-11	1.5	1.7	2.8	2.2	1.1	1.0	1.5	1.6	1.6	1.4	1.0	1.0	1.2	1.2	1.2	1.1	1.0	1.0
-10	1.3	1.5	3.0	2.4	1.2	1.1	1.5	1.7	1.7	1.5	1.0	1.0	1.2	1.2	1.2	1.2	1.0	1.0
- 9	1.1	1.3	3.2	2.6	1.2	1.1	1.6	1.8	1.9	1.6	1.1	1.0	1.2	1.3	1.2	1.2	1.0	1.0
- 8	1.0	1.0	3.4	2.9	1.3	1.1	1.5	1.8	2.0	1.7	1.1	1.0	1.3	1.3	1.3	1.2	1.0	1.0
- 7	0.8	0.7	3.3	3.3	1.3	1.2	1.5	1.8	2.2	1.8	1.1	1.0	1.3	1.3	1.3	1.3	1.0	1.0
- 6	0.7	0.3	2.9	3.8	1.3	1.3	1.4	1.8	2.5	2.1	1.1	1.0	1.3	1.4	1.4	1.3	1.0	1.0
- 5	0.4	0.0	2.2	4.4	1.3	1.6	1.3	1.5	2.8	2.4	1.2	1.0	1.3	1.5	1.6	1.4	1.0	1.0
- 4	0.2	-0.3	1.2	5.2	1.2	1.8	1.1	1.1	3.1	2.8	1.3	1.0	1.3	1.6	1.8	1.6	1.0	1.0
- 3	0.0	-0.5	0.1	6.0	1.2	1.9	0.9	0.6	2.7	3.7	1.3	1.1	1.2	1.5	2.3	2.0	1.1	1.0
- 2	-0.2	-0.8	-0.6	6.9	1.2	2.1	0.7	0.2	1.1	5.2	1.3	1.1	1.0	1.1	3.0	2.7	1.2	1.0
- 1	-0.3	-0.9	-1.2	7.5	1.1	4.1	0.5	-0.1	-0.4	7.3	1.3	1.5	0.7	0.3	1.7	5.0	1.3	1.0
0	-0.4	-1.0	-1.3	1.0	1.0	3.7	0.4	-0.3	-1.0	8.1	1.4	3.9	0.6	-0.1	-1.0	9.9	1.3	3.0
+ 1	-0.4	-0.9	-0.9	4.4	1.0	3.3	0.4	-0.2	-0.2	3.4	1.0	3.1	0.6	0.2	0.0	0.0	1.0	3.7
+ 2	-0.5	-0.6	-0.6	2.3	1.0	3.0	0.5	0.3	0.1	1.1	0.8	2.5	0.9	1.1	0.7	0.5	0.9	3.4
+ 3	-0.3	-0.8	-0.8	1.6	1.0	2.6	0.3	0.0	0.1	1.0	0.8	2.2	1.1	0.4	0.8	1.0	0.9	3.1
+ 4	-0.9	-0.7	-0.6	1.0	1.0	2.3	0.2	-0.2	0.1	0.7	0.7	2.2	0.3	0.6	0.1	1.0	0.9	2.9
+ 5	-0.1	-0.4	-0.4	0.6	1.0	2.1	0.6	0.2	0.2	0.3	0.3	2.1	1.4	0.4	0.9	0.2	0.9	2.8
+ 6	-0.7	-0.5	-0.5	0.2	0.8	2.1	-0.2	0.0	0.1	0.0	0.0	2.1	-0.3	0.9	0.3	-0.3	0.9	2.6
+ 7	-0.4	-0.7	-0.6	0.4	0.7	2.1	0.4	-0.2	0.0	0.5	0.5	2.0	1.8	0.0	0.3	1.2	0.9	2.5
+ 8	-0.7	-0.3	-0.2	0.5	0.7	2.0	-0.3	0.1	0.4	0.5	0.5	2.0	-1.0	0.4	1.2	1.0	0.9	2.4
+ 9	-0.1	0.0	-0.1	0.4	0.7	1.8	0.6	0.4	0.4	0.3	0.3	2.0	2.2	1.5	0.6	0.1	0.9	2.3
+10	-0.6	-0.4	-0.4	0.3	0.7	1.9	-0.3	-0.2	0.1	0.3	0.3	2.0	-0.4	-0.5	0.3	0.4	0.9	2.3
+11	-0.5	-0.3	-0.2	0.4	0.6	1.9	0.0	0.2	0.4	0.7	0.7	2.0	0.4	0.4	0.5	1.7	0.9	2.2
+12	-0.1	0.2	0.2	0.4	0.6	1.8	0.4	0.7	0.9	0.5	0.5	2.0	1.3	1.5	1.7	0.1	0.9	2.2
MAX	2.0	2.1	3.4	7.7	1.4	4.4	1.6	1.9	3.1	8.4	1.4	3.9	2.3	1.7	3.1	9.9	1.5	4.2

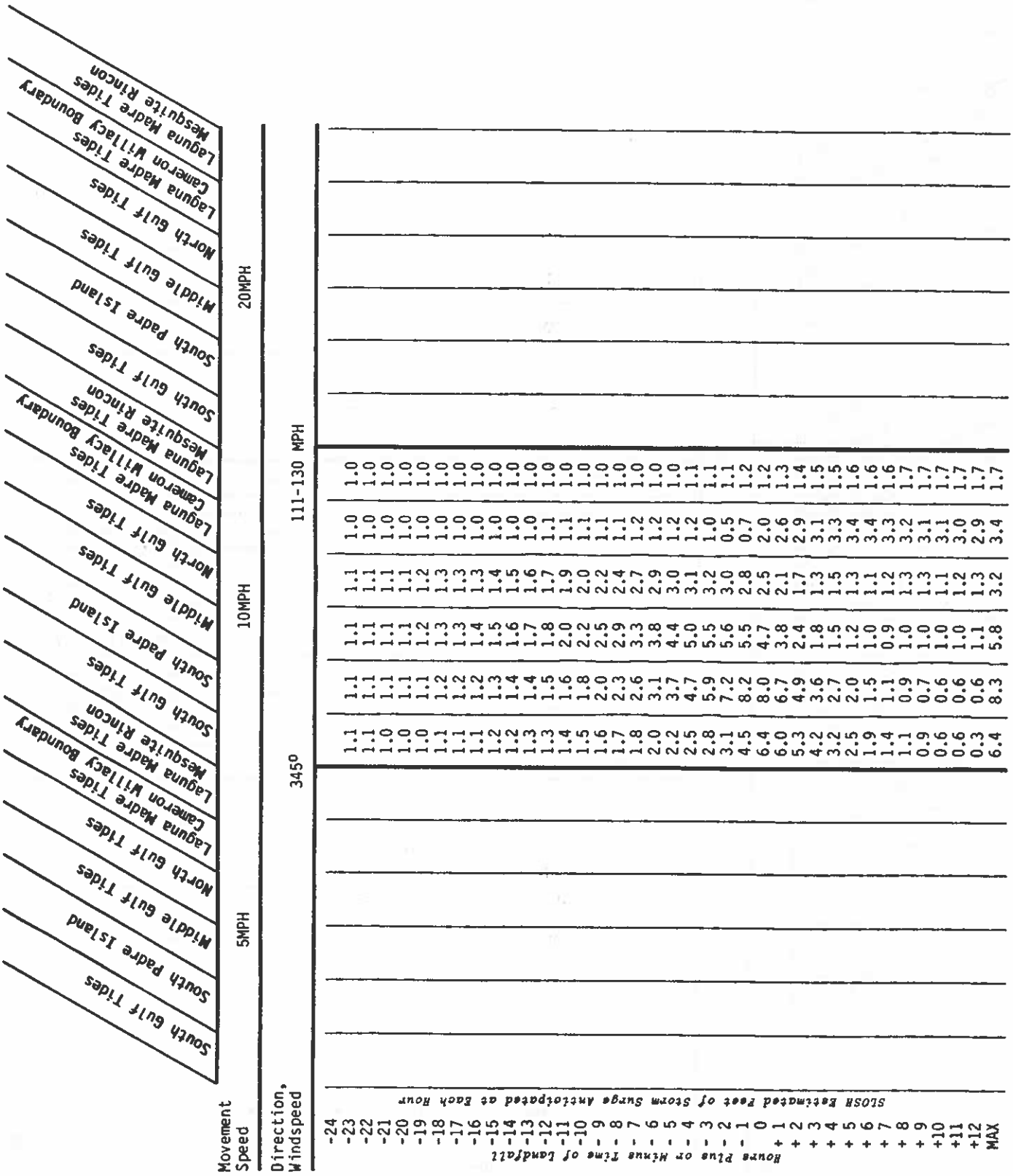
HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL AT THE MOUTH OF LOWER LAGUNA MADRE



HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL AT THE MOUTH OF LOWER LAGUNA MADRE



HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL AT THE MOUTH OF LOWER LAGUNA MADRE

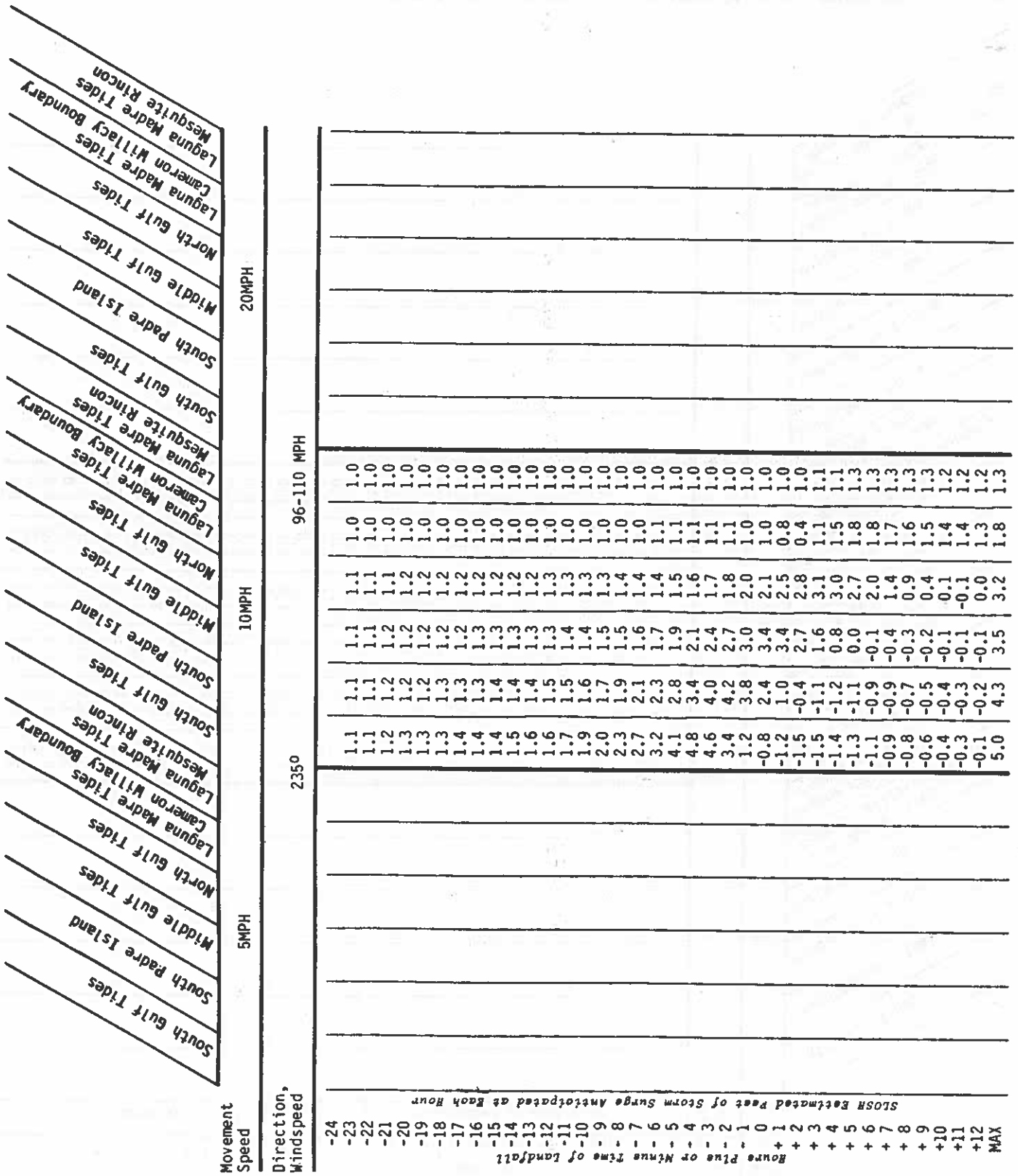


HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE

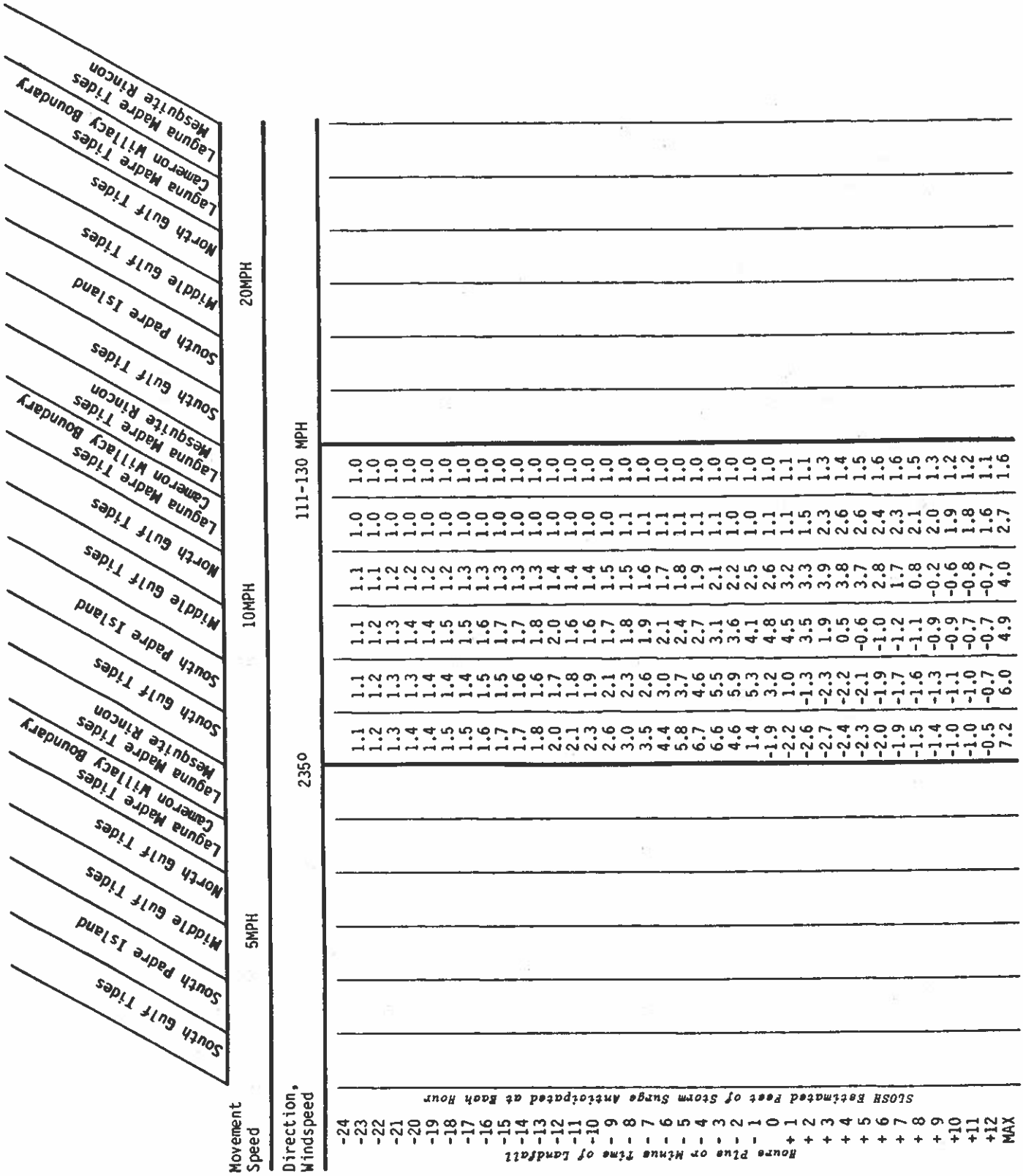
Movement Speed	5MPH						10MPH						20MPH					
Direction, Windspeed	235° 74-95 MPH																	
Hours Plus or Minus Time of Landfall	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon	South Gulf Tides	South Padre Island	Middle Gulf Tides	North Gulf Tides	Laguna Madre Tides Cameron Willacy Boundary	Laguna Madre Tides Mesquite Rincon
-24																		
-23							1.1	1.1	1.0	1.0	1.0	1.0						
-22							1.1	1.1	1.1	1.1	1.0	1.0						
-21							1.1	1.1	1.1	1.1	1.0	1.0						
-20							1.1	1.1	1.1	1.1	1.0	1.0						
-19							1.1	1.1	1.1	1.1	1.0	1.0						
-18							1.2	1.1	1.1	1.1	1.0	1.0						
-17							1.2	1.1	1.1	1.1	1.0	1.0						
-16							1.2	1.2	1.1	1.1	1.0	1.0						
-15							1.2	1.2	1.1	1.1	1.0	1.0						
-14							1.2	1.2	1.1	1.1	1.0	1.0						
-13							1.3	1.2	1.2	1.1	1.0	1.0						
-12							1.3	1.2	1.2	1.1	1.0	1.0						
-11							1.4	1.3	1.2	1.1	1.0	1.0						
-10							1.4	1.3	1.2	1.1	1.0	1.0						
- 9							1.5	1.4	1.2	1.2	1.0	1.0						
- 8							1.6	1.4	1.3	1.2	1.0	1.0						
- 7							1.8	1.5	1.3	1.2	1.0	1.0						
- 6							2.1	1.6	1.4	1.2	1.0	1.0						
- 5							2.5	1.8	1.4	1.3	1.0	1.0						
- 4							2.8	2.1	1.5	1.3	1.0	1.0						
- 3							2.7	2.4	1.7	1.4	1.0	1.0						
- 2							2.1	2.5	1.8	1.4	1.1	1.0						
- 1							1.1	2.3	1.9	1.5	1.1	1.0						
0							0.1	1.7	2.1	1.5	1.1	1.0						
+ 1							-0.1	1.0	2.1	1.7	1.1	1.0						
+ 2							-0.2	0.3	1.9	1.9	1.1	1.0						
+ 3							-0.3	-0.1	1.4	2.2	1.2	1.0						
+ 4							-0.3	-0.1	0.9	2.1	1.2	1.0						
+ 5							-0.2	-0.2	0.5	2.0	1.3	1.0						
+ 6							-0.2	-0.1	0.3	1.7	1.2	1.0						
+ 7							-0.1	-0.1	0.2	1.4	1.2	1.0						
+ 8							0.0	0.0	0.2	1.0	1.1	1.0						
+ 9							0.1	0.0	0.2	0.6	1.1	1.0						
+10							0.2	0.1	0.2	0.4	1.1	1.0						
+11							0.2	0.2	0.3	0.3	1.0	1.0						
+12							0.3	0.3	0.3	0.3	1.0	1.0						
MAX							2.9	2.6	2.2	2.2	1.3	1.0						

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

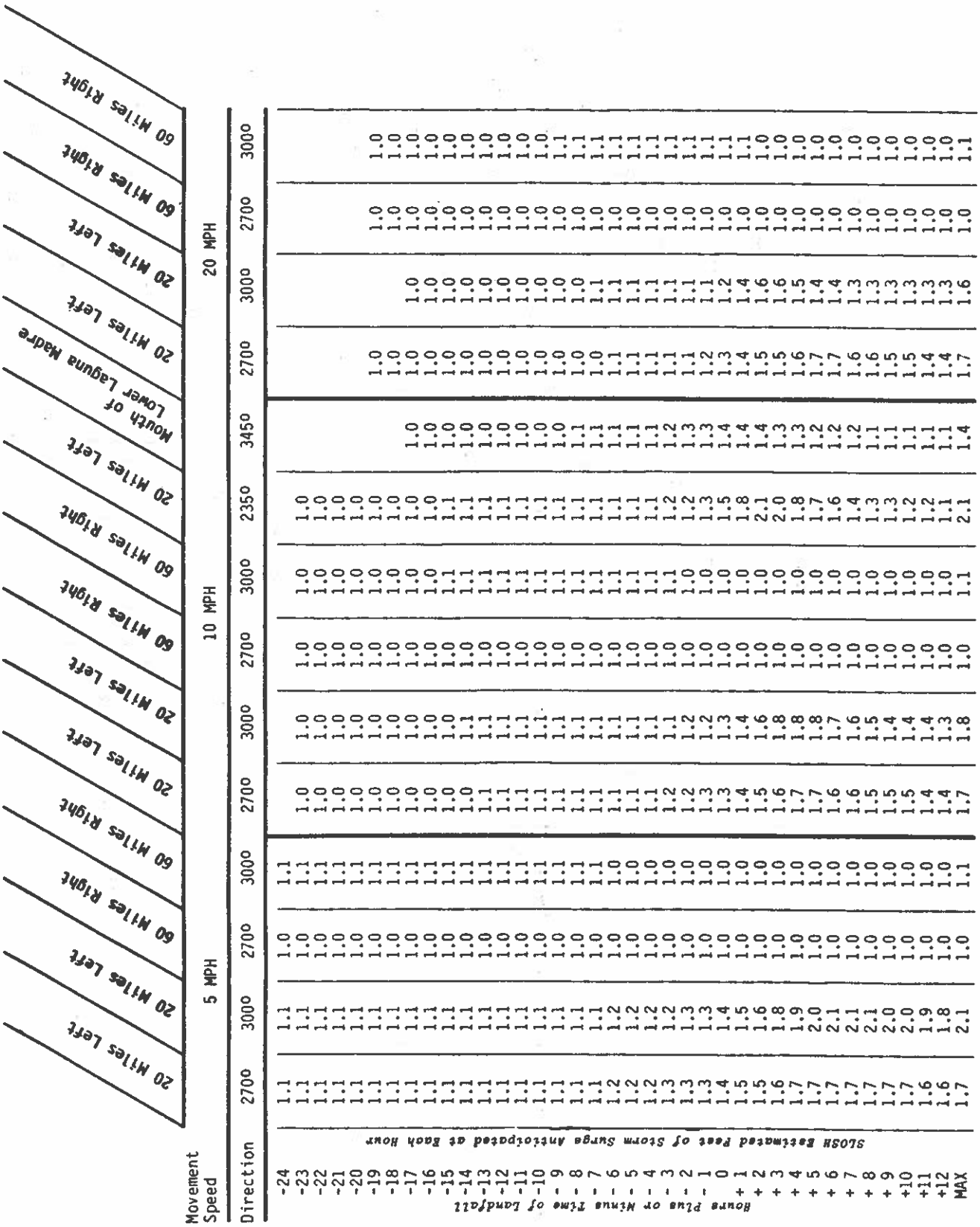
HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL 20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE



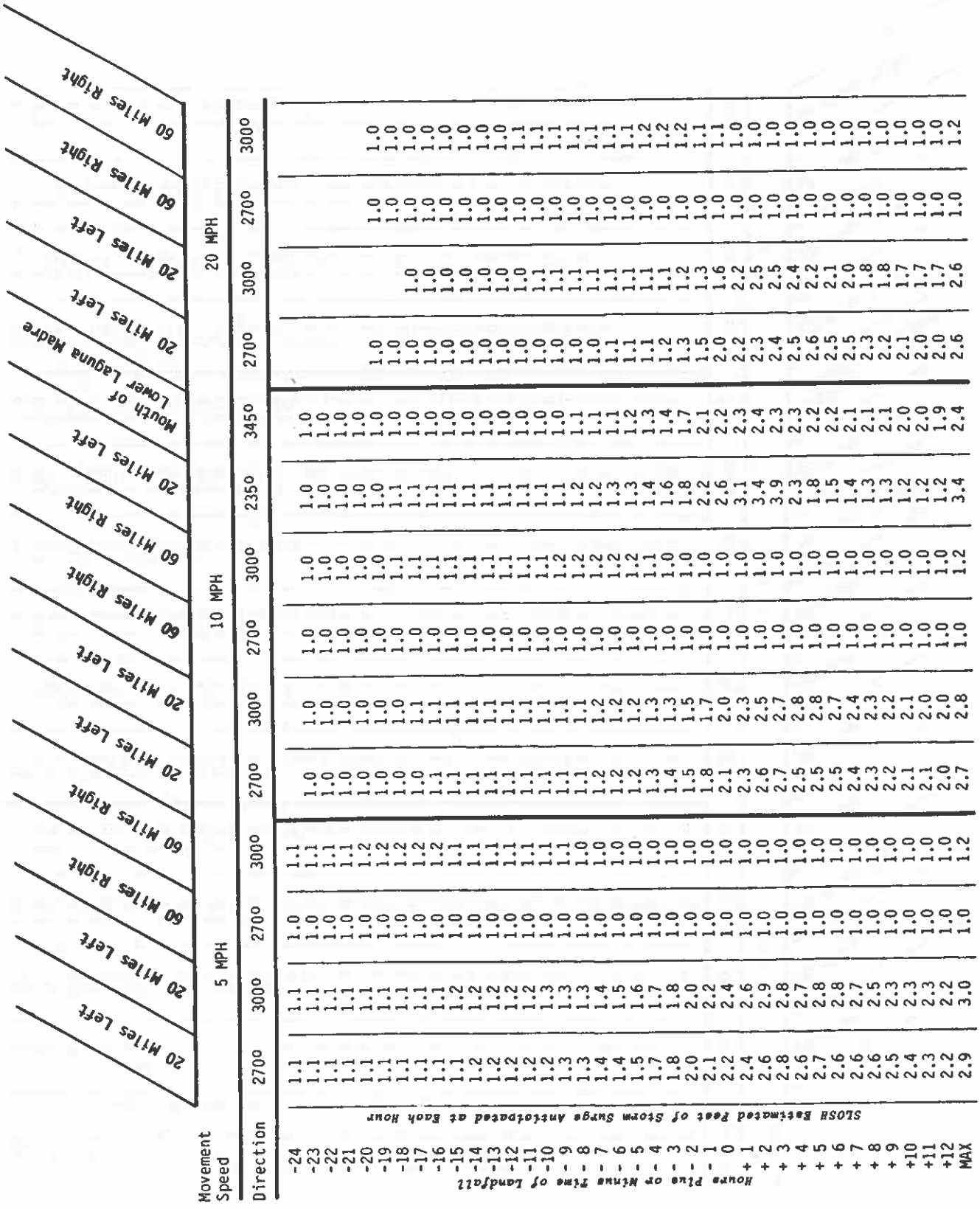
HOURLY SURGE CONDITIONS FOR HURRICANES MAKING LANDFALL
20 MILES LEFT, MOUTH OF LOWER LAGUNA MADRE



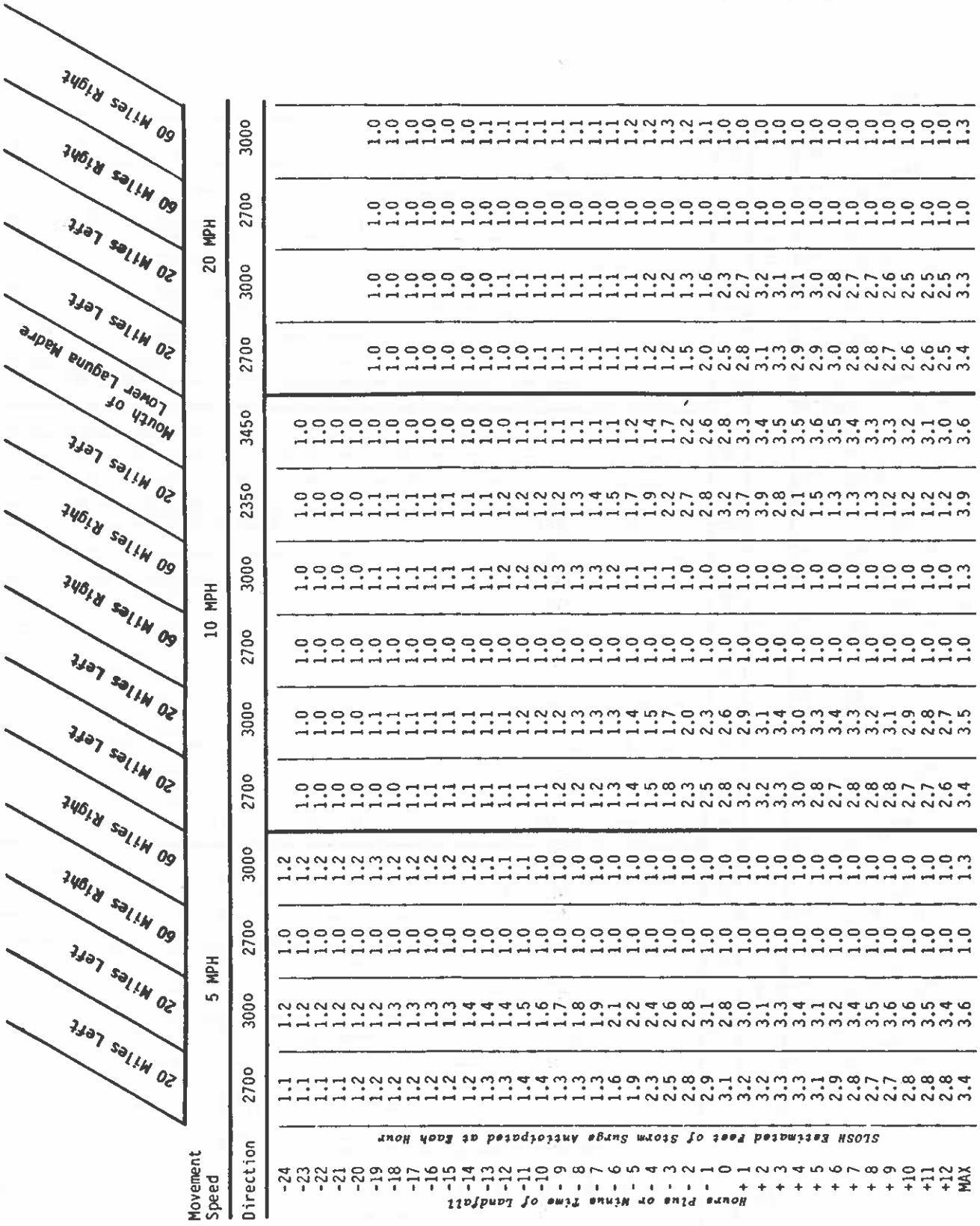
HOURLY SURGE CONDITIONS FOR HURRICANES (74-95 MPH) FOR MOUTH OF ARROYO COLORADO



HOURLY SURGE CONDITIONS FOR HURRICANES (96-110 MPH) FOR MOUTH OF ARROYO COLORADO



HOURLY SURGE CONDITIONS FOR HURRICANES (111-130 MPH) FOR MOUTH OF ARROYO COLORADO



HOURLY SURGE CONDITIONS FOR HURRICANES (131-155 MPH) FOR MOUTH OF ARROYO COLORADO

Hours Plus or Minus Time of Landfall	SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour																								
Direction	Movement Speed	5 MPH				10 MPH							20 MPH												
		20 Miles Left	20 Miles Left	20 Miles Left	20 Miles Left	Mouth of Lower Laguna Madre	20 Miles Left	60 Miles Right	60 Miles Right	60 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	60 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	60 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	60 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right
		2700	3000	2700	3000	2700	2350	3000	2700	3000	2700	3000	2700	3000	2700	3000	2700	3000	2700	3000	2700	3000	2700	3000	3000
-24		1.2	1.3	1.0	1.3	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-23		1.2	1.3	1.0	1.3	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-22		1.2	1.3	1.0	1.3	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-21		1.2	1.3	1.0	1.3	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-20		1.2	1.3	1.0	1.2	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-19		1.2	1.4	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-18		1.2	1.4	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-17		1.3	1.4	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-16		1.3	1.5	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-15		1.3	1.5	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-14		1.4	1.6	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-13		1.4	1.7	1.0	1.2	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-12		1.4	1.8	1.0	1.1	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-11		1.4	1.9	1.0	1.1	1.0		1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
-10		1.5	2.0	1.0	1.1	1.0		1.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 9		1.6	2.1	1.0	1.2	1.0		1.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 8		1.9	2.2	1.0	1.3	1.0		1.0	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 7		2.2	2.4	1.0	1.3	1.0		1.0	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 6		2.4	2.5	1.0	1.5	1.0		1.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 5		2.7	2.7	1.0	1.6	1.0		1.0	1.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 4		2.8	3.0	1.0	1.9	1.0		1.0	1.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 3		3.2	3.0	1.0	2.3	1.0		1.0	1.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 2		3.3	3.0	1.0	2.4	1.0		1.0	2.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- 1		3.3	3.3	1.0	3.0	1.0		1.0	2.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0		3.8	3.3	1.0	3.4	1.0		1.0	2.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 1		3.6	3.7	1.0	3.6	1.0		1.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 2		3.4	3.8	1.0	4.1	1.0		1.0	3.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 3		3.4	3.7	1.0	4.4	1.0		1.0	3.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 4		3.5	3.3	1.0	4.6	1.0		1.0	4.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 5		3.5	3.3	1.0	4.6	1.0		1.0	4.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 6		3.7	3.6	1.0	4.5	1.0		1.0	4.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 7		3.8	3.9	1.0	4.4	1.0		1.0	4.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 8		3.9	4.0	1.0	4.2	1.0		1.0	4.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+ 9		3.9	4.2	1.0	4.1	1.0		1.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+10		3.9	4.2	1.0	4.0	1.0		1.0	3.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+11		3.9	4.1	1.0	3.7	1.0		1.0	3.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+12		3.9	3.9	1.0	3.8	1.0		1.0	3.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
MAX		4.0	4.2	1.0	4.6	1.0		1.0	4.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.4	1.4

HOURLY SURGE CONDITIONS FOR HURRICANES (OVER 155 MPH) FOR MOUTH OF ARROYO COLORADO

Movement Speed	5 MPH				10 MPH				20 MPH			
Direction	20 Miles Left	20 Miles Left	20 Miles Left	60 Miles Right	20 Miles Left	20 Miles Left	20 Miles Left	60 Miles Right	20 Miles Left	Mouth of Lower Laguna Madre	20 Miles Left	60 Miles Right
	2700	3000	2700	3000	2700	3000	2700	3000	2700	3450	2350	3000
-24	1.1	1.1	1.0	1.1					1.0			1.0
-23	1.1	1.1	1.0	1.1					1.0			1.0
-22	1.1	1.1	1.0	1.1	1.0	1.0			1.0			1.0
-21	1.1	1.1	1.0	1.1	1.0	1.0			1.0			1.0
-20	1.1	1.1	1.0	1.1	1.0	1.0			1.0			1.0
-19	1.1	1.1	1.0	1.1	1.0	1.0			1.0			1.0
-18	1.1	1.1	1.0	1.2	1.0	1.1			1.0			1.0
-17	1.1	1.1	1.0	1.2	1.0	1.1			1.0			1.0
-16	1.1	1.1	1.0	1.2	1.0	1.1			1.0			1.0
-15	1.1	1.2	1.0	1.1	1.0	1.1			1.0			1.0
-14	1.1	1.2	1.0	1.1	1.0	1.1			1.0			1.0
-13	1.2	1.2	1.0	1.1	1.0	1.1			1.0			1.0
-12	1.2	1.2	1.0	1.1	1.0	1.1			1.0			1.0
-11	1.2	1.2	1.0	1.1	1.0	1.1			1.0			1.0
-10	1.2	1.2	1.0	1.1	1.0	1.1			1.0			1.0
- 9	1.2	1.3	1.0	1.1	1.0	1.1			1.0			1.0
- 8	1.2	1.3	1.0	1.1	1.0	1.1			1.0			1.0
- 7	1.3	1.4	1.0	1.1	1.0	1.1			1.1			1.0
- 6	1.3	1.4	1.0	1.1	1.0	1.2			1.1			1.0
- 5	1.2	1.5	1.0	1.2	1.0	1.2			1.2			1.0
- 4	1.2	1.6	1.0	1.2	1.0	1.2			1.2			1.0
- 3	1.1	1.8	1.0	1.3	1.0	1.3			1.3			1.0
- 2	1.1	2.0	1.0	1.4	1.0	1.4			1.5			1.0
- 1	1.1	2.1	1.0	1.6	1.0	1.6			1.7			1.0
0	1.1	2.4	1.0	1.9	1.0	1.9			2.0			1.0
+ 1	1.1	2.6	1.0	2.2	1.0	2.2			2.2			1.0
+ 2	1.1	2.7	1.0	2.6	1.0	2.6			2.3			1.0
+ 3	1.1	2.9	1.0	2.6	1.0	2.6			2.5			1.0
+ 4	1.1	3.0	1.0	2.8	1.0	2.8			2.5			1.0
+ 5	1.1	2.7	1.0	3.0	1.0	3.0			2.5			1.0
+ 6	1.2	2.9	1.0	2.5	1.0	2.5			2.3			1.0
+ 7	1.4	2.9	1.0	2.4	1.0	2.4			2.2			1.0
+ 8	1.6	2.8	1.0	2.3	1.0	2.3			2.2			1.0
+ 9	1.8	2.8	1.0	2.3	1.0	2.2			2.2			1.0
+10	1.9	2.9	1.0	2.2	1.0	2.2			2.2			1.0
+11	2.2	2.9	1.0	2.1	1.0	2.1			2.1			1.0
+12	2.2	2.8	1.0	2.1	1.0	2.1			2.1			1.0
MAX	2.3	3.0	1.0	3.0	1.0	3.0			2.6			1.2

Hours Plus or Minus Time of Landfall

SLOSH Estimated Peak of Storm Surge Anticipated at Each Hour

HOURLY SUSTAINED WIND SPEEDS FOR HURRICANES (74-95 MPH) FOR BROWNSVILLE INTERNATIONAL AIRPORT

Movement Speed	5 MPH				10 MPH						20 MPH						
Direction	270°	300°	270°	300°	270°	300°	270°	300°	235°	345°	270°	300°	270°	300°	270°	300°	
-24	18.6	18.2	17.6	22.9													
-23	19.2	18.7	18.2	23.7	10.8	10.7	10.7	12.5	11.7								
-22	20.0	19.6	18.7	24.6	11.1	11.1	11.1	13.0	12.2								
-21	20.7	20.2	19.2	25.5	11.8	11.6	11.4	13.7	12.7								
-20	21.6	20.9	19.9	26.4	12.2	12.1	12.0	14.3	13.4						7.0		7.8
-19	22.5	21.8	20.5	27.3	12.9	12.6	12.5	15.1	14.0		7.2				7.4		8.2
-18	23.4	22.9	21.2	28.3	13.5	13.3	13.1	16.0	14.8		7.5				7.8		8.7
-17	24.4	23.8	22.0	29.4	14.7	13.9	13.7	16.9	15.7	14.7	7.9	7.8			8.2		9.2
-16	25.6	24.8	22.6	30.4	15.0	14.7	14.4	17.8	16.6	15.6	8.5	8.3			8.7		10.0
-15	26.9	26.0	23.4	31.5	15.9	15.5	15.1	19.0	17.8	16.5	9.0	8.8			9.4		10.7
-14	28.2	27.4	24.2	32.5	16.8	16.4	16.0	20.2	19.0	17.6	9.6	9.4			9.9		11.4
-13	29.8	28.9	25.0	33.4	17.9	17.4	16.8	21.6	20.4	18.7	10.3	10.0			10.7		12.5
-12	31.3	30.4	25.9	34.3	19.1	18.6	17.8	23.0	22.0	20.2	10.9	10.8			11.4		13.5
-11	33.3	32.2	26.7	35.0	20.5	20.0	18.9	24.7	23.8	21.7	11.8	11.7			12.5		14.9
-10	35.2	34.2	27.6	35.6	22.1	21.6	20.0	26.5	26.0	23.5	12.9	10.4			13.5		16.5
- 9	37.6	36.4	28.3	35.9	24.1	23.4	21.3	28.3	28.5	25.7	14.0	13.9			14.8		18.5
- 8	40.0	38.9	29.3	36.1	26.3	25.5	22.8	30.3	31.6	28.3	15.7	15.5			16.5		20.7
- 7	42.9	41.6	30.0	36.3	29.0	28.1	24.2	32.2	35.2	31.3	17.7	17.3			18.3		23.4
- 6	46.0	44.6	30.7	36.4	32.2	31.1	25.9	33.8	39.7	35.2	20.5	19.6			20.5		26.8
- 5	49.5	48.0	31.3	35.9	36.3	34.8	27.4	34.6	44.9	39.8	24.4	22.6			23.1		30.4
- 4	53.2	51.7	31.9	35.2	41.2	39.5	29.0	34.5	50.8	45.5	30.0	26.8			26.1		33.4
- 3	57.1	55.6	32.2	34.5	47.5	45.6	30.4	34.7	56.4	52.4	38.0	32.6			29.1		31.6
- 2	60.7	59.4	32.5	33.7	55.0	52.7	31.3	33.2	59.3	59.9	49.0	41.3			30.9		29.4
- 1	63.6	62.5	32.5	32.8	63.1	60.5	31.3	31.3	56.7	66.2	63.0	55.0			28.0		25.0
0	64.6	63.7	32.6	31.9	67.6	65.9	31.1	29.5	56.2	67.3	70.0	70.5			25.4		22.1
+ 1	59.0	56.8	32.6	30.8	56.0	47.3	30.6	37.7	52.5	63.8	57.1	2.6			22.0		20.0
+ 2	48.0	40.3	32.8	30.3	45.4	3.4	29.5	26.4	47.8	58.2	44.0	47.1			20.3		18.3
+ 3	41.3	20.5	33.0	30.0	50.7	36.1	28.6	25.5	44.5	55.6	43.7	45.0			18.5		16.5
+ 4	37.4	2.9	32.5	29.1	50.6	46.0	27.2	23.9	39.7	49.8	45.8	35.8			16.6		14.8
+ 5	37.3	16.9	31.6	28.1	46.9	45.4	25.5	22.4	35.4	44.1	47.2	28.7			14.7		13.0
+ 6	39.3	27.4	30.0	26.5	42.1	41.7	23.5	20.5	31.3	38.7	43.0	23.4			13.7		12.1
+ 7	41.9	34.8	29.8	26.1	38.6	38.6	22.6	19.6	28.9	35.2	34.8	20.2			12.1		10.8
+ 8	41.6	37.6	28.1	24.6	33.8	34.1	20.8	17.9	25.7	31.1	25.6	17.0			10.7		9.6
+ 9	40.3	38.0	26.5	23.0	29.6	29.9	19.0	16.4	22.9	27.3	19.0	14.6			9.4		8.5
+10	38.1	36.8	24.7	21.6	26.1	26.3	17.3	15.0	20.4	24.2	11.1	13.0			8.7		8.1
+11	37.8	37.2	24.2	20.9	23.9	24.2	16.4	14.2	19.0	22.2	12.0	11.2			8.3		7.5
+12	36.7	36.4	23.8	20.5	22.2	22.5	15.7	13.8	17.9	20.8	10.3	10.4			30.9		33.7
MAX	64.6	63.7	33.3	36.4	67.6	65.9	31.5	34.8	59.3	67.6	69.9	70.5					

Hours Plus or Minus Time of Landfall

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

20 Miles Left
20 Miles Left
20 Miles Left
20 Miles Left
60 Miles Right
60 Miles Right
60 Miles Right
60 Miles Right
20 Miles Left
20 Miles Left
20 Miles Left
20 Miles Left
60 Miles Right
60 Miles Right
60 Miles Right
60 Miles Right

South of Lower Laguna Madre

HOURLY SUSTAINED WIND SPEEDS FOR HURRICANES (96-110 MPH) FOR BROWNSVILLE INTERNATIONAL AIRPORT

Hours Plus or Minus Time of Landfall

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5 MPH				10 MPH						20 MPH			
	20 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	20 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	20 Miles Left	Mouth of Lower Laguna Madre	20 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right
Direction	2700	3000	2700	3000	2700	3000	2700	3000	2350	3450	2700	3000	2700	3000
-24	26.8	26.3	25.6	33.3										
-23	27.8	27.2	26.3	34.5	15.3	15.2	15.2	17.9	16.6	15.9				
-22	28.7	28.1	27.2	35.8	16.0	15.7	15.9	18.7	17.4	16.5				
-21	30.0	29.1	27.9	37.0	16.8	16.5	16.5	19.6	18.2	17.3				
-20	31.1	30.3	28.9	38.5	17.4	17.2	17.2	20.7	19.1	18.1				
-19	32.4	31.6	29.8	39.9	18.3	17.9	17.9	21.7	20.2	19.0	10.0		75.1	10.9
-18	33.8	32.9	30.8	41.3	19.2	18.9	18.9	22.9	21.3	19.9	10.5		10.4	11.6
-17	35.2	34.3	31.9	42.9	20.2	19.9	19.6	24.3	22.5	20.9	11.1	10.9	10.9	12.2
-16	36.9	35.9	32.9	44.3	21.3	20.9	20.7	25.7	23.9	22.2	11.7	11.6	11.6	13.0
-15	38.7	37.7	34.1	45.9	22.6	22.1	21.7	27.3	25.5	23.5	12.5	12.4	12.2	13.9
-14	40.7	39.7	35.2	47.5	23.9	23.4	22.9	29.1	27.2	25.0	13.4	13.1	13.1	15.0
-13	42.9	41.7	36.4	48.9	25.5	25.0	24.2	31.1	29.3	26.8	14.3	14.0	14.0	16.1
-12	45.4	44.1	37.6	50.2	27.3	26.7	25.6	33.3	31.5	28.6	15.3	15.1	15.0	17.6
-11	48.0	46.5	38.9	51.4	29.3	28.6	27.2	35.8	34.2	30.9	16.5	16.4	16.1	19.1
-10	51.0	49.5	40.2	52.3	31.6	30.8	28.9	38.4	37.3	33.5	17.9	17.8	17.6	21.1
- 9	54.2	52.7	41.3	52.9	34.3	33.4	30.8	41.2	41.0	36.7	19.6	19.5	19.1	23.3
- 8	57.9	56.2	42.6	53.3	37.6	36.5	32.9	44.2	45.5	40.3	21.8	21.6	21.1	26.0
- 7	61.9	60.2	43.8	53.7	41.5	40.2	35.1	47.1	50.8	44.7	24.7	24.2	23.3	29.4
- 6	66.4	64.6	44.9	53.8	46.0	44.6	37.4	49.5	57.3	50.1	28.5	27.4	26.0	33.4
- 5	71.4	69.6	45.9	53.3	51.7	50.1	39.9	51.1	65.0	56.7	33.8	31.7	29.1	38.4
- 4	76.7	74.9	46.7	52.4	58.9	56.8	42.3	51.6	73.7	64.7	41.6	37.6	32.9	43.8
- 3	82.2	80.5	47.3	51.4	67.7	65.1	44.3	52.3	82.1	74.4	52.8	45.8	37.3	48.4
- 2	87.4	85.9	47.8	50.2	78.3	75.5	45.9	50.2	87.0	85.0	68.9	58.2	41.9	48.4
- 1	91.5	90.4	48.1	48.9	89.7	87.1	46.5	47.7	84.9	93.7	88.4	77.6	44.7	46.2
0	92.8	91.9	48.4	47.5	95.8	94.0	46.8	45.1	84.4	95.6	98.1	98.4	43.7	40.4
+ 1	82.4	79.3	48.5	46.2	79.3	67.2	46.4	42.6	79.7	90.5	78.3	3.8	40.0	35.9
+ 2	68.9	58.0	47.8	44.5	64.4	5.1	44.1	39.8	71.6	82.9	62.9	71.5	35.4	31.7
+ 3	55.1	27.3	46.4	42.5	68.5	50.1	41.3	36.7	63.1	75.8	58.2	63.4	31.2	27.6
+ 4	49.5	3.9	44.5	40.0	68.2	63.1	38.2	33.5	54.9	67.1	61.1	49.1	27.3	23.9
+ 5	49.1	22.8	41.9	37.4	62.0	60.6	34.8	30.3	47.5	58.0	62.4	38.4	23.7	20.7
+ 6	49.3	34.6	39.1	34.6	52.5	52.3	30.6	26.4	39.8	48.4	54.9	30.6	20.3	17.7
+ 7	52.0	43.6	37.6	32.9	46.9	47.2	28.3	24.4	35.6	42.9	43.4	25.6	17.9	15.9
+ 8	50.7	46.0	35.1	30.7	40.6	41.0	25.6	22.1	31.2	37.2	31.6	21.5	15.7	13.9
+ 9	48.6	46.2	32.4	28.2	36.0	36.4	23.7	20.3	28.1	33.0	23.0	17.8	13.5	12.1
+10	46.9	45.6	30.7	26.7	32.0	32.4	21.7	18.7	25.4	29.5	17.7	15.5	12.1	10.8
+11	42.6	42.0	28.0	24.3	27.6	28.0	19.2	16.6	22.1	25.6	13.7	13.1	10.4	9.5
+12	40.0	39.8	26.3	22.8	24.6	24.8	17.7	15.3	20.0	23.0	11.3	11.6	9.4	8.6
MAX	92.9	91.9	48.6	54.0	95.8	94.0	47.2	52.4	87.1	95.9	98.2	98.4	44.9	49.1

HOURLY SUSTAINED WIND SPEEDS FOR HURRICANES (111-130 MPH) FOR BROWNSVILLE INTERNATIONAL AIRPORT

SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour

Movement Speed	5 MPH				10 MPH						20 MPH			
	20 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	20 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right	20 Miles Left	Mouth of Lower Laguna Madre	20 Miles Left	20 Miles Left	60 Miles Right	60 Miles Right
Direction / Hours Plus or Minus Time of Landfall	270°	300°	270°	300°	270°	300°	270°	300°	235°	345°	270°	300°	270°	300°
-24	33.3	32.6	31.9	41.6										
-23	34.5	33.8	32.8	43.0	19.0	18.7	19.0	22.2	20.7	19.5				
-22	35.8	35.0	33.8	44.6	19.8	19.5	19.6	23.3	21.6	20.4				
-21	37.2	36.3	34.8	46.3	20.7	20.4	20.5	24.4	22.6	21.3				
-20	38.6	37.7	36.0	48.0	21.6	21.3	21.3	25.6	23.8	22.4	12.2	12.1	12.1	13.4
-19	40.3	39.3	37.2	49.8	22.6	22.2	22.4	27.0	25.0	23.4	12.9	12.7	12.7	14.2
-18	42.0	41.0	38.5	51.6	23.8	23.4	23.4	28.5	26.4	24.6	13.7	13.4	13.5	15.1
-17	43.8	42.6	39.8	53.6	25.0	24.6	24.4	30.2	28.0	26.0	14.4	14.2	14.3	16.0
-16	45.9	44.7	41.1	55.5	26.4	25.9	25.7	32.0	29.6	27.4	15.3	15.1	15.1	17.2
-15	48.2	46.8	42.5	57.5	28.0	27.3	27.0	33.9	31.6	29.1	16.4	16.1	16.1	18.5
-14	50.6	49.3	43.9	59.3	29.6	29.0	28.5	36.3	33.7	30.9	17.6	17.2	17.2	19.9
-13	53.3	51.9	45.5	61.1	31.6	30.8	30.2	38.7	36.3	33.0	18.9	18.5	18.5	21.6
-12	56.3	54.7	46.9	62.8	33.8	33.0	31.9	41.5	39.1	35.5	20.3	20.0	19.9	23.5
-11	59.7	58.0	48.5	64.2	36.3	35.4	33.8	44.5	42.4	38.2	22.1	21.8	21.6	25.9
-10	63.3	61.5	50.2	65.5	39.1	38.1	36.0	47.8	46.3	41.5	24.2	23.9	23.5	28.7
- 9	67.3	65.5	51.7	66.3	42.5	41.3	38.4	51.5	51.0	45.2	26.8	26.5	25.9	32.2
- 8	71.9	70.0	53.3	67.0	46.5	45.2	41.0	55.1	56.6	49.8	30.2	29.6	28.7	36.4
- 7	77.0	74.9	54.7	67.5	51.2	49.8	43.8	58.8	63.2	55.3	34.8	33.7	32.1	41.5
- 6	82.6	80.3	56.2	67.6	57.1	55.3	46.7	62.0	71.2	61.9	41.3	39.0	36.0	47.6
- 5	88.7	86.5	57.5	67.0	64.1	62.0	49.8	64.2	80.9	70.0	50.8	46.2	40.8	54.5
- 4	95.3	93.1	58.5	66.0	72.8	70.3	52.8	65.3	91.9	79.8	64.6	56.3	46.4	60.6
- 3	102.1	100.1	59.3	64.6	83.7	80.7	55.5	66.0	102.6	91.8	84.4	71.6	52.1	61.8
- 2	108.6	106.9	59.9	63.2	96.9	93.7	57.6	63.7	109.1	104.8	108.3	95.4	56.0	59.5
- 1	113.5	112.3	60.5	61.6	110.6	107.9	58.6	60.7	107.1	115.4	120.5	120.6	56.0	52.8
0	115.2	114.1	60.7	59.9	118.2	116.4	59.2	57.5	106.7	117.9	97.9	5.1	49.8	45.0
+ 1	104.3	100.8	58.6	56.4	97.4	82.9	56.8	52.5	99.1	110.2	81.0	92.0	43.9	39.0
+ 2	88.3	75.0	57.3	53.4	82.6	6.8	53.3	48.1	89.2	103.5	75.8	76.4	37.4	32.6
+ 3	71.9	36.4	54.0	49.3	87.6	66.7	48.5	42.8	75.9	92.4	80.7	57.3	32.4	27.8
+ 4	67.1	5.5	51.2	46.2	86.3	82.3	44.5	38.6	65.1	80.7	81.9	44.7	28.2	24.2
+ 5	69.2	33.9	49.0	43.6	77.8	78.1	41.1	35.2	56.6	69.8	69.7	35.9	24.4	21.2
+ 6	71.6	53.3	46.5	40.8	67.3	68.5	37.7	32.1	49.1	60.1	52.0	29.9	21.6	18.9
+ 7	72.7	63.7	44.6	38.7	58.6	59.8	34.8	29.6	43.7	52.5	37.4	35.4	19.2	16.9
+ 8	77.6	67.1	42.5	36.8	51.1	52.1	32.2	27.3	38.9	46.0	27.7	21.7	17.0	15.1
+ 9	68.0	66.4	40.4	34.7	44.7	45.6	29.6	25.1	34.7	40.7	21.2	19.0	15.2	13.7
+10	63.7	63.6	38.2	32.8	39.4	40.2	27.2	23.1	31.1	36.0	17.0	16.6	13.7	12.2
+11	59.0	59.4	35.9	30.7	34.7	35.5	24.8	21.2	28.0	32.1	14.3	14.6	12.2	11.1
+12	54.2	54.9	33.7	28.7	30.8	31.3	22.6	19.4	25.1	28.6	120.5	120.6	56.6	62.9
MAX	115.3	114.3	60.7	67.6	118.2	116.4	59.5	66.2	109.2	118.2				

HOURLY SUSTAINED WIND SPEEDS FOR HURRICANES (131-155 MPH) FOR BROWNSVILLE INTERNATIONAL AIRPORT

Movement Speed	5 MPH			10 MPH					20 MPH				
Direction	270°	300°	270°	300°	270°	300°	235°	345°	270°	300°	270°	300°	
	SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour												
Hours Plus or Minus Time of Landfall													
-24	38.9	38.0	37.2	48.5									
-23	40.2	39.4	38.4	50.3	22.1	21.8	22.1	25.9					
-22	41.7	40.8	39.5	52.1	23.0	22.8	22.9	27.2					
-21	43.3	42.3	40.7	54.1	24.1	23.7	23.9	28.5					
-20	45.1	43.9	42.1	56.0	25.1	24.7	24.8	29.9					
-19	46.9	45.8	43.4	58.1	26.4	25.9	26.0	31.2			14.2	14.0	15.6
-18	49.0	47.7	44.9	60.3	27.7	27.2	27.2	32.9			15.0	14.8	16.4
-17	51.2	49.8	46.4	62.5	29.1	28.6	28.5	35.1			15.7	15.6	17.4
-16	53.6	52.1	48.0	64.9	30.7	30.2	29.9	37.3			16.6	16.5	18.6
-15	56.2	54.7	50.0	67.1	32.5	31.9	31.5	39.7			17.7	17.6	19.9
-14	59.0	57.5	51.4	69.4	34.5	33.8	33.3	42.3			18.9	18.6	21.3
-13	62.1	60.6	53.2	71.5	36.7	35.9	35.1	45.2			20.3	19.9	23.0
-12	65.7	64.0	54.9	73.6	39.3	38.4	37.2	48.4			21.7	21.5	25.1
-11	69.6	67.6	56.8	75.3	42.1	41.2	39.5	51.4			23.4	23.1	27.3
-10	73.8	71.8	58.6	76.7	45.5	44.3	42.0	55.9			25.5	25.2	30.2
- 9	78.5	76.4	60.5	77.7	49.4	48.1	44.9	60.2			28.0	27.7	33.4
- 8	83.9	81.6	62.3	78.5	54.1	52.7	47.8	64.5			30.9	30.7	36.4
- 7	89.7	87.4	64.1	79.2	59.7	58.0	51.1	68.8			35.0	34.5	42.3
- 6	96.2	93.9	65.7	79.3	66.3	64.4	54.6	72.7			40.3	39.0	48.4
- 5	103.4	100.9	67.2	78.5	74.5	72.2	58.2	75.4			47.8	45.1	55.5
- 4	111.0	108.7	68.5	77.4	84.8	81.9	61.8	76.8			58.8	53.4	63.7
- 3	119.0	117.0	70.0	75.9	97.4	94.1	65.0	77.8			74.8	65.3	71.0
- 2	126.4	124.5	70.3	74.2	112.5	109.1	67.5	75.1			97.6	83.1	73.3
- 1	132.2	130.9	70.9	72.4	128.6	125.6	68.9	71.8			125.3	110.8	70.4
0	134.2	133.1	71.2	70.5	137.2	135.3	69.7	68.0			139.5	139.5	63.3
+ 1	115.1	116.2	62.5	60.2	108.0	92.6	60.7	56.2			109.1	5.9	48.9
+ 2	98.2	84.4	58.6	54.1	92.3	8.0	54.1	48.8			90.6	100.1	39.7
+ 3	85.3	44.6	54.9	49.5	100.0	79.7	48.9	43.0			90.1	79.8	32.9
+ 4	82.7	7.3	51.6	45.8	95.8	94.4	44.3	38.4			96.2	57.9	27.6
+ 5	85.4	45.4	47.5	41.9	81.8	83.9	39.8	33.8			92.2	43.0	23.1
+ 6	86.7	70.0	43.4	38.2	67.3	69.6	35.5	29.9			70.6	33.3	19.6
+ 7	82.7	76.2	42.5	36.9	57.7	59.4	33.3	28.0			50.7	28.1	17.7
+ 8	78.5	76.4	41.6	35.9	50.7	52.1	31.5	26.5			36.1	24.4	16.4
+ 9	73.6	73.3	40.3	34.7	45.0	46.2	29.6	25.0			27.2	21.6	15.1
+10	67.0	67.2	38.9	33.2	40.0	41.0	27.6	23.4			20.0	19.1	13.8
+11	61.9	62.4	37.2	31.7	35.9	36.7	25.6	21.8			17.4	17.2	12.6
+12	56.9	57.6	35.4	30.0	32.2	32.9	23.8	20.4			15.0	15.3	11.6
MAX	134.2	133.3	71.2	79.4	137.2	135.3	69.7	77.9			139.5	139.5	74.2

20 Miles Left
20 Miles Left
20 Miles Left
20 Miles Left
Mouth of Lower Laguna Madre
20 Miles Left
60 Miles Right
20 Miles Left
60 Miles Right
20 Miles Left
60 Miles Right
20 Miles Left
60 Miles Right
20 Miles Left
60 Miles Right
60 Miles Right

HOURLY SUSTAINED WIND SPEEDS FOR HURRICANES (OVER 155 MPH) FOR BROWNSVILLE INTERNATIONAL AIRPORT

Movement Speed	5 MPH				10 MPH				20 MPH						
Direction	2700	3000	2700	3000	2700	3000	2700	3000	2350	3450	2700	3000	2700	3000	
	SLOSH Estimated Feet of Storm Surge Anticipated at Each Hour														
Hours Plus or Minus Time of Landfall															
-24	25.5	25.0	24.4	32.2											20 Miles Left
-23	26.4	25.9	25.2	33.5	14.3	14.2	14.3	16.9							20 Miles Left
-22	27.4	26.8	26.0	34.8	15.0	14.7	15.0	17.7							20 Miles Left
-21	28.5	27.8	26.9	36.1	15.6	15.3	15.5	18.6							20 Miles Left
-20	29.8	29.0	27.8	37.7	16.3	16.1	16.3	19.5							20 Miles Left
-19	30.9	30.2	28.7	39.1	17.0	16.5	16.9	20.5			9.1	9.0	9.1	10.0	Mouth of Lower Laguna Madre
-18	32.4	31.6	29.8	40.8	17.9	17.7	17.7	21.7			9.6	9.5	9.6	10.7	20 Miles Left
-17	33.9	33.0	30.8	42.5	18.9	18.6	18.6	23.0			10.1	10.0	10.1	11.3	20 Miles Left
-16	35.6	34.7	31.9	44.2	19.9	19.6	19.5	24.4			10.8	10.7	10.7	12.1	20 Miles Left
-15	37.6	36.5	33.0	46.0	21.2	20.7	20.7	26.1			11.4	11.3	11.3	12.9	20 Miles Left
-14	39.7	38.5	34.3	47.7	22.5	22.0	21.7	27.4			12.2	12.0	12.1	13.9	20 Miles Left
-13	41.9	40.7	35.5	49.5	23.9	23.4	23.0	29.9			13.0	12.9	13.0	15.0	60 Miles Right
-12	44.5	43.2	36.8	51.1	25.7	25.1	24.4	32.2			14.0	13.9	13.9	16.3	60 Miles Right
-11	47.5	46.0	38.2	52.7	27.7	27.0	26.0	34.8			15.2	15.0	15.1	17.8	60 Miles Right
-10	50.7	49.3	39.5	53.8	29.9	29.3	27.8	35.6			16.5	16.4	16.4	19.6	60 Miles Right
- 9	54.5	52.9	41.0	54.7	32.6	31.9	29.6	40.8			18.1	17.9	17.8	21.8	60 Miles Right
- 8	58.9	57.2	42.4	55.4	35.9	35.0	31.9	44.1			20.0	19.9	19.6	24.6	60 Miles Right
- 7	64.0	62.1	43.7	55.6	39.9	38.7	34.2	47.6			22.6	22.4	21.8	28.0	60 Miles Right
- 6	70.1	68.0	45.0	55.6	44.9	43.4	36.8	50.8			26.3	25.5	23.1	32.2	60 Miles Right
- 5	77.2	74.9	46.2	54.9	51.1	49.4	39.4	53.4			31.3	29.6	24.6	32.6	60 Miles Right
- 4	85.7	83.3	47.2	54.0	59.4	57.2	42.1	54.5			39.0	35.4	27.8	43.8	60 Miles Right
- 3	96.1	93.5	48.1	52.9	70.6	68.0	44.7	54.7			50.8	43.9	31.9	50.3	60 Miles Right
- 2	108.7	106.2	48.8	51.7	86.5	83.2	46.9	52.3			69.8	57.4	36.5	53.3	60 Miles Right
- 1	123.8	121.9	49.0	50.3	109.7	106.1	48.2	50.1			100.9	83.7	41.9	49.4	60 Miles Right
0	140.9	141.1	49.3	48.8	142.7	141.4	48.2	47.3			143.3	142.2	46.5	44.5	60 Miles Right
+ 1	131.7	133.5	42.6	40.6	141.6	139.6	40.7	38.0			139.4	12.9	36.1	33.0	20 Miles Left
+ 2	127.9	124.3	41.0	38.2	128.8	15.7	38.1	34.3			126.5	104.7	31.7	27.8	20 Miles Left
+ 3	118.2	76.3	40.4	36.9	114.4	110.9	36.5	31.9			119.2	65.7	28.3	24.2	20 Miles Left
+ 4	108.3	12.1	39.5	35.0	91.5	97.5	34.1	29.1			109.3	45.2	24.8	20.8	20 Miles Left
+ 5	103.0	66.4	38.6	33.5	73.2	97.5	32.0	26.9			89.7	34.5	21.8	18.3	20 Miles Left
+ 6	96.2	87.5	37.3	32.0	59.4	62.3	29.6	25.2			63.8	27.6	19.1	16.1	20 Miles Left
+ 7	89.7	89.6	37.6	31.7	51.5	53.4	28.6	23.9			44.7	23.8	17.7	15.1	20 Miles Left
+ 8	82.8	85.2	37.3	31.3	45.5	46.9	27.6	23.0			32.0	21.1	16.3	14.0	20 Miles Left
+ 9	75.1	77.5	36.8	31.1	40.8	42.0	26.4	22.1			24.3	19.0	15.2	13.3	20 Miles Left
+10	69.0	71.2	35.9	30.2	36.7	37.6	25.0	21.1			19.1	17.2	13.9	12.4	20 Miles Left
+11	62.4	64.2	34.6	29.1	33.2	33.9	23.5	19.9			15.9	15.5	12.9	11.4	20 Miles Left
+12	57.2	58.8	33.2	28.0	29.9	30.6	22.0	18.7			13.7	14.0	11.8	10.7	20 Miles Left
MAX	140.9	141.3	49.3	55.9	148.3	150.0	48.4	55.0			145.5	163.2	47.7	53.4	60 Miles Right

APPENDIX D
SOP

STEP ONE

Estimate the time the eye is to cross coastline. This time can be estimated by dividing the distance of the eye from the probable point of landfall by its forward movement speed. For safety purposes, other possible points of landfall that could place your area in **greater danger** should also be considered.

Example One: If a storm 250 miles from Port Isabel were heading toward Port Isabel at 5 mph, then the estimated time the eye would cross the coastline would be 250 divided by 5, or 50 hours.

50 hours
5 mph ⟌ 250 miles from Port Isabel

Example Two: If a storm were 300 miles from Port Isabel and heading toward Corpus Christi at 5 mph, you would want to consider what would happen if the hurricane would change its course and head toward Port Isabel. Divide the distance by the forward movement speed to estimate the time the eye could cross the coastline; this would be 60 hours.

60 hours
5 mph ⟌ 300 miles from Port Isabel

Now place those hours in the upper portion of the Step One box and count forward in time and place the estimated day and hour the eye of

the hurricane will cross the coastline in the lower portion of the Step One box (D-6).

STEP TWO

Determine the possible cut-off times for critical data points that affect your area. Data point locations can be found in the map located inside the back cover of this report. You will have to determine which data point or points can indicate a blockage on the evacuation route or routes controlling your area, or which data points represent areas where wind gusting conditions could make travel hazardous in the zone. Suggested data points by zone are:

	Surge	Wind
Cameron		
C_A	---	13, 14
C_B	---	17, 20, 21
C_1	1	1
C_2	5, 6, 8, 9, 10, 11	4, 5, 6, 15
C_3	2, 3	2, 3
C_4	6	12
Willacy		
W_A	---	18, 19, 22
W_1	2, 3	2, 3
W_2	7	7

These point locations are numbered and can be found by these numbers in Appendix B. In Appendix B, route cut-off times are given by

storm type. There are 70 storm types displayed for each data point. Your first step is to find the **row** with the appropriate wind speed. The classifications are:

74- 95 mph
96-110 mph
111-130 mph
131 mph and over

When you have found the proper row, you can **find which of the six columns** to use by the direction the hurricane is heading (in degrees) and its anticipated point of landfall (See Figure 1-2 for Simulated Hurricane Tracks). Since you may not find the exact hurricane direction or point of landfall, you may have to do some estimating. These storms were chosen because they can pose the greatest threats to the area, however, with the changeable nature of hurricanes, it is well to plan on the worst case. Once you have found the row and column, the movement speed will determine the **exact column.** The route cut-off time should be determined either by surge penetration or by wind gusts for car tipping (65-70 mph), whichever has the earliest cutoff time.

Now place the number of hours in the top half of the Step Two box. If it is a minus figure, count backwards in time (if it is a rare plus figure, place a "0" in time) and figure the estimated day and hour the evacuation route will be blocked and place that day and hour in the bottom half of the Step Two box.

STEP THREE

Estimate the probable evacuation time needed to evacuate your area and/or zones. This can be done by determining the location of zones in your area on the enclosed fold-out map. This fold-out also gives the

estimated times for two differing storm conditions. If winds are 130 mph or less, use the estimated hours in the first column; if winds are in excess of 130 mph, use the estimated hours in the second column.

Now place the number of hours in the top of the Step Three box and go backward in time and place the proper day and hour in the lower portion of the box.

STEP FOUR

Adjusted time estimates consist of adding three hours to Step Three. It is estimated that it will take about one hour to warn the people to evacuate, another hour for them to prepare to evacuate, and another hour to establish a monitoring system that will permit maximum use of the evacuation routes.

Now place the number of hours in the top of Step Four box and then go backward in time and place the proper day and hour in the lower portion of the box.

STEP FIVE

Final adjustment factors should include the unpredictability of hurricane intensification or weakening, varying forward movement speed, changing direction, and evacuation route blockage by unexpected rainfall.

Now place the number of hours (if any) in the top of the Step Five box and then go backwards in time and place the proper day and hour in the lower portion of the box. This now gives you the time the evacuation needs to begin to evacuate the residents in your area and/or

zones. To facilitate traffic control, the Texas Department of Public Safety regional office needs to know when an evacuation is going to be recommended.

CAUTION

Your evacuation needs to be coordinated with other areas that may be affected by evacuation of your area.

Example One: You are located some distance inland and you decide to play it safe and call for an evacuation of your area long before it would be needed. How could this possibly affect any other area? It could cause confusion in more vulnerable areas where an evacuation has not yet been recommended.

Example Two: You are located in a vulnerable area and you recommend an evacuation long before the circumstances would indicate the need for an evacuation. What effect could this have on other areas? It could start persons evacuating in the areas through which your evacuees would travel.

ESTIMATED EVACUATION TIMES

	Advisory No. ___ Day ___ Hour ___	Advisory No. ___ Day ___ Hour ___	Advisory No. ___ Day ___ Hour ___	Advisory No. ___ Day ___ Hour ___
Step One: Add time remaining before landfall:	+ (hours) (Day) (Hour)	+ (hours) (Day) (Hour)	+ (hours) (Day) (Hour)	+ (hours) (Day) (Hour)
Step Two: Subtract time before landfall evacuation routes blocked:	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)
Step Three: Subtract evacuation time:	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)
Step Four: Subtract time needed for information dissemination and packing:	-3 (hours) (Day) (Hour)	-3 (hours) (Day) (Hour)	-3 (hours) (Day) (Hour)	-3 (hours) (Day) (Hour)
Step Five: Subtract any final adjustment time:	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)	- (hours) (Day) (Hour)

Note: Compare the results of Step Five to the time the advisory was issued to obtain the estimated safe time remaing before an evacuation decision needs to be made. For more information on evacution time estimating procedures see Section Five. Use of 24 hour mode, i.e., 20:00 in place of 8:00 pm, etc., will simplify calculations.

APPENDIX E
ESTED-TX

ESTED-TX is an acronym for a computerized program to **E**stimate **S**afe **T**ime remaining before **E**vacuation **D**ecisions (Te**X**as Coast) must be made. The program is not designed to tell when you need to recommend an evacuation, but how much "safe" time remains before it will be too late to recommend an evacuation.

ESTED-TX is currently available for most computers which use the C/PM operating system (C/PM is a registered trademark of Digital Research). It is also available for IBM compatible computers and Apple computers. Additional information regarding the availability of the program can be obtained by contacting the Texas Agricultural Extension Service of The Texas A&M University System. Inquiries should be addressed to:

Computer Services Unit--TAEX
USDA Building, Room 133
Texas A&M University
College Station, Texas 77843
Phone: (409) 845-3929

This section describes:

1. What is **ESTED-TX**?
2. Cautions Using **ESTED-TX**
3. Understanding Internal Calculations of **ESTED-TX**
4. How To Use **ESTED-TX**
5. Understanding **ESTED-TX** results

What Is ESTED-TX?

ESTED-TX takes information provided in each hurricane advisory issued by the National Hurricane Center and figures the remaining safe time before an evacuation decision needs to be made for a particular coastal area.

The program considers five conditions for indicating safe time to decision makers. These conditions are:

1. Storm surge at low tide
2. Storm surge at mean sea level
3. Storm surge at high tide
4. Wind gusting conditions that could tip cars (gusts of 65-70 mph)
5. Wind gusting conditions that could tip high profile vehicles (gusts of 50-55 mph)

The actual decision to recommend evacuation should consider the potential death and destruction the hurricane can inflict upon the area in question.

Because hurricanes can increase or decrease their forward movement speed and/or their windspeed, these critical factors can be changed in anticipation of the actual hurricane conditons changing. The decision maker is given the opportunity to "simulate" his own scenarios in order to be prepared for all possibilities.

Cautions Using ESTED-TX

Cautions regarding use of the program include the following:

1. The program does not consider wave action in evacuation route cutoff time unless there is a large body of water of sufficient depth over which waves can be generated, such as the Galveston, Corpus Christi and Nueces Bays.

2. There is no way to include rainfall in these calculations. It is possible for a hurricane to stall and dump unexpected amounts of rainfall at any location. The slower a hurricane moves, the more rainfall it can produce. Maximum rainfall can be estimated roughly by dividing 100 by the forward movement speed to indicate inches of rainfall.

3. Wind estimates are based on the generated wind fields which **SLOSH** used to predict storm surge. Surge conditions have been checked by using data from historic hurricanes. However, there has been no systematic attempt to double check estimated windspeeds at data points or the windspeed arrival times.

4. No attention has been given to the advantage of evacuating during daylight hours.

5. Anticipated time of landfall printout numbers should be disregarded for hurricanes moving parallel to the coast.

Understanding Internal Calculations of ESTED-TX

The calculations performed by **ESTED-TX** should be understood if the user is to have confidence in the program. The "safe" time remaining before it would be too late to complete an evacuation is calculated by performing the following sequence of steps.

1. The latitude and the longitude of the hurricane is used to determine the distance from each point of landfall as well as the direction of movement of the hurricane. The distance the eye of the

hurricane is from the point of landfall is divided by the forward movement speed to arrive at the number of **H**ours **B**efore **L**andfall (**HBL**).

320 miles / 10 mph = 32 hours

2. The amount of **T**ime **B**efore landfall that the **S**torm **C**onditions (**TBSC**) will block major escape routes is determined from the **SLOSH** data. These evacuation route cutoff times are calculated for differing storm surge conditions (low tide, MSL and high tide) and wind conditions (car tipping and high profile vehicle tipping). Each zone has specific data points which are used to determine these cutoff times. The Brownsville points are distributed in the zones as follows:

Zone	Surge	Wind
C_A	---	13,14
C_B	---	17,20,21
C_1	1	1
C_2	5,6,8,9,10,11	4,5,6,15
C_3	2,3	2,3
C_4	6	12
W_A	---	18,19,22
W_1	2,3	2,3
W_2	7	7

Because evacuations must be completed before evacuation routes are blocked, **TBSC** is subtracted from **HBL**. The result is the time remaining for an evacuation to be completed.

Note that in these calculations, if any evacuation route is to be blocked after the time of landfall, that amount is not added since it would be unwise to plan an evacuation that could not be completed before the time of landfall. Also, wind conditions were considered as not only blocking key evacuation routes, but also blocking vehicular movement within a zone.

3. The amount of Time needed for an Evacuation (TE)for each zone under varying conditions is determined from surveys and analysis of the evacuation routes. This time is also subtracted from the remaining hours to determine how much time remains before an evacuation must begin in order to be completed before the routes are cutoff. Three additional hours are subtracted from this time because there is a Time Delay between when the decision to evacuate is reached and when the public has a chance to receive the information and begin evacuating.

The final SAFE TIME is determined by the following formula.

HBL - TBSC - TE - TD = SAFE TIME

This "safe" time, which is a number of hours, is added to the time of the weather bulletin to arrive at the latest "safe" time to recommend an evacuation.

WED 17:00 HOURS + 20 HOURS = THUR 13:00 HOURS

(Time of Bulletin + Safe Time = Latest Safe Time)

How To Use ESTED-TX

The program hardware consists of a CRT terminal, floppy disk drives, the CPU (Central Processing Unit), and a line printer. The **ESTED-TX** program is stored on a five and a quarter inch single-sided, double density, standard CP/M format diskette. This diskette must be stored in a cool, dry, dust-free location. It should never be bent, and the plastic surface should not be touched. It is also important that the diskette be stored in a static-free and magnetic-free location to prevent partial or total erasure of the program.

Since the program is subject to revision and updating depending on population growth and additional evacuation route availability, caution should be exercised to ensure you have the most recent version of the program. The version date can be found at the top of the screen.

Before this diskette can be used, the operating system must first be loaded into the computer. This is usually done by placing the system diskette into the disk drive labeled "A" and pressing the reset button. This sequence may vary from one system to another; refer to your computer user's guide for this information. After this has been done, a prompt (usually "A>") will appear on the CRT, signaling that the computer is ready with the system loaded. This prompt indicates that the disk drive "A" is the primary drive. Now the program diskette should be placed into the disk drive labeled "B". The diskette label should be up for horizontal drives or to the left for vertical drives. Next, type "B:" and press the return, enter, or new line key. Now another prompt (usually "B>") will appear on the CRT screen, signaling that the second drive is ready and is now the primary drive. At this point make sure your printer is turned on and continuous feed paper is properly loaded.

To run the program, simply type "**ESTEDTX**" on the CRT keyboard and press the <return>, enter, or new line key. The first three screens will be the Notice, Objectives, and Instructions. After reading each screen you may push any key to see the next screen. The fourth screen will look like Figure E-1. The cursor will be positioned at the first question. Enter the forward movement speed of the hurricane that is

FIGURE E-1

SCREEN #1 OF QUESTIONS

ESTED-TX

HURRICANE MOVEMENT SPEED IN MPH (MPH = 1-20)	= 10
HURRICANE WINDSPEED IN MPH (MPH = 74-200)	= 100
LOCATION OF HURRICANE	
LATITUDE (DEGS = 19.0 - 30.0)	= 25.2
LONGITUDE (DEGS = 81.0 - 98.0)	= 95.3
ENTER NUMBER OF DESIRED COASTAL AREA (1-5)	= 4

SAMPLE ANSWERS

1. LAKE SABINE
2. HOUSTON-GALVESTON
3. CORPUS CHRISTI
4. BROWNSVILLE
5. ALL FOUR AREAS

ANSWER THE INQUIRY AND PRESS 'RETURN' OR USE THE ARROW KEYS TO MOVE TO ANOTHER QUESTION

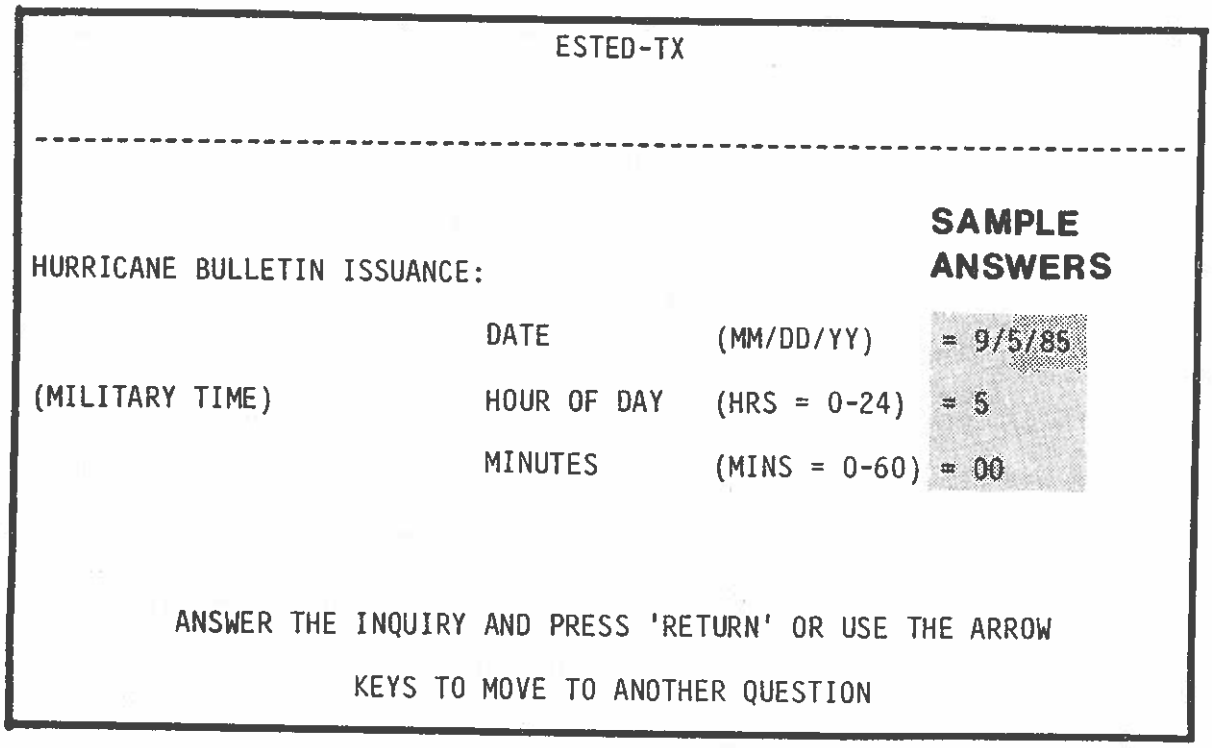
given in the advisory. Press <return> and the cursor will move to the next question. Answer the next four questions in the same manner. Notice the numeric range for each answer. A message will be printed at the top of the screen if your answer is not within the requested range. If this happens, simply answer the question again and press <return>. After you have answered the last question regarding the desired coastal area, hit <return>. You will now see a question which gives you the option of correcting any errors on the previous screen. Answer the question accordingly and hit <return>.

You may correct your answers by moving the cursor to the desired question and typing a new answer. When you have made the corrections you want, you must answer the last question again to move on.

The next screen will look like Figure E-2. Enter the date and time the weather advisory was issued. **DO NOT use the current time you are using the program!** After you have completed these three questions you are given a chance to correct your answers again. Answer these questions accordingly if you wish to make corrections. The calculations will begin after you have answered all of the questions. The computer will keep you posted on what it is doing.

FIGURE E-2

SCREEN #2 OF QUESTIONS



Understanding ESTED-TX Results

Results of these inputs will be in the form of a map of the area and a table of evacuation times for all evacuation and contingency zones in the requested coastal area. The zones for the Brownsville area are indicated in Section Three of this report. If the Brownsville area is selected, information will be printed for the anticipated points of landfall , 20 miles left of the lower Laguna Madre mouth and 60 miles right of the lower Laguna Madre mouth. The map is printed first and is used as an early warning of the critical zones in the area. Refer to pages E-12 and E-14 for an example of the map. A zone is considered

critical if there is less than six hours of "safe time" remaining. A zone with three to six hours remaining is designated with an "*" in front of the zone label (*EX). A zone with less than three hours remaining is designated by an "*" on both sides of the zone label (*EX*). These critical zones are also listed in a summary at the bottom of the map. The critical zones should be further analyzed by using the table of evacuation times.

The evacuation table gives the last time an evacuation should be recommended for each zone and storm condition. Refer to pages E-13 and E-15 for examples of the table. If the time remaining before a decision needs to be made is a negative value (that is, has already passed), it will be indicated by the letters "TL"--meaning Too Late. Contingency zones are assumed to be unaffected until windspeeds reach 131 mph, for this reason these zones are left blank for storms with lower windspeeds (except the Lake Sabine Area where the cutoff windspeed is 111 mph). All of the symbols which are used in the table are described in a summary at the bottom of the table.

To clearly understand how to read the map and table as a unit, refer to the examples on the following pages. A map and a table are created for each point of landfall. To illustrate how this information is related, the critical zones are shaded on the map, in the summary at the bottom of the map, and in the evacuation table. You can easily follow the steps of recognizing a critical zone on the map and summary and then finding the specific times associated with that zone in the table.

The earliest listed time (and the time used to indicate critical zones on the map) is almost always for high profile vehicle (trucks, busses, vans, etc...) wind tipping gusts. This is the safest time for you to use for purposes of recommending an evacuation. However, there may be occasions when due to a sudden shift of the hurricane it may be too late to use this earliest listed time. In this event you would want to use the next earliest time which would be from one of the remaining four conditions (car tipping, surge flooding for low, MSL, and high tide). High profile vehicles should be encouraged to evacuate early to avoid the possibility of blocked evacuation routes from the wind gusting which will occur closer to the time of landfall. For easy reference, this second summary of critical zones which excludes the wind tipping of high profile vehicles is also at the bottom of the map and is the last column in the table.. This alternative summary of critical zones should only be used after the first summary has been made obsolete due to the reasons already mentioned.

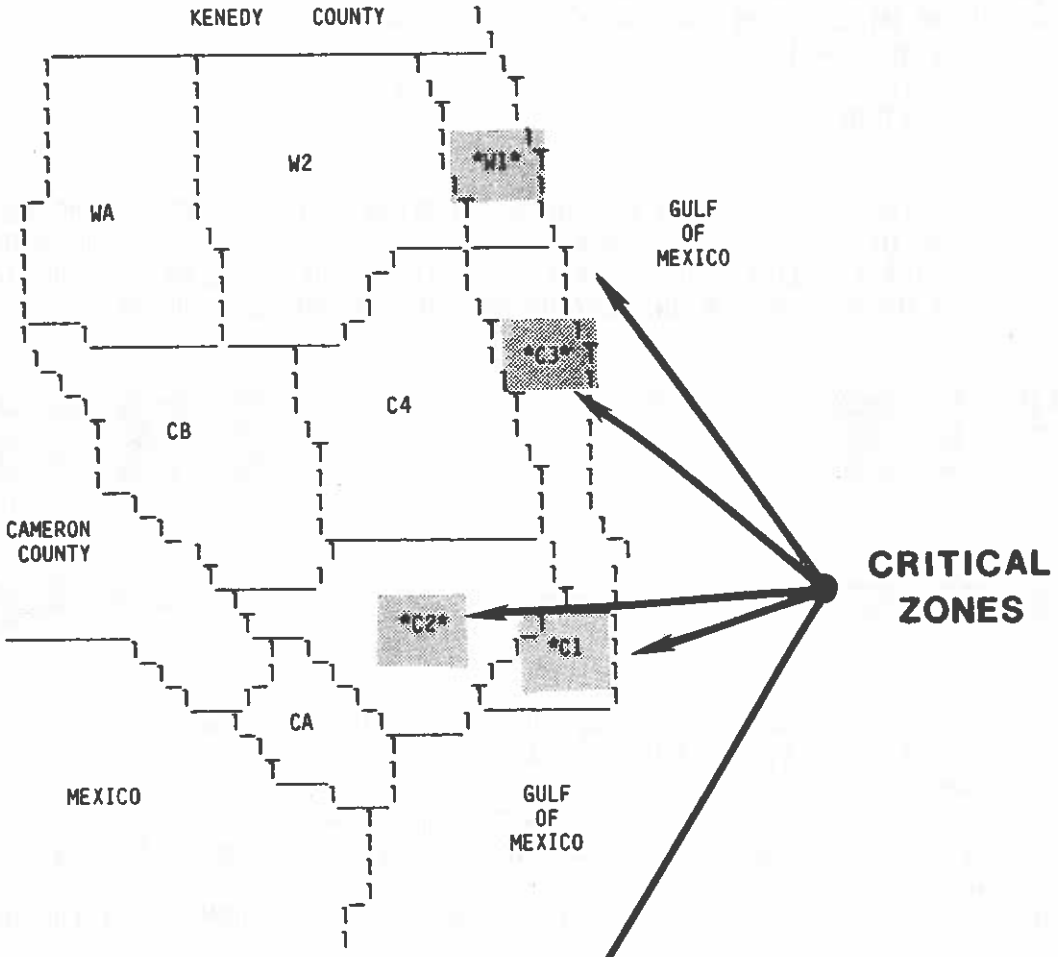
ESTEDTX
UPDATE 9/85

TIME EVACUATION MAP
BROWNSVILLE AREA

DATE: 9/5/85
BULLETIN TIME: 11:00

FOR A HURRICANE MAKING LANDFALL AT
A POINT 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH

ESTIMATED SAFE TIME REMAINING FROM BULLETIN	DESCRIPTION
T L-3.0 HOURS	*XX* AN '*' APPEARS ON BOTH SIDES OF ZONE LABEL
3.1-6.0 HOURS	*XX AN '*' APPEARS IN FRONT OF ZONE LABEL
OVER 6 HOURS	XX ZONE LABEL



ESTIMATED SAFE TIME REMAINING FROM BULLETIN	AFFECTED ZONES
TOO LATE	--
0.0-3.0 HOURS	-- C2 C3 W1
3.1-6.0 HOURS	-- C1

EXCLUDING HIGH PROFILE VEHICLE TIPPING (NOT INDICATED ON MAP)

TOO LATE	--
0.0-3.0 HOURS	-- C3 W1
3.1-6.0 HOURS	-- C2

ESTEDTX
UPDATE 9/85

EVACUATION TIMES FOR ZONES IN THE BROWNSVILLE AREA

DATE: 9/5/85
BULLETIN TIME: 11:00

FOR A HURRICANE MAKING LANDFALL AT
A POINT 60 MILES RIGHT OF LOWER LAGUNA MADRE MOUTH

HURRICANE MOVEMENT SPEED IN MPH:	10
HURRICANE WINDSPEED IN MPH:	100
BEARING OF HURRICANE IN DEGREES:	311.8
NUMBER OF MILES FROM LANDFALL:	196.84
LOCATION OF HURRICANE:	
LATITUDE	25
LONGITUDE	95

	ANTICIPATED TIME OF LANDFALL		BASED ON SURGE FLOODING MEAN SEA LEVEL						WIND TIPPING H. PROFILE CAR				EARLIEST LISTED EXCLUDING H. PROFILE	
			LOW TIDE				HIGH TIDE				VEHICLE			
ZN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN
C1	S6	6:30	.	.	.	.	.	.	S5	18:30	S5	15:00	S5	18:30
C2	S6	6:30	.	.	.	.	.	.	S5	14:30	S5	11:30	S5	14:30
C3	S6	6:30	.	.	.	.	.	.	S5	14:00	S5	11:00	S5	14:00
C4	S6	6:30	.	.	.	.	.	.	S5	21:00	S5	19:30	S5	21:00
CA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CB	.	.	.	.	.	.	.	.	.	.	.	.	.	.
W1	S6	6:30	.	.	.	.	.	.	S5	14:00	S5	11:00	S5	14:00
W2	S6	6:30	.	.	.	.	.	.	S5	20:00	S5	17:30	S5	20:00
WA	.	.	.	.	.	.	.	.	.	.	.	.	.	.

CRITICAL ZONES

H. PROFILE VEHICLE - HIGH PROFILE TRUCKS, BUSSES, VANS, etc...
T L IT IS TOO LATE TO EVACUATE A ZONE
N C VALUE IS NOT CALCULATED
. . VALUE IS CALCULATED BUT IS NOT SIGNIFICANT
VALUES FOR CONTINGENCY ZONES ARE NOT CONSIDERED SIGNIFICANT UNTIL WIND SPEEDS EXCEED 130 mph.
AN '*' BY THE MONTH INDICATES THAT THE MONTH HAS CHANGED TO THE NEXT.

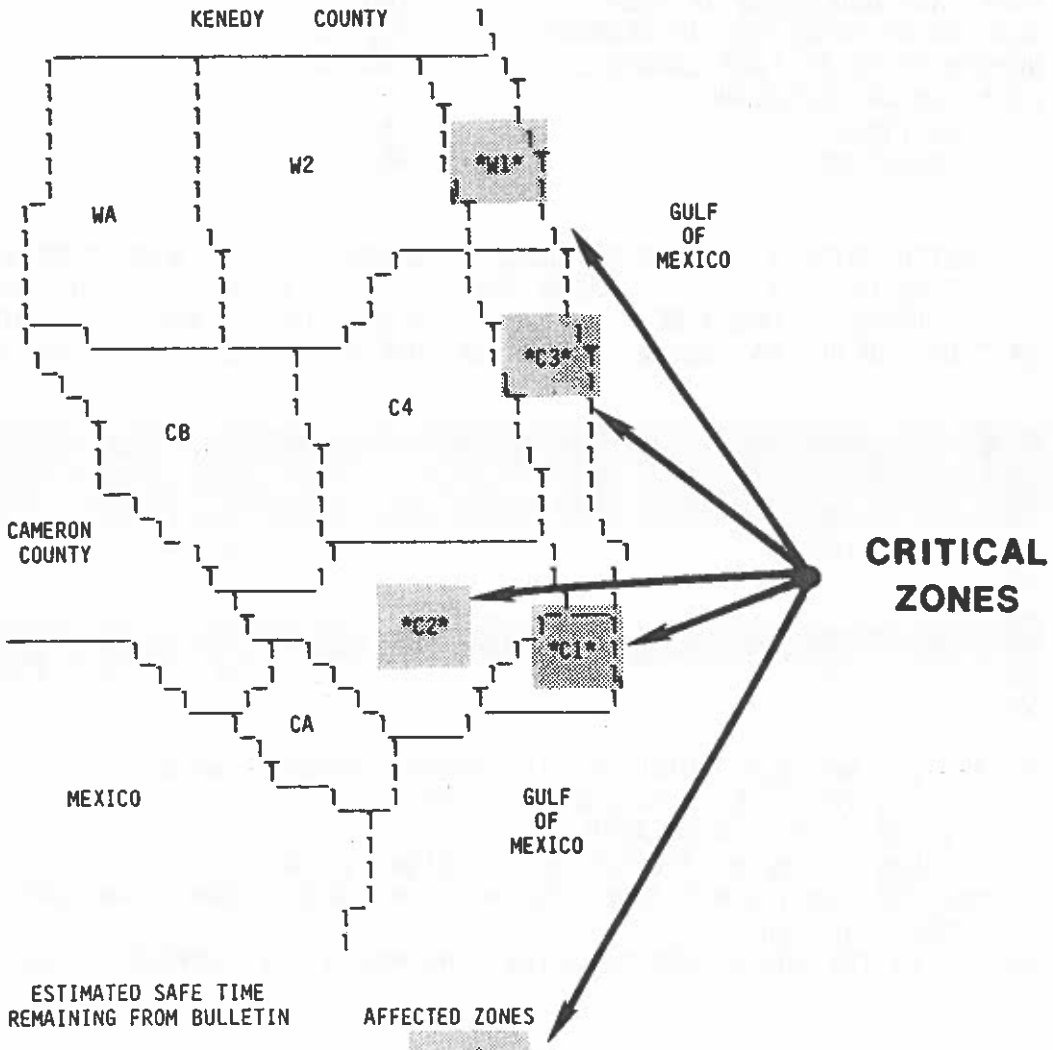
ESTEDTX
UPDATE 9/85

TIME EVACUATION MAP
BROWNSVILLE AREA

DATE: 9/5/85
BULLETIN TIME: 11:00

FOR A HURRICANE MAKING LANDFALL AT
A POINT 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH

ESTIMATED SAFE TIME REMAINING FROM BULLETIN	DESCRIPTION
T L-3.0 HOURS	*XX* AN '*' APPEARS ON BOTH SIDES OF ZONE LABEL
3.1-6.0 HOURS	*XX AN '*' APPEARS IN FRONT OF ZONE LABEL
OVER 6 HOURS	XX ZONE LABEL



ESTIMATED SAFE TIME REMAINING FROM BULLETIN	AFFECTED ZONES
TOO LATE	-- C2 C3 W1
0.0-3.0 HOURS	-- C1
3.1-6.0 HOURS	--

EXCLUDING HIGH PROFILE VEHICLE TIPPING (NOT INDICATED ON MAP)

TOO LATE	--
0.0-3.0 HOURS	-- C2 C3 W1
3.1-6.0 HOURS	-- C1

ESTEDTX
UPDATE 9/85

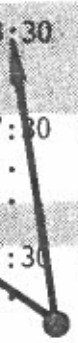
EVACUATION TIMES FOR ZONES IN THE BROWNSVILLE AREA

DATE: 9/5/85
BULLETIN TIME: 11:00

FOR A HURRICANE MAKING LANDFALL AT
A POINT 20 MILES LEFT OF LOWER LAGUNA MADRE MOUTH

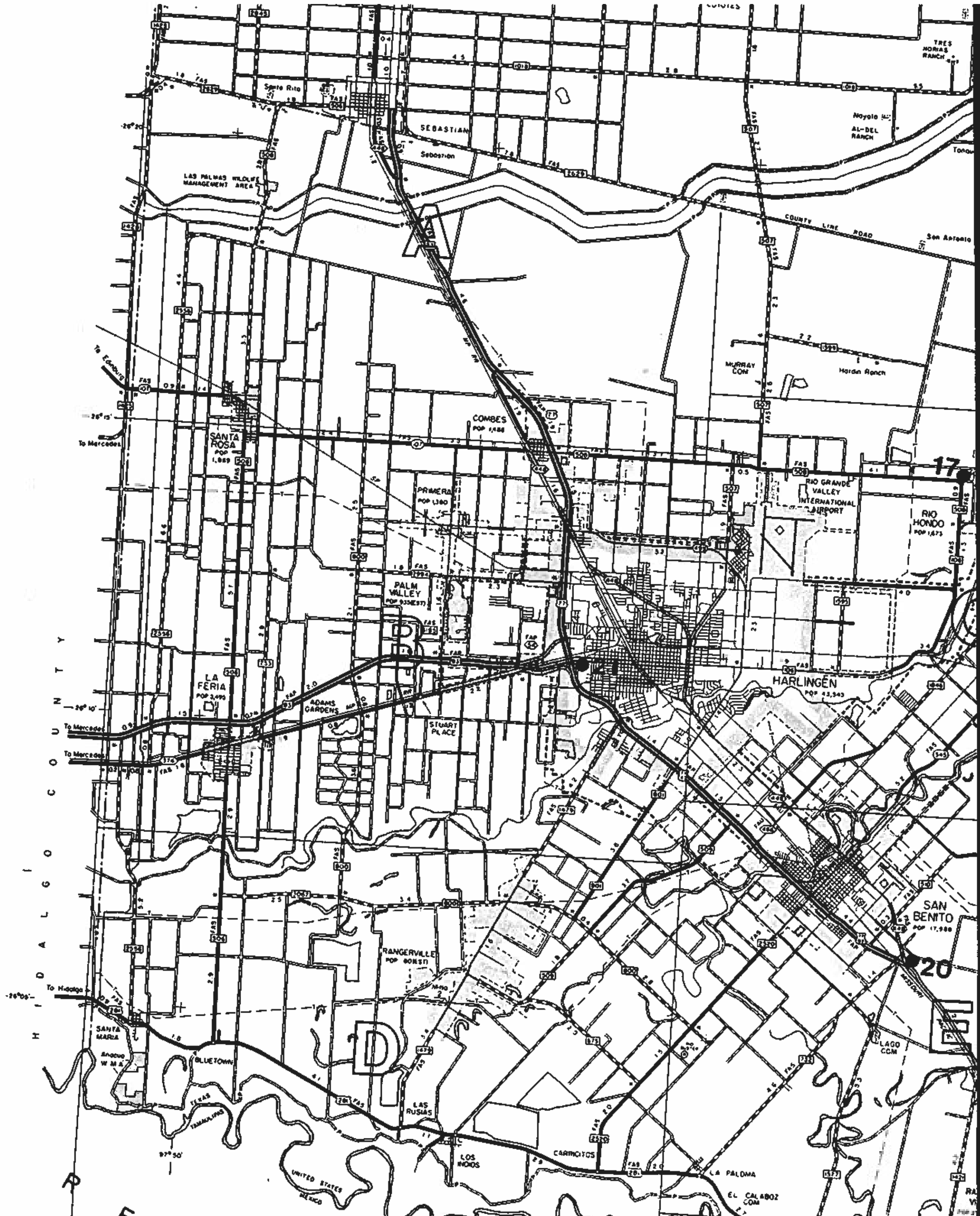
HURRICANE MOVEMENT SPEED IN MPH:	10
HURRICANE WINDSPEED IN MPH:	100
BEARING OF HURRICANE IN DEGREES:	292.06
NUMBER OF MILES FROM LANDFALL:	146.38
LOCATION OF HURRICANE:	
LATITUDE	25
LONGITUDE	95

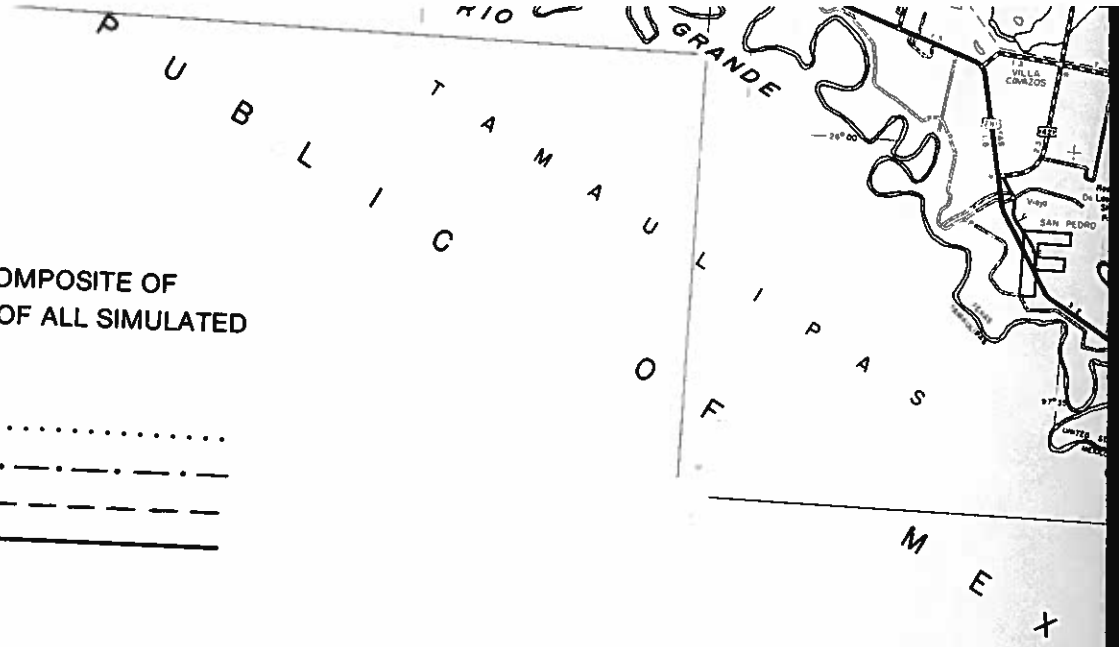
	ANTICIPATED TIME OF LANDFALL		BASED ON SURGE FLOODING						WIND TIPPING				EARLIEST LISTED EXCLUDING H. PROFILE	
			LOW TIDE		MEAN SEA LEVEL		HIGH TIDE		CAR		H. PROFILE VEHICLE			
ZN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN	DAY	HR:MN
C1	S6	1:30	S5	20:00	S5	18:30	S5	16:30	S5	16:30	S5	13:30	S5	16:30
C2	S6	1:30	.	.	.	.	.	.	S5	13:00	T	L	S5	13:00
C3	S6	1:30	S5	16:30	S5	15:00	S5	13:30	S5	12:30	T	L	S5	12:30
C4	S6	1:30	.	.	.	.	.	.	S5	19:30	S5	17:30	S5	19:30
CA	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CB	.	.	.	.	.	.	.	.	.	.	.	.	.	.
W1	S6	1:30	S5	16:30	S5	15:00	S5	13:30	S5	12:30	T	L	S5	12:30
W2	S6	1:30	.	.	.	.	.	.	S5	20:30	S5	17:30	S5	20:30
WA	.	.	.	.	.	.	.	.	.	.	.	.	.	.



H. PROFILE VEHICLE - HIGH PROFILE TRUCKS, BUSSES, VANS, etc...
T L IT IS TOO LATE TO EVACUATE A ZONE
N C VALUE IS NOT CALCULATED
. . VALUE IS CALCULATED BUT IS NOT SIGNIFICANT
VALUES FOR CONTINGENCY ZONES ARE NOT CONSIDERED SIGNIFICANT UNTIL WIND SPEEDS EXCEED 130 mph.
AN '*' BY THE MONTH INDICATES THAT THE MONTH HAS CHANGED TO THE NEXT.


KENEDY
HIDALGO COUNTY
HIDALGO COUNTY
97°55'
97°50'
97°45'
97°40'
26°35'
26°30'
26°25'
RAYMONDVILLE
POP 9,493
LYFORD
POP 1,548
SAN PERLITA
POP 475
SASARA
LA SAL VIEJA OIL FIELD
LA SAL VIEJA RANCH
CORBET GAS FIELD
ESPERANZA RANCH
YTURRIA
LA CHATA RANCH
RAYMONDVILLE OIL FIELD
RAYMONDVILLE GAS FIELD
CASA BLANCA RANCH
San Manuel
To San Manuel
To Hargill
COUNTY LINE ROAD
MISSOURI
MPRR
22

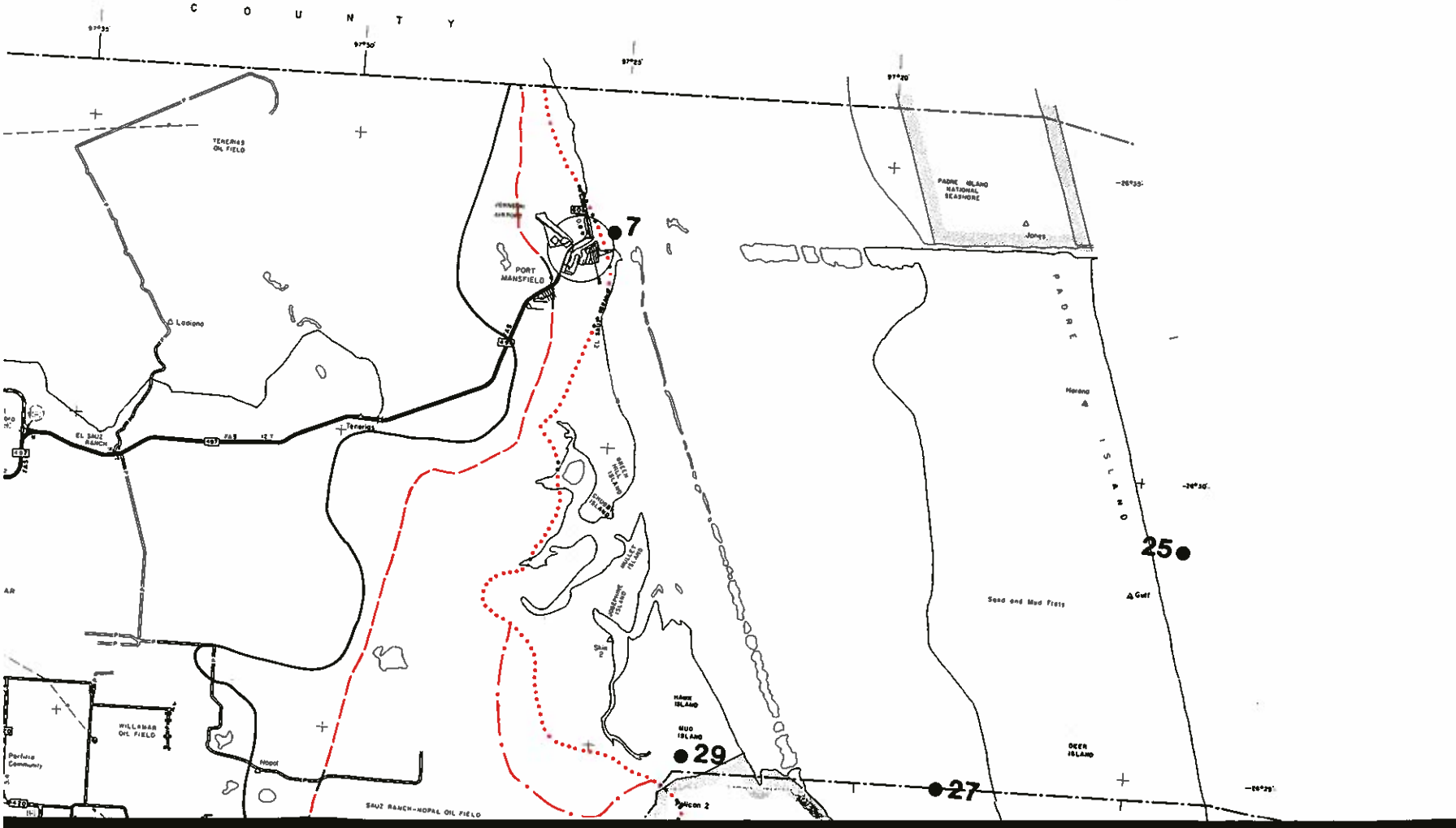

SEBASTIAN
LAS PALMAS WILDLIFE MANAGEMENT AREA
COUNTY LINE ROAD
San Antonio
Noyola
AL-DEL RANCH
TRES NORIAS RANCH
MURRAY COM
Hardin Ranch
To Edinburg
To Mercedes
SANTA ROSA POP 1,889
COMBES POP 1,488
PRIMERA POP 1,380
RIO GRANDE VALLEY INTERNATIONAL AIRPORT
RIO HONDO POP 1,673
17
PALM VALLEY POP 935(EST)
HARLINGEN POP 43,543
LA FERIA POP 3,495
ADAMS GARDENS
STUART PLACE
SAN BENITO POP 17,988
20
RANGERVILLE POP 80(EST)
H I D A L G O C O U N T Y
To Hidalgo
SANTA MARIA
BLUETOWN
LAS RUSIAS
LAGO COM
CARRICITOS
LOS INDIOS
LA PALOMA
EL CALABOZ COM
TEXAS
TAMAULIPAS
UNITED STATES
MEXICO
A
D

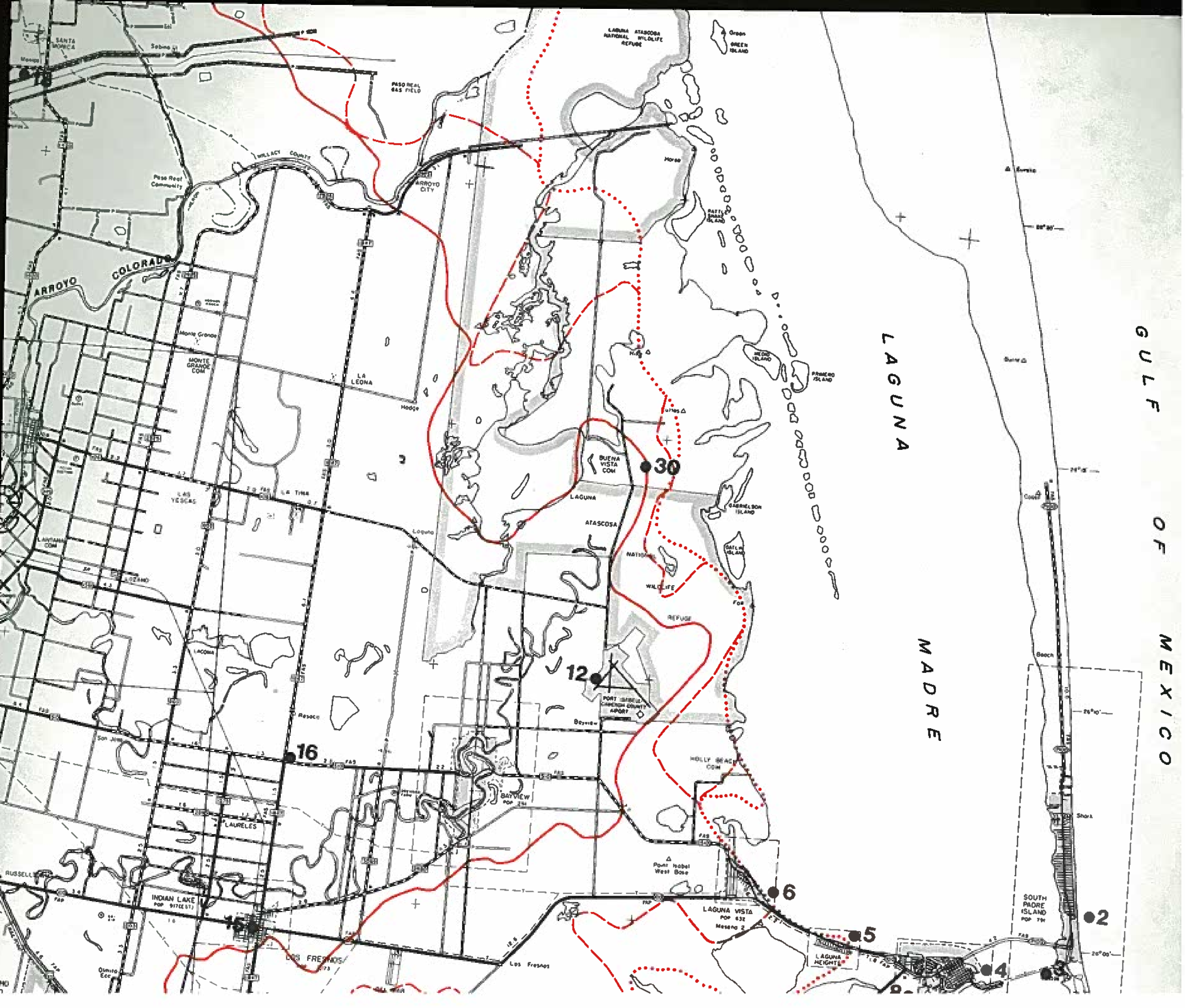


NOTE: EACH STORM SURGE LINE IS A COMPOSITE OF MAXIMUM SURGE PENETRATION OF ALL SIMULATED HURRICANES.

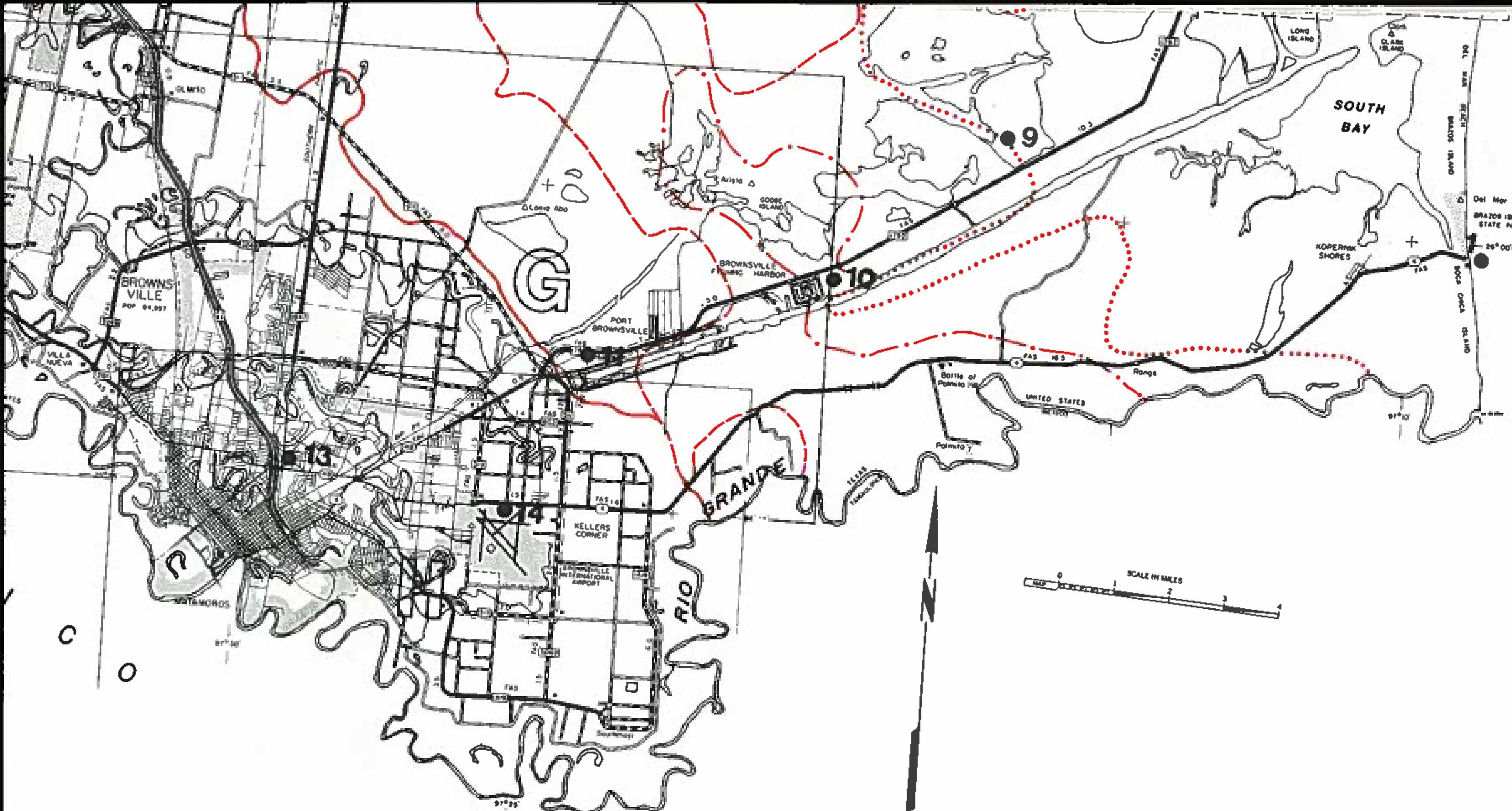
WIND SPEED	74-95 MPH	.....
	96-110 MPH	—·—·—·—·—·—
	111-130 MPH	— — — — — — — —
	Over 131 MPH	———————

POSSIBLE ESTIMATED STORM SURGE PENETRATION FROM HURRICANES WITH VARYING WIND SPEEDS

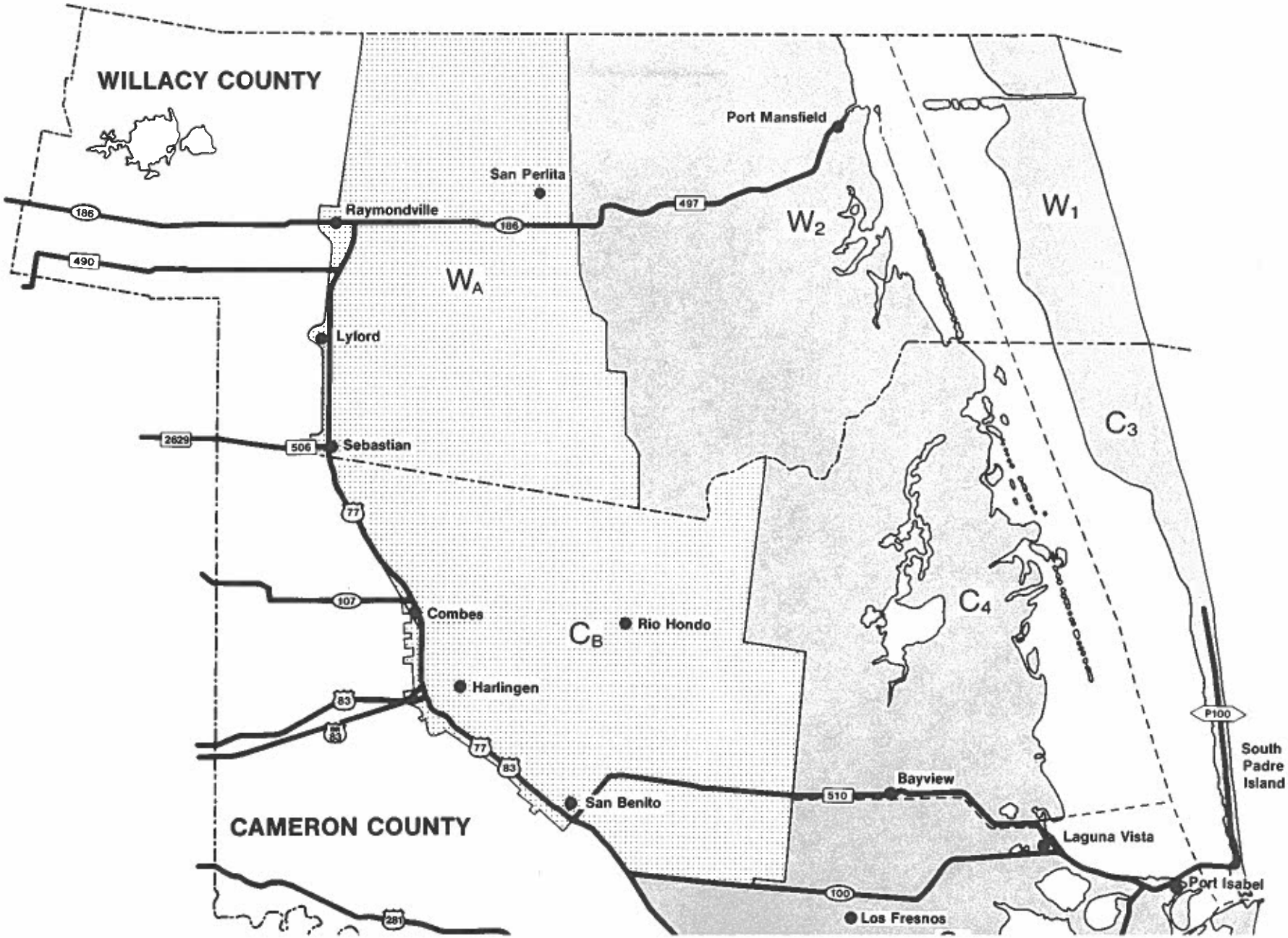


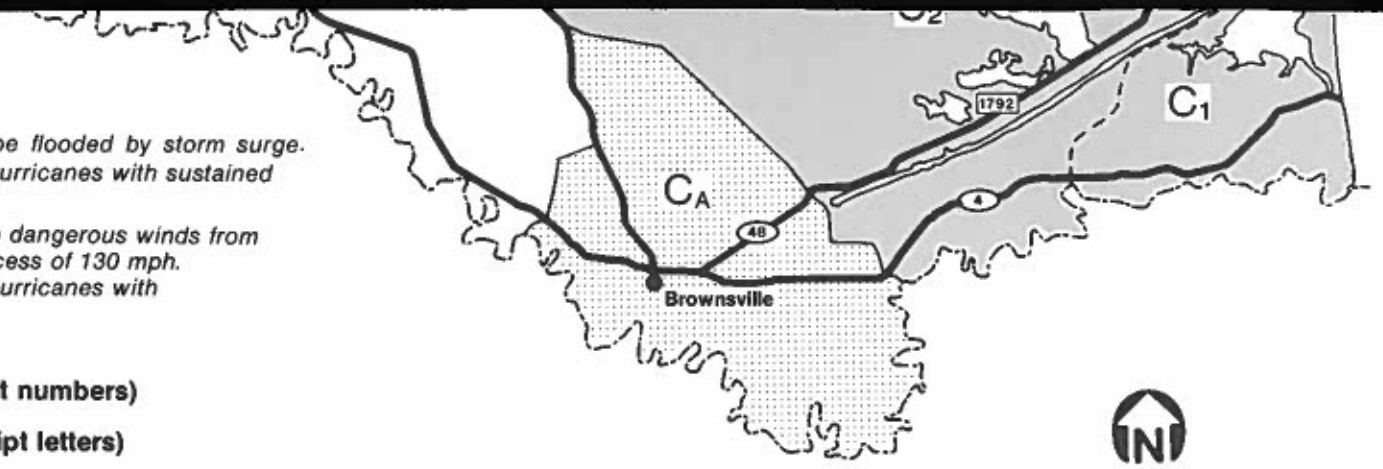


LAGUNA MADRE
GULF OF MEXICO
ARROYO COLORADO
LAGUNA ATASCOSA NATIONAL WILDLIFE REFUGE
ARROYO CITY
LA LEONA
MONTE GRANDE COM
BUENA VISTA COM
30
12
16
6
5
4
2
HOLLY BEACH COM
BAYVIEW
LAURELES
INDIAN LAKE
LOS FRESNOS
Los Fresnos
Point Isabel West Base
LAGUNA VISTA
LAGUNA HEIGHTS
SOUTH PADRE ISLAND



SOUTH BAY
BROWNSVILLE
G
PORT BROWNSVILLE
BROWNSVILLE FISHING HARBOR
KELLERS CORNER
BROWNSVILLE INTERNATIONAL AIRPORT
RIO GRANDE
MATAMOROS
KOPERNIK SHORES
BRAZOS ISLAND STATE PARK
SCALE IN MILES
9
10
13
14


WILLACY COUNTY
Port Mansfield
San Perlita
Raymondville
186
497
490
W_A
W_2
W_1
Lyford
2629
506
Sebastian
C_3
77
107
Combes
C_B
Rio Hondo
C_4
Harlingen
83
77
83
P100
South Padre Island
Bayview
510
San Benito
CAMERON COUNTY
Laguna Vista
Port Isabel
100
Los Fresnos
281



Evacuation Zones: *Areas that can be flooded by storm surge. Evacuation should be considered for hurricanes with sustained winds up to 130 mph.*

Contingency Zones: *Areas subject to dangerous winds from hurricanes with sustained winds in excess of 130 mph. Evacuation should be considered for hurricanes with sustained winds over 130 mph.*

Evacuation Zone (subscript numbers)

Contingency Zone (subscript letters)

Evacuation Routes

0 5 10 MILES

Estimated Evacuation Time in Hours by County and Zone*

		Partial Evacuation*			Total Evacuation**		
		June July August	Sept. Oct.	Nov.	June July August	Sept. Oct.	Nov.
Cameron	C_1	0.5	0.5	0.5	12.5	12.0	11.5
	C_2	7.0	4.5	3.0	12.5	12.0	11.5
	C_3	7.0	4.5	3.0	12.5	12.0	11.5
	C_4	1.0	1.0	1.0	12.5	12.0	11.5
	C_A	---	---	---	12.5	12.0	11.5
	C_B	---	---	---	12.5	12.0	11.5
Willacy	W_1	7.0	4.5	3.0	12.5	12.0	11.5
	W_2	0.5	0.5	0.5	12.5	12.0	11.5
	W_4	---	---	---	12.5	12.0	11.5

* *Evacuation of only those in evacuation zones indicating they would evacuate if so advised. Used for hurricanes with sustained winds up to 130 mph.*

** *Total evacuation of all evacuation and contingency zones. Used for hurricanes with sustained winds over 130 mph.*