CERTIFIED COPY
GALVESTON COUNTY COMMISSIONERS' COURT

RE: AGENDA ITEM NO. 23a

Consideration of approving and adopting the Galveston County Erosion Response Plan as Appendix 9; an amendment to the Galveston County Dune Protection and Beach Access Plan and authorize it's submission to the Texas General Land Office for certification.

Motion to Approve by County Judge Henry, seconded by Commissioner O'Brien that the above action be taken by the Court.

Passed: 5-0

Aye: County Judge Henry, Commissioner Doyle, Commissioner O'Brien, Commissioner Holmes, Commissioner Clark
Nay: (None)
Abstain: (None)
Absent: (None)

STATE OF TEXAS §

COUNTY OF GALVESTON §

I, Dwight D. Sullivan, Clerk County Court and Ex-Officio Clerk of the Commissioners' Court of Galveston County, Texas, do hereby certify that the attached is a true and correct copy of that certain:

RE: AGENDA ITEM NO. 23a

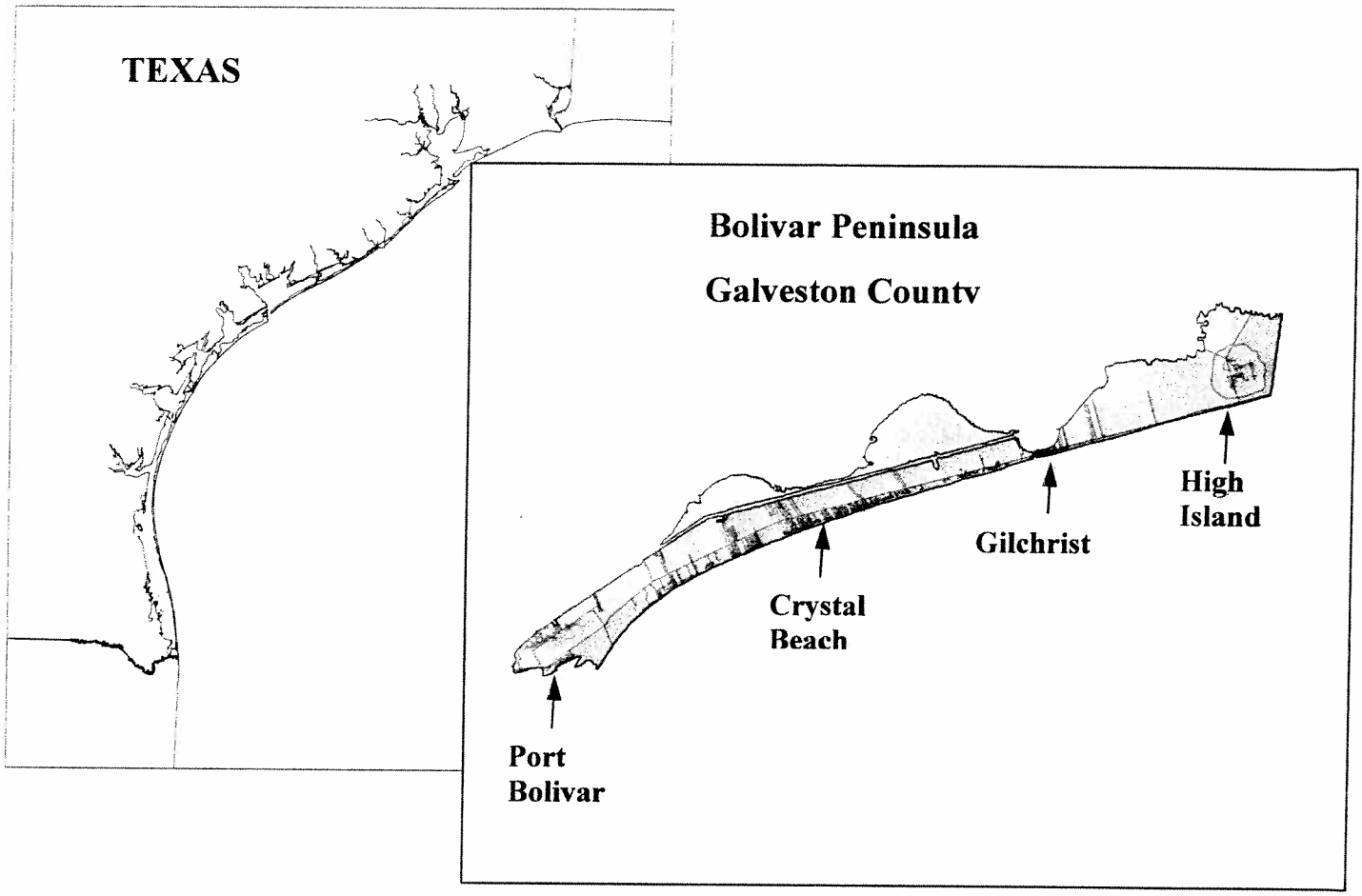
as passed by the Commissioners' Court on the 7th day of August, 2012, REGULAR Term of Commissioners' Court and as the same appear(s) in the Commissioners' Court Records of Galveston County, Texas.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 7th DAY OF AUGUST, A. D., 2012.

DWIGHT D. SULLIVAN, Clerk County Court
and Ex-Officio Member of the Commissioners'
Court of Galveston County, Texas

By: Brandy Chapman
Brandy Chapman, Deputy

GALVESTON COUNTY EROSION RESPONSE PLAN



APPENDIX #9 to the Galveston County Dune Protection and Beach Access Plan

July 2012

Prepared by:

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Submitted to:

Texas General Land Office

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1. Executive Summary

The development of an Erosion Response Plan is required pursuant amendments in the Texas Natural Resource Code that provided authority to the Texas General Land Office to promulgate rules for local jurisdictions with gulf facing coastlines requiring them to create and implement Erosion Response Plans (ERP's) and address seven (7) specific areas intended to reduce public expenditures resulting from storm damage, and were developed to accommodate a shoreline retreat.

Additionally, the General Land Office will use the new ERP's as a qualification criteria for local governments to remain eligible for consideration in the various grant programs administered by the GLO; and conversely, Galveston County will use the final certified product as a basis to submit grant applications to the Coastal Erosion Planning Response Act program, the Coastal Management Program, and the Coastal Impact Assistance Program. Galveston County; and jurisdictions within the County have been very fortunate to receive the largest number of CEPRA grant awards throughout the state totaling over $19.87 million dollars, resulting in 51 projects since the beginning of the CEPRA program.

A draft Galveston County ERP was presented to Commissioners Court on June 26, 2011. The Commissioners Court approved the draft plan for submission to the GLO ahead of the July 1, 2011 deadline. The GLO reviewed the submitted draft plan and provided comments back to Galveston County on August 8, 2011.

The Erosion Response Plan is composed according to the seven specific sections of the Texas Administrative Code regarding the development of a local government ERP with the first six sections providing an explanation of the necessary background information and the unique issues faced on the peninsula. The ERP identifies the beach and dune system as the first line of defense to storm surge.

The Plan identifies the Building Setback area as extending to the Dune Protection Line to reduce any potential confusion regarding the permitting process, and in so doing, alleviates the issues resulting from the varying array of erosion rates on the peninsula. Existing structures that were properly permitted by Galveston County are exempt from the building setback prohibition, provided there are no practicable alternatives, the footprint of the building is not increased, and the new structure meets Galveston County's adopted building code.

The Plan addresses short and long term plans for dune restoration, beach front public amenities, provides an inventory of beach access roads, denotes their condition, and identifies potential long term plans to help reduce the impacts of surge. The Plan provides criteria for the ranking and acquisition of property and structures seaward of the building setback line.

2. Introduction and Background

2-A. Erosion Response Plan Guidelines

As detailed in the Texas Administrative Code (TAC), Title 31; Part 1; Chapter 15; Subchapter A; Rule 15.17 entitled, "Local Government Erosion Response Plans", "local governments must develop plans for reducing public expenditures for erosion and storm damage losses to public and private property, including public beaches. The Erosion Response Plan (ERP) should be prepared in consultation with the General Land Office and may include the following seven (7) elements:

1) A building set-back line that will accommodate a shoreline retreat
2) A prohibition on new construction seaward of the building set-back line, (with criteria)
3) Consideration of exemptions. Local governments may consider exemptions from the prohibition of residential and commercial construction seaward of the building set-back line.
4) Construction requirements for exempt properties. Where the local government allows an exemption from the prohibition for building seaward of the building set-back line, it should require improved construction standards.
5) Procedures for preserving and enhancing the public's right of access to and use of the public beach from losses due to erosion and storm damage. Additionally the ERP should include (A) an evaluation of all areas of public access to determine those that require improved protection from erosion and storm surge; (B) evaluation of construction methods and design improvements for areas of beach access to reduce costs associated with repair, rebuild, or replacement due to storm damage and erosion; (C) list of goals and implementation schedules for areas of public access design improvements that prioritize short term (two years or less) and long term goals; (D) inventory all publicly funded existing amenities and access ways as a basis for qualifying for FEMA post-storm funding sources; (E) establishment of procedures based on subparagraphs (A) and (B) of this paragraph for conducting post-storm assessment and identifying requirements for rehabilitation.
6) Procedures for preserving, restoring, and enhancing critical sand dunes for natural storm protection and conservation purposes (with criteria).
7) Criteria for voluntary acquisition of property seaward of the building setback line. The local government may develop criteria for identifying properties with structures located entirely seaward of the building set-back line, providing for voluntary acquisition of fee simple title or a lesser interest in such properties, and procedures for prioritizing properties to be acquired, (with suggested criteria).

2-B. Location and Permitting

This Erosion Response Plan is limited to the Bolivar Peninsula, which includes the only gulf facing beach area in the unincorporated area in Galveston County. The City of Galveston and the City of Jamaica Beach encompass the gulf facing shoreline on Galveston Island. The plan area on Bolivar Peninsula is approximately 27 miles in length and is populated by the small communities of (from west to east), Port Bolivar, Crystal Beach, Caplan / Gilchrist and High Island. The permitting for coastal construction in the unincorporated areas of Galveston County is administered through the County Engineers Office in coordination with the GLO.

2-C. Grant Considerations

The basis for developing an Erosion Response Plan (ERP) is to reduce future public expenditures resulting from severe weather impacts; to continue to provide public access to future generations of Texans and visitors, and as detailed in the Texas Administrative Code local jurisdictions, "In order to be fully considered by the General Land Office for an expenditure from the coastal erosion response account (Account) pursuant to Texas Natural Resources Code, §33.605(b)(6)(B), a local government must adopt and submit the ERP or any amendments to the General Land Office for certification no later than December 31 immediately preceding the state fiscal biennium in which funding is sought. Provided, however, for consideration by the General Land Office for an expenditure from the Account in the state fiscal biennium beginning September 1, 2011, a local government must submit a draft ERP to the General Land Office no later than July 1, 2011."

Galveston County has been very fortunate to receive funding from the State of Texas through the CEPRA program since its inception in 1999. In fact, over 60 projects have either been funded directly to Galveston County, to cities within the county, to State agencies or non-profit organizations conducting projects within the County meeting a wide range needs; totaling almost over $20,000,000.00. This number of projects and total dollar allocation is more than any other county in the State.

2-D. References and Sources

The development of this ERP required Galveston County staff to review information from a variety of sources including: the erosion rate information published by the University of Texas, Bureau of Economic Geology (BEG); information developed through the federal Sabine Pass to Galveston Bay Shoreline Erosion Feasibility Study; and to seek the assistance of coastal engineers / geologists, attorneys, scientists, GLO staff, and Licensed State Land Surveyors (LSLS). As well as the "Texas Coastwide Erosion Response Plan (2009 Update).

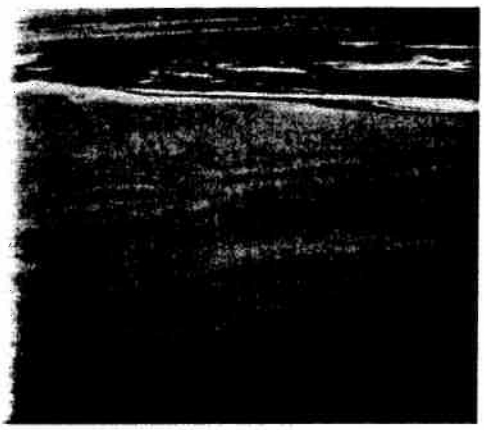
Around the nation, America's coasts are shrinking. This loss of valuable coastal resources is due to a combination of many factors including subsidence, sediment loss, sea level rise, impacts from storms and unsustainable development (human factor). Specifically Texas has 367 miles of gulf facing shoreline and studies have found that "64% of the total Texas coast is eroding at an average rate of -5.9 feet/year with some discrete areas experiencing greater than -30 feet/year*". Within Galveston County, the Bolivar Peninsula is located in far eastern Galveston County to the border with neighboring Chambers County. The peninsula ranges in width from as narrow as ¼ mile at Rollover Pass in the Gilchrist area to 3.5 miles wide at Crystal Beach. Adjacent beaches to the east of the county line consist primarily of exposed areas of clay, covered with a thin veneer of fine grained (silt) sand. This lack of sediment from the east has caused the peninsula to be sand starved and contributes to the erosion rate of peninsula beaches. Man-made structures have also impacted the natural littoral flow of sand along the peninsula coastline, in some locations compounding the existing erosion rates and in others mitigating them completely, causing adjacent areas to accrete at an accelerated rate. The net result of this littoral drift from east to west is at the rate of approximately 100,000 cu/yds per year as found through studies performed during the Sabine Pass to Galveston Bay Shoreline Erosion Feasibility Study. Two of the largest structures, having the greatest effect are the North Jetty located on the western end of the peninsula and Rollover Pass located in the small community of Gilchrist.

*Texas Coastwide Erosion Response Plan – 2009 Update- December 2009, McKenna

2-E. Structure Impacts

2-E-1. North Jetty-

Constructed to serve as a twin for the South Jetty located on eastern Galveston Island, the North Jetty is located on the western end of the Bolivar Peninsula and serves to provide protection to the Houston-Galveston ship channel. These now twin granite structures were originally constructed in 1874 with a great amount of the work not being completed until 1898 following Congressional appropriation of funding in 1890. The north jetty is the longer of the two jetties extending approximately 35,899.9 feet in length; while the south jetty is 25,907.2 feet long. Together these two jetties help maintain the ship channel depth by limiting the amount of sediment transport from the Bolivar peninsula (by the north jetty) into the ship channel. This is evidenced by the build up of material on the eastern side of the north jetty and the lack of erosion immediately adjacent and to the east of the jetty



Photo's 1 & 2 **Oblique aerial photo's of the "build-up" of sediment and material on the northeast side of the North Jetty on the western end of the Bolivar Peninsula**

2-E-2. Rollover Pass-

Located in Gilchrist is a man-made connection between the Gulf of Mexico and "East Bay". Originally created in 1954 by the Texas Fish and Game Commission through a natural wash-over area to improve recreational fishing, the original plan called for the channel to have an approximate 80ft wide bottom at a depth of 8ft. with sloping earthen sides all around with the exception of a steel sheet-pile bulkhead on the southwestern side. However, during construction the currents through the newly excavated channel caused extensive erosion, widening the channel to approximately 500ft. and washing out the channel to a depth of 30ft. under the highway 87 bridge. High tides caused additional damage and in 1955 a temporary steel sheet-pile wall was constructed south of the bridge to interrupt the flow. After temporary corrective measures the "Cut" was partially opened and it was not until 1958-1959 when corrective measures were implemented based on information from the U.S. Army Corp of Engineers (USACE) that the Pass could be fully stabilized. But, these stabilization efforts provide evidence of the velocity and sediment transport through the Pass and into Rollover Bay. The natural flow of sediment along the eastern Bolivar coastline is interrupted by the Pass, providing an "escape hatch" for sediment to leave the gulf facing shoreline and detour into Rollover Bay where it will settle out over the oyster reefs and other marine habitat. It also causes siltation of the Gulf Intra-coastal Waterway (GIWW). This siltation has two primary negative impacts; 1) It increases public expenditures to maintain the depth of the channel for the USACE; and, 2) Reduces the amount of sediment available to maintain beach width and thereby increases the rate of erosion experienced by down drift beaches. This

erosion has been mitigated in the past with beneficial use of dredged material (BUDM) projects and other beach nourishment projects co-funded by a variety of sources including Galveston County and the Texas General Land Office.* (Note the sediment accumulation in Photo 3 in Rollover Bay.)

Photo 3- Oblique pre-Ike aerial view of Rollover Pass

Photo 4- Post-Ike view of Rollover Pass area

2-F. Tropical Weather System Impacts / Response Actions

Galveston County has a long history of experiencing weather impacts from tropical depressions / storms to the 1900 Storm and Hurricane Ike in 2008. In response to the 1900 Storm Galveston residents constructed the seawall. But even the smaller events like Tropical Depressions and Storms can have significant impacts along the coast. In 1996 Tropical Storm Josephine never made landfall in Texas, but its path through the gulf toward south Florida elevated water levels and caused extensive damage and served as the catalyst for Galveston County and the GLO to partner on a haybale dune project in the Gilchrist area. In 1998 Tropical Storm Frances impacted the upper Texas coast, and destroyed the haybale dunes. In response to TS Francis, Galveston County again partnered with various agencies to construct a mitigation project, the geotextile tube core dunes. Although impacted by TS Allison in 2001, TS's Faye and Isidore and Hurricane Lili in 2002, Hurricane Claudette in 2003, and Hurricane Rita in 2005 the geotextile tube core dune remained in place with annual repairs and maintenance until Hurricane Ike in 2008.

Hurricane Ike exceeded the intended design protection levels of the geotextile tube core dunes causing a complete failure and as a result the remains were removed from the public beach by the GLO.

2-F-1 Hurricane Ike-

No plan for Bolivar Peninsula could be complete without examination of the impacts resulting from Hurricane Ike. Bolivar Peninsula was the most impacted part of the County by Hurricane Ike, approximately 2.2 million cubic yards of debris was removed from Bolivar Peninsula alone, as compared to approximately 750,000 cu/yd for the remainder of the unincorporated areas of the County.

*GLO USACE permit application http://www.glo.texas.gov/what-we-do/caring-for-the-coast/_documents/coastal-erosion/rollover-pass/rollover-pass-permit-application.pdf Report- Analysis of Rollover Pass Impacts to Adjacent Beaches and the Littoral System January 12, 2010 pg.2)

Approximately 3,660 structures were either washed away or sustained major damage, with over 97% of all structures on the peninsula receiving damage.

Photo 5 The community of Gilchrist facing east from Rollover Pass following Ike

Photo 6 Community of High Island surrounded by storm surge from Hurricane Ike 24 hours after landfall

2-G Coastal Barrier Resource Act Zones (CBRA Zones)

Created by the Coastal Barrier Resources Act enacted in 1982; Public Law 97-348 designates various undeveloped coastal barrier islands, as designated by map, that are now ineligible for direct or indirect federal financial assistance that might support development, including the issuance of flood insurance, except for emergency life-saving activities. The following Coastal Barrier Resource Zone Units are located on the Bolivar Peninsula:

- T02A
- T03A
- T03AP

3. Survey Monument

All survey measurements used in the development of this Erosion Response Plan including dune elevations, dune widths and representative contours lines are referenced from the following monument.

Monument Name	Elevation	Location
HGCSD 64	5.10ft. NAVD 88	N: 13,744,577.76 E: 3,366,638.51

4. Definitions

The following words and terms, when used in this Erosion Response Plan, shall have the following meanings, unless the context clearly indicates otherwise.

Affect - As used in this Plan regarding dunes, dune vegetation, and the public beach, "affect" means to produce an effect upon dunes, dune vegetation, or public beach use and access.

Amenities - Any non-habitable major structure including swimming pools, bathhouses, detached garages, cabanas, pipelines, piers, canals, lakes, ditches, artificial runoff channels and other water retention structures, roads, streets, highways, parking areas and other paved areas (exceeding 144 square feet in area), underground storage tanks, and similar structures.

Applicant - Any person applying to Galveston County for a permit and/or certificate for any construction or development plan.

Attorney General (AG) or Office of the Attorney General (OAG) - Attorney General of the State of Texas.

Backdunes - The dunes located landward of the foredune ridge which are usually well vegetated but may also be unvegetated and migratory. These dunes supply sediment to the beach after the foredunes and the foredune ridge have been destroyed by natural or human activities. In this Plan, backdunes shall be understood to be the most landward dunes within the beach/dune system and the most landward feature of the critical dune area.

Beach - See public beach.

Beach access - The right to use and enjoy the public beach, including the right of free and unrestricted ingress and egress to and from the public beach.

Beach and Parks Department - See Parks Department.

Beach/Dune Rules (GLO Rules, GLO Beach/Dune Rules) - Subchapter A of Chapter 15 of Title 31 of the Texas Administrative Code, as amended, affecting Galveston County; at the adoption of this Plan the rules are 31 Texas Administrative Code §§ 15.1-15.10, 15.12, 15.21, and 15.35.

Beach/dune system - The land from the line of mean low tide of the Gulf of Mexico to the landward limit of dune formation.

Beach maintenance - The cleaning or removal of debris from the beach by handpicking, raking, or mechanical means.

Beach nourishment project area - The beach nourishment project area is that area seaward of naturally occurring continuous vegetation and north of the mean low tide line of the Gulf of

Mexico where local, state or federal funds have been used to enhance, preserve or improve the beach and dune system.

Beach profile - The shape and elevation of the beach as determined by surveying a cross section of the beach.

Beach-related services - Reasonable and necessary services and facilities directly related to the public beach which are provided to the public to ensure safe use of and access to and from the public beach, such as vehicular controls, management, and parking (including acquisition and maintenance of off-beach parking and access ways); sanitation and litter control; lifeguarding and lifesaving; beach maintenance; law enforcement; beach nourishment projects; beach/dune system education; beach/dune protection and restoration projects; providing public facilities such as restrooms, showers, lockers, equipment rentals, and picnic areas; recreational and refreshment facilities; liability insurance; and staff and personnel necessary to provide beach-related services. Beach-related services and facilities shall serve only those areas on or immediately adjacent to the public beach.

Beach user fee - A fee collected by Galveston County in order to establish and maintain beach-related services and facilities for the preservation and enhancement of access to and from and safe and healthy use of public beaches by the public.

Blowout - A breach in the dunes caused by wind erosion.

Breach - A break or gap in the continuity of a dune caused by wind or water.

Building Official - the county employee within the County Engineer's office, or authorized representative responsible for issuance of Building Permits, Coastal Construction Permits, and subsequent inspections of authorized work.

Building perimeter or footprint - The area of a lot covered by a structure used or usable for habitation. The habitable structure perimeter or footprint does not include incidental projecting eaves, balconies, ground-level paving, landscaping, open recreational facilities (for example, pools and tennis courts), or other similar features.

Building Permit - A permit issued and defined pursuant to the County Floodplain Regulations.

Bulkhead - A structure or partition built to retain or prevent the sliding of land. A secondary purpose is to protect the upland against damage from wave action.

Coastal and shore protection project - A project designed to slow shoreline erosion or enhance shoreline stabilization, including, but not limited to, erosion response structures, beach nourishment, sediment bypassing, construction of man-made vegetated mounds, and dune re-vegetation.

Coastal Construction Permit - The document issued by Galveston County to authorize construction or other regulated activities in a specified location seaward of a dune protection line or landward of public beaches lying in the area either up to the first public road parallel to the beach or to any closer public road not parallel to the beach, or to within 1,000 feet of mean high tide, whichever is greater, that affects or may affect public access to and use of public beaches. It also certifies that the proposed construction either is consistent with the Galveston County Dune Protection and Beach Access Plan or is inconsistent with that Plan. In the latter case, Galveston County must specify how the construction is inconsistent with the Plan, as required by the Open Beaches Act, § 61.015 of the Texas Natural Resources Code.

Coastal Management Plan - the plan as developed by the Commissioner of the Texas General Land Office under Texas Natural Resources Code §33.052, Development of Coastal Management Program.

Commercial facility - Any structure used for providing, distributing, and selling goods or services in commerce including, but not limited to, hotels, restaurants, bars, rental operations, and rental properties.

Commissioner - "Commissioner" means the Commissioner of the General Land Office.

Commissioners' Court - The County Commissioners' Court of Galveston County, Texas.

Construction - Causing or carrying out any building, bulk-heading, filling, clearing, excavation, or substantial improvement to land or the size of any structure. "Building" includes, but is not limited to, all related site work and placement of construction materials on the site. "Filling" includes, but is not limited to, disposal of dredged materials. "Excavation" includes, but is not limited to, removal or alteration of dunes and dune vegetation and scraping, grading, or dredging a site. "Substantial improvements to land or the size of any structure" include, but are not limited to, creation of vehicular or pedestrian trails, landscape work (that adversely affects dunes or dune vegetation), and increasing the size of any structure.

Coppice mounds - The initial stages of dune growth formed as sand accumulates on the downwind side of plants and other obstructions on or immediately adjacent to the beach seaward of the foredunes. Coppice mounds may be unvegetated.

Council - The Coastal Coordination Council, as established by the Coastal Coordination Act, Texas Natural Resources Code §33.203(20).

County - As used in this Plan, means Galveston County, Texas, Galveston County Commissioners' Court, or its authorized representative.

County Engineer - Engineer for the County of Galveston, Texas or the Engineer's authorized representative.

County Floodplain Regulations - Means the Regulations of Galveston County, Texas for Flood Plain Management adopted by order of the Commissioners' Court of Galveston County, Texas on October 28, 2002 to be effective December 6, 2002 and thereafter, and as such order may be amended.

Critical dune areas - Those portions of the beach/dune system as designated by the General Land Office that are located within 1,000 feet of mean high tide of the Gulf of Mexico that contain dunes and dune complexes that are essential to the protection of public beaches, submerged land, and state-owned land, such as public roads and coastal public lands, from nuisance, erosion, storm surge, and high wind and waves. Critical dune areas include, but are not limited to, the dunes that store sand in the beach/dune system to replenish eroding public beaches.

Cumulative impact - The effect on beach use and access, on a critical dune area, or an area seaward of the dune protection line which results from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Dedication - Includes, but is not limited to, a restrictive covenant, permanent easement, and fee simple donation.

Dune - An emergent mound, hill, or ridge of sand, either bare or vegetated, located on land bordering the waters of the Gulf of Mexico. Dunes are naturally formed by the windward transport of sediment, but can also be created via man-made vegetated mounds. Natural dunes are usually found adjacent to the uppermost limit of wave action and are usually marked by an abrupt change in slope landward of the dry beach. The term includes coppice mounds, foredunes, dunes comprising the foredune ridge, backdunes, and man-made vegetated mounds.

Dune complex or dune area - Any emergent area adjacent to the waters of the Gulf of Mexico in which several types of dunes are found or in which dunes have been established by proper management of the area. In some portions of the Texas coast, dune complexes may contain depressions known as swales.

Dune Conservation Area (DCA) – The area, beginning at the line of vegetation (LOV) and moving landward for a distance of 50ft. There is an absolute prohibition of construction activities within the Dune Conservation Area, excepting properly permitted structures providing access.

Dune Protection Act - Texas Natural Resources Code, Chapter 63.

Dune Protection and Beach Access Plan or Plan - Galveston County's legally enforceable program, policies, and procedures for protecting dunes and dune vegetation and for preserving and enhancing use of and access to and from public beaches, as required by the Dune Protection Act and the Open Beaches Act.

Dune protection line - A line established by the County Commissioners' Court for the purpose of preserving sand dunes within Galveston County and within those areas within Galveston County subject to the authority of the Commissioners' Court. No municipality within Galveston County is authorized to establish a dune protection line unless the authority to do so has been specifically delegated to the municipality by the Galveston County Commissioners' Court. All critical dune areas shall be seaward of the dune protection line.

Dune vegetation - Flora indigenous to natural dune complexes, and growing on naturally-formed dunes or man-made vegetated mounds on the Texas coast and can include coastal grasses and herbaceous and woody plants.

Effect or effects - "Effects" include: direct effects - those impacts on public beach use and access, on critical dune areas, or on dunes and dune vegetation seaward of a dune protection line which are caused by an action and occur at the same time and place; and indirect effects - those impacts on beach use and access, on critical dune areas, or on dunes and dune vegetation seaward of a dune protection line which are caused by an action and are later in time or farther removed in distance than a direct effect, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. "Effects" and "impacts" as used in this Order are synonymous. "Effects" may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.

Enclosure - An area below BFE of a structure. The enclosure shall meet the requirements of NFIP regulations for V-zone construction as codified in Title 44, Section 60.3(a)(3) of the Code of Federal Regulations. As defined by FEMA a breakaway wall is not part of the structural support of the building and is intended through it's design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

Eroding area - A portion of the shoreline which is experiencing an historical erosion rate of greater than two feet per year based on published data of the University of Texas at Austin, Bureau of Economic Geology.

Erosion - The wearing away of land or the removal of beach and/or dune sediments by wave action, tidal currents, wave currents, drainage, or wind. Erosion includes, but is not

limited to, horizontal recession and scour and can be induced or aggravated by human activities.

Erosion response structure - A hard or rigid structure built for shoreline stabilization which includes, but is not limited to, a jetty, retaining wall, groin, breakwater, bulkhead, seawall, riprap, rubble mound, revetment, or the foundation of a structure which is the functional equivalent of these specified structures.

FEMA - The United States Federal Emergency Management Agency. This agency administers the National Flood Insurance Program and publishes the official flood insurance rate maps.

FEMA Rules - County-adopted requirements for construction required of all construction in areas covered by FEMA insurance.

Foredunes - The first clearly distinguishable, usually vegetated, stabilized large dunes encountered landward of the Gulf of Mexico. On some portions of the Texas Gulf Coast, foredunes may also be large, unvegetated, and unstabilized. Although they may be large and continuous, foredunes are typically hummocky and discontinuous and may be interrupted by breaches and washover areas. Foredunes offer the first significant means of dissipating storm-generated wave and current energy issuing from the Gulf of Mexico. Because various heights and configurations of dunes may perform this function, no standardized physical description applies. Foredunes are distinguishable from surrounding dune types by their relative location and physical appearance.

Foredune ridge - The high continuous line of dunes which are usually well vegetated and rise sharply landward of the foredune area but may also rise directly from a flat, wave-cut beach immediately after a storm.

General Land Office (GLO, Land Office) - The agency of the Texas state government charged with coordinating and overseeing the development and implementation of dune protection and beach access plans by counties and cities on the Gulf of Mexico Coast of the State of Texas.

Geotube® - Geotube is a registered trademark owned by Ten Cate Nicolon, Miratech Division and refers to its' geotube containment system.

GLO Rules – See Beach/Dune Rules.

Habitable structures - Structures suitable for human habitation including, but not limited to, single or multi-family residences, hotels, condominium buildings, and buildings for commercial purposes. Each building of a condominium regime is considered a separate habitable structure, but if a building is divided into apartments, then the entire building, not the individual apartments, is considered a single habitable structure. Additionally, a habitable structure includes porches, gazebos, and other attached improvements.

Industrial facilities - Includes, but are not limited to, those establishments listed in Part 1, Division D, Major Groups 20-39 and Part 1, Division E, Major Group 49 of the Standard Industrial Classification Manual as adopted by the Executive Office of the President, Office of Management and Budget (1987 ed.). However, for the purposes of this Plan, the establishments listed in Part 1, Division D, Major Group 20, Industry Group Number 209, Industry Numbers 2091 and 2092 are not considered "industrial facilities."

Large-scale construction - Construction activity greater than 5,000 square feet or habitable structures greater than two stories in height. Both the area beneath the lowest habitable level of an elevated structure and a cupola (i.e. "widow's walk") with an area of 400 square feet or less on the top of the second habitable story are not considered stories for the purpose of this section. Multiple-family habitable structures are typical of this type of construction.

Line of vegetation (also vegetation line, {LOV}) - The extreme seaward boundary of natural vegetation which spreads continuously inland. The line of vegetation is typically used to determine the landward extent of the public beach. On the portions of Texas coast where there is no marked vegetation line or the line is discontinuous or modified, the line of vegetation shall be determined consistent with §15.10(b) of the Texas Administrative Code and the Open Beaches Act, Texas Natural Resources Code §§61.016 and 61.017.

Litter - As authorized by Texas Natural Resources Code §61.122, the Commissioners' Court of a County bordering the Gulf of Mexico or its tidewater limits, by order, may define the term littering. Litter includes any act of placing on the ground, scattering, or leaving unattended upon any beach in Galveston County other than in a proper disposal receptacle, any trash, garbage or debris of any character, including but not limited to food, used containers or packaging, rubber, glass, paper, plastic, wood, metal, non-biodegradable cast-off appliances, or medical waste from land-based activities such as housekeeping, medical treatment or research, recreation, camping, fishing, or picnicking or water-based activities such as shipping, off-shore oil and gas production, and commercial or recreational fishing. Paper and other trash resulting from fireworks exploded on the public beach or within the critical dune area is also considered litter. The County shall regulate litter and criminal penalties will apply where regulations are established.

Littering - See litter.

Littoral owner - means the owner of land adjacent to the shore and includes a lessee, licensee, or anyone acting under the littoral owner's authority.

Local government - A municipality; any special purpose district, any unit of government, or any other political subdivision of the state. Unless otherwise explained in this Plan, local government shall refer to Galveston County, Texas.

Man-made vegetated mound - A mound, hill, or ridge of sand created by the deliberate placement of sand or sand trapping devices including sand fences, trees, or brush and planted with dune vegetation.

Master plan (Master planned development)- A plan developed by the applicant in consultation with the GLO, the applicant or applicants, and the County, for the development of an area subject to the Beach/Dune Rules, as identified in 31 Texas Administrative Code §15.3. The master plan shall fully describe in narrative form the proposed development and all proposed land and water uses, and shall include maps, drawings, tables, and other information, as needed. The master plan must, at a minimum, fully describe the general geology and geography of the site, land and water use intensities, size and location of all buildings, structures, and improvements, all vehicular and pedestrian access ways, and parking or storage facilities, location and design of utility systems, location and design of any erosion response structures, retaining walls, or stormwater treatment management systems, and the schedule for all construction activities described in the master plan. The master plan shall comply with the Open Beaches Act and the Dune Protection Act. The master plan shall provide for overall compliance with the Beach/Dune Rules and, when approved as an amendment to the Galveston County Dune Protection and Beach Access Plan, may vary from the specific standards, means and methods provided in the Beach/Dune Rules if the degree of dune protection and the public's right to safe and healthy use of and access to and from the public beach are preserved. If all impacts to dunes, dune vegetation and public beach use and access are accurately identified, the County shall not require permits for construction on the individual lots within the master plan area. Master plans are intended to provide a comprehensive option for planning along the Texas coast.

Material changes - Changes in project design, construction materials, or construction methods or in the condition of the construction site which occur after an application is submitted to the County or after the County issues a Coastal Construction Permit. Material changes are those additional or unanticipated changes which have caused or will cause adverse effects on dunes, dune vegetation, or beach access and use, or exacerbation of erosion on or adjacent to the construction site.

Mitigation sequence - The series of steps which must be taken if dunes and dune vegetation will be adversely affected. First, such adverse effects shall be avoided. Second, adverse effects shall be minimized. Third, the dunes and dune vegetation adversely affected shall be repaired, restored, or replaced. Fourth, the dunes and dune vegetation adversely affected shall be replaced or substituted to compensate for the adverse effects.

National Flood Insurance Act - 42 United States Code, §§ 4001, et seq. National Flood Insurance Program also known as NFIP

Natural resources - Land, fish, wildlife, insects, biota, air, surface water, groundwater, plants, trees, habitat of flora and fauna, and other such resources.

Open Beaches Act - Texas Natural Resources Code, Chapter 61.

Order "order" means an order of the Commissioners' Court; "Order" means this Order of Commissioners' Court of Galveston County, Texas Adopting the Galveston County Dune Protection and Beach Access Plan.

Owner or operator - Any person owning, operating, or responsible for operating commercial or industrial facilities.

Parks Department - The Galveston County Parks Department.

Permit condition - A requirement or restriction in a permit necessary to assure protection of life, natural resources, property, and adequate beach use and access rights (consistent with the Dune Protection Act and/or the Open Beaches Act) which a permittee must satisfy in order to be in compliance with the permit.

Permit - See Coastal Construction Permit.

Permittee - Any person authorized to act under a permit issued by the County.

Person - An individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, United States Government, state, municipality, commission, political subdivision, or any international or interstate body or any other governmental entity.

Pipeline - A tube or system of tubes used for the transportation of oil, gas, chemicals, fuels, water, sewerage, or other liquid, semi-liquid, or gaseous substances.

Plan - Galveston County Dune Protection and Beach Access Plan.

Practicable - Available and capable of being done after taking into consideration existing building practices, costs, siting alternatives, and the footprint of the structure in relation to the area of the buildable portion of the lot, and considering the overall development scheme for the property.

Production and gathering facilities - The equipment used to recover and move oil or gas from a well to a main pipeline, or other point of delivery such as a tank battery, and to place such oil or gas into marketable condition. Included are pipelines used as gathering lines, pumps, tanks, separators, compressors, and associated equipment and roads.

Project area - The portion of a site or sites which will be affected by proposed construction.

Public beach or beach - As used in this Plan, "public beach" is defined in the Texas Natural Resources Code, §61.013(c). Any beach bordering on the Gulf of Mexico that extends inland from the line of mean low tide to the natural line of vegetation bordering on the

seaward shore of the Gulf of Mexico, or such larger contiguous area to which the public has acquired a right of use or easement to or over by prescription, dedication, or estoppel, or has retained a right by virtue of continuous right in the public since time immemorial as recognized by law or custom. This definition does not include a beach that is not accessible by a public road or ferry as provided in §61.021 of the Texas Natural Resources Code.

Recreational activity - Includes, but is not limited to, hiking, sunbathing, and camping. As used in Section 15.3(s)(2)(C) of the Beach/Dune Rules and Section II(F)(3) of this Plan, recreational activities are limited to the private activities of the person owning the land and the social guests of the owner. Operation of recreational vehicles is not considered a recreational activity, whether private or public.

Recreational vehicle - A dune buggy, marsh buggy, minibike, trail bike, jeep, or any other mechanized vehicle that is being used for recreational purposes.

Restoration - The process of constructing man-made vegetated mounds, repairing damaged dunes, or vegetating existing dunes.

Restored (man-made) dune - For the purposes of determining construction setbacks and the location of the Dune Protection Line, a restored dune shall be defined as having more than 50% vegetative cover, a minimum 3:1 slope on the seaward face, an average height of 75% of the peninsula's mean base flood elevation as measured from mean sea level, a naturally established connection to the dune contour and elevation of the adjacent property, and shall not extend further seaward than 4.1' elevation from mean sea level or seaward of the 20 ft. recognized dune corridor.

Retaining wall - A structure designed primarily to contain material and to prevent the sliding of land. Retaining walls may collapse under the forces of normal wave activity.

Sand budget - The amount of all sources of sediment, sediment traps, and transport of sediment within a defined area. From the sand budget, it is possible to determine whether sediment gains and losses are in balance.

Sandsock - A generic term for a containment system. An example of a sandsock is the geotube® containment system, which is a geotextile sand-filled containment system product. For the purposes of this Plan, it is recognized that all existing sandsock structures were destroyed by Hurricane Ike and removed as debris from the beach by the General Land Office

Seawall - An erosion response structure specifically designed to or which will withstand wave forces.

Seaward of a dune protection line - The area between a dune protection line and the line of mean high tide.

Shore protection project - See "Coastal and shore protection project."

Small-scale construction - Construction activity less than or equal to two stories in height that is also less than or equal to 5,000 square feet. Both the area beneath the lowest habitable level of an elevated structure and a cupola (i.e. "widow's walk") with an area of 400 square feet or less on the top of the second habitable story are not considered stories for the purpose of this section. Single-family habitable structures are typical of this type of construction.

Structure - Includes, without limitation, any building or combination of related components constructed in an ordered scheme that constitutes a work or improvement constructed on or affixed to land.

Swales - Low areas within a dune complex located in some portions of the Texas coast which function as natural rainwater collection areas and are an integral part of the dune complex.

Unique flora and fauna - Endangered or threatened plant or animal species listed at 16 United States Code Annotated, §1531, the Endangered Species Act of 1973, and/or the Parks and Wildlife Code, Chapter 68, or any plant or animal species that the County has determined in this Plan are rare or uncommon.

Vegetation line - See line of vegetation.

Washover areas - Low areas that are adjacent to beaches and are inundated by waves and storm tides from the Gulf of Mexico. Washovers may be found in abandoned tidal channels or where foredunes are poorly developed or breached by storm tides and wind erosion.

5-A. Setback Line Considerations

Prior to the implementation of this Plan the setback line on the Bolivar Peninsula, post Hurricane Ike, in the absence of a natural line of vegetation line, is 200ft. landward of mean low tide plus an additional 50ft. dune conservation area setback for a total distance of 250ft from mean low tide. This post-Ike line was implemented with General Land Office concurrence, as a result of the complete loss and scouring of the dune system along the length of the Bolivar Peninsula. Galveston County through the County Engineers Office has implemented in practice a setback line 50ft. landward of the line of vegetation. As detailed previously the implementation of a building set back line is a major part of the development of this erosion response plan, taking into account the following criteria:

a) Historical erosion rates as determined by the University of Texas at Austin, Bureau of Economic Geology, or other source approved by the General Land Office;

The ERP should also include the establishment of a stable and verifiable reference point that could be used toward the development of a smooth and consistent relatively straight line which could include any of the reference points listed below:

b) The line of vegetation (LOV);
c) Mean Low Tide;
d) Mean High Tide; or
e) The line depicted in a coastal boundary survey approved and filed as provided in Texas Natural Resources Code, §33.136;
f) The dune protection line (DPL). The building set-back line may not be located further landward than the DPL, which is established by a local government under the Dune Protection Act and updated as specified in §15.3(k) of this title (relating to Local Government Review of Dune Protection Line Location). The building set-back line must protect as much of the critical dune area as practicable.

5-B. Objectives to be Accomplished by Implementing a Setback Line

- Mitigate against future losses due to storm and tidal surge and to reduce public expenditures.
- Protect critical dune width allowing sufficient area for existing and future dunes while also preserving public access.
- Determine criteria, issues and allowable facilities when no practicable alternative exists for construction seaward of the setback line.

6. Bolivar Peninsula Erosion Rates

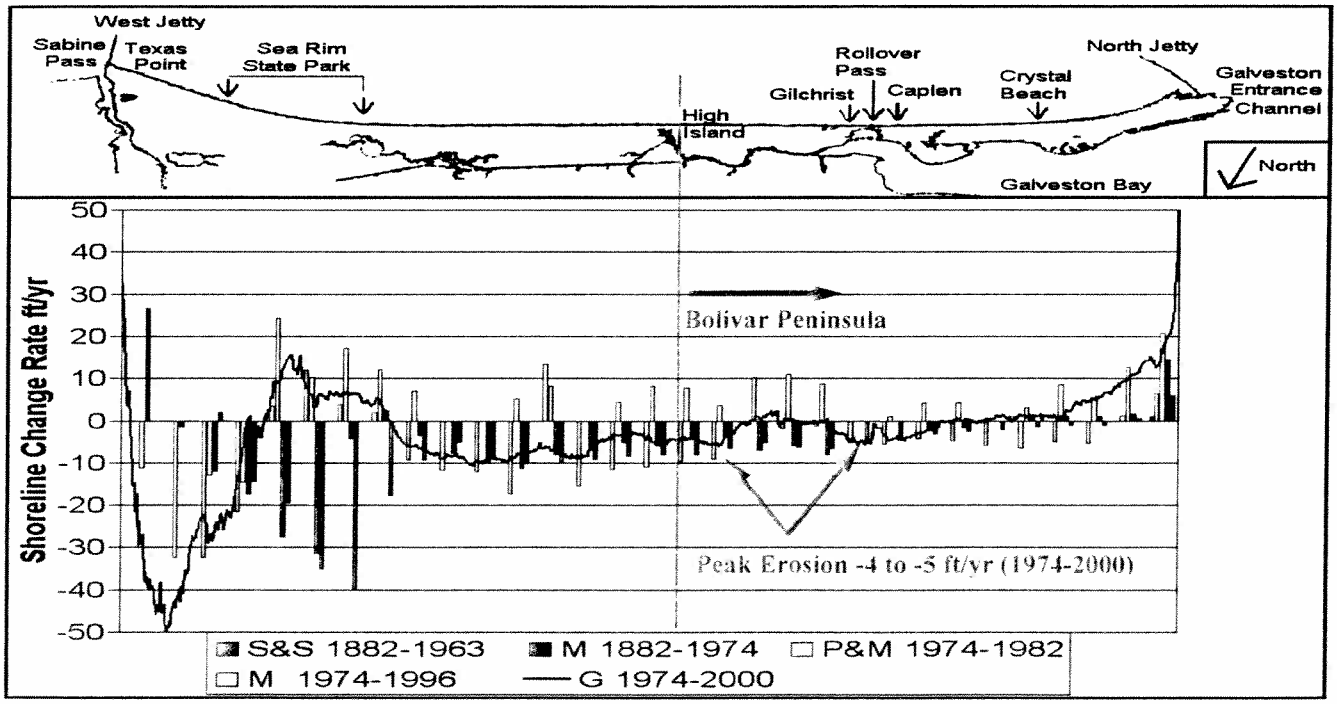
Graph 1 on the following page, provides a summary of shoreline change rates between Sabine Pass and the Galveston Entrance Channel from the USACE's "Sabine Pass to Galveston Bay, Texas – Shoreline Erosion Feasibility Study" (King 2007). This figure includes the study area of Bolivar Peninsula. The 1974-2000 average was developed by Dr. Jim Gibeaut at the University of Texas Bureau of Economic Geology (BEG) specifically for the Feasibility Study. As seen below, shoreline changes vary significantly along the entire study area. In particular Bolivar Peninsula has an area of erosion occurring in the vicinity of Rollover Pass with an average rate of 5 ft/yr (see Figure 2; page 23), which then transitions into a relatively stable area and then an area of significant accretion at the west end of the peninsula. An item of note is that the shoreline near High Island and to the west within McFaddin National Wildlife Refuge area has experienced significant long-term erosion with average rates between 5 and 10 ft/yr. Site visits show that the shoreface has lost much of its sand and the shoreline consists

mostly of exposed clay (see Photos 7 and 8). As a result, there is limited sand available for transport to Galveston County and Bolivar Peninsula beaches, which could increase erosion rates along the eastern portion of the peninsula.

Photo 7-Typical Chambers County shoreline
(Facing West)

Photo 8 McFaddin NWR
(Note exposed clay)

Recently the BEG updated long-term erosion rates for Galveston County with partial data from 1838 to 1882 and full data from 1930 through 2007. It should be noted that significant changes to the shoreline, inlets, and the construction of Rollover Pass (1955) occurred during this long time period. As a result, these longer-term erosion rates may not be indicative of the recent shoreline change trends on Bolivar Peninsula. Therefore, application of the erosion rates developed for the Feasibility Study is recommended for use in of Galveston County's set-back



Graph 1. Historical Shoreline Change between Sabine Pass and the Galveston Entrance Channel (modified after King 2007)

Galveston Co.
Chambers Co
N
Erosion Rate (FT/YR)
-5.88 - -5.00
-4.99 - -4.00
-3.99 - -3.00
-2.99 - -2.00
-1.99 - -1.00
-0.99 - -0.50
-0.49 - 0.00
0.01 - 2.00
2.01 - 65.87
Data developed by the UT BEG for Galveston
Pass to Galveston Bay Texas Shoreline
Erosion Feasibility Study
HDR
HDR Engineering, Inc.
TEXAS FIRM REGISTRATION NUMBER F-754
Galveston County
Bolivar Peninsula ERP
Average Erosion Rates Along
Bolivar Peninsula (1974-2000)
Figure 2
Project No 164492

6-A Duration for Setback Projection

The set-back line should be far enough landward to accommodate future erosion over a specific timeframe. Gibeaut *et al.* (2004) recommended a minimum of 20 years. Another option; although more difficult to justify, is to consider an initial timeframe of five (5) years as the setback duration. This option is a potential consideration because the erosion response plan is required to be updated every five (5) years and if corresponding changes are required they could be incorporated into the plan at the time of the five (5) year revision. However, justification of such a limited timeframe and it's overall benefits are very difficult to quantify on such a short time frame. Other counties on the Texas coast have developed a more lengthy time frame- for example Nueces County requires structures located within sixty times (60) the erosion rate to be designed so that they can be relocated (Nueces County 2010). In Florida, regulations for coastal construction include a 30-year erosion projection line (McKenna 2009).

The setback distance would vary depending on the length of time selected and the specific erosion rates at a given area. For example, at the west end of the Bolivar Peninsula in the Rettilon Road area, the beach is accreting and is the widest beach on the peninsula due to the influences of the North Jetty (Note photo's 1 and 2; on page 8 and Graph 1 on page 22). A BSL in this area would necessarily include recognition of that accretion. In contrast, immediately west of Rollover Pass, where the average erosion rate is approximately 4ft to 5ft ft/yr; the setback distance combined with the average dune width could result in a set back area possibly back to State Highway 87.

It is recommended the timeframe used for consideration in the development of a BSL should be no less than 20 years in coordination with the average erosion rate based on the 1974-2000 averages applied to the USACE Feasibility Study by the BEG for the specific area multiplied by that factor of 20 (or whatever the duration) years and added with the average dune width for the Bolivar peninsula to determine the total setback area.

6-B Reference Line Determination

An important consideration for development of a set-back distance is the seaward reference line from which the setback is measured. This reference line should be consistent, stable, easily verifiable location point or line that is easily obtained and does not place an undue burden on those whom the line will affect. The rules for the development of a local Erosion Response Plan as published by the GLO, recommend the possible use of several reference lines:

- The Line of Vegetation (LOV)
- Mean Low Tide (or Mean Low Water)
- Mean High Tide (or Mean High Water)
- Approved State Coastal Boundary Survey (typically the Mean Higher High Water line)

Table 1 on the following page provides a summary of elevations for various tidal datum and common geomorphic features found on Galveston County beaches. Tidal datum are from NOAA Station 87715101 located on the Galveston Pleasure Pier. There is a tide station at Rollover Pass; however, it is located on the bay side of the Pass and does not provide an accurate representation of Gulf shoreline tidal variations.

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Table 1. Elevations of tidal datums and geomorphic features along Galveston County beaches.		
Reference/Feature	**Elevation, ft (NAVD)**	**Comment**
MLLW	-0.61	Forebeach ("Swash Zone") – extremely dynamic/variable on monthly and seasonal timescales.
MLW	-0.22	
MSL	+0.50	
MHW	+1.23	
MHHW (State "Coastal Boundary")	+1.43	
"Shoreline"	Approx. +2.5 ft	
Dry Beach	> +2.5 ft	Backbeach – less dynamic/variable on monthly and seasonal timescales.

6-C Reference Line Summaries

6-C-1 Line of Vegetation-. (LOV) is a difficult line to determine, especially along eastern Bolivar Peninsula as there was a significant loss of vegetation from Ike and it is only now slowly starting to come back. Also, the County cannot determine this line; it has to be done by GLO. The LOV determination process is found in TAC; Title 31; Part 1; Chapter 15; Subchapter A; Rule 15.3(1) – (6). The GLO has agreed to be available as needed by Galveston County to access the LOV. The LOV determination for the ERP is only for planning purposes, not for permitting purposes.

6-C-2 Mean Low Tide (MLT): Line is a contour, and due to its location on the beach profile (very low), it will move significant distances landward and seaward throughout the year. This could cause issues with building applicants submitting at different times of the year. In addition, not all upland topographic surveyors understand how to establish this line, or elevation. It should be noted that at certain times of the year (spring and fall) this elevation may be in relatively deep water, making a survey using traditional survey equipment very difficult. However, this is the reference line that has been used for permitting purposes since Hurricane Ike.

6-C-3 Mean High Tide (MHT): Similar issues to MLT in regards to seasonal variability and how to locate by non-coastal area surveyor.

6-C-4 Coastal Boundary Survey: A Coastal Boundary Survey does not currently exist for all of Bolivar Peninsula. For this line to be used as a reference point the coverage gaps would need to be filled, or a new survey for the entire peninsula performed. Obtaining this new information would be an expensive undertaking, and is subject to being located in the surf over time. A Coastal Boundary Survey, to be certified, must be published in the Texas Register and entails a significant time requirement.

Galveston County is considering approaching the issue from a different perspective- moving the landward boundary of the building setback area to the Dune Protection Line. This movement has several distinct advantages:

- The seaward reference line, mean low tide, is a familiar line to the general public and has been used since Hurricane Ike in 2008.

- It moves the landward boundary of the setback area as far landward as possible.
- The landward boundary is a stable upland contour and is easier for all topographic surveyors to locate.
- Builders, real estate agents, and others can more easily relate to measurement tool they are familiar using.

As additional information a schematic sketch of how the reference lines and building limit lines relate is provided below.

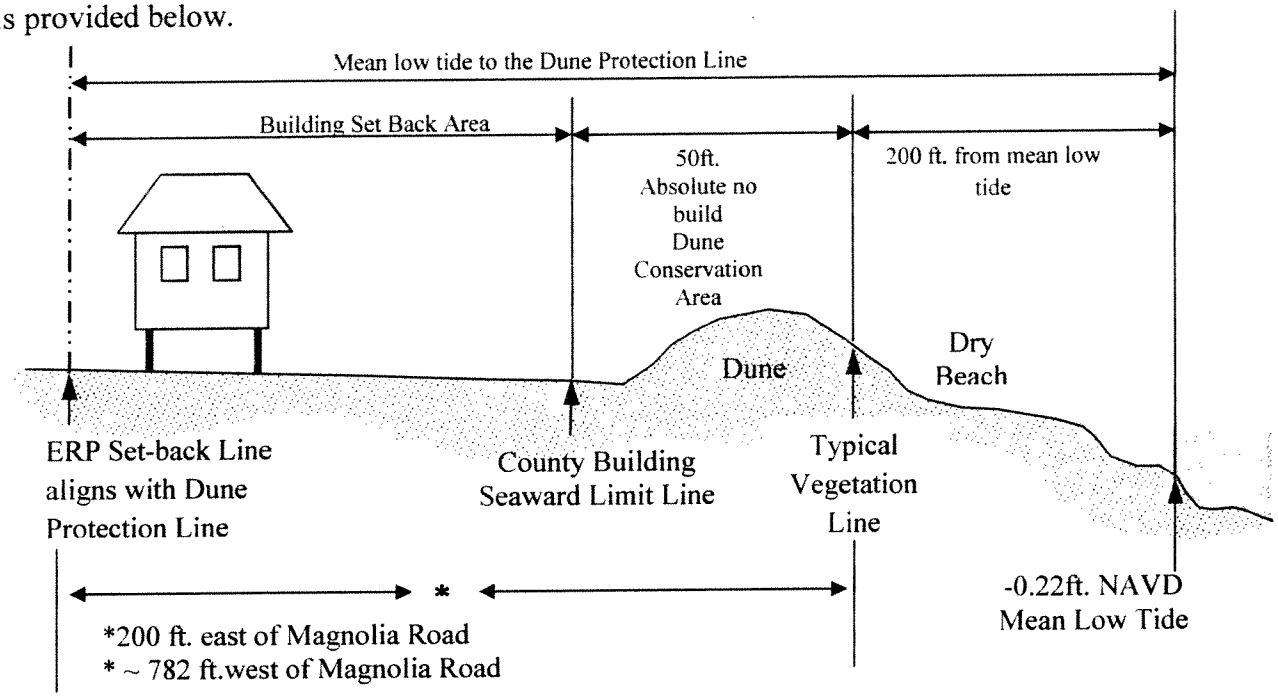

Figure 3. Definition Schematic for Construction Set-Back Line.

6-C-5 Current County Building Limit Line

The County has a Building Limit Line for construction on Gulf-front properties; historically, this limit line is located 50 ft landward of the LOV. However, after Hurricane Ike, the LOV was obliterated, rendering it impossible to be used as a reference point. The Open Beach Act uses distance markers from a tidal datum (mean low tide) for an area with no marked line of vegetation; or an area that has been obliterated; or artificially created. As a result, since Hurricane Ike Galveston County has utilized 200ft from Mean Low Tide plus a County 50 ft. setback to create the seaward Building Limit Line for a total of 250ft from mean low tide. This limit line therefore includes the public beach easement and 50 ft for creation of a dune feature. It is understood the GLO only uses this process if a natural line of vegetation cannot be determined.

6-C-6 Relationship to the Dune Protection Line

As provided beginning on page four (4) of the Galveston County Dune Protection and Beach Access Plan (Plan) and found fully described in Appendix #1, certified effective by the GLO on September 13, 2006 and pursuant to Texas Natural Resources Code § 63.011, the Commissioners' Court established the dune protection line for the purpose of preserving sand dunes within Galveston County within those areas in Galveston County subject to the authority of this Order' "The dune protection line shall be located 200 feet landward of the line of vegetation beginning from a point on the Galveston County and Chambers County line and traveling southwesterly continuously thereafter along a line

continuously 200 feet landward of the line of vegetation to a point near the southwest end of Bolivar Peninsula on Magnolia Lane said point (TXSC N 13,721,753.72, E 3,336,333.29), being N 46°27'39" E, a distance of 9678.90 feet from said NGS Monument "PETER";
Thence, S 46°10'50" W, a distance of 427.94 feet (TXSC Coordinates N 13,721,457.42, E 3,336,024.52);
Thence N 38°45'00" W, a distance of 88.21 feet (TXSC Coordinates N 13,721,526.21, E 3,335,969.31);
Thence S 40°16'56" W, a distance of 3393.38 feet (TXSC Coordinates N 13,718,937.50, E 3,333,775.31);
Thence S 35°35'03" W, a distance of 2414.76 feet (TXSC Coordinates N 13,716,973.67, E 3,332,370.16);
Thence S 30°52'54" W, a distance of 879.31 feet (TXSC Coordinates N 13,716,219.02, E 3,331,918.84);
Thence S 39°34'31" W, a distance of 996.97 feet (TXSC Coordinates of N 13,715,450.57, E 3,331,283.68);
Thence S 0°07'47" W, a distance of 362.46 feet (TXSC Coordinates N 13,715,088.11, E 3,331,284.50);
Thence S 28°43'27" W, a distance of 232.67 feet (TXSC Coordinates N 13,714,884.07, E 3,331,172.68);
Thence S 28°52'36" W, a distance of 955.24 feet (TXSC Coordinates N 13,714,047.60, E 3,330,711.39);
Thence S 24°34'26" W, a distance of 2077.14 feet (TXSC Coordinates N 13,712,158.59, E 3,329,847.56);
Thence S 36°59'32" W, a distance of 457.33 feet (TXSC Coordinates N 13,711,793.31, E 3,329,572.38);
Thence S 7°15'14" W, a distance of 279.41 feet (TXSC Coordinates N 13,711,516.14, E 3,329,537.10);
Thence S 20°48'35" W, a distance of 1208.71 feet (TXSC Coordinates N 13,710,386.28, E 3,329,107.69);
Thence S 9°23'59" W, a distance of 1586.57 feet (TXSC Coordinates N 13,708,821.01, E 3,328,848.57);
Thence S 40°35'37" W, a distance of 3621.67 feet (TXSC Coordinates N 13,706,070.91, E 3,326,491.99) to a turning point on the dune protection line;
Thence N 53°00'22" W, a distance of 3823.12 feet (TXSC Coordinates N 13,708,371.39, E 3,323,438.46);
Thence S 54°14'32" W, along the said line 200 feet landward of the Southerly extent of Vegetation in the Gulf of Mexico, a distance of 2274.65 feet to a point in the Northerly extension of the centerline of the North Jetty with (TXSC Coordinates) of N 13,707,042.17, E 3,321,592.59 and being 45°20'43" W, a distance of 129.39 feet from a brass monument in the North end of the North Jetty and S 43°56'18" W, a distance of 11,152.42 feet from said NGS Monument "PETER".... c. Pursuant to the Dune Protection Act, the farthest landward that the County may establish the dune protection line is 1,000 feet from mean high tide. Accordingly, the dune protection line shall not exceed 1,000 feet landward of the line of mean high tide of the Gulf of Mexico. At the time of adoption of this Order, the Commissioners' Court finds that the dune protection line described herein does not exceed 1,000 feet landward of mean high tide for the areas of Galveston County for which the dune protection line is established. All critical dune areas shall be seaward of the dune protection line.

3. The written description of the dune protection line herein is filed with the County Clerk of Galveston County, Texas by the adoption and filing of this Order.

4. Review - The County will review the location of the dune protection line at least once every five years to determine whether the line is adequately located to achieve its stated purposes...."

6-C-7 Dune Width

See section 12 for Procedures for Preserving, Restoring, and Enhancing Critical Sand Dunes for natural Storm Protection and Conservation Purposes. The setback distance should be adequate to help reduce impediments to natural dune migration and/or recovery after storms. As additional information below is a summary of previous studies / surveys that provide information on natural dune width along the Bolivar Peninsula:

Through analysis of LIDAR surveys, Gibeaut and Caudle (2009) concluded that the typical natural foredune complex along the upper Texas coast occupies an approximate 200-ft wide corridor as measured landward from the +1.2 m MSL (+4.5 ft NAVD) contour. However, through the development of this ERP a representative sampling by topographic surveys completed by Coastal Surveying of Texas has found an average pre-Ike dune width of 37' in eroding areas and 112' in accreting areas. Gibeaut *et al.* (2002) suggested that, along the upper Texas coast, washover and damage to beach-front construction from storms with surges of up to approximately 5 ft does not typically occur where the foredunes are at least 10 ft high or 100 ft wide.

6-C-8. Coastal Zones and Building Setback Line

Due to the varying conditions on the Bolivar Peninsula, the varying rates of erosion and in the interest of implementing a stable and understandable system the landward extent of the Building Set-back areas will be the Dune Protection Line as depicted above in Section 6-C-6.

7 - Prohibition on New Construction Seaward of the Setback line

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Texas Administrative Code
A prohibition on new construction seaward of the building set-back line. The prohibition criteria should include at least the following minimum criteria:

(A) To the maximum extent practicable, all structures should be constructed landward of the building set-back line.

(B) Construction of structures landward of the building set-back line establishes a rebuttable presumption that the permittee has followed the mitigation sequence requirements for avoidance and minimization of effects on dunes and dune vegetation specified in §15.4(f) of this title (relating to Mitigation). However, the permittee is not exempt from compliance with compensatory mitigation requirements for unavoidable adverse effects on dunes and dune vegetation.

7-A Prohibitions-

New construction is prohibited seaward of the Building Set-back Area, except as provided in Section 9 Exemptions. Additionally, paving, grading, or altering the ground in any manner is prohibited in the area within 50ft. of the LOV. This area may not be disturbed from its natural state in any manner, including mowing, grading, landscaping, filling, or fertilizing.

Public and private dune walkovers, footpaths, beach access roads, dune restoration projects, sand fences (utilized in accordance with U.S. Fish and Wildlife Service and Texas General Land Office guidelines) and irrigation systems for the dune that are approved through a beachfront construction permit and/or dune protection permit may be allowed.

7-B Mitigation Sequence

Structures constructed landward of the Building Setback Line, establishes a rebuttable presumption that the structure/permitee has followed the mitigation sequence requirements for avoidance and minimization of effects on dunes and dune vegetation as specified in the Texas Administrative Code. Permitee's are not exempt from compliance with compensatory mitigation requirements for unavoidable adverse effects to dunes and dune vegetation and compliance with the adopted Mitigation Sequence as detailed in the Galveston County Dune Protection and Beach Access Plan.

8 - Exemptions

Texas Administrative Code
Consideration of exemptions. Local governments may consider exemptions from the prohibition of residential and commercial construction seaward of the building set-back line for:

> (A) properties for which the owner has demonstrated to the satisfaction of the local government that no practicable alternatives to construction seaward of the building set-back line exist. For purposes of this section, practicable means available and capable of being done after taking into consideration existing building practices, siting alternatives, and the footprint of the structure in relation to the area of the buildable portion of the lot, and considering the overall development scheme for the property;
> (B) properties for which construction is permitted under a dune protection and beach access plan establishing a building set-back line certified by the General Land Office prior to the effective date of this section; and
> (C) structures located seaward of the building set-back line prior to the effective date of this section for which modifications are sought that do not increase the footprint of the structure. However, structures seaward of the building set-back line that are damaged more than 50% or destroyed should be subject to this section before any repairs or reconstruction may be conducted.

The following criteria establish an exception from the prohibition of residential and commercial construction seaward of the landward extent of the Building Setback Area (BSA):

8-A-1 Demonstration of no Practicable Alternative

Practicable, for purposes of this section means "Available and capable of being done after taking into consideration existing building practices, costs, siting alternatives, and the footprint of the structure in relation to the area of the buildable portion of the lot, and considering the overall development scheme for the property." If a landowner can demonstrate that no practicable alternative to construction seaward of the landward extent of the Building Setback Area exists, an exception to the prohibition on construction shall be granted, excluding the area located within the Dune Conservation Area.

8-A-2 Procedure for Appeal of Practicable Determination

The Building Official shall make the finding on whether it is not practicable to conduct construction activities landward of the Building Set-back line when an applicant proposes construction activities seaward of the landward extent of the Building Set-back area on lots platted before the effective date of this Erosion Response Plan.

The Building Official's finding may be appealed to the County Engineer. If both the Building Official and the County Engineer find that the applicant has not demonstrated that it is not practicable to comply with the requirement that the proposed construction activities be located landward of the Building Set-back line, then the applicant may appeal to the Commissioners' Court. All appeals must be filed within two (2) weeks of the applicant's receipt of the finding from the Building Official or the County Engineer, as applicable, by filing a written request for appeal in the County Engineer's office. The finding of the Commissioners' Court is final. The finding of whether it is not practicable to comply with the requirement that the construction activity be located landward of the Building Set-back line shall be made by the County.

8-A-3 Property Permitted Under Existing Dune Protection and Beach Access Plan

An exemption may be granted to existing permits issued prior to the effective date of this Erosion Response Plan. Existing structures that were properly permitted by Galveston County are exempt from the building setback prohibition, provided there are no practicable alternatives, that the footprint of the building is not increased and that the new structure meets new construction guidelines.

Galveston County may consider exemptions from the prohibition of residential and commercial construction seaward of the building set-back line for:

A. Properties for which the owner has demonstrated to the satisfaction of the local government that no practicable alternatives to construction seaward of the building set-back line exist. For purposes of this section, practicable means available and capable of being done after taking into consideration existing building practices, siting alternatives, and the footprint of the structure in relation to the area of the buildable portion of the lot, and considering the overall development scheme for the property;

B. Properties for which construction is permitted under a dune protection and beach access plan establishing a building set-back line certified by the General Land Office prior to the effective date of this section; and

C. Structures located seaward of the building set-back line prior to the effective date of this section for which modifications are sought that do not increase the footprint of the structure. However, structures seaward of the building set-back line that are damaged more than 50% or destroyed should be subject to this section before any repairs or reconstruction may be conducted.

8-A-4 Substantial Improvement to Structures

In accordance with NFIP guidelines, structures damaged more than 50% of their appraised value must be repaired in accordance with new construction guidelines. Reconstructions, rehabilitations, additions, or other improvements to existing structures seaward of the Building Setback Line, with a cost of less than 50 percent of the appraised value of the existing structure, should be exempt from the prohibition on construction.

Galveston County Commissioners Court has adopted the IRC Building code for construction standards, has developed local floodplain regulations and participates in the National Flood Insurance program. Compliance with building standards for residential construction is administered by the County Engineers Office.

9 - Construction Requirements for Exempt Properties

Texas Administrative Code
Construction requirements for exempt properties. Where the local government allows an exemption from the prohibition for building seaward of the building set-back line, it should require the following conditions of construction:

(A) plans and certifications for the structure by a registered professional engineer licensed in the State of Texas providing evidence of the following:

(i) a minimum two-foot freeboard above base flood elevation (BFE);

(ii) no enclosures below BFE;

(iii) the adequacy of elevated building foundations and the proper placement, compaction, and protection of fill when used as construction for all newly constructed, substantially damaged, and substantially improved buildings elevated on pilings, posts, piers, or columns in accordance with the latest edition of specifications outlined in American Society of Civil Engineers, Structural Engineering Institute, Flood Resistant Design and Construction, ASCE 24-05;

(iv) feasible relocation of any habitable structure; and

(v) all construction is designed to minimize impacts on natural hydrology;

(B) location of all construction should be landward of the landward toe of the foredune ridge, where practicable.

9-A Construction Requirements

Where an exception from the prohibition for new construction seaward of the landward extent of the Building Setback Area (BSA) is allowed, the following conditions should be met:

1. All construction shall be designed to minimize impacts on natural hydrology, create no erosion to adjacent properties, critical dune areas, or the public beach, and preserve to the greatest extent practicable (see definition) the natural dune line and vegetation and include certification by an engineer licensed in the State of Texas;
2. All construction is located as far landward as is practicable;
3. Construction is in accordance with IRC 2009 building codes and local floodplain regulations;
4. Increasing freeboard is encouraged on new construction above the NFIP base flood elevation (BFE);
5. All enclosures below BFE must be in compliance with NFIP guidelines, and utilize technologies to minimize impacts on natural hydrogeology.
6. Areas located within 25 feet of a habitable structure may only be disturbed if the proposed activity is located landward of the Dune Conservation Area.
7. Dune walkovers, footpaths, beach access roads, dune restoration projects, sand fences, and irrigation systems for the dune that are approved through a beachfront certificate and/or dune protection permit may be allowed according to General Land Office guidelines;
8. Structures shall be designed for feasible, above-site relocation. Proof that a structure is designed for feasible relocation shall be provided by a certified engineer, and for large-scale construction, financial assurance to fund the eventual relocation or demolition and removal of the proposed structure shall be provided, prior to construction implementation.

9-B Enclosures

Enclosures properly constructed, utilizing breakaway walls, louvered wall design, that do not provide a barrier to natural hydrology are more desirable than numerous small unsecured outbuildings. Previous experience has found that outbuildings (secured and not) are more likely to damage adjacent structures than those properly constructed. Under FEMA construction guidelines, enclosures are allowed below BFE as long as all walls for the enclosure are designed to breakaway under wind, surge, and wave impact in order to reduce impacts on water movement underneath and around the structure. Allowing breakaway wall construction is a viable alternative in that it is allowed by NFIP rules. Enclosures will reduce the footprint of outbuildings and thereby lessen the potential impact to critical dune and natural vegetation. It is recommended that every effort be made to control blowing sand through the use of sand fencing and native vegetation to reduce the volume of airborne sand lost to the beach. Additionally, heavy amounts of airborne sand is a hazard to the public by reducing visibility and placing beach goers at risk to vehicles operated on the beach.

10 - Procedures for Preserving and Enhancing the Public's Right of Access

Texas Administrative Code
Procedures for preserving and enhancing the public's right of access to and use of the public beach from losses due to erosion and storm damage. The ERP should include the following:

(A) evaluation of all areas of public access to determine those that require improved protection from erosion and storm surge;

(B) evaluation of construction methods and design improvements for areas of beach access to reduce costs associated with repair, rebuild, or replacement due to storm damage and erosion;

(C) list of goals and implementation schedules for areas of public access design improvements that prioritize short term (two years or less) and long term goals;

(D) inventory all publicly funded existing amenities and access ways as a basis for qualifying for FEMA post-storm funding sources;

(E) establishment of procedures based on subparagraphs (A) and (B) of this paragraph for conducting post-storm assessment and identifying requirements for rehabilitation which include:

(i) inspection of beach access areas after meteorological events;

(ii) compilation of a list of access points that no longer comply with the local government's approved dune protection and beach access plan and the Beach/Dune rules with a description of specific required repairs and replacements including, but not limited to parking, pedestrian and vehicular access ways, and signage; and

(iii) schedules for access area repair and replacement based on available local funding and grant requests.

10-A Public Beach Access Inventory and Evaluation

Beaches on the Bolivar Peninsula are open to vehicle traffic without restriction with the exception of the Houston Audubon Society Bolivar Flats area located at the west end of the peninsula. However, this area has not been accessible by vehicle for approximately 20 years. On beach parking is available at the edge of the sanctuary area and pedestrian traffic is allowed. As detailed on page 33 (and listed below) of the County Plan certified in 2006, Galveston County has an inventory of 51 beach access roads on the Bolivar Peninsula repaired following Ike utilizing FEMA Public Assistance repairs and is considering the final placement of the ADA dune walkover formerly located within the Johnson Road right-of-way.

Name of Roadway	Road Surface	Improvement
1. 15th St.	Improved, all weather	None
2. 16th St.	Improved, all weather	None
3. Rettilon	Improved, all weather	None
4. Magnolia	Improved, all weather	None
5. Johnson Crawford Circle (4th Street)	Improved, all weather	None
6. Boyt	Improved, all weather	None
7. Helen Blvd.	Improved, all weather	None
8. Melody Ln.	Improved, all weather	None
9. Honeysuckle Dr.	Improved, all weather	None
10. Alma	Improved, all weather	None
11. Tinkle	Improved, all weather	None
12. Jacks	Improved, all weather	None
13. O'Neil	Improved, all weather	None

Name of Roadway	Road Surface	Improvement
14. East Rd.	Improved, all weather	None
15. Buell	Improved, all weather	None
16. Lazy Ln.	Improved, all weather	None
17. Townsend	Improved, all weather	None
18. Gulfview	Improved, all weather	None
19. Surfview	Improved, all weather	None
20. Holiday Dr.	Improved, all weather	None
21. Palmetto Dr.	Improved, all weather	None
22. Wommack	Improved, all weather	None
23. West	Improved, all weather	None
24. Mr. G	Improved, all weather	None
25. Monkhouse Dr.	Improved, all weather	None
26. Crystal Beach Dr.	Improved, all weather	None
27. Kahla	Improved, all weather	None
28. Gulf Shores Dr.	Improved, all weather	None
29. Westview	Improved, all weather	None
30. Gulfway	Improved, all weather	None
31. Eastview	Improved, all weather	None
32. Alberdie	Improved, all weather	None
33. Noisy Waves	Improved, all weather	None
34. Clara	Improved, all weather	None
35. Center	Improved, all weather	None
36. Kenlyn	Improved, all weather	None
37. Driftwood Dr.	Improved, all weather	None
38. Seadrift Dr.	Improved, all weather	None
39. Ramada Blvd.	Improved, all weather	None
40. Nassau Ln.	Improved, all weather	None
41. Redfish	Improved, all weather	None
42. Stingaree St.	Improved, all weather	None
43. Cove	Improved, all weather	None
44. Cade	Improved, all weather	None
45. Bauer Lane (west side of Rollover Pass)	Sand/shell	Overlay/elevate
46. Bauer Street (east side of Rollover Pass)	Sand/shell	Overlay/elevate
47. Kirkpatrick*	Improved, all weather	None
48. Dirty Pelican Pier	Sand/shell	realign/elevate
49. Unnamed road (2.3 miles west of State Highway 124)	Sand/shell	realign/elevate
50. Unnamed road (1.7 miles west of State Highway 124)	Sand/shell	realign/elevate
51. Unnamed road (just west of State Highway 124)	Sand/shell	realign/elevate

Galveston County maintains a detailed listing of 142 trash barrels mounted on posts on the Bolivar gulf shoreline beaches and provides seasonal portable toilets and roll-off containers at primary beach access roads. Galveston County has a central Road Administration office and manages and maintains each of the County owned roads. Galveston County facilitated the purchase of 21 beach wheel chairs donated to the Galveston Park Board to improve handicap access on Galveston Island.

11. - Procedures for Preserving, Restoring, and Enhancing Critical Sand Dunes for Natural Storm Protection and Conservation Purposes.

Texas Administrative Code

Procedures for preserving, restoring, and enhancing critical sand dunes for natural storm protection and conservation purposes. The ERP should include the following:

(A) specific proposals for the height (above mean sea level), width (as measured perpendicular to the shoreline), and percent of vegetative cover of critical front row dunes necessary to protect public and private property from severe meteorological events. The minimum dune height should be based on at least 75% of the BFE height from mean sea level established by the National Flood Insurance Program Flood Insurance Rate Maps for the local area;

(B) identification and listing of specific locations where restoration is needed to fill in gaps and blowouts in the foredune ridge;

(C) specific proposals for dune re-vegetation projects, including the identification of native plant species to be used in these projects;

(D) identification of enhanced dune protection measures for existing residences, multi-family structures and businesses. Establish dune protection measures which protect the landward side of the foredune ridge, which may include, but are not limited to:

(i) use of native (indigenous) vegetation; and

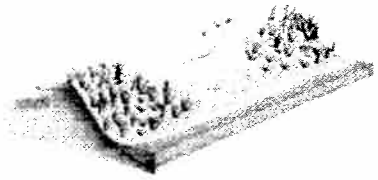
(ii) limitations on the use of fertilizer and mowing;

(E) identification of specific goals and implementation schedules to meet the requirements outlined in subparagraphs (A) - (D) of this paragraph; and

(F) identification of available funding and proposed grant requests to accomplish goals and implementation schedules for dune restoration.

11-A Dune Goals

Protection of private and public infrastructure through the development of a well vegetated healthy dune system. The methods and practices used to meet this goal will be determined by County beach maintenance operations on a daily basis and depend on current situations including; but not limited to, the width and height of the existing dune system, accessibility to the area due to tides, beach width, and other on-site factors. A healthy dune system is the backbone for reducing impacts from storm events and is the measurement model used by the U.S. Army Civil Works through the Corp of Engineers Coastal program for storm damage reduction. Three factors found by Gibeaut and many others that indicate a healthy system include height, width, and vegetative cover. According to recent studies, a foredune ridge that is approximately 10 feet in height combined with a dune width of 200 feet and a high level of vegetative cover is essential to hold the dune system in place and reduce susceptibility to a "blow out" from high winds and provide protection to beachfront property. However, very limited areas on the Bolivar Peninsula prior to Hurricane Ike had a dune complex of this width; and following Hurricane Ike that limited amount was significantly reduced. The illustration below is taken from the GLO's Fifth Edition of the Dune Protection Manual and provides visual evidence of what occurs when a dune lacks sufficient height, depth and vegetative cover.



Before Storm

Post Storm

11-B Dune Characteristics

Recognizing the importance of these three factors, along with research regarding historic dune widths on the upper Texas coast and specifically the peninsula, Galveston County has established minimum standards for creation of restored or man-made dunes as detailed in the Galveston County Dune Protection and Beach Access Plan; Section IV; Dune Reconstruction, beginning on page 28. Restored dunes should have the following characteristics:

- 50% vegetative cover;
- A minimum 3:1 slope (seaward face);
- An average height of 75% of the peninsula's base flood elevation as measured from mean sea level;
- A naturally established connection to the dune contour and elevation of the adjacent property; and
- Shall not extend further seaward than 20ft. seaward of the landward boundary of the public beach.

11-C Dune Vegetation

As general guidance for dune restoration or re-vegetation projects, the County recommends the following:

*Vegetating Location	Recommendation
Seaward Face of the Dune	Bitter Panicum (grass), Sea Oats (grass), Marsh Hay Cordgrass (grass), beach morning glory (vine, and seagrapes (vine).
Landward Side of the Dune	Low-growing plants and shrubs found on the back side of the dunes include seacoast bluestem, cucumber leaf sunflower, rose ring gallardia, partridge pea, prickly pear, and lantana. (Many of these are flowering plants, which are an attractive alternative to dune grasses though less effective as dune stabilizers.)
*Recommended Material	Technique
Native Hay.	The use of a 3- to 6-inch thick layer native hay, with seeds of the above listed vegetation, on bare sand areas to provide immediate protection from blowing sand and encourage the natural process of re-seeding. The hay must be harvested in fall when mature seeds are present.
Sand Fencing.	According to USFWS and GLO guidelines for endangered species for sand fencing to build up dunes where re-vegetation alone is unlikely to encourage sufficient dune width and height. Sand fencing can be used as a first step prior to re-vegetation. Diagonal 10ft. to 20ft. parallel sections.

As previously described, the dune system and vegetative cover on the Bolivar Peninsula were obliterated by Hurricane Ike. Very few individual dunes are present on the peninsula except a few isolated places where small-scale restorations have occurred conducted by Homeowner Associations.

**Source: GLO Dune Protection and Improvement Manual for the Texas Gulf Coast 5th Edition*

11-D Dune Priorities

Galveston County has identified priority projects for dune restoration / re-vegetation and has submitted various grant applications and public assistance claims to FEMA to help implement these projects

Priorities-

1. Protection of the lives of Galveston County residents and visitors through the development of a healthy dune system by reducing the impacts of tidal surge.
2. Protection of existing public infrastructure including State Highway 87, the only evacuation route for the Bolivar Peninsula by increasing the width of the beach and dune system on the Bolivar peninsula.
3. Protection of upland private property and ad valorem tax base from the effects of storm and tidal surge benefitting citizens, school districts and many other public service entities.

11-E Goals, Implementation, Post-Disaster and Funding Sources Issues

Galveston County will continue to seek funding for dune restoration in an effort to continue the protection of critical dune areas. A primary concern for Galveston County is the issue of Coastal Barrier Resource Act (CBRA) Units located on the peninsula. Federal laws prohibit the use of federal funds within CBRA units that could promote or lead to development and the increase of potential at-risk populations. Federal funding offers the greatest potential for development of large-scale dune restoration projects, but it also carries the greatest restrictions in their use.

As part of its continuing management process Galveston County has maintained a post-disaster emergency stand-by contract with HDR Engineering since 2007. This stand-by contract includes post-event damage assessment, mapping, surveys, ground level photographs, aerial photographs, technical assistance to FEMA, and estimates of sand loss for beach and dune areas on Bolivar. Other features reviewed would include drainpipes, dune drive-overs, the public ADA walkover and recommendations for mitigation actions in coordination with FEMA. The post-event survey transects would reoccupy previously established survey lines as a basis for comparison.

11-E-1 Short Term Goals

Include filling gaps and blow-outs in the existing dune system using naturally occurring sargassum to supplement the vegetation growth process. Gaps should be filled to match existing dune dimensions; areas that would benefit from the implementation of this short term goal include the beachfront from the eastern Galveston / Chambers County line westward to Rollover Pass. Prioritization of this area was based on the rate of erosion, previous land loss, and the close proximity of daily high tides to the highway 87 / highway 124 evacuation route connection that serves the entire peninsula. Medium priority areas include Rollover Pass west to the Caplan area. However, it is believed the closure of Rollover Pass will result in at least a 50% reduction in the rate of erosion within this area. The beach and dune system west of the Caplan area is largely stable and going west becomes rapidly accretional.

11-E-2 Long Term Goals

Include:

- The establishment of a continuous line of dunes along the length of the Bolivar peninsula that could provide a first level of storm damage protection, and increase the available evacuation window allowing more time for residents to evacuate inland.

- An ideal dune configuration would include a minimum height of 10ft and a minimum base width of 100ft. measured perpendicular to the gulf beach, having a vegetative cover of at least 75%.
- A recommendation that large scale dune restoration projects be designed to meet U.S. Army Corp of Engineer standards as defined in Chapter 4 of the Coastal Engineering Manual (USACE, 2008).
- Elevation, drainage improvements, and potential re-alignment of selected beach access roads away from the prevailing winds, similar to what was successfully accomplished in Brazoria County to reduce the impacts of storm surge.
- Potential consolidation of access roads within subdivisions that have an excess of roadways to reduce "cuts" through the dune and improve dune integrity
- Pending completion of the FEMA flood mapping project and final approval of the new maps, it is recommended that restored dune heights exceed 75% of the average height of the BFE along Bolivar peninsula.

11-E-3 **Potential Funding Sources for dune restoration and re-vegetation:**

- NOAA Programs and Grants, in non-CBRA areas
- GOMESA Program through BOEMR, in non-CBRA areas
- GLO Program and Grants
- Coastal Erosion Planning and Response Act (CEPRA)
- Coastal Impact Assistance Program (CIAP) in non-CBRA areas
- Coastal Management Program (CMP), in non-CBRA areas
- Beach Maintenance Reimbursement Fund (supplemental only)
- Coastal and Estuarine Land Conservation Program (CELCP), in non-CBRA areas
- Galveston County Capital Improvement Program
- Local Beach User Fees
- Private funds / Homeowner Associations (HOAs) contributions

Galveston County continues to encourage private participation in dune restoration and re-vegetation projects that are consistent with State and County guidelines.

12. -Criteria for Voluntary Acquisition of Property Seaward of the Building Setback Line.

Texas Administrative Code

Criteria for voluntary acquisition of property seaward of the building setback line. The local government may develop criteria for identifying properties with structures located entirely seaward of the building set-back line, providing for voluntary acquisition of fee simple title or a lesser interest in such properties, and procedures for prioritizing properties to be acquired.

(b) Local governments must use historical erosion data and other relevant data from the State Coastal Erosion Response Plan in the preparation of local erosion response plans. The State Coastal Erosion Response Plan may be found at:
http://www.glo.texas.gov/what-we-do/caring-for-the-coast/_documents/coastal-erosion/response-plans/coastwide-erosion-response-plan.pdf

(c) The local government must hold a public educational meeting on the ERP before implementation. The meeting may be held in conjunction with the formal hearing required for establishment of a new DPL, as outlined in §15.3(l) of this title (relating to Provisions for Public Hearings on Dune Protection Lines). If held separately from the hearing on a new DPL, the meeting must be advertised in the same manner outlined in §15.3(l) of this title.

(d) The ERP must be submitted to the General Land Office for review and approval as a dune protection and beach access plan amendment following the procedures outlined in §15.3(o) of this title (relating to Submission of Local Government Plans to the General Land Office).

12-A Criteria

Used to determine potential acquisition properties include:

- Proximity to the beach, and a structure this is entirely seaward of the building setback line.
- Is a hindrance to public beach access
- Potential use for a public purpose
- Properties bordering an existing public right of way the slough (to create a maintenance easement)
- Negatively affects hydrology as determined by a registered professional geologist/engineer licensed in the State of Texas.
- If the structure is determined to be a hazard to health and safety.
- If the structure is causing erosion or negative impacts to adjacent as determined by a registered professional geologist or engineer licensed in the State of Texas.

12-B Properties

Properties to be acquired are prioritized based on the individual situation of each structure; considering the severity and amount of the above criteria met. Galveston County may implement a removal strategy on the most critical or highest ranked structure. Strategies for acquisition will include:

- Identification of potential property or structure
- Ranking of respective property or structure
- Availability of acquisition / demolition / removal-disposal funding.
- Acquisition negotiation with property owner
- Successful execution of sales agreement
- Removal or relocation of structure (if necessary)

12-C Outreach

Development of the draft plan began in April 2011, and is continuing with the required timeline set forth by the GLO for draft and final plan submittal. Contracts with subject matter experts were approved by Commissioners Court in May 2011; specifically with HDR for coastal engineering assistance and Coastal Surveying of Texas for surveying / topographic assistance. The draft erosion response plan elements and associated timeline have been discussed at the following meetings:

- Galveston County Beach Erosion Task Force (BETF) monthly meetings beginning in February 2011 – July 2012
- Participated as a resource in the early meeting of the citizens group commenting the City of Galveston draft plan
- Informational meeting with community representatives on June 1, 2011 in Crystal Beach
- Commissioners Court Workshop June 7, 2011
- Tentative Commissioners Court agenda for authorization to submit a draft plan to the GLO prior to the July 1, 2011 date.
- May 15, 2012 Galveston County Commissioners Court
- May 29, 2012 Galveston County Commissioners Court
- June 21, 2012 Public meeting in Crystal Beach, at the Eddie Barr County Annex Building
- June 26, 2012 Galveston County Commissioners Court

In addition to the meetings, the provisions of the Texas Administrative Code regarding the Erosion Response Plan has been posted on the Galveston County website at:
www.co.galveston.tx.us/beacherosiontaskforce

The Galveston County Beach Erosion Task Force has periodically coordinated meetings with elected officials to discuss beachfront construction regulations, specifically related to construction setbacks and building practices. Galveston County expended a great deal of time and effort drafting comments in response to the 2007 legislation regarding erosion response planning (known locally as House Bill 2819) providing comments through the BETF and elected officials and hosting numerous public meetings and two public hearing (one each on Galveston and the Bolivar Peninsula) The County's comments regarding HB 2819 were submitted to the GLO on June 11, 2008 and August 13, 2008.

13. References-

Gibeaut, J.C., Anderson, J.B., and Dellapenna, T.M., 2004, Living with geohazards on Galveston Island: a preliminary report with recommendations. Prepared for and submitted to the Galveston, Texas City Council, July 2, 2004, 12 p.

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Gibeaut, J.C., Hepner, T., Waldinger, R.L., Andrews, J.R., Smyth, R.C., and Gutiérrez, R. 2003. Geotextile tubes along the upper Texas Gulf coast: May 2000 to March 2003: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for Texas Coastal Coordination Council pursuant to National Oceanic and Atmospheric Administration Award No. NA07OZ0134, under GLO contract number 02-493 R, 37 p. + apps.

King, D.B. 2007. Wave and Beach Processes Modeling for Sabine Pass to Galveston Bay, Texas, Shoreline Erosion Feasibility Study. ERDC/CHL TR-07-6. Vicksburg, MS: U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory.

McKenna, K.K. 2009. Texas Coastwide Erosion Response Plan. Final Report to the Texas General Land Office, GLO Contract No. 06-076-000, 86 p. plus appendices.

Nueces County. 2010. Nueces County Beach Management Plan. http://www.co.nueces.tx.us/pw/pdf/beachmanagement.pdf.

COASTAL
Strategies Group, LLC

July 27, 2012

Mr. Mike Fitzgerald, County Engineer
Old Galveston County Courthouse
722 Moody, 1st Floor
Galveston, Texas 77550

Via Email: mike.fitzgerald@co.galveston.tx.us
elizabeth.robertson@co.galveston.tx.us

RE: Erosion Response Plan

Dear Mr. Fitzgerald: Mike

Last Tuesday, (7/24/2012), I received an informal email from Ms. Angela Sunley, the Beach/Dune Team Leader at the General Land Office responsible for reviewing and providing comments on the Erosion Response Plan (ERP) drafts submitted by Galveston County. Ms. Sunley indicated our most recent exchange of information had satisfied all the comments provided by the General Land Office on the recent version of the ERP approved by Commissioners Court on June 26, 2012.

Enclosed with this letter is a one page summary of the revisions made to the June 26th Court approved version of the ERP; and the "final" version deemed by the GLO to satisfy their comments. The summary includes a brief detail of those respective changes, along with page and section numbers. The items numbered 13; 15; 16; 19; 20; 22–25; and having a smaller font "GLO" adjacent to the page number, were the outstanding issues identified as resolved with the receipt of the email from Ms. Sunley.

Moving forward, the process confirmed with the GLO, the County need only to place the Erosion Response Plan on Commissioners Court agenda for consideration. The potential agenda language provided below has been reviewed by the GLO and will help expedite the certification process. However, this language is only a suggestion.

Consideration of approving and adopting the Galveston County Erosion Response Plan as Appendix 9; an amendment to the Galveston County Dune Protection and Beach access Plan and authorize it's submission to the Texas General Land office for certification, submitted by the County Engineer.

If approved at Court, a certified copy of the ERP with signatures (same as process for 6/26/2012 draft) would next be forwarded to Ms. Sundley at the GLO to begin the certification process. It is anticipated the process, including publication in the Texas Register, would take approximately four (4) months; with certification occurring prior to the deadline of December 31, 2012.

Thank you for the opportunity to be of assistance to Galveston County in the development of this important Erosion Response Plan. Should you have any questions or if I can be of any other assistance please do not hesitate to let me know.

Sincerely,

John Lee Jr., Managing Director
Coastal Strategies Group, LLC

Enclosure: Summary of Changes between 6/26/2012 ERP draft and "Final" version

COASTAL
Strategies Group, LLC

Summary of Changes Between 6/26/2012 ERP Draft and "Final" version

	Page	Section	Revision
1.	1-42	Entire Document	Remove "Draft" Watermark
2.	Page 1	Date	Change June to July 2012
3.	Page 2	Table of Contents	Change heading listing of Section 9-A-(A-H) to 9-A-(1-8)
4.	Page 3	Table of Contents	Change heading listing of Section 10-B to 9-B
5.	Page 5	Section 2-A heading	Re-format, move one tab left
6.	Page 5	Section 2-B heading	Re-format, move one tab left
7.	Page 7	Photo's 1 & 2	Re-format, move one tab right
8.	Page 9	Section 3 table	Re-format, change font of bottom shaded row, from 12 to 8
9.	Page 21	Section 6, 8th line	Change Figure 2 page number from "24" to "23"
10.	Page 22	Section 6, 1st line	Change photo numbers from "5 & 6" to "7 & 8"
11.	Page 22	Graph 1	Insert page break below Graph 1
12.	Page 24	Section 6-A,	Change photo's "3&4" to "1&2" add "Graph 1"
13.	Page 25 GLO	Section 6-C-1	Strike from 3rd line at GLO to end of paragraph at "Ike". Insert LOV determination process from Texas Administrative Code and GLO will be available to assist Galveston County when needed
14.	Page 28	Section 6-C-8	Re-format reference in line 3 to 6-C-6 from 7-C-6
15.	Page 29 GLO	Section 7-A	Insert "General Land Office" within parenthesis, for sand fences
16.	Page 32 GLO	Section 9-A, line 2	Change "several" to "the following"; original intent of section
17.	Page 32	Section 9-A	Re-format (A-H) to (1-8); same as #3 above
18.	Page 34	Section 10-A, line 2	Revised language regarding Bolivar Flats area
19.	Page 35 GLO	Section 10-A (45-51)	Identify future goals, overlay, elevate, and realign access roads
20.	Page 35 GLO	Section 10-A	Revise paragraph to include beach barrels, roll-off containers, portable toilets, and Galveston County Road Administration
21.	Page 36	Section 11-A, line 14	Change "following page" to "below"
22.	Page 37 GLO	Section 11-C	Revise sand fence paragraph to include GLO & USFWS
23.	Page 38 GLO	Section 11-E	Insert reference to existing Emergency Stand-by contract for Post-disaster services, executed 2007, not activated yet.
24.	Page 38 GLO	Section 11-E-2	Insert long term goals for roads through dunes; Bullets 4&5
25.	Page 40 GLO	Section 12	Revise URL link in Texas Administrative Code section

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