

# USACE – Port of Galveston Channel Deepening Phase 1 & 2



# USACE – Port of Galveston Channel Deepening Phase 1



# USACE – Port of Galveston Channel Deepening Phase 2



# USACE – Project Objectives

1. **Repair & Increase capacity of the Pelican Island and San Jacinto Dredge Material Placement Areas (DMPA).**
2. **Increase the depth of the Galveston Channel to 50 feet.**
3. **Build levee foundations for a 50 year life span**

# DMPA Scope Of Work

## Pelican Island

1. **Build 35,000 ft. of levee in Cell's A, B, C, which formed the hydraulic fill berm templates.**
2. **Install 900' of shoreline protection, which amounted to 3,200 tons of rock.**
3. **Remove Existing Weir Structures and install a new Weir structures in their place.**

# DMPA Scope Of Work

## San Jacinto

1. **Build 29,000 ft. of levee in Cell's A, B, C, which formed the hydraulic fill berm templates.**
2. **Install 2,135 tons of rock on both Spillway discharge corridors.**
3. **Remove Existing Weir Structures and install a new Weir structure in Cell A.**

# Dredging Scope Of Work

1. Deepen 19,500 feet of the Galveston Channel to 50 feet by Hydraulically dredging approximately 3 million cubic yards of clay
2. Use the clay Dredged from the Channel to fill the Hydraulic fill berm templates on each DMPA.

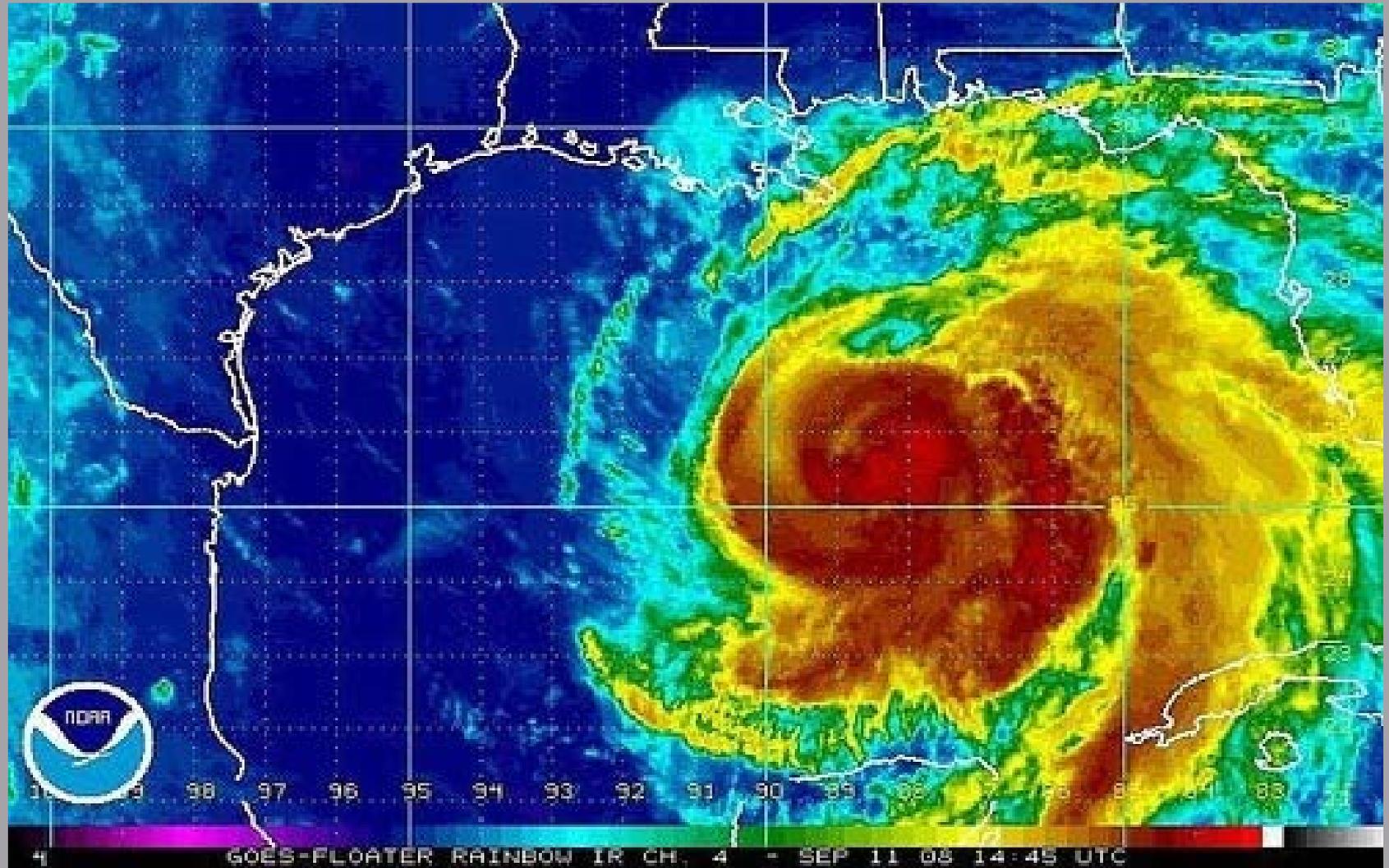
# USACE Notice of Project Award

**KFMS received contract award on:**

**Pelican Island Phase 1:** September 5, 2008 for  
Approx. \$14 Million

**San Jacinto Phase 2:** August 5, 2009 for Approx.  
\$13 Million

# HURRICANE IKE



# USACE Notice of Project Award

Before the USACE could issue a “Notice to Proceed”, at midnight September 13, 2008 Hurricane IKE made landfall devastating Galveston and the surrounding areas.

As Ike passed over the placement area, it washed out the North West Levee of Pelican Island. As a result, the site conditions as awarded were significantly changed.

# *Pelican Island Cell C Before Ike*



# *Pelican Island Cell C Before Ike*



# *Pelican Island Cell C After Ike*



**KING FISHER  
MARINE SERVICE LP**  
ORION MARINE GROUP

# *Pelican Island Cell C After Ike*



# *Pelican Island Cell C After Ike*



# Evaluating Existing Conditions

KFMS offered

**“*Value Engineered Design Solutions*”**, throughout the life of both projects to resolve field and design issues encountered during the construction and dredging phases, often significantly reducing the USACE’s initial estimate’s.

# Project Goals & Objectives For Phase One & Two

- ❑ **0 Recordable and 0 Incident Rates.**
- ❑ Provide the Client With a High Quality Product.
- ❑ **Stay On Schedule and Under Budget.**
- ❑ Establish Positive Drainage Throughout Work Areas For Levee Construction.
- ❑ **Finish All Construction Work, Booster Setup, Electrical Setup, and Pipeline Routes Before the Dredge Arrived On Site.**
- ❑ Maintain a Good Working Relationship With Client.

# Pelican Island Post Ike Repair



# Pelican Island Post Ike Repair



02/08/2009

# Pelican Island Post Ike Repair



# Removing Existing Weir Structure



# Installation of New Weir Structure



# Completed New Weir Structure



# Demolition of Existing Drop Outlet Structure



# Completed New Drop Outlet Structure



# Rock Placement Pelican Island



# Rock Placement Pelican island



# Rock Placement San Jacinto



# Rock Placement San Jacinto



# Spillway Installation San Jacinto



# Spillway Installation San Jacinto



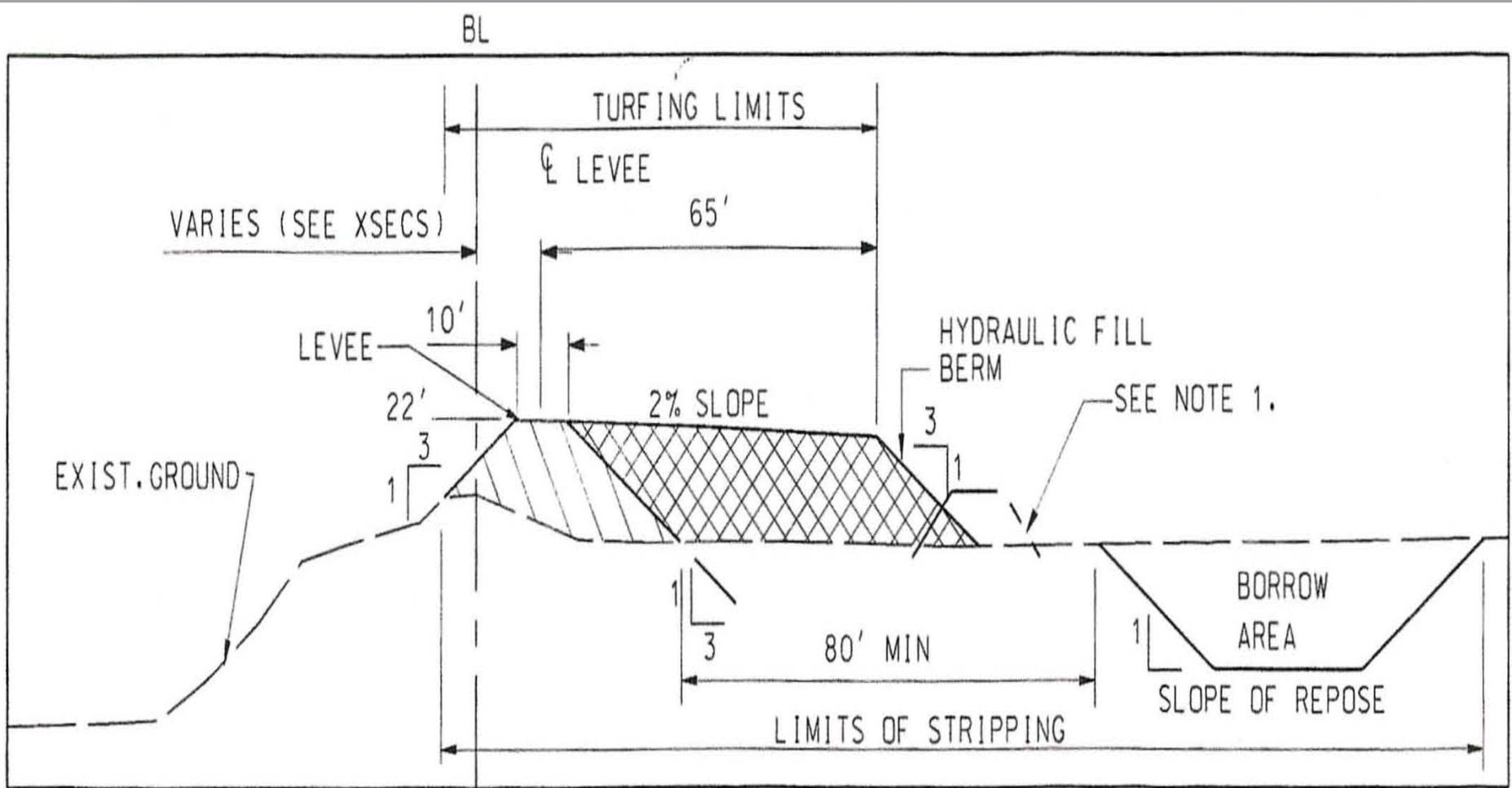
# Levee Repair San Jacinto



# Levee Repair San Jacinto



# Hydraulic Fill Levee Preparation



# Hydraulic Fill Levee Preparation



# Hydraulic Fill Levee Preparation



# Hydraulic Fill Levee Preparation



# Levee Completion



# Hydraulic Dredging Preparation



# Dredge Parameters

*Dredge depth - 50' of water & 4.5 miles of pipeline.*

1. 1 – 800 HP underwater pump on dredge ladder
2. 1 – 1,500 HP Main Dredge pump
3. 2 – 1,500 HP Booster pumps
4. 1 – 400 HP cutter Motor
5. 1 – 150 HP motor inc. swing, spud, & ladder winches

# Dredge Parameters Continued

Electric Dredge powered by 12,470 Volts

- ❑ Build an electrical substation which would power the Dredge and two Boosters
- ❑ To power the Dredge from the Substation, a 3” Electrical mining cable, 5,700’ long was stored on a extension barge and laid out as needed
- ❑ Total Maximum Dredge load = 12,470 Volts
- ❑ Total Maximum Booster Load = 4,160 Volts

# Benefits of Electric Dredging

- ❑ **Environmentally Friendly**
  - ❑ Clean, Zero emissions
  - ❑ Quieter
  - ❑ No fuel or oil to transfer
  
- ❑ **Efficient**
  - ❑ Cost effective (cheaper than diesel)
  - ❑ Lower operational and maintenance costs
  - ❑ Controls are easy to integrate and manage
  - ❑ Real time feedback

# Dredge Alternative Power

**Onboard Alternative power was supplied by a 3,000 HP Alco Diesel Drive Engine.**

**Coupled to a Fairbanks Morse 27,850 KW AC Generator.**

# Equipment Installed On Dredge



**800 HP Ladder pump motor**



**1500 HP Main pump motor**



**On board generator**



**Main dredge pump**

# 100 ton 96 foot dredge ladder “The Business End”



Suction pipe at end of ladder



Ladder



Cutter Head



Underwater pump

# Electrical Substation



# Electrical Mining Cable



5,700' power cable "extension cord"



Power cable on "190' extension barge"

# 1,500 HP Electric Booster Pumps



# Variable Frequency Drives



Incoming Pressure

Pump Current

Differential Pressure

Out going Pressure

red lion



BOOSTER # 1

BOOSTER # 2

107 PSI

POWER AMPS: 55 %

95 PSID

202 PSI

203 PSI

POWER AMPS: 66 %

111 PSID

314 PSI

82 GPM

55 GPM

AMPS: 88 %

SEAL WATER # 1

AMPS: 53 %

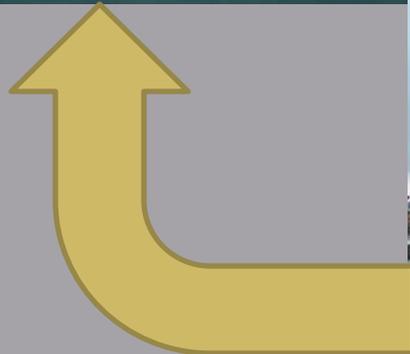
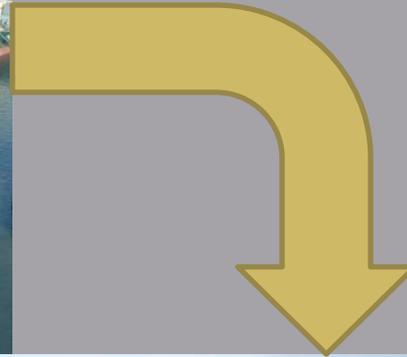
SEAL WATER # 2

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Seal Water Flow

Seal Water Pump Current

# Project Operations



# Hydraulic Fill Levee Construction



# Hydraulic Fill Levee Construction



# Hydraulic Fill Levee Construction



# Hydraulic Fill Levee Construction



# Hydraulic Fill Levee Construction



# Project Challenges

- ❑ **Dealing with Hurricane Ike Site Changes after bid was submitted and awarded.**
- ❑ **Working on the Galveston Island Post Hurricane IKE.**
- ❑ **Securing electric substations with adequate power to supply the electric dredge.**
- ❑ **Inconsistent Boring log's not matching actuals for levee placed material.**
- ❑ **Dredging and deepening Galveston Channel while with commercial and recreational traffic 24/7.**

# Project Award

- **King Fisher Marine Service to receive an award for accruing 50,000 Man Hours, From The Period July 1, 2009 Through June 30, 2010, Without A Lost Time Accident.**

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# Pelican Island



# San Jacinto



# The Linda Laquay



# The Linda Laquay



# Questions & Answers

