Hazard Mitigation Technical Assistance Program
Contract No. EMW-2000-CO-0247
Task Order 338
Hurricane Ivan Rapid Response
Alabama and Mississippi Coastal High Water Mark (CHWM) Collection
FEMA-1549-DR-AL & 1550-DR-MS

Final Report

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Submitted to:

Federal Emergency Management Agency
Region IV
Atlanta, GA

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Introduction

Hurricane Ivan was rated as the most powerful hurricane to hit the Caribbean in 10 years. On September 7 and 8, 2004, it damaged 90 percent of the homes in Grenada and caused catastrophic damage as it swept over Grenada, Barbados, and the other islands in the area. By Thursday morning on September 9, Ivan's sustained winds reached 160 mph making it a rare Category 5 hurricane on the Saffir-Simpson scale. By Monday September 13, it had skirted western Cuba with winds clocked at 156 mph.

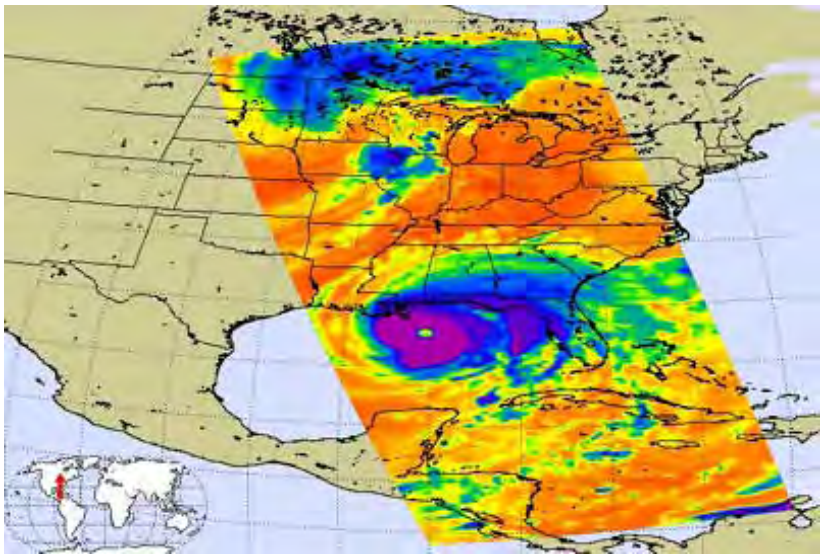


Figure 1: Hurricane Ivan Approaches

Hurricane Ivan was one of the strongest and most destructive hurricanes to hit Florida's Panhandle coast in recorded history and the most severe since Hurricane Opal in 1995. The image of Hurricane Ivan (Figure 1), was acquired by the Atmospheric Infrared Sounder (AIRS) infrared, microwave, and visible sensors on September 15 at 1:30 pm local time as the storm moved into Alabama (http://www-airs.jpl.nasa.gov/multimedia/image_releases/2004/hurricane_ivan.html). Ivan approached the Florida and Alabama area at Category 4 strength, moving north at 14 mph. Maximum sustained winds were reported to be 135 mph and extended 105 miles from the center, while tropical storm-force winds extended 290 miles from the center. Figure 1 shows how the storm looked through an AIRS Infrared window channel. It reveals a very large eye about 75 km (50 miles) across.

The storm path as it made landfall is shown in Figure 2. The hurricane began affecting Alabama and Mississippi on September 13, 2004 and made landfall on the east side of Mobile Bay, Alabama at 1:50 a.m. (2:50 a.m. ET) Thursday September 16, 2004 as a slightly weakened Category 3 hurricane with winds of 130 mph (208 kph) and storm surges over 8 feet. Storm surge with associated wave action was reported at +15 to +20 feet above mean sea level. The hurricane's strongest winds were located east-northeast of the storm center. This aspect coupled with the higher, on-shore directed winds and associated storm surge and accompanying breaking

waves resulted in much of Ivan's destructive impacts on Gulf Shores, Alabama. As the hurricane moved through Alabama and Mississippi, wind and wave action disrupted utilities, caused damage, and created localized flooding. The barrier islands exposed to Ivan's strongest winds, for example, the communities of Gulf Shores and Orange Beach, Alabama, are, in places, low lying, their dunes rising only several meters, which is insufficient to have contained Ivan's storm surge. The Gulf spilled across the islands in a strong current capable of transporting massive amounts of sand landward, undermining buildings and roads, and opening new island breaches. On top of the surge, breaking waves nearly as tall as the water was deep eroded dunes and battered structures.

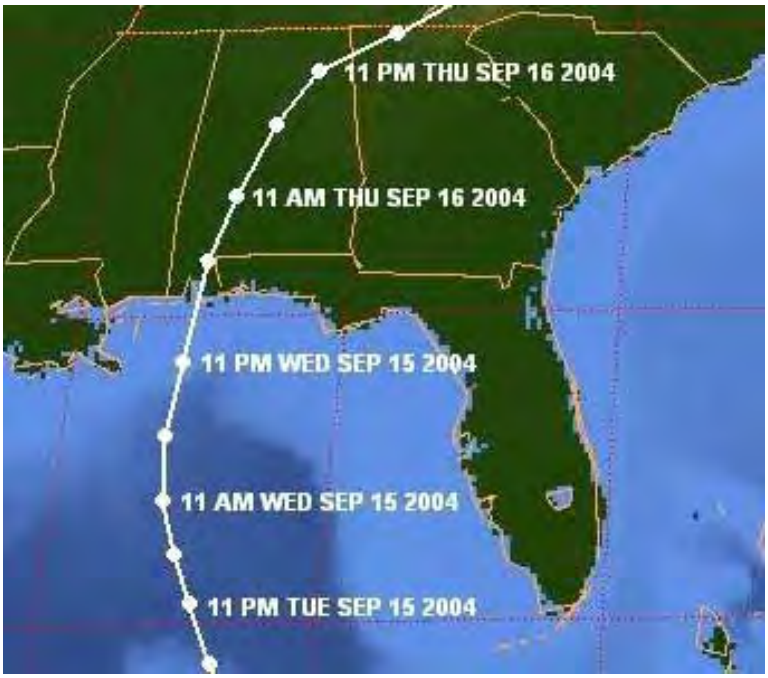


Figure 2: Hurricane Ivan Storm Path

Ivan continued inland, maintaining hurricane strength until it was over central Alabama. Late on the 16th, Ivan weakened to a tropical depression over northeastern Alabama. The hurricane continued to move toward the north-northeast and brought devastating flooding to the Appalachians and southern New England. On September 18, the remnants of Ivan drifted off the mid-Atlantic coast of the United States into the Atlantic Ocean, and the low-pressure disturbance continued to pour rain on the east coast of the United States.

Ivan reformed into a tropical depression on September 22, 2004 in the Gulf of Mexico after having traveled in a circular motion through the southeastern United States causing tremendous flooding (See Figure 3). An interesting development occurred on September 20 as a small surface low, caused by the southern remnants of Ivan, moved across the Florida peninsula. As it continued west across the northern Gulf of Mexico, the system organized and took on tropical characteristics. On September 22 the National Weather Service, determined that the low was in fact a result of the remnants of Ivan and named it accordingly.

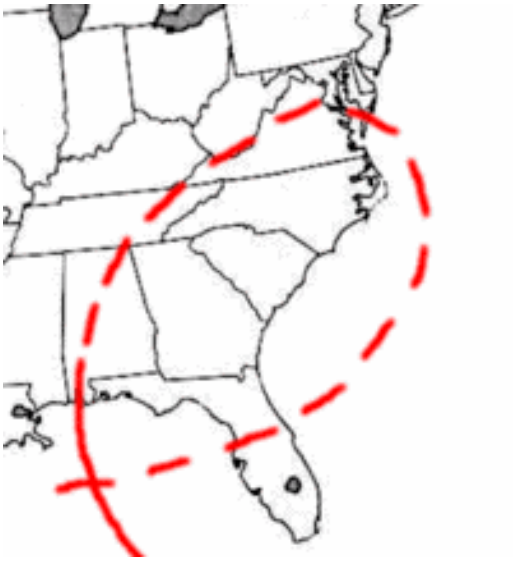


Figure 3: Hurricane Ivan Reforms and Returns

Notice was given in the Federal Register, in letters for Alabama and Mississippi, dated September 15, 2004, that the President declared a major disaster under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act for damage in certain areas in Alabama and Mississippi resulting from Hurricane Ivan (FEMA-1549-DR, Alabama and FEMA-1550-DR-Mississippi; http://www.fema.gov/news/dfrn.fema?id=2984, http://www.fema.gov/news/dfrn.fema?id=2983). The declaration provides the necessary Federal assistance to meet immediate needs and to help recover as quickly as possible.

State of Alabama

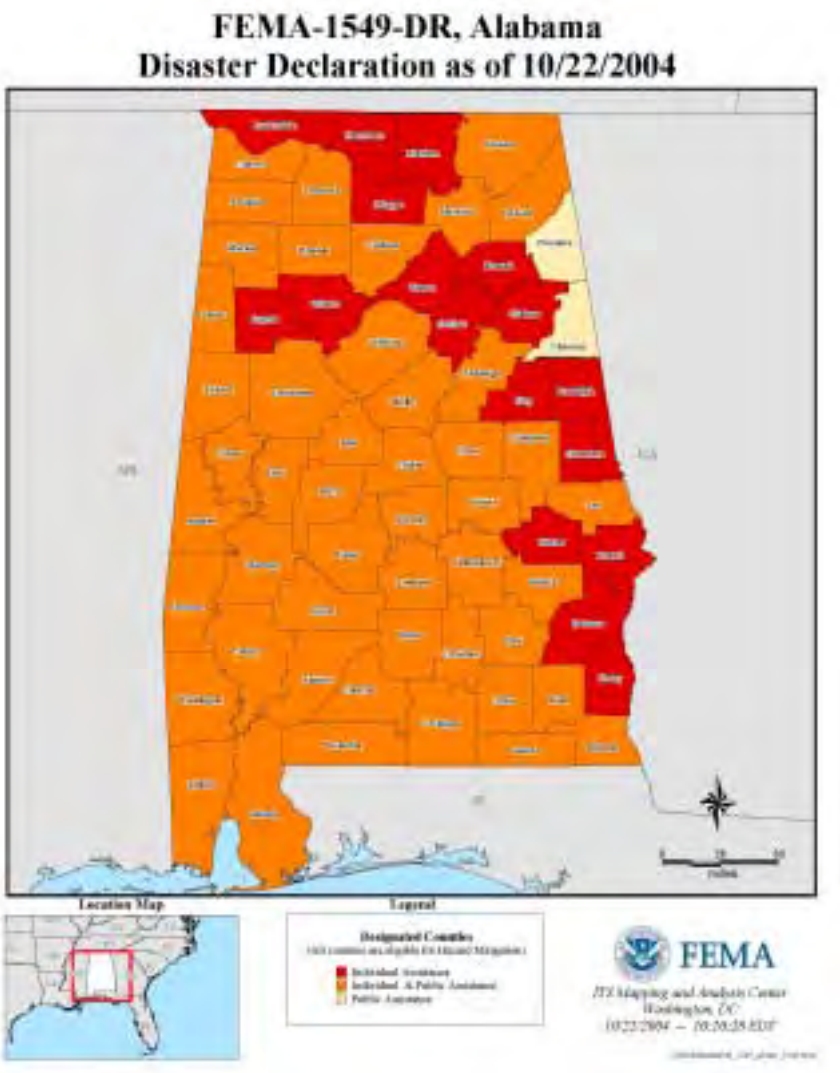
The following Alabama counties were designated for disaster declaration FEMA-1549-DR-AL. Declared Alabama counties are shown on Figure 4.

Individual Assistance was provided to: Baldwin, Butler, Clarke, Coffee, Conecuh, Covington, Crenshaw, Escambia, Geneva, Mobile, Monroe, and Washington Counties.

Amendment No. 1 to a Notice of a Major Disaster Declaration included Barbour, Blount, Bullock, Calhoun, Clay, Cullman, Dale, Etowah, Fayette, Franklin, Lamar, Lawrence, Lee, Macon, Marshall, Marion, Pike, St. Clair, Tallapoosa, Walker, and Winston Counties for Individual Assistance. Autauga, Bibb, Chilton, Choctaw, Coosa, Dallas, Elmore, Greene, Hale, Jefferson, Lowndes, Marengo, Montgomery, Perry, Pickens, Shelby, Sumter, Talladega, Tuscaloosa, and Wilcox Counties were included for Individual Assistance. These counties were already designated for debris removal and emergency protective measures (Categories A & B) under the Public Assistance Program including direct Federal assistance, at 100 percent Federal funding of the total eligible costs for a period of up to 72 hours.

Amendment No. 4 included Chambers, DeKalb, Henry, Houston, Jackson, Lauderdale, Limestone, Morgan, and Russell Counties for Individual Assistance.

Amendment No. 5 included Colbert, Madison, and Randolph Counties for Individual Assistance.



Source: http://www.gismaps.fema.gov/2004graphics/dr1549/dec_1549.pdf

Figure 4: Disaster Declaration Map - Alabama

Public Assistance was provided to: Autauga, Baldwin, Bibb, Butler, Chilton, Choctaw, Clarke, Coffee, Conecuh, Coosa, Covington, Crenshaw, Dallas, Elmore, Escambia, Geneva, Greene, Hale, Jefferson, Lowndes, Marengo, Mobile, Monroe, Montgomery, Perry, Pickens, Shelby, Sumter, Talladega, Tuscaloosa, Washington, and Wilcox Counties for Public Assistance Categories A and B, including direct Federal assistance, at 100 percent of the total eligible costs for a period of up to 72 hours.

Amendment No. 2 included Autauga, Baldwin, Bibb, Butler, Chilton, Choctaw, Clarke, Coffee, Conecuh, Coosa, Covington, Crenshaw, Dallas, Elmore, Escambia, Geneva, Greene, Hale, Jefferson, Lowndes, Marengo, Mobile, Monroe, Montgomery, Perry, Pickens, Shelby, Sumter, Talladega, Tuscaloosa, Washington, and Wilcox Counties for Public Assistance (Categories C through G) which were already designated for Public Assistance (Categories A and B), including direct Federal assistance, at 100 percent Federal funding of the total eligible costs for a period of up to 72 hours, and Individual Assistance.

Amendment No. 6 included Cleburne, Colbert, Cullman, Dale, DeKalb, Franklin, Lamar, Lawrence, Lee, Marion, Marshall, Pike, Tallapoosa, and Winston Counties for Public Assistance.

Amendment No. 7 included Cherokee, Bullock, Houston, and Jackson Counties for Public Assistance.

Hazard Mitigation Grant Program (HMGP). All counties in the State of Alabama are eligible to apply for assistance under the HMGP.

State of Mississippi

The following Mississippi counties were designated for disaster declaration FEMA-1550-DR-MS. Declared Mississippi counties are shown on Figure 5.

Individual Assistance was provided to: George, Hancock, Harrison, Jackson, Perry, Stone, and Wayne Counties. Amendment No. 1 included Greene County. Amendment No. 2 included Clarke and Lauderdale Counties.

Public Assistance was provided to*:* Clarke, Covington, Forrest, George, Greene, Hancock, Harrison, Jackson, Jefferson Davis, Jones, Kemper, Lamar, Lauderdale, Lowndes, Marion, Neshoba, Newton, Noxubee, Pearl River, Perry, Smith, Stone, and Walthall Counties for Public Assistance Categories A and B, including direct Federal assistance, at 100 percent of the total eligible costs for a period of up to 72 hours.

Amendment No. 1 to a Notice of a Major Disaster Declaration included Jasper County for Public Assistance Categories A and B, including direct Federal assistance, at 100 percent of the total eligible costs for a period of up to 72 hours, and Wayne County for Public Assistance Categories A and B, including direct Federal assistance, at 100 percent of the total eligible costs for a period of up to 72 hours (already designated for Individual Assistance).

Amendment No. 4 included Clay, Monroe, Oktibbeha, and Winston Counties for Public Assistance and Clarke, Forrest, George, Greene, Hancock, Harrison, Jackson, Jasper, Jones, Kemper, Lamar, Lauderdale, Lowndes, Neshoba, Newton, Noxubee, Perry, Stone, and Wayne Counties for Public Assistance Categories C through G.

Amendment No. 5 included Adams, Amite, Claiborne, Copiah, Franklin, Hinds, Jefferson, Lawrence, Lincoln, Pike, Rankin, Scott, Simpson, Warren, and Wilkinson Counties for emergency protective measures (Category B) under the Public Assistance Program, including

direct Federal assistance, at 100 percent Federal funding of the total eligible costs for a period of up to 72 hours.

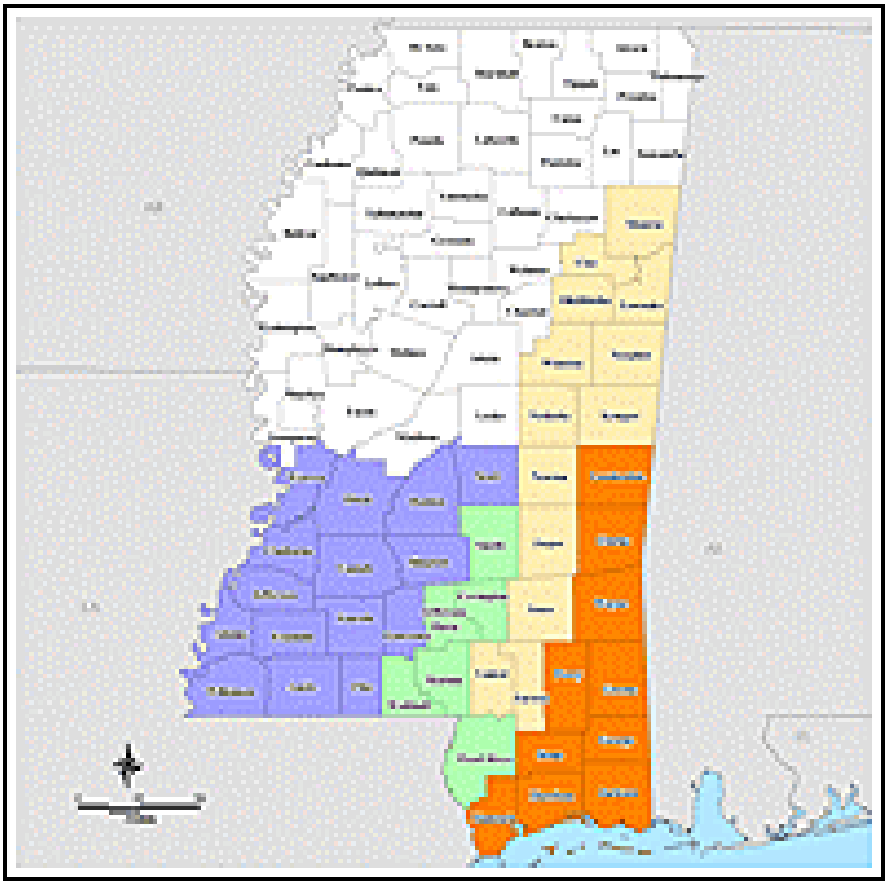


Figure 5: Disaster Declaration Map - Mississippi

HMGP. All counties in the State of Mississippi are eligible to apply for assistance under the HMGP.

URS Group, Inc. was contracted by the Federal Emergency Management Agency (FEMA) under the Hazard Mitigation Technical Assistance Program (HMTAP) to assist in the Hurricane Ivan disaster recovery. Assistance provided by this Task Order includes flagging, surveying, and reporting of Coastal High Water Marks (CHWMs). This report summarizes the methodologies used to flag the CHWM locations and survey the locations and elevations of the marks. This is an important step in assisting communities in establishing high water marks, which will be used in flood hazard mitigation.

Hurricane Ivan caused both coastal and riverine flooding. The resulting high water marks were flagged and surveyed along coastal locations. The purpose of this report is to document the flagging and surveying of the CHWMs, estimate the storm surge at each location, and discriminate between storm surge and wave action.

The data collected is invaluable to Federal, state, and local recovery efforts. The data assists in identifying areas of significant damage in order to target resources needed for disaster recovery.

It also helps to establish the magnitude and recurrence interval of the flood and erosion events caused by hurricanes along various areas of the coast. This data collection is also beneficial for future use in (a) accurately assessing the benefits to be expected from flood mitigation efforts, (b) prioritizing the flood mitigation efforts pursued following the hurricane, and (c) making HMGP decisions.

Area of Study

The area FEMA identified to be covered by the Coastal High Water Study Team extended west from the Alabama-Florida state line. At the time of the study's mobilization, it was known that the Gulf Shore to Perdido Key section of the coast was most impacted by the surge. The western extent of surge impact was not known, but the broad and shallow region off the Mississippi coast suggested that effects could be noted that far west. Therefore, URS was directed to cover the area from the Alabama-Florida state line to Bay St. Louis, Mississippi. The distribution of effort was concentrated in the higher impacted eastern areas and progressively sparser to the west. Two counties were covered in Alabama and two in Mississippi as listed in the following tables:

Table 1: Number of Alabama CHWMs Surveyed by County

County	Number of CHWMs Surveyed
Baldwin	38
Mobile	13
TOTAL	51

Table 2: Number of Mississippi CHWMs Surveyed by County

County	Number of CHWMs Surveyed
Harrison	6
Jackson	3
TOTAL	9

The National Oceanic and Atmospheric Administration (NOAA), U.S. Army Corps of Engineers (USACE), U.S. Geological Survey (USGS) and U.S. Coast Guard (USCG) tide and river gages that were operating in the area during the time of the hurricane and their peak elevations during the Hurricane are shown in Table 3.

Table 3: Peak Water Elevations during Hurricane Ivan Reported in USACE-Mobile, September 2004 Report

Name	Longitude (West)	Latitude (North)	Hurricane Ivan Peak Elevation (Ft) NGVD 29
Mississippi Sound at Waveland, MS (USGS)	89.364722	30.280556	4.56
Gulfport Harbor at Gulfport, MS (540)	89.090833	30.360278	4.63
Mississippi Sound at Ship Island	88.971944	30.211944	5.15
Biloxi Bay at Point Cadet	88.857222	30.389722	4.23
West Pascagoula River at Hwy 90 at Gautier, MS	88.608889	30.382778	4.10
Pascagoula River (NOAA) at Pascagoula, MS	88.563333	30.366944	6.72
Mississippi Sound at Pascagoula PI-Rear Range	88.514444	30.298889	5.83
Mississippi Sound at Petit Bois Island	88.505556	30.214444	4.83
Escatawpa River at I-10 near Orange Grove, MS	88.451389	30.458611	3.93
Middle Gage at Bayou LaBatre	88.256944	30.398611	4.66
Mobile Bay at Cedar Point, AL	88.138333	30.310556	6.90
Dauphin Island Bay at Dauphin Island	88.107778	30.258333	7.80
Mobile Bay at Dauphin Island (USCG)	88.079444	30.251111	8.0
Mobile River at Mobile, AL	88.039444	30.704444	4.87
Mobile River at Bucks, AL (Barry Steam Plant)	88.011111	30.004444	6.82
Mobile Bay at Ft. Morgan Front Range	88.033333	30.233333	7.85
Perdido Pass Orange Beach, AL	87.555000	30.278611	8.81

NGVD = National Geodetic Vertical Datum

Marking and Survey Methodology

Field and survey crews from URS and their subconsultants, Dewberry and PBS&J, were deployed to interview residents, find evidence of coastal high water levels, take digital photographs, and survey CHWMs from Hurricane Ivan. Figures 6 and 7 show an example of both the flaggers' form and the surveyors' form used to record field information. During the flagging, field crews entered estimates of surge heights in the comments field on the flagger forms. These were visual estimates and were referenced to the normal range of the tides as best estimated by the observers. The purpose of these observations was to initially estimate water levels well before the surveyors' work was completed. The CHWM flagging crews were deployed on Tuesday, September 28, 2004, shortly followed by the survey crews.

The survey crews followed the field crews and used static global positioning system (GPS) methods to determine an accurate elevation for each CHWM. Since static GPS requires an area with no tree cover to return an accurate result, in some cases it was necessary to perform a short level loop survey from the GPS point to the CHWM. Wherever possible, finished floor elevations of structures adjacent to the CHWM were collected. This information may be used at a later date for possible damage assessments or HMGP applications. CHWM locations were surveyed horizontally in North American Datum of 1983 (NAD 83), State Plane feet, and vertically in North American Vertical Datum of 1988 (NAVD 88), US survey feet. CHWM locations have been surveyed to within accuracies of 0.25 foot vertically and 10 feet horizontally with a 95% confidence level.

Figure 6: Sample CHWM Flagger Form

HIGH WATER MARK (HWM) REPORT – FLAGGERS

HWM ID	
HWM Address	
Date of Flagging/ Interview	
Date of Flood Event	
Name of Storm Event	
Stream Name/Flood Source	
Closest Municipality	
County	
State	

HWM Type	
HWM Object	
Location of HWM Object	
HWM Quality	
Type of Mark	
Directions to Flagger's Mark	
Vertical Dist from set point & description of set point	
Survey Needed	
Flagger HWM Latitude	
Flagger HWM Longitude	
Flooding Type	
Photo ID	
Photo Location/ Orientation	
Photo Description/Subject	
Comments	
Name of Flagger/Interviewer	
Unit Number	
Flagger Company	
Resident/Eyewitness Information	
Name	
Address	
Phone	
How Long Lived There	
Obtained Permission to Survey	

Figure 7: Sample CHWM Surveyor Form

HWM ID	
HWM Address	
HWM/Flood Elevation (1)	
Survey Crew	
Survey Company	
Survey Date	
Survey Latitude	
Survey Longitude	
Northing	
Easting	
Vertical Datum	NAVD 88
Horizontal Datum	NAD 83
Survey Project	
Approx. First Floor Elevation	
Survey Comments	

Field crews flagged CHWMs with characteristics such as surge, wave runup, and wave height. These designations on the survey sheets in the appendices represent the flaggers' estimates of this characteristic based on a combination of physical flood evidence and interviews with witnesses at the time of collection. Surge represents the rise in the normal water level, wave runup indicates the height of water rise above the stillwater level due to water runup from a breaking wave, and wave height indicates CHWM elevation due to more direct wave action. Typically, surge CHWMs are associated with a slow rising flood that causes more water damage than structural damage. Wave height usually results in a higher elevation. All attempts were

made to flag storm surge elevations, but in areas where surge characteristics were not obvious, wave runup or wave height was flagged.

Elevation Conversion from NAVD 88 to NGVD 29 Using VERTCON

The elevations shown in the 1929 NGVD were derived from the VERTCON program and the existing 1988 NAVD elevation. The VERTCON software was developed by the National Geodetic Survey (NGS) Office to allow the conversion of data between different vertical data scales. VERTCON is available as an element of the NGS Geodetic Toolkit and can be downloaded from the NGS website: http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html.

VERTCON allows the user to compute the modeled difference in orthometric height for a given location specified by its latitude and longitude. Applying the VERTCON datum difference value to a specific elevation converts from one datum to another.

For example, a NAVD 88 elevation is 5.33 feet. Using the latitude and longitude, VERTCON computes a datum shift of (-)1.171 feet; to convert to the NGVD 29 elevation, SUBTRACT the datum shift from the NAVD 88 height. NAVD EL=5.33’ minus (-)1.171 feet equals NGVD 29 elevation of 6.50 feet.

Findings and Observations

The results of this survey are presented as a series of six maps that are shown on Figures 8-13 (Appendix A). The individual points are coded to differentiate between surge data (taken in places protected from the effects of waves), wave runup data (where the water line resulted from waves rushing up a slope) and wave height data (where wave crests caused the water mark). The relative quality of each data point is also represented. Further information about each point is given on CHWM forms in Appendices B through E.

Results from the NOAA National Hurricane Center Sea, Lake and Overland Surges from Hurricanes (SLOSH) computer model were used to plan the locations of the collected CHWMs. Damage was so extensive over the eastern portion of the area that it was possible to designate general locations where data points would be most useful. Almost without exception, places with distinct water marks could be found within these general locations. One result is that the great majority of the data points represent water marks from protected locations such as interior walls. On the other hand, the storm damage was so extensive that coastal roads were washed out or entirely buried with sand. These areas are shown as being inaccessible on the figures. Some of the Gulf beaches in this area are within parks or National Seashores. These natural areas contained scant record of the coastal storm surge compared to the built-up areas.

The NOAA SLOSH model prediction run output shows that the maximum surge conditions moved across the area as the storm tracked across the coast. Hurricane Ivan crossed the coast in the general area of Gulf Shores and Orange Beach. Because it tracked north-northeast from there, Mobile Bay and most of the Alabama coast was exposed to the weaker “left-front” storm quadrant. The major storm surge struck Orange Beach, Gulf Shores, and the peninsula between Bon Secour Bay (the southeastern corner of Mobile Bay) and the open Gulf. Figures 8 and 9 show the CHWM elevations in these areas. The surge height, determined from water marks in sheltered locations such as interior rooms, ranged between 12 and 14½ feet along this portion of the open Alabama shore. Much of the beach system was overtopped or overwashed. Little Lagoon filled with water but the effects of wave set-up may have been smaller than on the open coast, accounting for slightly lower CHWM elevations along its north shore.

The open Gulf coastal CHWM elevations decrease slightly near Perdido Pass, possibly because of the flow into Perdido Bay. Figure 8 shows that CHWM elevations in the lower Perdido Bay were on the order of 6 to 7 feet. Data from the Florida side of upper Perdido Bay (not shown) indicated that the water level increased towards the head of the bay with values in the range of 8½ to 9 feet at its northern end. The surge was then amplified as it propagated up the lower Perdido River such that the USGS gage at Barrineau Park indicated a level of 14 feet above the preceding river level. A similar effect appears to have affected the head of Wolf Bay as shown on Figure 8.

Figure 9 shows that the CHWM elevations were much lower along the eastern shore of Mobile Bay compared to the open coast. Data on Figures 9 and 10 show that elevations on the order of 6½ feet were characteristic of this eastern shore.

Figure 11 shows the effect of the storm on Dauphin Island and the lower western part of Mobile County. Along the open coast, CHWM elevations reached 12 feet and ranged between 3 and 6.8 feet on the landward side of the island and the more protected coastline of lower Mobile County.

Figures 12 and 13 show the CHWM locations and elevations along the Mississippi coast from Pascagoula west to Bay St. Louis. CHWMs recorded at these points show a general decrease in elevation from east to west along this coast with a height range between 6½ and 4 feet.

Recommendations

The following recommendations discuss how FEMA can use the CHWM information to assist in the recovery effort from Hurricane Ivan:

- Compare the Hurricane Ivan CHWMs to the flood elevation data on the effective or preliminary Flood Insurance Rate Maps. These comparisons can help FEMA determine where the updated flood hazard data was supported by the flooding that occurred or where new detailed studies should be performed to update the maps, and can help illustrate deficiencies on the existing maps.

- An evaluation is needed of the recurrence intervals of the surge conditions across the area. This will vary from place to place owing to distance from the storm track and local geographic effects. Preliminary evidence suggests that much of the area that experienced the most severe surge conditions was exposed to more than 100-year conditions.

- Compare the Ivan CHWMs to CHWMs from other significant flood events. This will identify areas of repetitive flooding that can assist FEMA in determining locations that would make good flood mitigation projects.

- Complete detail-engineering analyses to determine flood elevations in the areas where deficiencies have been identified on the existing FEMA maps, or on areas where property loss occurred where no previous studies have been prepared.

- The locations and severity of the Ivan CHWMs can help FEMA identify areas of concern for future mitigation projects when funding for such projects becomes available.

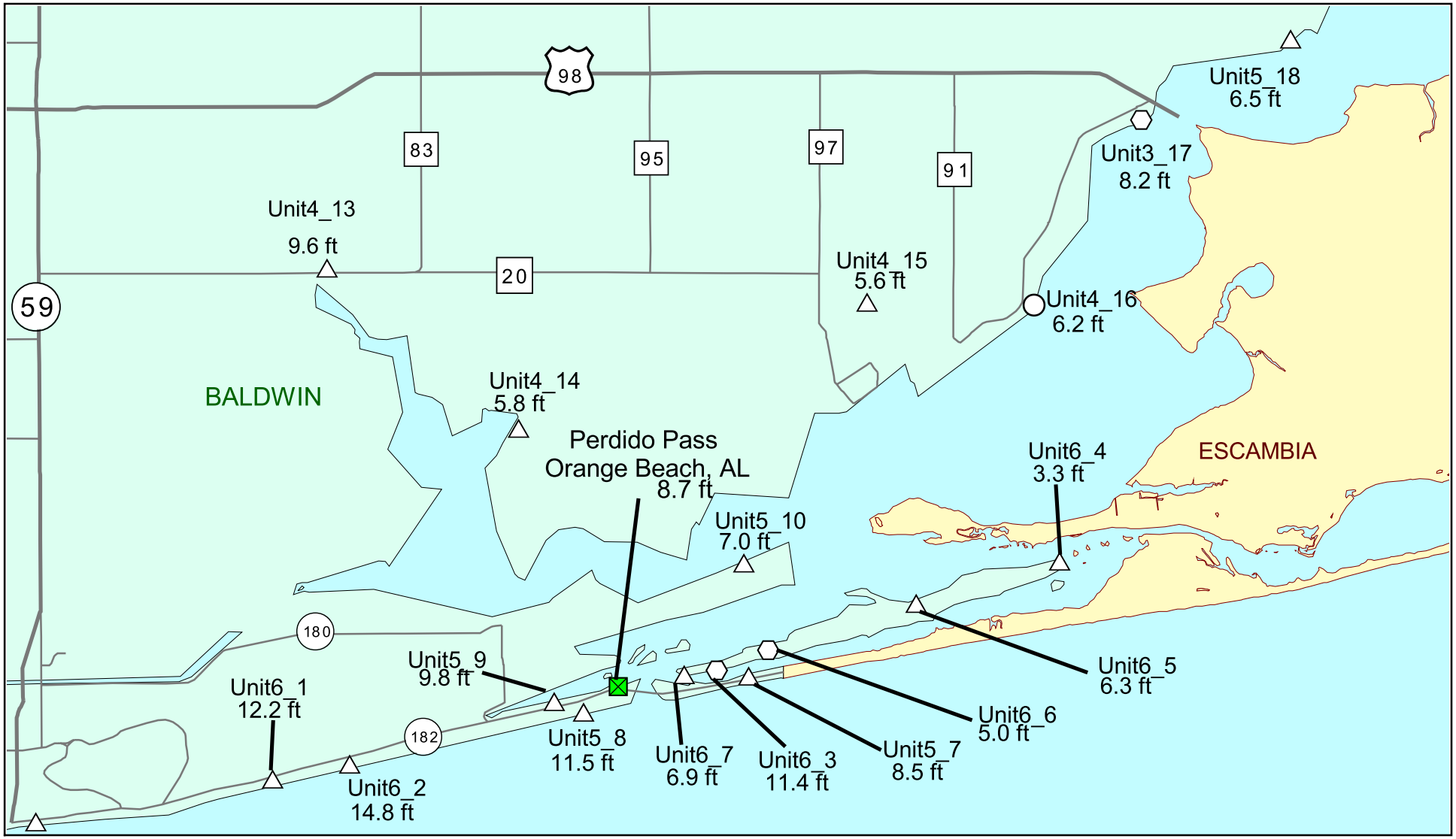
- Use these CHWMs to evaluate the success of completed mitigation projects. The flood depths that occurred during Ivan can be used to estimate potential damage that could have occurred to structures that have been bought out and removed as part of mitigation projects already completed. Documentation of the “damages avoided” can be used as success stories to further support the mitigation efforts.

- The CHWMs can be used to create inundation mapping for Hurricane Ivan. The inundation maps would provide a plan-view of the extent of flooding from Hurricane Ivan and can assist in determining the accuracy of existing FEMA flood maps. The inundation mapping would be a spatially correct Geographic Information System (GIS) coverage that can be provided to community officials to assist in disaster recovery. Note that under HMTAP Task Order 352, the CHWMs for Baldwin County are being used for flood inundation maps.

- Provide this report on the Internet to aid public officials and the community in the recovery effort.

Appendices

Appendix A: Figures



Flood Type Surge - Quality Fair
Flood Type Wave Runup - Quality Fair
Flood Type Surge - Quality Good
Flood Type Wave Runup - Quality Good
Flood Type Surge - Quality Poor
Other Gage Source

Cities
Primary road with limited access
Primary road
Secondary road
Ferry crossing
Alabama Counties
Florida Counties
Mississippi Counties
10.5 ft Surveyed CHWM Elevations (NAVD88)

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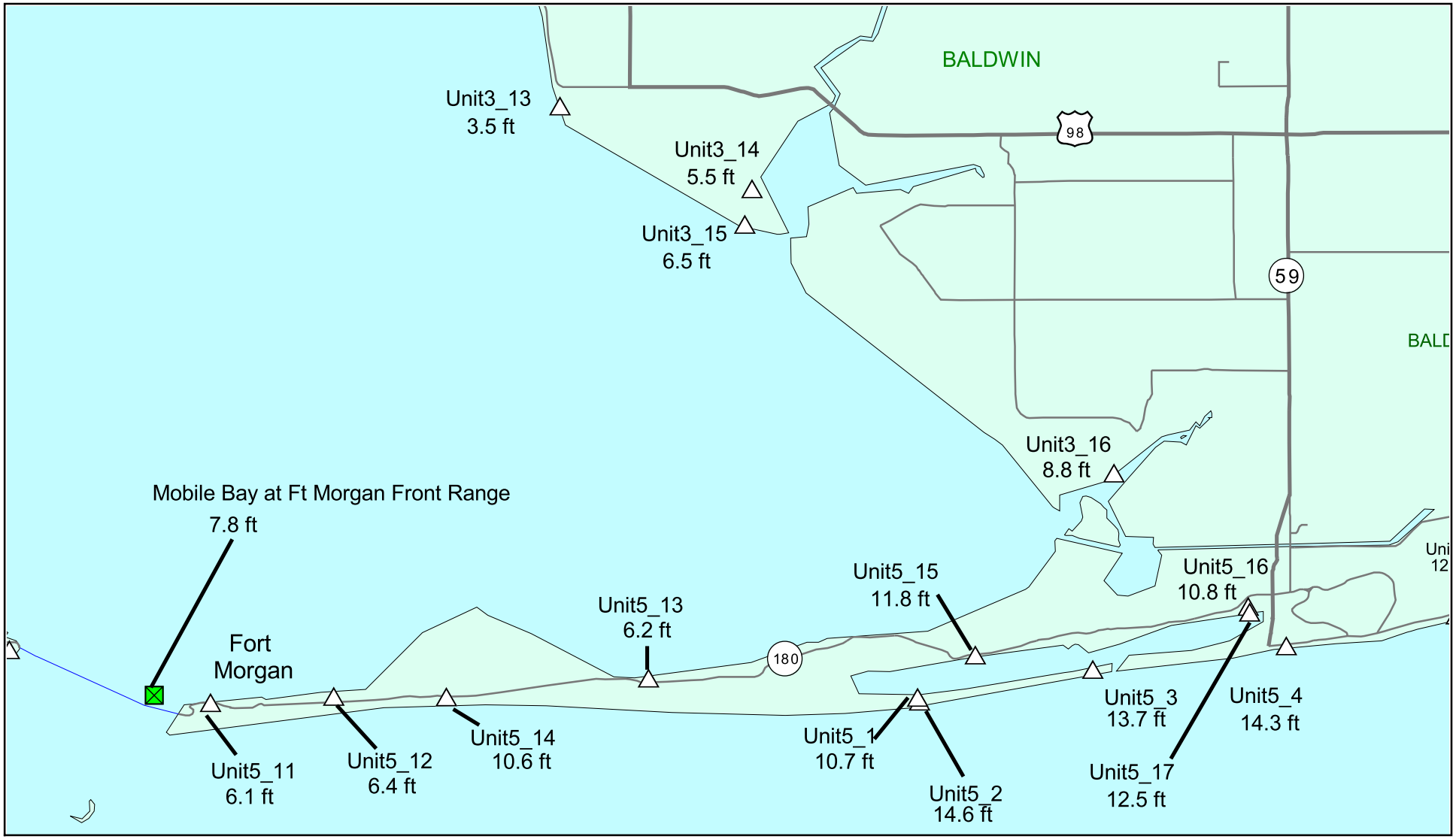
Figure 8
Hurricane Ivan
CHWM Surveyed Elevations
Orange Beach / Ono Island Area

FEMA

1 0 1 2 Miles
1 0 1 2 3 Kilometers



Flood Type Surge - Quality Fair
Flood Type Wave Runup - Quality Fair
Flood Type Surge - Quality Good
Flood Type Wave Runup - Quality Good
Flood Type Surge - Quality Poor
Other Gage Source

Cities
Primary road with limited access
Primary road
Secondary road
Ferry crossing
Alabama Counties
Florida Counties
Mississippi Counties
10.5 ft Surveyed CHWM Elevations (NAVD88)

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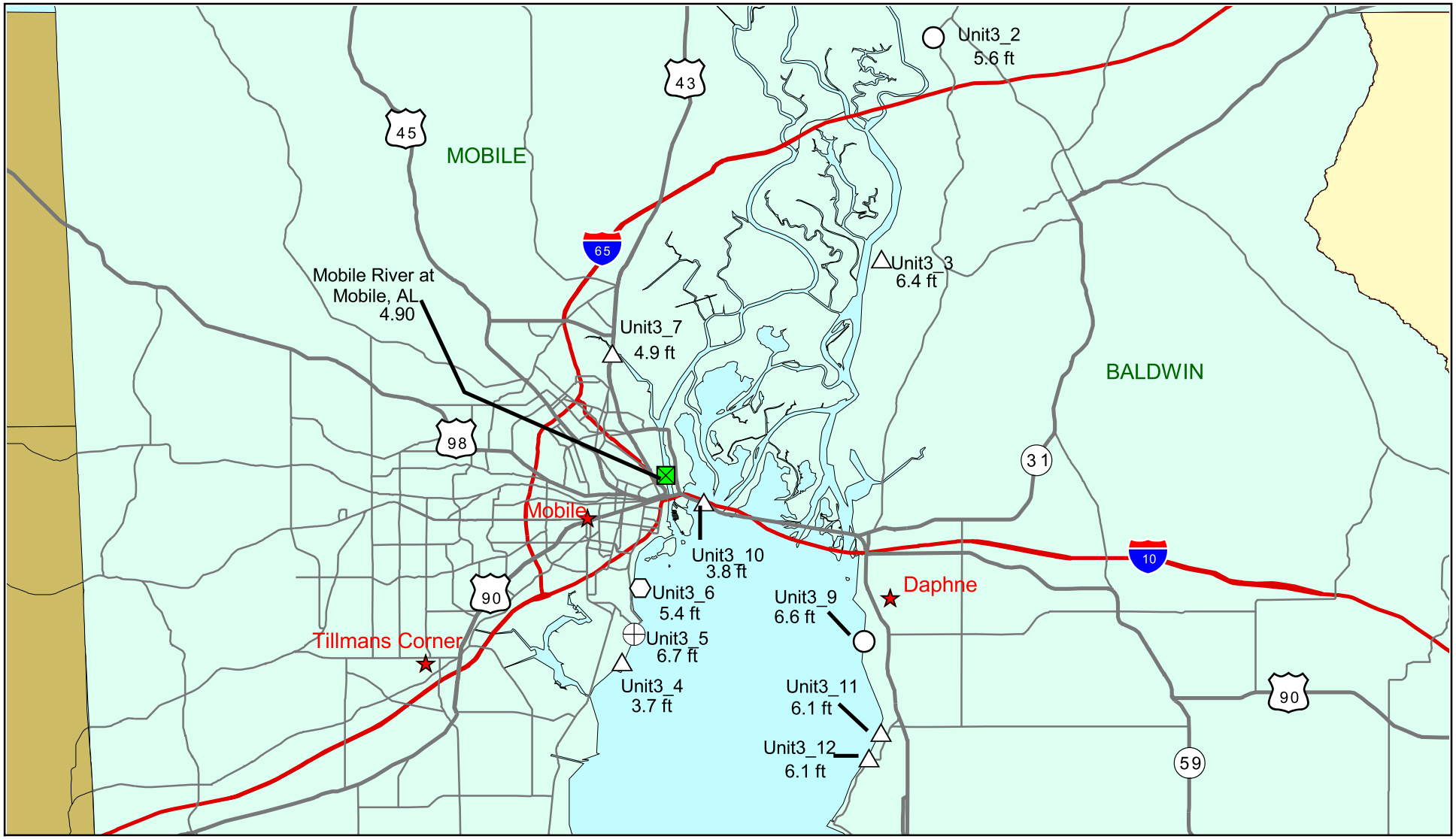
Figure 9
Hurricane Ivan
CHWM Surveyed Elevations
West Beach / Fort Morgan Area

FEMA

1 0 1 2 3 Miles
1 0 1 2 3 4 Kilometers



Flood Type Surge - Quality Fair
Flood Type Wave Runup - Quality Fair
Flood Type Surge - Quality Good
Flood Type Wave Runup - Quality Good
Flood Type Surge - Quality Poor
Other Gage Source

Cities
Primary road with limited access
Primary road
Secondary road
Ferry crossing
Alabama Counties
Florida Counties
Mississippi Counties
10.5 ft Surveyed CHWM Elevations (NAVD88)

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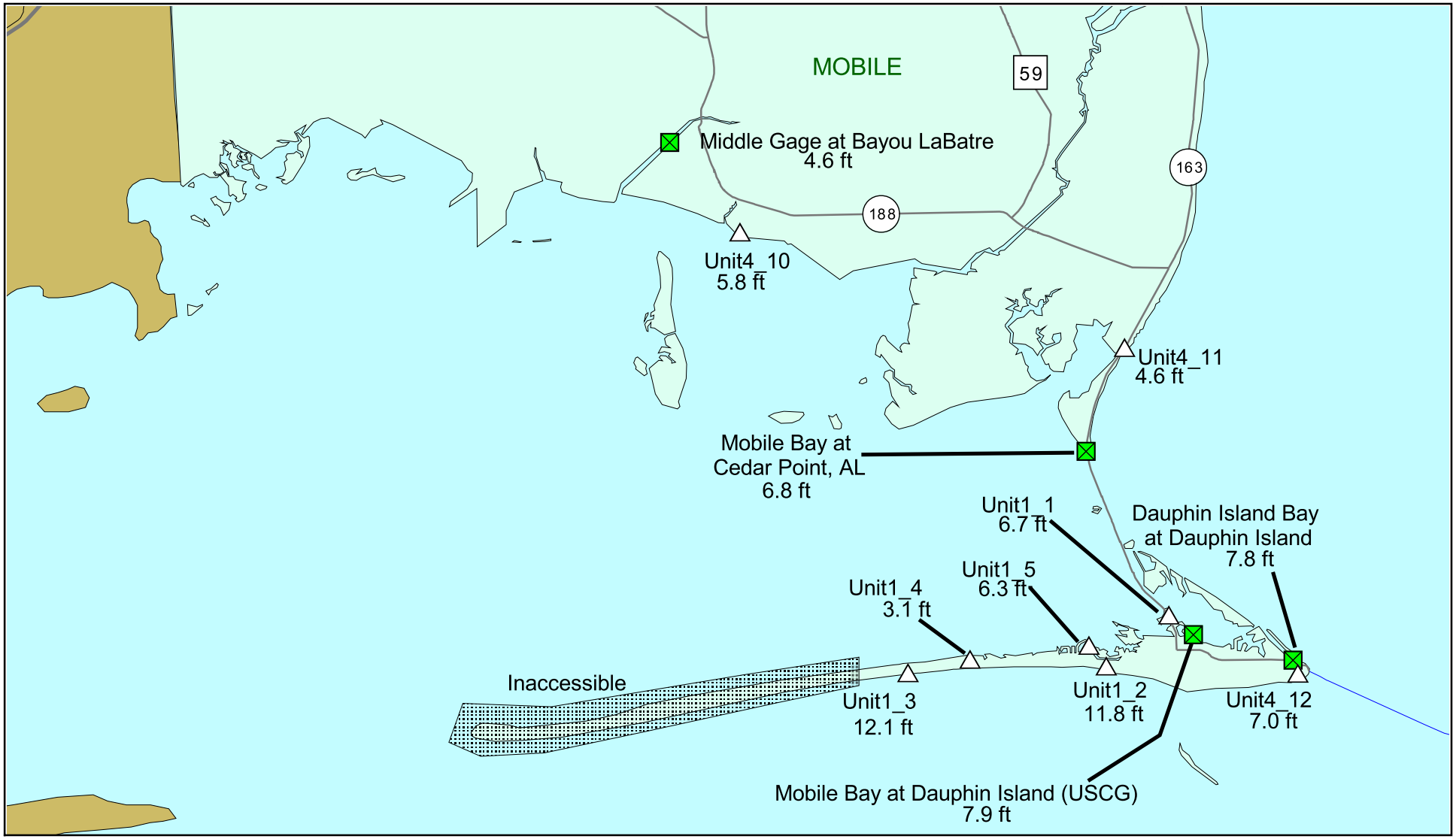
Figure 10
Hurricane Ivan
CHWM Surveyed Elevations
Upper Mobile Bay Area

FEMA

2 0 2 4 6 Miles
2 0 2 4 6 8 Kilometers



Flood Type Surge - Quality Fair
Flood Type Wave Runup - Quality Fair
Flood Type Surge - Quality Good
Flood Type Wave Runup - Quality Good
Flood Type Surge - Quality Poor
Other Gage Source

Cities
Primary road with limited access
Primary road
Secondary road
Ferry crossing
Alabama Counties
Florida Counties
Mississippi Counties
10.5 ft Surveyed CHWM Elevations (NAVD88)

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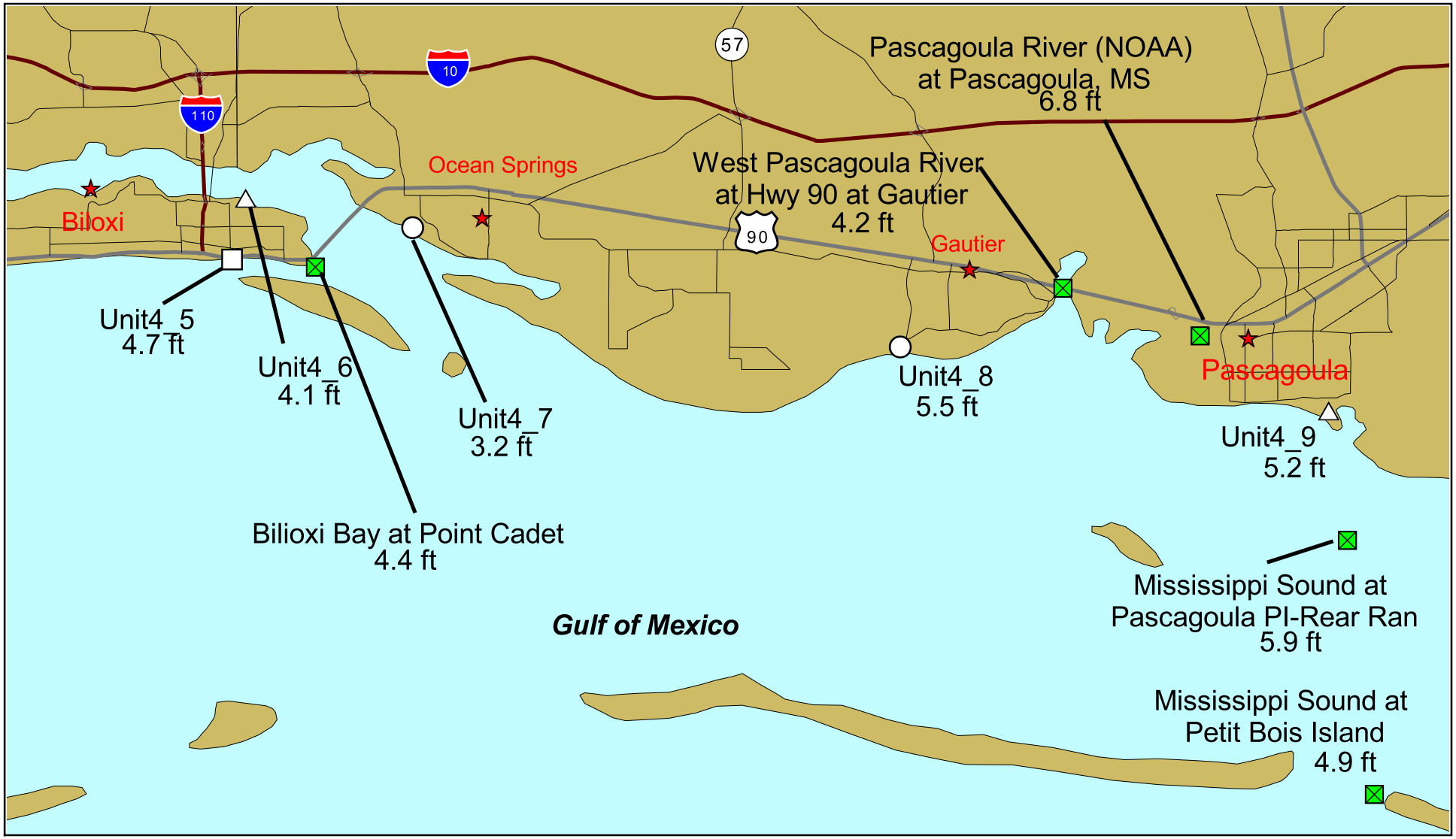
Figure 11
Hurricane Ivan
CHWM Surveyed Elevations
Dauphin Island Area

FEMA

1 0 1 2 3 Miles
1 0 1 2 3 4 Kilometers



Flood Type Surge - Quality Fair
Flood Type Wave Runup - Quality Fair
Flood Type Surge - Quality Good
Flood Type Wave Runup - Quality Good
Flood Type Surge - Quality Poor
Other Gage Source

Cities
Primary road with limited access
Primary road
Secondary road
Ferry crossing
Alabama Counties
Florida Counties
Mississippi Counties
10.5 ft Surveyed CHWM Elevations (NAVD88)

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Figure 12
Hurricane Ivan
CHWM Surveyed Elevations
Biloxi Bay Area

FEMA

1 0 1 2 3 Miles
1 0 1 2 3 4 Kilometers

Flood Type Surge - Quality Fair
Flood Type Wave Runup - Quality Fair
Flood Type Surge - Quality Good
Flood Type Wave Runup - Quality Good
Flood Type Surge - Quality Poor
Other Gage Source

Cities
Primary road with limited access
Primary road
Secondary road
Ferry crossing
Alabama Counties
Florida Counties
Mississippi Counties
10.5 ft Surveyed CHWM Elevations (NAVD88)

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Figure 13
Hurricane Ivan
CHWM Surveyed Elevations
St Louis Bay Area

FEMA

1 0 1 2 3 Miles
1 0 1 2 3 4 Kilometers

Appendices

Appendix B: Survey Sheets from Baldwin County, Alabama

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-1

HWM ID	Unit3_2	**Type of Mark:**	Stake and flagging tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Tensaw River	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**5.6 ft** **NGVD 29: 5.5 ft**	**HWM Object:**	Ground
Flooding Type:	Surge		
HWM Address:	N/A		
Location of HWM Object	To the right of the boat ramp.		
HWM Type:	Debris line		
Closest Municipality:	Stockton	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/29/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	11/1/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	564665.1921	**Easting (feet):**	1852572.385
Survey Latitude:	30.98145	**Northing (Meters):**	108855.7659	**Northing (feet):**	357137.6252
Survey Longitude:	87.86993	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_2.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

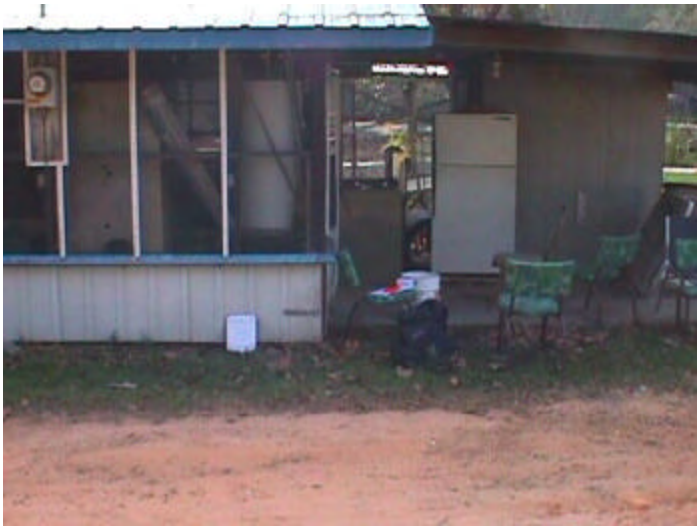
PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-2

HWM ID	Unit3_3	**Type of Mark:**	Water line
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Hurricane Bayou off of Tensaw River	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.4 ft** **NGVD 29: 6.4 ft**	**HWM Object:**	Outside wall
Flooding Type:	Surge		
HWM Address:	7060 Hurricane Road		
Location of HWM Object	NE corner of the Hurricane Bream club.		
HWM Type:	Gray duct tape		
Closest Municipality:	Bayminette/Spanish Fort	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/29/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/29/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	561468.2521	**Easting (feet):**	1842083.757
Survey Latitude:	30.84157	**Northing (Meters):**	93358.94298	**Northing (feet):**	306295.1321
Survey Longitude:	87.90282	**Approx. First Floor Elevation:**	5.8 ft		

Comment



Unit3_3.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-3

HWM ID	Unit3_8	**Type of Mark:**	Stake and flag
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**20.3 ft** **NGVD 29: 20.2 ft**	**HWM Object:**	Ground
Flooding Type:	Wave run-up		
HWM Address:	2605 Main St.		
Location of HWM Object	82' SE of the southernmost corner of stilt house.		
HWM Type:	Debris line		
Closest Municipality:	Daphne	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	560441.4134	**Easting (feet):**	1838714.870
Survey Latitude:	30.61850	**Northing (Meters):**	68633.44741	**Northing (feet):**	225174.9020
Survey Longitude:	87.91260	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_8.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-4

HWM ID	Unit3_9	**Type of Mark:**	Duct tape w/red spray paint
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**6.6 ft** **NGVD 29: 6.5 ft**	**HWM Object:**	Power pole
Flooding Type:	Surge		
HWM Address:	Pier at the end of College Ave.		
Location of HWM Object	12' from southernmost concrete piling.		
HWM Type:	Water line		
Closest Municipality:	Daphne	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	560307.1122	**Easting (feet):**	1838274.251
Survey Latitude:	30.59938	**Northing (Meters):**	66514.39208	**Northing (feet):**	218222.6347
Survey Longitude:	87.91392	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_9.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-5

HWM ID	Unit3_11	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.1 ft** **NGVD 29: 6.0 ft**	**HWM Object:**	Outside wall
Flooding Type:	Surge		
HWM Address:	101 Volanta Ave		
Location of HWM Object	To the right of the entrance door.		
HWM Type:	Water line		
Closest Municipality:	Fairhope	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	561308.4507	**Easting (feet):**	1841559.475
Survey Latitude:	30.54171	**Northing (Meters):**	60117.66689	**Northing (feet):**	197236.0455
Survey Longitude:	87.90324	**Approx. First Floor Elevation:**	5.8 ft		

Comment

Unit3_11a.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-6

HWM ID	Unit3_12	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.1 ft** **NGVD 29: 6.1 ft**	**HWM Object:**	Outside wall
Flooding Type:	Surge		
HWM Address:	Bay Front Park		
Location of HWM Object	First (only) covered barbeque pit in park.		
HWM Type:	Water line		
Closest Municipality:	Fairhope	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	560586.0808	**Easting (feet):**	1839189.500
Survey Latitude:	30.52572	**Northing (Meters):**	58347.48707	**Northing (feet):**	191428.3805
Survey Longitude:	87.91070	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_12.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

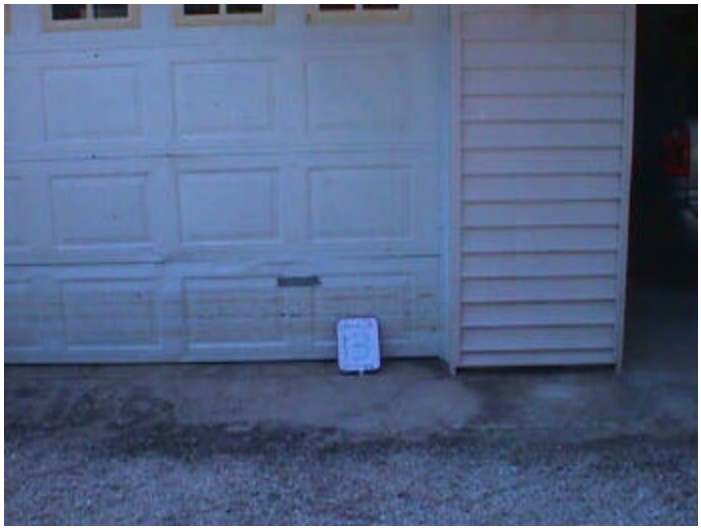
PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-7

HWM ID	Unit3_13	**Type of Mark:**	Water line
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**3.5 ft** **NGVD 29: 3.5 ft**	**HWM Object:**	Outside wall
Flooding Type:	Surge		
HWM Address:	13083 County Road 1		
Location of HWM Object	On garage door.		
HWM Type:	Water line		
Closest Municipality:	Fairhope	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	560785.4556	**Easting (feet):**	1839843.616
Survey Latitude:	30.41515	**Northing (Meters):**	46089.49386	**Northing (feet):**	151211.9478
Survey Longitude:	87.90816	**Approx. First Floor Elevation:**	2.6 ft		

Comment



Unit3_13.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-8

HWM ID	Unit3_14	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Week's Bay, 1st Canal	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.5 ft** **NGVD 29: 5.5 ft**	**HWM Object:**	Stilt
Flooding Type:	Surge		
HWM Address:	10215 Bayou Circle		
Location of HWM Object	2nd set of pillars from right and 2nd pillar in from canal.		
HWM Type:	Water line		
Closest Municipality:	Fairhope	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/29/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	566475.1658	**Easting (feet):**	1858510.606
Survey Latitude:	30.38965	**Northing (Meters):**	43243.68728	**Northing (feet):**	141875.3307
Survey Longitude:	87.84885	**Approx. First Floor Elevation:**	12.8 ft		

Comment

Unit3_14.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-9

HWM ID	Unit3_15	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Week's Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.5 ft** **NGVD 29: 6.5 ft**	**HWM Object:**	Door
Flooding Type:	Surge		
HWM Address:	10615 County Road 1		
Location of HWM Object	West side of house.		
HWM Type:	Water line		
Closest Municipality:	Fairhope	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J
Survey Date:	10/25/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 566258.1222	**Easting (feet):** 1857798.523
Survey Latitude:	30.37873	**Northing (Meters):** 42033.89779	**Northing (feet):** 137906.2130
Survey Longitude:	87.85107	**Approx. First Floor Elevation:** 6.2 ft	

Comment

Unit3_15.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

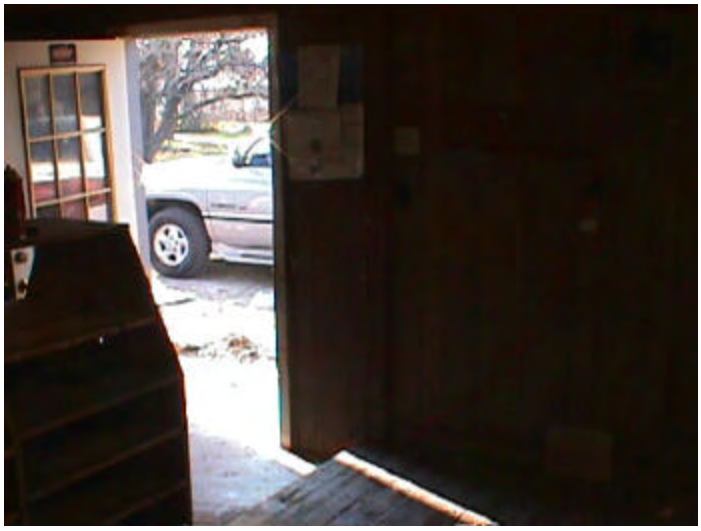
PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-10

HWM ID	Unit3_16	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Bon Secour Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**8.8 ft** **NGVD 29: 8.9 ft**	**HWM Object:**	Inside wall
Flooding Type:	Surge		
HWM Address:	10806 River Road West, Parks Boat Supplies and Hardware		
Location of HWM Object	Entrance wall.		
HWM Type:	Water line		
Closest Municipality:	Bon Secour	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	577186.1300	**Easting (feet):**	1893651.495
Survey Latitude:	30.30187	**Northing (Meters):**	33485.0213	**Northing (feet):**	109858.7741
Survey Longitude:	87.73718	**Approx. First Floor Elevation:**	4.0 ft		

Comment



Unit3_16a.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-11

HWM ID	Unit3_17	**Type of Mark:**	Stake and flag
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Perdido Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**8.2 ft** **NGVD 29: 8.4 ft**	**HWM Object:**	Ground
Flooding Type:	Wave run-up		
HWM Address:	12280 S. 7th St.		
Location of HWM Object	Front yard on septic tank mound.		
HWM Type:	Debris line		
Closest Municipality:	Lillian	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/29/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	605842.0676	**Easting (feet):**	1987666.85
Survey Latitude:	30.40403	**Northing (Meters):**	44788.04396	**Northing (feet):**	146942.1076
Survey Longitude:	87.43920	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_17.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-12

HWM ID	Unit4_13	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Sandy Creek/Wolf Bay/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**9.6 ft** **NGVD 29: 9.6 ft**	**HWM Object:**	Shed in back yard, outside wall
Flooding Type:	Coastal surge		
HWM Address:	10070 Coleman Lane		
Location of HWM Object	NW corner of shed at foot of dock in back yard.		
HWM Type:	Water mark		
Closest Municipality:	Elberta	**County** Baldwin	**State:** AL
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/2/2004		
Survey Crew:	T. Tipton	**Survey Company:**	PBS & J
Survey Date:	10/30/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 588513.8156	**Easting (feet):** 1930815.743
Survey Latitude:	30.37130	**Northing (Meters):** 41163.98869	**Northing (feet):** 135052.1862
Survey Longitude:	87.61950	**Approx. First Floor Elevation:** N/A	

Comment

Unit4_13.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-13

HWM ID	Unit4_14	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Wolf Bay/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.8 ft** **NGVD 29: 5.8 ft**	**HWM Object:**	Exterior wall in shower stall
Flooding Type:	Coastal surge		
HWM Address:	7685 Bayshore Dr.		
Location of HWM Object	On wall in shower stall (exterior) on street side of house.		
HWM Type:	Water mark		
Closest Municipality:	Elberta	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/30/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	592585.506	**Easting (feet):**	1944174.281
Survey Latitude:	30.33581	**Northing (Meters):**	37225.85667	**Northing (feet):**	122131.8314
Survey Longitude:	87.57711	**Approx. First Floor Elevation:**	4.4 ft		

Comment

Unit4_14.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-14

HWM ID	Unit4_15	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Soldier Creek/Perdido Bay/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.6 ft** **NGVD 29: 5.7 ft**	**HWM Object:**	Waterline inside shed transferred to outside of shed next to door of shed in back yard
Flooding Type:	Coastal surge		
HWM Address:	9538 Perdido Vista		
Location of HWM Object	Exterior wall of shed in back yard, beside shed door.		

HWM Type:	Water line				
Closest Municipality:	Elberta	**County**	Baldwin	**State:**	AL
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry		
Date of Flagging/Interview:	10/2/2004				
Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/30/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	600011.2147	**Easting (feet):**	1968536.794
Survey Latitude:	30.36373	**Northing (Meters):**	40319.1579	**Northing (feet):**	132280.4372
Survey Longitude:	87.49988	**Approx. First Floor Elevation:**	4.8 ft		

Comment

Unit4_15.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-15

HWM ID	Unit4_16	**Type of Mark:**	Stake and mark on road
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Perdido Bay/Gulf of Mexico	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**6.2 ft** **NGVD 29: 6.4 ft**	**HWM Object:**	Ground
Flooding Type:	Coastal surge, could include wave affects		
HWM Address:	Empty lot to the north of 9500 N. Bayview Drive		
Location of HWM Object	In the empty lot to the north of 9500 N. Bayview Dr. 212' 3" east of mark on road.		
HWM Type:	Debris line		
Closest Municipality:	Perdido Beach	**County** Baldwin	**State:** AL
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/2/2004		
Survey Crew:	KEITH	**Survey Company:**	PBS & J
Survey Date:	11/6/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 603564.696	**Easting (feet):** 1980195.172
Survey Latitude:	30.36317	**Northing (Meters):** 40256.925	**Northing (feet):** 132076.2625
Survey Longitude:	87.46292	**Approx. First Floor Elevation:** N/A	

Comment

Unit4_16.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-16

HWM ID	Unit5_1	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**14.6 ft** **NGVD 29: 14.6 ft**	**HWM Object:**	Deck support beam
Flooding Type:	Surge		
HWM Address:	3213 Dolphin Drive		
Location of HWM Object	Rear of house under porch.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores (Lagoona Key)	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	571397.7438	**Easting (feet):**	1874660.765
Survey Latitude:	30.23157	**Northing (Meters):**	25705.81592	**Northing (feet):**	84336.49772
Survey Longitude:	87.79715	**Approx. First Floor Elevation:**	7.2 ft		

Comment

Unit5_1.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-17

HWM ID	Unit5_2	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**10.7 ft** **NGVD 29: 10.7 ft**	**HWM Object:**	Exterior wall at front door
Flooding Type:	Surge		
HWM Address:	3220 Seahorse Circle or Drive		
Location of HWM Object	Inside house (foyer).		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	571343.5421	**Easting (feet):**	1874482.938
Survey Latitude:	30.23275	**Northing (Meters):**	25837.13065	**Northing (feet):**	84767.31947
Survey Longitude:	87.79772	**Approx. First Floor Elevation:**	5.4 ft		

Comment

The house is located at the center of the Island, therefore could not determine if the flood source was the Gulf or the Bay.

Unit5_2.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-18

HWM ID	Unit5_3	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**13.7 ft** **NGVD 29: 13.8 ft**	**HWM Object:**	Exterior wall/utility room
Flooding Type:	Surge		
HWM Address:	1832 West Beach Blvd., (Gulf Shores Surf & Racket Club)		
Location of HWM Object	Backside of front building on east end next to electrical storeroom.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL
Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		
Survey Crew:	T. Tipton	**Survey Company:**	PBS & J
Survey Date:	10/26/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 576546.5404	**Easting (feet):** 1891553.108
Survey Latitude:	30.24138	**Northing (Meters):** 26781.75915	**Northing (feet):** 87866.48815
Survey Longitude:	87.74368	**Approx. First Floor Elevation:** 6.7 ft	

Comment

Unit5_3.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-19

HWM ID	Unit5_4	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**14.3 ft** **NGVD 29: 14.4 ft**	**HWM Object:**	Exterior wall
Flooding Type:	Surge		
HWM Address:	337 East Beach Blvd., (Best Western Denny's restaurant)		
Location of HWM Object	At front entrance to Denny's.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	582285.6938	**Easting (feet):**	1910382.314
Survey Latitude:	30.24862	**Northing (Meters):**	27572.78305	**Northing (feet):**	90461.70573
Survey Longitude:	87.68407	**Approx. First Floor Elevation:**	12.8 ft		

Comment

Unit5_4.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-20

HWM ID	Unit5_7	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**8.5 ft** **NGVD 29: 8.7 ft**	**HWM Object:**	Exterior wall
Flooding Type:	Surge		
HWM Address:	29235 Perdido Beach Blvd. (Legacy Key)		
Location of HWM Object	Inside parking garage on wall next to electrical room door.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL
Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		
Survey Crew:	T. Tipton	**Survey Company:**	PBS & J
Survey Date:	10/27/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 597482.5859	**Easting (feet):** 1960240.784
Survey Latitude:	30.28097	**Northing (Meters):** 31144.72117	**Northing (feet):** 102180.6394
Survey Longitude:	87.52617	**Approx. First Floor Elevation:** 7.8 ft	

Comment

Unit5_7.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-21

HWM ID	Unit5_8	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	N/A
Survey Elevation (NAVD 88):	**11.5 ft** **NGVD 29: 11.6 ft**	**HWM Object:**	Exterior wall
Flooding Type:	Surge		
HWM Address:	27100 Perdido Beach Blvd. Unit 010 (Phoenix East)		
Location of HWM Object	Outside wall of Unit 010 by sliding glass door 5' 2" up from slab.		
HWM Type:	Surge		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL
Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		
Survey Crew:	T. Tipton	**Survey Company:**	PBS & J
Survey Date:	10/26/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 593965.7344	**Easting (feet):** 1948702.580
Survey Latitude:	30.27298	**Northing (Meters):** 30261.14584	**Northing (feet):** 99281.77598
Survey Longitude:	87.56272	**Approx. First Floor Elevation:** 6.4 ft	

Comment

Water line in supervisors office was transferred to an outside wall.

Unit5_8.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-22

HWM ID	Unit5_9	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico/Cotton Bayou	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**9.8 ft** **NGVD 29: 10.0 ft**	**HWM Object:**	Exterior wall
Flooding Type:	Surge		
HWM Address:	26619 Perdido Beach Blvd., (Zeke's Landing)		
Location of HWM Object	Exterior wall to the right of entrance to Seacrets Gift Shop.		
HWM Type:	Debris line on wall		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	593345.3023	**Easting (feet):**	1946667.046
Survey Latitude:	30.27525	**Northing (Meters):**	30512.76528	**Northing (feet):**	100107.2974
Survey Longitude:	87.56917	**Approx. First Floor Elevation:**	7.1 ft		

Comment

Unit5_9.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-23

HWM ID	Unit5_10	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Intra Coastal Waterway	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**7.0 ft** **NGVD 29: 7.2 ft**	**HWM Object:**	Exterior workroom/storage room wall
Flooding Type:	Surge		
HWM Address:	5524 Wolfhead		
Location of HWM Object	In carport under house.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach (Bear Point)	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/27/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	597379.0274	**Easting (feet):**	1959901.026
Survey Latitude:	30.30600	**Northing (Meters):**	33919.69114	**Northing (feet):**	111284.8534
Survey Longitude:	87.52725	**Approx. First Floor Elevation:**	4.2 ft		

Comment

Unit5_10.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-24

HWM ID	Unit5_11	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.1 ft** **NGVD 29: 6.1 ft**	**HWM Object:**	Interior building wall rear (north)
Flooding Type:	Surge		
HWM Address:	Fort Morgan #3 ticket booth at entrance		
Location of HWM Object	On wall.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	550338.2441	**Easting (feet):**	1805568.056
Survey Latitude:	30.23112	**Northing (Meters):**	25731.16963	**Northing (feet):**	84419.67903
Survey Longitude:	88.01593	**Approx. First Floor Elevation:**	5.4 ft		

Comment

Surveyors should contact Dr. Kolberg if experiencing any trouble locating the building containing the HWM.

Unit5_11.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-25

HWM ID	Unit5_12	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.4 ft** **NGVD 29: 6.4 ft**	**HWM Object:**	Interior wall bottom floor of house
Flooding Type:	Surge		
HWM Address:	2410 Choctaw		
Location of HWM Object	Interior wall transferred to exterior wall.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	554004.9274	**Easting (feet):**	1817597.833
Survey Latitude:	30.23302	**Northing (Meters):**	25925.77935	**Northing (feet):**	85058.1611
Survey Longitude:	87.97785	**Approx. First Floor Elevation:**	3.2 ft		

Comment

Unit5_12.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-26

HWM ID	Unit5_13	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.2 ft** **NGVD 29: 6.2 ft**	**HWM Object:**	Exterior storeroom wall
Flooding Type:	Surge		
HWM Address:	8309 Hwy 180 West		
Location of HWM Object	Lower level, second storeroom on left looking toward Bay.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	563346.961	**Easting (feet):**	1848247.488
Survey Latitude:	30.23865	**Northing (Meters):**	26514.99548	**Northing (feet):**	86991.28101
Survey Longitude:	87.88082	**Approx. First Floor Elevation:**	4.4 ft		

Comment

Unit5_13.jpg

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Registration Number: 26274-S
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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-27

HWM ID	Unit5_14	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**10.6 ft** **NGVD 29: 10.6 ft**	**HWM Object:**	Front porch floor
Flooding Type:	Surge		
HWM Address:	4590 Hwy 180		
Location of HWM Object	Front porch floor.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	557343.2994	**Easting (feet):**	1828550.475
Survey Latitude:	30.23283	**Northing (Meters):**	25891.94584	**Northing (feet):**	84947.15897
Survey Longitude:	87.94317	**Approx. First Floor Elevation:**	10.8 ft		

Comment

Eyewitness states that the water level rose to the same elevation as the top of the structure's front porch.

Unit5_14.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Registration Number: 26274-S
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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-28

HWM ID	Unit5_15	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Little Lagoon	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**11.8 ft** **NGVD 29: 11.9 ft**	**HWM Object:**	Inside line transferred to exterior wall
Flooding Type:	Surge		
HWM Address:	14232 Hwy 180		
Location of HWM Object	Right hand side of front door.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	573060.4227	**Easting (feet):**	1880115.737
Survey Latitude:	30.24577	**Northing (Meters):**	27275.67624	**Northing (feet):**	89486.94781
Survey Longitude:	87.77992	**Approx. First Floor Elevation:**	9.9 ft		

Comment

Unit5_15.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-29

HWM ID	Unit5_16	**Type of Mark:**	Duct tape on wall
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Little Lagoon	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**10.8 ft** **NGVD 29: 10.9 ft**	**HWM Object:**	Garage wall
Flooding Type:	Surge		
HWM Address:	420 Magnolia Drive		
Location of HWM Object	Inside garage on the left, right at entrance.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	581160.4316	**Easting (feet):**	1906690.516
Survey Latitude:	30.26085	**Northing (Meters):**	28930.72703	**Northing (feet):**	94916.89359
Survey Longitude:	87.69578	**Approx. First Floor Elevation:**	6.2 ft		

Comment

Damage is extreme in this area. The 1st floor of many houses have been damaged. Debris has washed up everywhere, much of which came from West Beach.

Unit5_16.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-30

HWM ID	Unit5_17	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Little Lagoon	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**12.5 ft** **NGVD 29: 12.6 ft**	**HWM Object:**	Interior wall
Flooding Type:	Surge		
HWM Address:	417 Sunset Drive		
Location of HWM Object	Interior wall - elevation transferred to outside wall by front door.		
HWM Type:	Water line		
Closest Municipality:	Gulf Shores	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	581206.589	**Easting (feet):**	1906841.951
Survey Latitude:	30.25900	**Northing (Meters):**	28725.57497	**Northing (feet):**	94243.8239
Survey Longitude:	87.69530	**Approx. First Floor Elevation:**	5.8 ft		

Comment

Damage is extreme in this area. The 1st floor of many houses have been damaged. There are many trees down in the area.

Unit5_17.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-31

HWM ID	Unit5_18	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Perdido Bay (west side)	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.5 ft** **NGVD 29: 6.7 ft**	**HWM Object:**	Exterior wall
Flooding Type:	Surge		
HWM Address:	36460 Boykin Blvd		
Location of HWM Object	To the left of front door.		
HWM Type:	Water line		
Closest Municipality:	Lillian	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/29/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	609014.4703	**Easting (feet):**	1998074.974
Survey Latitude:	30.42210	**Northing (Meters):**	46792.93987	**Northing (feet):**	153519.8369
Survey Longitude:	87.40617	**Approx. First Floor Elevation:**	5.9 ft		

Comment

Unit5_18.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-32

HWM ID	Unit6_1	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**12.2 ft** **NGVD 29: 12.4 ft**	**HWM Object:**	Interior wall
Flooding Type:	Surge		
HWM Address:	23044 Perdido Blvd., Sugar Beach Condos		
Location of HWM Object	Inside guard house at main entrance.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	587334.6269	**Easting (feet):**	1926947.022
Survey Latitude:	30.25810	**Northing (Meters):**	28617.00053	**Northing (feet):**	93887.60923
Survey Longitude:	87.63162	**Approx. First Floor Elevation:**	9.6 ft		

Comment

Unit6_1.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-33

HWM ID	Unit6_2	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**14.8 ft** **NGVD 29: 14.9 ft**	**HWM Object:**	Interior wall
Flooding Type:	Surge		
HWM Address:	24036 Perdido Key (Romas Towers)		
Location of HWM Object	Elevation transferred to exterior wall to left of front door at Unit 1A.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	588975.7128	**Easting (feet):**	1932331.151
Survey Latitude:	30.26147	**Northing (Meters):**	28988.41787	**Northing (feet):**	95106.16762
Survey Longitude:	87.61457	**Approx. First Floor Elevation:**	14.5 ft		

Comment

Unit6_2.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-34

HWM ID	Unit6_3	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Old River	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**11.4 ft** **NGVD 29: 11.5 ft**	**HWM Object:**	2nd level of stairs on bottom step
Flooding Type:	Wave run-up		
HWM Address:	28824 Ono Blvd		
Location of HWM Object	Behind resident's home.		
HWM Type:	Debris line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/27/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	596805.9689	**Easting (feet):**	1958020.916
Survey Latitude:	30.28215	**Northing (Meters):**	31276.07022	**Northing (feet):**	102611.5737
Survey Longitude:	87.53320	**Approx. First Floor Elevation:**	N/A		

Comment

Unit6_3.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-35

HWM ID	Unit6_4	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Perdido Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**3.3 ft** **NGVD 29: 3.5 ft**	**HWM Object:**	Inside wall
Flooding Type:	Surge		
HWM Address:	33411 River Road		
Location of HWM Object	Inside storage building under house.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/27/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	604103.7699	**Easting (feet):**	1981963.785
Survey Latitude:	30.30638	**Northing (Meters):**	33962.64027	**Northing (feet):**	111425.7623
Survey Longitude:	87.45733	**Approx. First Floor Elevation:**	10.3 ft		

Comment

Unit6_4.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-36

HWM ID	Unit6_5	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Bayou St. John (Intercoastal waterway)	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.3 ft** **NGVD 29: 6.5 ft**	**HWM Object:**	Inside wall
Flooding Type:	Surge		
HWM Address:	31507 Dolphine Dr.		
Location of HWM Object	Support piling to the left of the stairs when facing the house.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/27/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	601051.6906	**Easting (feet):**	1971950.422
Survey Latitude:	30.29705	**Northing (Meters):**	32927.31841	**Northing (feet):**	108029.0438
Survey Longitude:	87.48907	**Approx. First Floor Elevation:**	13.3 ft		

Comment

Unit6_5.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-37

HWM ID	Unit6_6	**Type of Mark:**	Stake and flag
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Bayou St. John (Intercoastal waterway)	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.0 ft** **NGVD 29: 5.1 ft**	**HWM Object:**	Ground
Flooding Type:	Wave run-up		
HWM Address:	29551 St. John Dr.		
Location of HWM Object	NE corner of backyard.		
HWM Type:	Debris line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/27/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	597909.2233	**Easting (feet):**	1961640.510
Survey Latitude:	30.28663	**Northing (Meters):**	31772.78043	**Northing (feet):**	104241.1971
Survey Longitude:	87.52173	**Approx. First Floor Elevation:**	N/A		

Comment

Unit6_6.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01003C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Bald-38

HWM ID	Unit6_7	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Old River	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.9 ft** **NGVD 29: 7.0 ft**	**HWM Object:**	Work bench inside garage
Flooding Type:	Surge		
HWM Address:	28420 Ono Blvd		
Location of HWM Object	Gray duct tape to the left of the garage.		
HWM Type:	Water line		
Closest Municipality:	Orange Beach	**County** Baldwin	**State:** AL

Name of Flagger/Interviewer:	Hatchett/Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/2/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/27/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	596108.4436	**Easting (feet):**	1955732.452
Survey Latitude:	30.28130	**Northing (Meters):**	31182.07392	**Northing (feet):**	102303.1875
Survey Longitude:	87.54045	**Approx. First Floor Elevation:**	5.4 ft		

Comment

Unit6_7.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Appendices

Appendix C: Survey Sheets from Mobile County, Alabama

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-1

HWM ID	Unit1_1	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico/Dauphin Island Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.7 ft** **NGVD 29: 6.7 ft**	**HWM Object:**	Exterior back door jam
Flooding Type:	Coastal surge		
HWM Address:	698 Lemoyne Dr., Barnacle Bills Marina Bar and Grill		
Location of HWM Object	Rear of building at back door entrance to bathrooms, exterior door jamb.		
HWM Type:	Water line		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL
Name of Flagger/Interviewer:	Westcott, Hatchett	**Flagger Company:**	Dewberry/URS
Date of Flagging/Interview:	9/29/2004		
Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J
Survey Date:	10/26/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 540842.3440	**Easting (feet):** 1774413.590
Survey Latitude:	30.26403	**Northing (Meters):** 29427.02974	**Northing (feet):** 96545.18007
Survey Longitude:	88.11479	**Approx. First Floor Elevation:** 6.1 ft	

Comment

The restaurant at this location is connected to a boat storage shed which has sustained moderate damage.

Unit1_1.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-2

HWM ID	Unit1_2	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**11.8 ft** **NGVD 29: 11.8 ft**	**HWM Object:**	Exterior wall - west end of porch
Flooding Type:	Coastal surge		
HWM Address:	1801 Bienville Blvd. Unit 109		
Location of HWM Object	Back porch of Unit 109 - west end of porch.		
HWM Type:	Water line		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Westcott, Hatchett	**Flagger Company:**	Dewberry/URS
Date of Flagging/Interview:	9/29/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	539122.4028	**Easting (feet):**	1768770.75
Survey Latitude:	30.24946	**Northing (Meters):**	27821.35359	**Northing (feet):**	91277.22423
Survey Longitude:	88.13257	**Approx. First Floor Elevation:**	11.1 ft		

Comment

Unit1_2.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-3

HWM ID	Unit1_3	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**12.1 ft** **NGVD 29: 12.2 ft**	**HWM Object:**	Exterior front door siding on right side
Flooding Type:	Coastal surge		
HWM Address:	105 Velasco Ct. (Shell Shack)		
Location of HWM Object	To the right side of the front door.		
HWM Type:	Water line		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Westcott, Hatchett	**Flagger Company:**	Dewberry/URS
Date of Flagging/Interview:	9/29/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	533665.2668	**Easting (feet):**	1750866.796
Survey Latitude:	30.22475	**Northing (Meters):**	25113.97241	**Northing (feet):**	82394.75782
Survey Longitude:	88.18910	**Approx. First Floor Elevation:**	12.0 ft		

Comment

Furniture inside structure was blown to the back of the room. There is approximately 1-2' of sand deposited under the house.

Unit1_3.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-4

HWM ID	Unit1_4	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico/Mississippi Sound	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**3.1 ft** **NGVD 29: 3.2 ft**	**HWM Object:**	Exterior wall of utility room under house
Flooding Type:	Coastal surge		
HWM Address:	2604 Bridgeview Dr.		
Location of HWM Object	SE corner of shed (utility room) under house.		
HWM Type:	Water mark		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Westcott, Hatchett	**Flagger Company:**	Dewberry/URS
Date of Flagging/Interview:	9/29/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/26/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	535384.6834	**Easting (feet):**	1756507.915
Survey Latitude:	30.25134	**Northing (Meters):**	28051.56162	**Northing (feet):**	92032.49842
Survey Longitude:	88.17142	**Approx. First Floor Elevation:**	-2.6 ft		

Comment

Unit1_4b.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-5

HWM ID	Unit1_5	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico/Mississippi Sound	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.3 ft** **NGVD 29: 6.4 ft**	**HWM Object:**	Inside wall of shed under back porch
Flooding Type:	Coastal surge		
HWM Address:	326 Pineda St.		
Location of HWM Object	Inside right hand wall immediately inside door to shed under porch.		
HWM Type:	Water mark/debris line		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL
Name of Flagger/Interviewer:	Westcott, Hatchett	**Flagger Company:**	Dewberry/URS
Date of Flagging/Interview:	9/29/2004		
Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J
Survey Date:	10/26/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 538650.4857	**Easting (feet):** 1767222.469
Survey Latitude:	30.25537	**Northing (Meters):** 28478.96398	**Northing (feet):** 93434.73432
Survey Longitude:	88.13751	**Approx. First Floor Elevation:** 6.4 ft	

Comment

Unit1_5b.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-6

HWM ID	Unit3_4	**Type of Mark:**	Stake and flag
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**3.7 ft** **NGVD 29: 3.6 ft**	**HWM Object:**	Ground
Flooding Type:	Surge		
HWM Address:	4151 Bayfront Dr.		
Location of HWM Object	East corner of property facing the beach.		
HWM Type:	Personal account		
Closest Municipality:	Mobile	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	545618.1297	**Easting (feet):**	1790082.147
Survey Latitude:	30.58644	**Northing (Meters):**	65143.68512	**Northing (feet):**	213725.5736
Survey Longitude:	88.06702	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_4.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-7

HWM ID	Unit3_5	**Type of Mark:**	Stake and flag
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**6.7 ft** **NGVD 29: 6.6 ft**	**HWM Object:**	Ground
Flooding Type:	Wave run-up		
HWM Address:	3408 Bay Front Rd		
Location of HWM Object	Red spray paint on road pointing to location of flag and stake 38.5 feet east of power pole with light attached to the top of the no parking sign attached to the pole.		
HWM Type:	Debris line		
Closest Municipality:	Mobile	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Keith (Dallas)	**Survey Company:**	PBS & J		
Survey Date:	10/25/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	546364.3669	**Easting (feet):**	1792530.427
Survey Latitude:	30.60386	**Northing (Meters):**	67071.38828	**Northing (feet):**	220050.0464
Survey Longitude:	88.05934	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_5.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-8

HWM ID	Unit3_6	**Type of Mark:**	Stake and flag
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.4 ft** **NGVD 29: 5.3 ft**	**HWM Object:**	Ground
Flooding Type:	Wave run-up		
HWM Address:	University of Alabama Gulf Pines Golf Course		
Location of HWM Object	167 Old Bayfront Dr.		
HWM Type:	Debris line		
Closest Municipality:	Mobile	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	KEITH	**Survey Company:**	PBS & J		
Survey Date:	11/6/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	546740.42	**Easting (feet):**	1793764.196
Survey Latitude:	30.63294	**Northing (Meters):**	70293.726	**Northing (feet):**	230622.0009
Survey Longitude:	88.05558	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_6.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-9

HWM ID	Unit3_7	**Type of Mark:**	Personal account
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Chickasaw River	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**4.9 ft** **NGVD 29: 4.9 ft**	**HWM Object:**	9" wood piling painted yellow
Flooding Type:	Personal account		
HWM Address:	559 N. Craft Hwy		
Location of HWM Object	There are 9" wood pilings painted yellow along the entrance to the ramp. Grey duct tape is on the last piling on left side when entering the ramp.		
HWM Type:	Gray duct tape (use bottom side of tape)		
Closest Municipality:	Chickasaw	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/29/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	545135.8196	**Easting (feet):**	1788499.768
Survey Latitude:	30.78162	**Northing (Meters):**	86783.96577	**Northing (feet):**	284723.7277
Survey Longitude:	88.07320	**Approx. First Floor Elevation:**	N/A		

Comment

Unit3_7.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-10

HWM ID	Unit3_10	**Type of Mark:**	Gray duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**3.8 ft** **NGVD 29: 3.7 ft**	**HWM Object:**	Outside wall
Flooding Type:	Surge		
HWM Address:	3000 Battleship Pkwy		
Location of HWM Object	Gray duct tape on outside wall of entrance to "Shirley's".		
HWM Type:	Water line		
Closest Municipality:	Mobile	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Phillips	**Flagger Company:**	URS
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	T. Tipton	**Survey Company:**	PBS & J		
Survey Date:	10/29/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	550625.1222	**Easting (feet):**	1806509.255
Survey Latitude:	30.68758	**Northing (Meters):**	76332.54046	**Northing (feet):**	250434.3432
Survey Longitude:	88.01535	**Approx. First Floor Elevation:**	-.2 ft		

Comment

Unit3_10.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-11

HWM ID	Unit4_10	**Type of Mark:**	Stake and mark on road
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mississippi Sound/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.8 ft** **NGVD 29: 5.9 ft**	**HWM Object:**	Ground
Flooding Type:	Coastal surge		
HWM Address:	Bridge on Coden Belt Road W. SE of Henry Johnson Rd		
Location of HWM Object	On northeast side of bridge approach, 11' 11" NNE of mark on road.		
HWM Type:	Debris line		
Closest Municipality:	Bayou La Batre	**County** Mobile	**State:** AL
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/1/2004		
Survey Crew:	KEITH	**Survey Company:**	PBS & J
Survey Date:	11/8/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 529166.169	**Easting (feet):** 1736106.005
Survey Latitude:	30.37303	**Northing (Meters):** 41579.799	**Northing (feet):** 136416.3894
Survey Longitude:	88.23694	**Approx. First Floor Elevation:** N/A	

Comment

Unit4_10.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-12

HWM ID	Unit4_11	**Type of Mark:**	Spray paint
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mobile Bay/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**4.6 ft** **NGVD 29: 4.7 ft**	**HWM Object:**	Ground
Flooding Type:	Coastal surge		
HWM Address:	Along SR193 South, just before 1st bridge to Dauphin Island		
Location of HWM Object	15' NW of mark on access road on west side of bridge.		
HWM Type:	Debris line		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/1/2004		
Survey Crew:	KEITH	**Survey Company:**	PBS & J
Survey Date:	11/8/2004		
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 539673.855	**Easting (feet):** 1770579.971
Survey Latitude:	30.34017	**Northing (Meters):** 37873.619	**Northing (feet):** 124257.0314
Survey Longitude:	88.12742	**Approx. First Floor Elevation:** N/A	

Comment

Unit4_11.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	01097C **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Mobi-13

HWM ID	Unit4_12	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**7.0 ft** **NGVD 29: 7.0 ft**	**HWM Object:**	Shed under building
Flooding Type:	Coastal surge		
HWM Address:	101 Bienville Blvd., Dauphin Island Sea Lab (Galethea Hall)		
Location of HWM Object	Inside wall of shed transferred to outside wall.		
HWM Type:	Water line		
Closest Municipality:	Dauphin Island	**County** Mobile	**State:** AL

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	KEITH	**Survey Company:**	PBS & J		
Survey Date:	11/6/2004				
Survey Projection:	State Plane Feet Alabama West	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	544373.031	**Easting (feet):**	1785997.184
Survey Latitude:	30.24742	**Northing (Meters):**	27566.772	**Northing (feet):**	90441.98542
Survey Longitude:	88.07800	**Approx. First Floor Elevation:**	N/A		

Comment

Unit4_12.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

James E. Godfrey - Professional Land Surveyor, State of Alabama
Registration Number: 26274-S
5300 W. Cypress St. Suite 200, Tampa Florida. 33607 PH. 813 282-7275

Appendices

Appendix D: Survey Sheets from Harrison County, Mississippi

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285255 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Harr-1

HWM ID	Unit4_1	**Type of Mark:**	Stake in ground
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.5 ft** **NGVD 29: 5.3 ft**	**HWM Object:**	Debris line along bank of tidal creek
Flooding Type:	Coastal surge		
HWM Address:	NW corner of Bayview Dr. & Livingston Dr.		
Location of HWM Object	Along bank of tidal creek NW of intersection of Bayview Dr. & Livingston Dr.		
HWM Type:	Debris line		
Closest Municipality:	Pass Christian	**County** Harrison	**State:** MS

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Dick Davis	**Survey Company:**	PBS & J		
Survey Date:	11/11/2004				
Survey Projection:	State Plane Mississippi East	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	256366.995	**Easting (feet):**	841097.3822
Survey Latitude:	30.31217	**Northing (Meters):**	90112.067	**Northing (feet):**	295642.6729
Survey Longitude:	89.28700	**Approx. First Floor Elevation:**	N/A		

Comment

Unit4_1b.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

Roswell Andrew Hathaway,Professional Land Surveyor, State of Mississippi
Registration Number: 02417
5665 New Northside Drive Suite 400, Atlanta GA. 30328 PH. 770 933-0280 Ext. 2430

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285255 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Harr-2

HWM ID	Unit4_2	**Type of Mark:**	Post
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**4.8 ft** **NGVD 29: 4.7 ft**	**HWM Object:**	Debris line along stone revetment along shoreline
Flooding Type:	Coastal surge, possible wave height or runup		
HWM Address:	100 W. Bayview Dr. (Point Isles Water & Sewer District Building)		
Location of HWM Object	Approx. 8' west of SW corner of Water Sewer District parking lot.		
HWM Type:	Debris line		
Closest Municipality:	Pass Christian	**County** Harrison	**State:** MS

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Dick Davis	**Survey Company:**	PBS & J		
Survey Date:	11/11/2004				
Survey Projection:	State Plane Mississippi East	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	256014.461	**Easting (feet):**	839940.7758
Survey Latitude:	30.31244	**Northing (Meters):**	90144.275	**Northing (feet):**	295748.3413
Survey Longitude:	89.29067	**Approx. First Floor Elevation:**	14.0 ft		

Comment

The HWM may include wave action or runup due to its unobstructed location on the coast.

Unit4_2b.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

Roswell Andrew Hathaway,Professional Land Surveyor, State of Mississippi

Registration Number: 02417

5665 New Northside Drive Suite 400, Atlanta GA. 30328 PH. 770 933-0280 Ext. 2430

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285257 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Harr-3

HWM ID	Unit4_3	**Type of Mark:**	N/A
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mississippi Sound/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.3 ft** **NGVD 29: 6.1 ft**	**HWM Object:**	Stillwater level
Flooding Type:	Coastal surge		
HWM Address:	929 S. Cleveland Ave (Long Beach Harbor)		
Location of HWM Object	3" below bottom of dock floor outside Harbor Master's office.		
HWM Type:	Water level from eyewitness		
Closest Municipality:	Long Beach	**County** Harrison	**State:** MS
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		
Survey Crew:	Dick Davis	**Survey Company:**	PBS & J
Survey Date:	11/11/2004		
Survey Projection:	State Plane Mississippi East	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 270306.836	**Easting (feet):** 886831.6788
Survey Latitude:	30.34497	**Northing (Meters):** 93701.887	**Northing (feet):** 307420.2729
Survey Longitude:	89.14217	**Approx. First Floor Elevation:** 3.3 ft	

Comment

Eyewitness was present during storm and states that the water level he witnessed did not include any waves.

NO IMAGE TO DISPLAY

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

None taken

Roswell Andrew Hathaway,Professional Land Surveyor, State of Mississippi

Registration Number: 02417

5665 New Northside Drive Suite 400, Atlanta GA. 30328 PH. 770 933-0280 Ext. 2430

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285253 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Harr-4

HWM ID	Unit4_4	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mississippi Sound/Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**6.2 ft** **NGVD 29: 6.1 ft**	**HWM Object:**	Post of Chain link gate at end of parking lot
Flooding Type:	Coastal surge		
HWM Address:	Jones Park (Marine Life Oceanarium)		
Location of HWM Object	Gate at NE end of parking lot.		
HWM Type:	Water line		
Closest Municipality:	Gulfport	**County** Harrison	**State:** MS

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Dick Davis	**Survey Company:**	PBS & J		
Survey Date:	11/10/2004				
Survey Projection:	State Plane Mississippi East	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	275308.274	**Easting (feet):**	903240.5617
Survey Latitude:	30.36283	**Northing (Meters):**	95669.39	**Northing (feet):**	313875.3223
Survey Longitude:	89.09019	**Approx. First Floor Elevation:**	6.3 ft		

Comment

Unit4_4.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	225205 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Harr-5

HWM ID	Unit4_5	**Type of Mark:**	Duct tape
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Mississippi Sound/Gulf of Mexico	**Quality of Mark:**	Poor
Survey Elevation (NAVD 88):	**4.7 ft** **NGVD 29: 4.8 ft**	**HWM Object:**	Top of bulkhead (water actually below bulkhead, but unsure how far below)
Flooding Type:	Coastal surge		
HWM Address:	679 Beach Blvd. (Biloxi small craft harbor)		
Location of HWM Object	NE corner of bulkhead around parking lot in front of chamber of Commerce Building/Harbor Master's office/Biloxi Port Commission office building.		
HWM Type:	Eyewitness of water level being below bulkhead		
Closest Municipality:	Biloxi	**County** Harrison	**State:** MS

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		

Survey Crew:	Dick Davis	**Survey Company:**	PBS & J		
Survey Date:	11/10/2004				
Survey Projection:	State Plane Mississippi East	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	198942.881	**Easting (feet):**	652698.4364
Survey Latitude:	30.39217	**Northing (Meters):**	99362.306	**Northing (feet):**	325991.1669
Survey Longitude:	88.88489	**Approx. First Floor Elevation:**	10.0 ft		

Comment

According to the Harbor Master, the water did not exceed the concrete bulkhead surrounding the Biloxi Harbor parking lot. No waves were noticed in the harbor.

Unit4_5.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285252 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Harr-6

HWM ID	Unit4_6	**Type of Mark:**	Stake in ground
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Back Bay of Biloxi	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**4.1 ft** **NGVD 29: 4.0 ft**	**HWM Object:**	Ground
Flooding Type:	Coastal surge		
HWM Address:	586 E. Bayview Ave (Biloxi Port Commission office)		
Location of HWM Object	8' 1" NE of NW corner of sidewalk at edge of parking lot.		
HWM Type:	Debris line on bank of bay		
Closest Municipality:	Biloxi	**County** Harrison	**State:** MS
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		
Survey Crew:	Dick Davis	**Survey Company:**	PBS & J
Survey Date:	11/10/2004		
Survey Projection:	State Plane Mississippi East	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 295473.57	**Easting (feet):** 969399.5364
Survey Latitude:	30.41256	**Northing (Meters):** 101154.235	**Northing (feet):** 331870.1865
Survey Longitude:	88.88044	**Approx. First Floor Elevation:** N/A	

Comment

This was a sheltered area and therefore should not have been affected by waves.

Unit4_6.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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Appendices

Appendix E: Survey Sheets from Jackson County, Mississippi

PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285259 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Jack-1

HWM ID	Unit4_7	**Type of Mark:**	Stake in ground on beach
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Biloxi Bay/Gulf of Mexico	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**3.2 ft** **NGVD 29: 3.3 ft**	**HWM Object:**	Beach
Flooding Type:	Coastal surge and possible wave runup		
HWM Address:	On the beach across the street from house located at 545 Front Beach Dr		
Location of HWM Object	111' 0" due south from mark on S. side of cement right-of-way of Front Beach Drive.		
HWM Type:	Debris line		
Closest Municipality:	Ocean Springs	**County** Jackson	**State:** MS
Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	9/30/2004		
Survey Crew:	Dick Davis	**Survey Company:**	PBS & J
Survey Date:	11/9/2004		
Survey Projection:	State Plane Mississippi East	**Vertical Datum:** NAVD 88	**Horizontal Datum** NAD 83
		Easting (Meters): 204709.029	**Easting (feet):** 671616.205
Survey Latitude:	30.40286	**Northing (Meters):** 100495.985	**Northing (feet):** 329710.5773
Survey Longitude:	88.82500	**Approx. First Floor Elevation:** N/A	

Comment

Unit4_7.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	280332 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Jack-2

HWM ID	Unit4_8	**Type of Mark:**	Stake and mark on pavement
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Pascagoula Bay/Gulf of Mexico	**Quality of Mark:**	Fair
Survey Elevation (NAVD 88):	**5.5 ft** **NGVD 29: 5.4 ft**	**HWM Object:**	Ground/roadway/boat ramp
Flooding Type:	Coastal surge, possible runup		
HWM Address:	Boat ramp at the end of Gulf View Pl. (near 3133 Gulf View Pl.)		
Location of HWM Object	Boat ramp at the end of Gulf View Place.		
HWM Type:	Debris line		
Closest Municipality:	Gautier	**County** Jackson	**State:** MS

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	Dick Davis	**Survey Company:**	PBS & J		
Survey Date:	11/11/2004				
Survey Projection:	State Plane Mississippi East	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	316379.183	**Easting (feet):**	1037987.371
Survey Latitude:	30.36322	**Northing (Meters):**	95696.833	**Northing (feet):**	313965.3599
Survey Longitude:	88.66294	**Approx. First Floor Elevation:**	N/A		

Comment

Unit4_8.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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PROJECT:	Hurricane Ivan, 1549 DR - ALABAMA, 1550 DR - Mississippi CHWMs
CONTENTS:	Individual Historical High Water Mark Survey Report
TYPE:	High Water Mark Survey
COMM. NO.	285260 **PREL.** 11/10/2004 **FINAL** 12/23/2004 **SHEET** Jack-3

HWM ID	Unit4_9	**Type of Mark:**	Stake and mark on road
Name of Storm Event:	Ivan	**Date of Flood Event:**	9/16/2004
Stream Name/Flood Source:	Gulf of Mexico	**Quality of Mark:**	Good
Survey Elevation (NAVD 88):	**5.2 ft** **NGVD 29: 5.2 ft**	**HWM Object:**	Ground
Flooding Type:	Coastal surge		
HWM Address:	South of road at end of Yacht Club Drive		
Location of HWM Object	12' 2" south of Yacht Club Drive from mark on road.		
HWM Type:	Debris line		
Closest Municipality:	Pascagoula	**County** Jackson	**State:** MS

Name of Flagger/Interviewer:	Westcott	**Flagger Company:**	Dewberry
Date of Flagging/Interview:	10/1/2004		

Survey Crew:	Dick Davis	**Survey Company:**	PBS & J		
Survey Date:	11/11/2004				
Survey Projection:	State Plane Mississippi East	**Vertical Datum:**	NAVD 88	**Horizontal Datum**	NAD 83
		Easting (Meters):	330067.976	**Easting (feet):**	1082898.018
Survey Latitude:	30.34200	**Northing (Meters):**	93373.43	**Northing (feet):**	306342.6613
Survey Longitude:	88.52061	**Approx. First Floor Elevation:**	N/A		

Comment

Unit4_9.jpg

Survey Certification: Coastal High Water Mark Location survey is certified to 0.25 feet vertically and 10 feet horizontally with a 95% accuracy level.

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