

# Resilient Jean Lafitte, LOUISIANA

FLOOD PREPAREDNESS TOOLKIT



# GLOSSARY

## Flood Insurance Rate Map

The Flood Insurance Rate Map (FIRM, digitalized=DFIRM) delineates both the special hazard areas and the risk premium zone. FIRMs also show the base flood elevation for the community. FIRMs get updated every five years, sometimes earlier as a result of a declared natural disaster.

## Special Flood Hazard Area

The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V.

## AE Zone

The AE Zone is subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

## Base Flood Elevation

The computed elevation to which floodwater is anticipated to rise during the base flood. Base Flood Elevations (BFEs) are shown on Flood Insurance Rate Maps (FIRMs) and on the flood profiles. The BFE is the regulatory requirement for the elevation of structures. The relationship between the BFE and a structure's elevation determines the premiums for policyholders in the National Flood Insurance Program (NFIP). It is recommended that regardless of the homeowners' participation in the NFIP, structures be elevated to at least the recommended elevation per the FIRM and BFE. Additionally, BFEs do not take into consideration subsidence, sea level rise, and land loss.

## Freeboard

The additional height above Base Flood Elevation to provide an additional level of safety to accommodate unanticipated flood conditions.

## Community Rating System (CRS)

The National Flood Insurance Program's (NFIP's) Community Rating System (CRS) is a voluntary incentive program that recognizes communities for implementing floodplain management practices that exceed the federal minimum requirements of the NFIP to provide protection from flooding.

In exchange for a community's proactive efforts to reduce flood risk, policyholders can receive reduced flood insurance premiums for buildings in the community. These reduced premiums reflect the reduced flood risk resulting from community efforts toward achieving the three CRS goals:

- 1 | Reduce flood damage to insurable property.
- 2 | Strengthen and support the insurance aspects of the NFIP.
- 3 | Encourage a comprehensive approach to floodplain management.

## DEFINING "SUBSTANTIAL"

**Substantial improvement (SI)** means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure (or smaller percentage if established by the community) before the "start of construction" of the improvement. This term includes structures that have incurred "substantial damage," regardless of the actual repair work performed.

**Substantial damage (SD)** means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. Work on structures that are determined to be substantially damaged is considered to be substantial improvement, regardless of the actual repair work performed.

For more info, visit  
<http://tinyurl.com/substantial-damage>

## Table of Contents

<b>Introduction</b>	<b>04</b>
---------------------	-----------

<b>Site and Building Scale Tools:</b> Flood Preparedness Design Guidelines	<b>06</b>
---	-----------

<b>Community Scale Tools:</b> <i>Living with Water</i> Guidelines and Standards for Jean Lafitte	<b>34</b>
---	-----------

## About Silver Jackets

The Silver Jackets program provides communities with an opportunity to work with all appropriate State and Federal agencies to develop a comprehensive flood risk management program to achieve community goals and address flood risk management priorities. The program's primary goals are to:

- Collaboratively identify, prioritize, and address risk management issues and implement solutions
- Increase and improve risk communication through a unified interagency effort
- Leverage information and resources
- Provide focused, coordinated hazard mitigation assistance in implementing high priority actions such as those identified by state mitigation plans
- Identify gaps among agency programs and/or barriers to implementation



Through the Silver Jackets Program, the Town of Jean Lafitte has requested a Flood Emergency preparedness Plan (FEPP). This FEPP will position the Town of Jean Lafitte to take advantage of funding opportunities from multiple State and Federal programs for the development and implementation of nonstructural hazard mitigation projects and programs.



# INTRODUCTION

## PURPOSE OF THE TOOLKIT

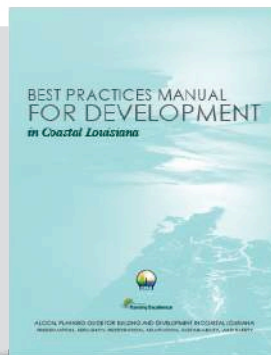
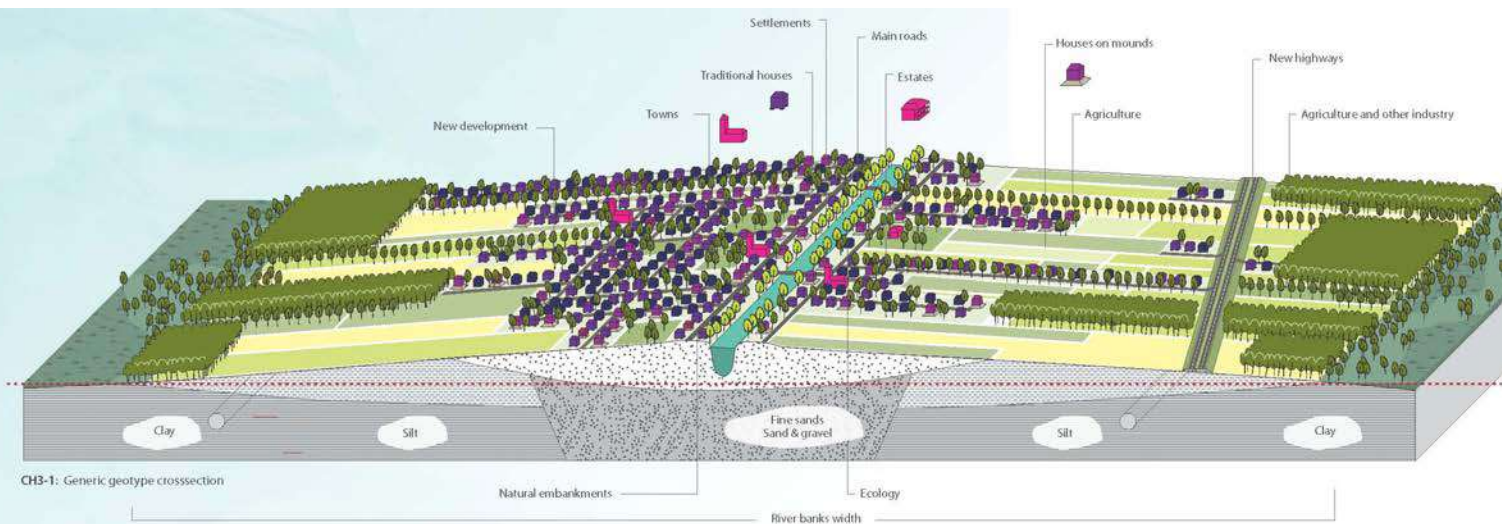
The *Jean Lafitte Flood Preparedness Toolkit* provides information, guidelines and recommended regulations to reduce flood risk. This document consolidates information and recommendations from several sources into one clear and easy to understand Toolkit specific to predominant conditions in Jean Lafitte. This Toolkit is prepared in concert with the *Jean Lafitte Flood Emergency Preparedness Plan* (FEPP) and provides detailed guidance on how to best implement concepts from the FEPP. The Toolkit augments generalized guidance from FEMA and other sources, which are outlined in the resources section at the end of this document. Recent research and publications such as the *Best Practices Manual for Development in Coastal Louisiana* are also referenced. While the Toolkit does not provide technical engineering specifications, it does provide information on key issues to consider during the design and development process to educate and inform homeowners, builders, and the Town on how to best protect assets against future floods and reduce repetitive losses.

This Toolkit also serves to assist property owners and builders with deciding the best approach to flood damage reduction for their property. Understanding key criteria, site conditions, and existing building characteristics will help determine whether to flood proof, elevate, or rebuild, and how best to do so. It also provides appropriate solutions for increasing the Town's flood resiliency through development guidelines and standards and Town initiatives.

## IMPORTANCE OF BUILDING AND DEVELOPMENT STANDARDS, BUILDING ELEVATION, AND FLOOD-PROOFING

The Town of Jean Lafitte and Jefferson Parish have a number of high-risk characteristics that necessitate a broad approach to flood damage reduction. Risks of levee overtopping or failure and inundation from storm surges, combined with the number of pre-FIRM and repetitive loss structures, point to a pressing need to implement a comprehensive development response to mitigate flood damage risks. Additionally, different types of flooding demand different development responses in order to effectively address hazards. The location of development sites, along with site characteristics, such as types of soils and ground elevation relative to the base flood, further influence the necessary property development specifications that result in longevity of the Town while preserving its character. Consequently, clear guidance on suitable approaches to protect life and property from flood damage in Jean Lafitte will ensure that appropriate measures are being taken to protect the future of the Town and its residents.

This Toolkit is representative of an approach that reinforces the "multiple lines of defense" approach to address a variety of issues ranging from enhancing structures against potential flood damage, integrating alternative stormwater management techniques to help mitigate flood dangers and landscape solutions that improve resiliency against floods and provide contextual landscape design alternatives. It also includes recommendations for a risk reduction standards that should be integrated into the Town's development ordinances.



## COASTAL RESOURCE

The *Best Practices Manual for Development in Coastal Louisiana* outlines the key strategies and best practices for development in delta areas such as Jean Lafitte. This Toolkit serves to translate many of those strategies into specific implementation measures for the Town.

# HOW TO USE THIS TOOLKIT AND WHAT IS INCLUDED

*The guidelines in this Toolkit are organized into two parts:*

## 1

Site and building tools, which provides property owners guidance and standards for developing and retrofitting individual public and private properties to address flooding risks of that particular site

## 2

Community-level tools, which describe a set of standards and ordinances to better promote *Living with Water*® in the Town of Jean Lafitte through ensuring more resilient developed patterns and built conditions, responding to known flood dangers, and capitalizing on the natural conditions as an asset.

---

*For individual sites and properties, this Toolkit includes a set of Flood Preparedness Design Guidelines. These guidelines include:*

## 1

**Assessment and evaluation considerations** to help determine appropriate measures to reduce losses to property and life due to flooding

## 2

**Technical considerations** that outline key factors impacting the design and engineering of flood-ready homes

## 3

**Design considerations** relating to preferred responses regarding a number of elevation-related issues

---

For the community as a whole, this Toolkit provides recommendations for Jean Lafitte at the site and building scale as well as the community scale. These recommendations, when implemented through ordinance adoption, can be used towards earning points in the Community Rating System, and guiding future development and redevelopment.

### COMMUNITY INPUT

As part of this project, community leaders, stakeholders and residents provided detailed information and feedback on specific conditions such as high-risk areas, freeboard recommendations, desirable types of elevations and landscaping.

# SITE AND BUILDING SCALE TOOLS: FLOOD PREPAREDNESS DESIGN GUIDELINES

The site and building scale tools are intended to provide the homeowner with an introduction to important considerations when planning to build a new house or retrofit an existing house. The tools are tailored toward the specific conditions found in the Town of Jean Lafitte.

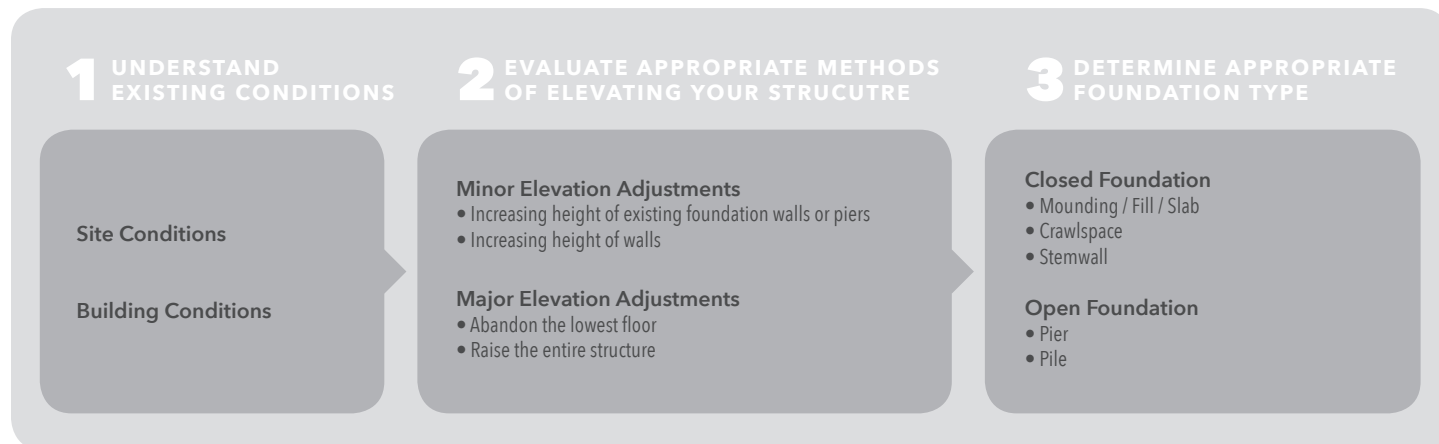
The Flood Preparedness Design Guidelines apply to all new construction and any substantial improvement using federal and/or private funds. The standards should also apply to priority projects identified by the Town of Jean Lafitte for the use of elevation grants.

## ASSESSMENT AND EVALUATION CONSIDERATIONS

While many homes in the Town of Jean Lafitte are currently elevated, a combination of factors have resulted in existing structures needing to be further elevated to improve their current flood protection.

Prior to developing a construction plan or retrofitting strategy for your property, residents and builders should consider the particular conditions of the property site and any existing structures on that site. This assessment will provide helpful information that will impact the design decisions relating the building. The site and building assessment should accomplish the following:

- Provide an understanding of the existing condition of the building site and current structure and how they influence design decisions;
- Take into consideration existing conditions and determine the best method to elevate the structure to achieve the desired flood protection; and
- Select the appropriate type of foundation construction or modification needed.



## UNDERSTANDING IMPACTS OF EXISTING SITE AND BUILDING CONDITIONS UPON ELEVATION METHOD AND

### Site characteristics common in Jean Lafitte:

While living near the water's edge has many benefits and is desired all over the world, tradeoffs, such as flooding and unsuitable soil for development, are critical considerations. Compared to most situations in the United States, the land along Louisiana's bayous has been accumulating over centuries due to frequent flooding that brought in sediment. While the natural elevation of sites on the water's edge might be higher than further away, they are also first in line for flooding from storm surge. Additionally, flood depth could be greater along the water's edge than on property located further from the source of flooding.

If the site is located near or on wetlands, development can be very costly due to current mitigation requirements of developing near or on wetlands.

In Jean Lafitte, properties along the bayou are desirable and have been developed, but these sites will flood first and deepest from storm surge. The further south and closer to the Gulf of Mexico the site is, the higher the risk; storm surge in Jean Lafitte travels north along Bayou Barataria. Understanding the particular conditions of the building site is a necessary step in preparing to build new construction or elevate an existing structure. Important site conditions to fully understand are outlined on the adjacent page.

Flood Type and Levels	CONDITIONS		IMPACT	
	Jean Lafitte is located in the southern part of Jefferson Parish. The entire Town proper is within the AE Zone and is subject to storm surge flooding. The Base Flood Elevations in the effective FIRM are 7 feet and 8 feet within Jean Lafitte, and the preliminary FIRM increases the BFE to 8 feet and 9 feet within the Town. The geographic ground elevation of Jean Lafitte is below the BFE, and is generally 3 feet throughout the Town.		All structures should be designed to withstand impacts and forces due to storm surge flooding, and the BFE identified in the preliminary FIRM is up to nine feet above mean sea level, depending upon location. An additional 24 inches of freeboard above the BFE is recommended.	

Geology	CONDITIONS		IMPACT	
	<p>The type of geology influences how susceptible a site is to flooding. Key elements to understand susceptibility include soil types and geographic elevation. Different soil types will have different characteristics that affect subsidence rate due to compaction, perviousness, rate of erosion, and avulsion. Jean Lafitte has soils from two distinct series - the Cancienne Series and the Schriever series. The types are very similar in that they are (somewhat) poorly drained, have very slow to moderately slow permeability, and are formed on clayey alluviums. How these particular soil conditions act upon foundations during and between flood events determines specific design parameters that must be met to ensure that foundations will best protect assets.</p> <p>In addition to understanding soil conditions, elevation of the site plays an important role in flood events. Jean Lafitte's elevation is generally 3 feet above sea level. Elevation near sea level combined with subsidence will likely increase the site's susceptibility to flooding. Exact subsidence rates for Jean Lafitte are unknown; however, Louisiana is losing approximately 27 square miles of wetlands annually due to the combined effects of subsidence and sea level rise.</p>		<p>Property owners and builders should work with a geotechnical professional to perform an investigation into the particular type of soils that exist on the building site prior to building or retrofitting a structure to be flood compliant. Soil studies should include borings from on site, borings from nearby sites, if feasible, and any available relevant soil surveys. Soil studies must determine the bearing capacity of the soil. Consult the International Building Code for allowable load-bearing values of soil. Lateral capacity of the soil must also be considered and accounted for in foundation design. These data will be important inputs into the design of the foundation to ensure that it performs properly in the given soil conditions. Additionally, foundations must be constructed to extend below levels of erosion and scour patterns based upon geotechnical study.</p> <p>The location of grade on the building site in relationship to the specific BFE applicable to the location plus freeboard determines the necessary height of the foundation. The objective is for the foundation to be high enough so that all of the habitable space of the home is lifted well above flood waters. Elevation must be measured relative to sea level. Determining a precise elevation of the site and whether it might be subject to subsidence will help to determine exactly how far above grade a living space must be elevated. Structures should be elevated to a height so that the lowest part of the structure, excluding foundation elements, is located 24 inches above the base flood elevation. Having a clear understanding of the required foundation height will determine what elevation methodology is most appropriate.</p>	

Vegetation	CONDITIONS		IMPACT	
	<p>The native or existing plant life in an area indicates a number of things about that place, including soils types, slopes, elevation, hydrology, and overall geographic context. It is important to use these cues when making development decisions. Areas with plants commonly found in coastal marshes and swamps are common indicators that the land is prone to flooding from storm surge. In many instances, this vegetation provides valuable erosion control and can also provide protection from wind.</p> <p>The region surrounding Jean Lafitte is within the Deltaic Coastal Marshes and Barrier Islands ecotype, much of which is permanently flooded marsh land. Common plants in the area include Live Oaks on higher ground, Bald Cypress in the freshwater swamps, and a variety of marsh grasses adapted to the brackish water of the coastal marsh. These fragile ecosystems require a delicate approach to the development that works with the surrounding environment, not against it. Local regulations, such as the Tree Ordinance, can ensure that appropriate planting materials are used that respect environmental conditions and address any site erosion concerns.</p>		<p>Decisions regarding building placement should not impact any natural flood or erosion barriers on site, and should not contribute to increased flood risk for adjacent properties. As a result, existing site conditions that may minimize erosion or contribute to improved flood conditions, such as vegetation, should be disturbed as little as possible as part of the elevation process and should be restored upon completion of the construction. Plantings may also be installed following construction to provide an additional line of defense against wind and erosion. Regulations concerning stormwater management should reflect this priority.</p>	

Size	CONDITIONS		IMPACT	
	In Jean Lafitte, property sizes are regulated by the district types, and include the following districts: suburban, single family residential, two family residential, multiple family residential, medical service, neighborhood commercial, general commercial, light industrial, and unrestricted. Jean Lafitte also has a growth and conservation area where development is limited. The size of the property may allow for more flexibility on what type(s) of structure can be placed or how an existing structure can be retrofitted to meet requirements.		Sites should undergo a hydrologic impact analysis to determine whether fill will negatively impact flood levels. A professional engineer should be consulted to determine impacts and provide any necessary mitigation techniques to ensure that the proposed fill is hydraulically neutral.	

## BUILDING CONDITIONS IMPACTING ELEVATION METHODOLOGY AND FOUNDATION DESIGN

Many structures in the Town of Jean Lafitte are at risk of flood losses. A common technique to address flood dangers posed to the home is to elevate the living space above potential flood levels, leaving only the foundation and uninhabited portions of the home exposed to flood waters.

Prior to undertaking this process and determining a path forward, it is important to assess:

- 1 | the structure's ability to withstand the stresses of being elevated;
- 2 | the complexity of the process to elevate the building given form and construction of the building, along with the method and degree of elevation;
- 3 | identify necessary modifications to the structure in order to withstand new forces that may act upon it from flooding and wind due to its new elevation.

**Factors to weigh in this assessment are outlined below:**

	CONDITIONS	IMPACT
Home size, shape and construction quality	A number of characteristics of the home impact the elevation process: the size and complexity of the shape of the home; the type of exterior cladding; the quality of construction, including types of connections between structural components of the home.	<p>In general, small homes with simple rectangular shapes are easier to lift. Larger homes, homes that consist of more than one story, and homes that have more complicated shapes can be difficult to lift because of challenges to stabilize the structure against structural damage during the lifting process. Homes with masonry or stucco exteriors must also be protected to guard against the cladding separating from the home when the structure is lifted. In some instances, it might be easier to remove cladding prior to elevating and replace it once it has been lifted.</p> <p>An evaluation of the structure will need to be conducted to determine whether the existing building has the integrity to resist the stresses of lifting and if it can handle the anticipated loads from flood and wind at the new height. If not, the structure may have to be demolished and reconstructed. Once the home is elevated, stairs, porches, decks, and possible alterations to the roof may also influence the structural integrity. In short, homeowners looking to elevate should pay attention to both the integrity of the existing structure and the integrity of the structure after elevation.</p>

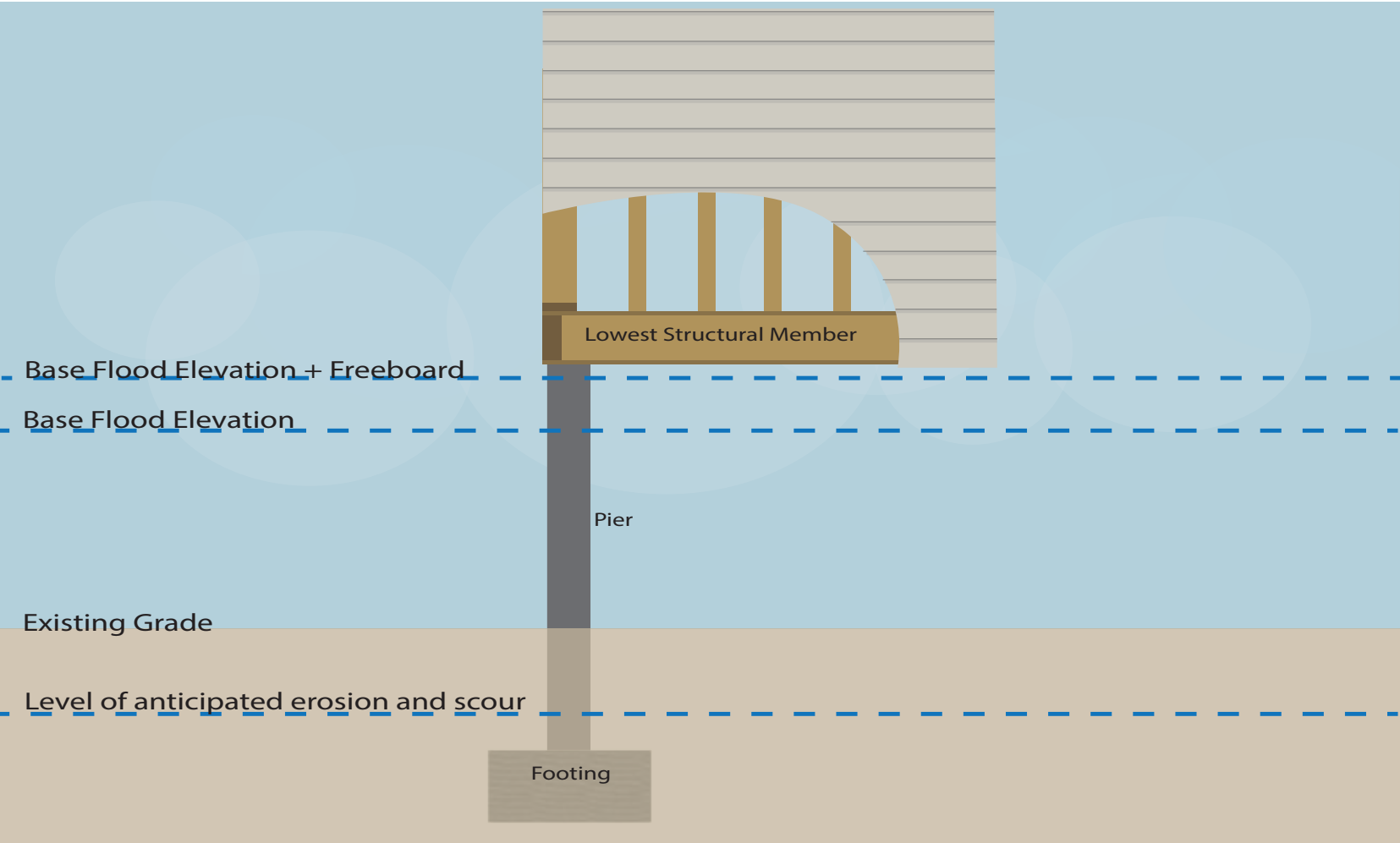
	CONDITIONS	IMPACT
Wind issues	Elevating a structure may change how wind loads act upon the existing building. This is especially important given that Jean Lafitte is subject to winds from tropical systems. Structural adjustments may be required to improve connections between walls and the roof structure, as well as adequate connections from the existing building to a new foundation that are capable of resisting anticipated lift created from winds.	Prior to elevating a structure, an engineer should be consulted to determine the impact of wind loads and any necessary structural adjustments.

	CONDITIONS	IMPACT
Slab separation issues	<p>Elevating a structure generally works well with buildings that currently have open, crawlspace or similar foundations. For buildings constructed with slab-on-grade foundations, the elevation process can be more complex and introduce another set of considerations. There are different types of slab foundations, including slabs with foundation walls and footings, or slabs with thickened edges. If lifting the structure is deemed the most appropriate alternative, there are two approaches to doing so for buildings with slab-on-grade foundations:</p> <ol style="list-style-type: none"> <li>1   lifting the entire structure on its existing slab, and</li> <li>2   removing the house from the slab.</li> </ol> <p>Elevating an existing slab changes how forces act upon the foundation. Slab foundations are designed to transfer loads from the building directly to the ground; however, when the slab is elevated, the method of supporting the slab and how loads are transferred through the foundation are changed. While it is generally easier to lift the entire slab, the process must be done very carefully to ensure that the foundation does not crack during the process. Alternatively, for buildings that are removed from their slabs, a new bottom floor must be constructed since a slab foundation generally also serves as the bottom floor of the home. This method is generally only reserved for homes that have already experienced extensive damage and are in need of repair.</p>	<p>Existing footings must be evaluated for strength and the number of new supports must be determined to accommodate the changing load. An engineer must determine the most appropriate method of raising a building that currently sits on a slab, and whether to lift the entire house on its slab, or remove the home from the slab and construct an entirely new foundation. This will depend largely on the existing slab's ability to withstand the stress of lifting and changes in the nature of the forces acting upon the foundation once it is lifted. If the home is removed from the slab, all of the walls must be braced so that all the walls can be lifted together.</p> <p>Depending on amount of elevation needed and other considerations, it might be more appropriate to select a different alternative to raising living space to minimize flood damage, such as extending the walls of the existing home or abandoning the lowest floors. These alternatives are discussed later in this section.</p>



	CONDITIONS	IMPACT
Impacts on neighbors	Elevating a building can have both visual and physical impacts upon adjacent properties. Visually, the structure can seem out of scale compared to adjacent structures if it is elevated significantly higher than its neighbors, or if the height of the foundation is disproportionate compared to the overall height of the structure. Physically, care should be taken to ensure that there are no negative hydrologic impacts to neighboring properties.	As part of the design process, determine what the impact of the various elevation methods will be on neighboring properties and the character of the community as a whole. As a consideration, elevating on fill will change the hydrology of the property. The Louisiana Department of Natural Resources has recognized this issue and included a <i>Hydrological Modification Impact Analysis Guide</i> into the Coastal Use Permit application. To address issues associated with the height and scale of the newly elevated building seeming out of context, a number of design solutions can be employed. Layered landscaping around the base of the foundation can soften the impact. Wide, prominent stairs can provide a better visual connection to the street level. If allowable by the Town of Jean Lafitte, architectural treatments, such as use of breakaway cladding or extending architectural elements, such as columns from the main structure, can be applied to the foundation so that it is more visually consistent with the main home.

	CONDITIONS	IMPACT
Changes in access	The raising of structures above the BFE has and will continue to change how residents access their living space. For example, structures previously accessed from grade, may now require stairs or other means of vertical access to the lowest floor. For those with mobility impairments or those desiring to age at home, stairs may present accessibility challenges. Ramps may be a viable alternative and should be designed and integrated as part of the elevation process. Elevators may also be a consideration. Homes with attached garages also present challenges regarding how best to handle vehicular access once the home is elevated.	<p>New means of access necessitated by the elevation process should be designed in a manner so that it is both functional and attractive. If ramping is desired, or needed, then adequate space on the site surrounding the building is necessary. Depending upon the amount of elevation needed, vehicular access to the new garage location may not be desirable, and alternative parking accommodations will need to be made.</p> <p>A site and structure assessment can help determine if the existing structures should be elevated; if so</p> <ol style="list-style-type: none"> <li>1   which method might be the most appropriate to elevate and what architectural considerations need to be accommodated in the process;</li> <li>2   the structure should be replaced with new construction;</li> <li>3   the existing structure should be moved to a more suitable site; and</li> <li>4   a new structure on a more suitable site would be most appropriate.</li> </ol>

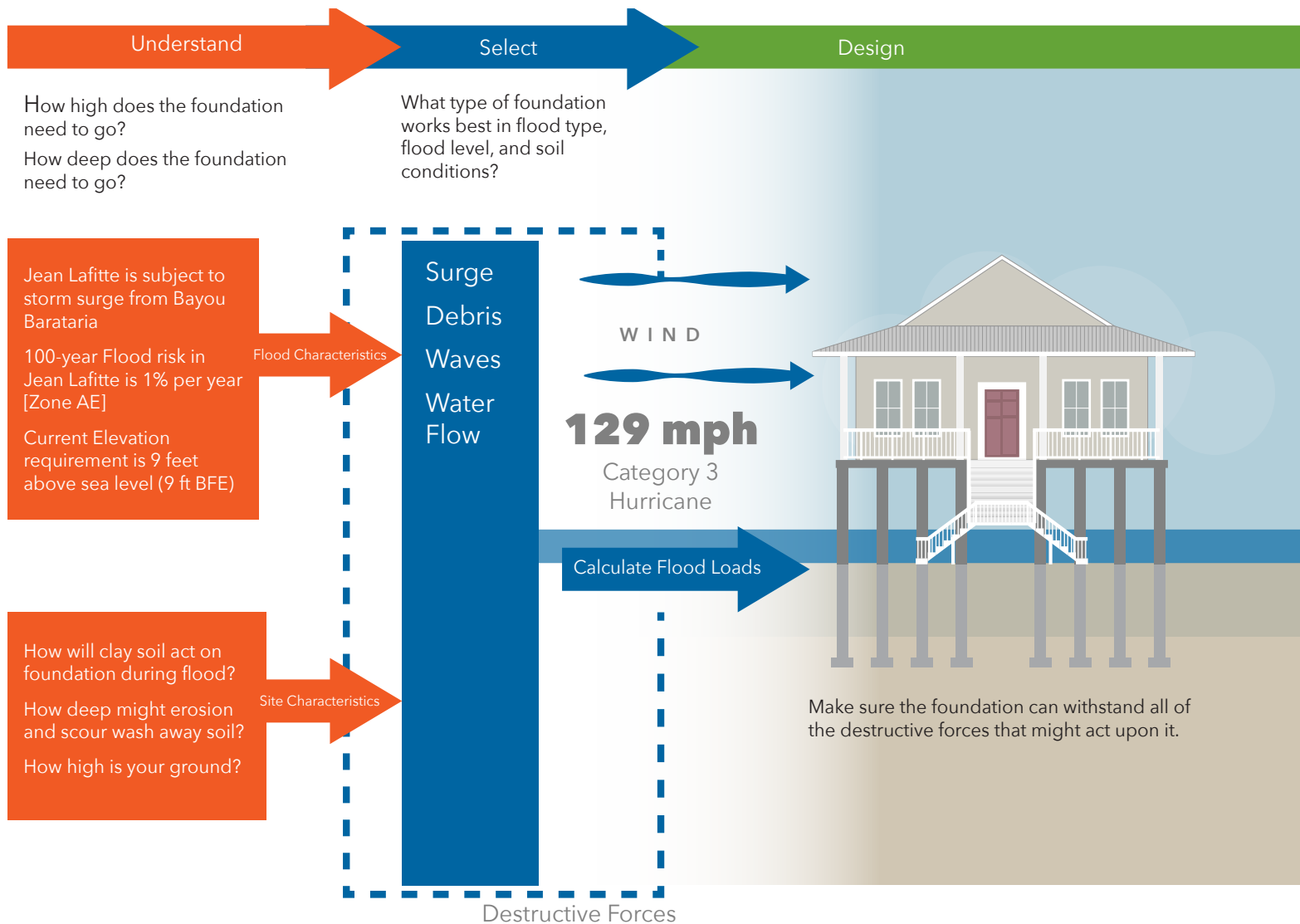


## TYPICAL METHODS OF ELEVATING STRUCTURES

There are several methods to elevating structures, depending on the need and desires of the homeowners. These include increasing the height of existing foundation walls or piers, increasing the height of walls, abandoning the lowest floor, and raising the entire structure. The method used often depend on the scale of the elevation needed to ensure that all material components of the building are located above the BFE.

Depending on particular structural and site conditions, an engineer can recommend the most appropriate alternative to elevate an existing structure. Depending upon the amount of elevation needed, there are a number of alternative methods to raise the building above the flood. For properties where only minor adjustments to building elevation (<4 feet) are found to be necessary, small elevation adjustments, such as extending foundation walls or increasing the height of existing walls, may be best. For properties where larger adjustments to building elevation are found to be necessary, it might be more appropriate to abandon the lowest floor or raise the entire structure. Typical elevation methodologies are defined below, along with their applicability to Jean Lafitte:

	METHOD OF ELEVATION	DESCRIPTION	KEY CONSIDERATIONS	APPLICATION TO JEAN LAFITTE
SMALL ELEVATION ADJUSTMENTS	<b>Increasing the height of existing foundation walls or piers</b>	This alternative requires removing the building from its existing foundation, and extending foundation walls or piers such that the lowest horizontal member is outside of the base flood.	Utilities must be disconnected and new connections designed and accommodated to reflect the new elevation of the home.  In some instances the brick veneer and/or chimneys may have to be removed prior to elevating the structure, and replaced once the structure has been relocated.  Openings that are a maximum of 1 foot above grade should be added to the foundation walls to allow flood waters to enter and exit under the home. An engineer should certify that openings are adequate to equalize pressures.	This alternative is generally not adequate to achieve heights to get above the BFE in Jean Lafitte; however, there may be homes that currently exist on mounds where this might be a viable option.
	<b>Increasing height of walls</b>	This alternative requires removing the roof from the existing structure in order to extend the existing walls. Walls must be extended to a sufficient height in order to accommodate raising the finish floor level above the base flood elevation. The new lowest floor may be either concrete slab or wood framed system generally consisting of beams and joists.	This alternative may also require reframing or relocating windows to accommodate the new floor height, as well as providing new building entries at the new finished floor elevation.  For areas of the existing walls below the base flood elevation, adjustments may be required to accommodate flood waters flowing into and out of the lowest portion of the building if a wood frame floor system is used.  If the new lowest floor is a slab, then fill dirt that is supporting the new slab should be properly compacted. Openings to equalize flood pressures are generally not required in this instance.	This is generally discouraged given the elevation necessary to achieve desired flood protection, but could be appropriate for homes on slab foundations currently elevated on a mound where only a few additional feet is necessary to achieve desired flood protection.
LARGE ELEVATION ADJUSTMENTS	<b>Abandon the lowest floor</b>	This alternatives requires that existing habitable living space on the ground level be repurposed to only function as storage.	A second floor may need to be added to provide living space, or, if a second floor already exists, it may need to be remodeled to provide a complete living unit.  Appliances and utilities may also need to be relocated to reduce the potential for flood damage.  Consult engineer to determine if there are any structural adjustments or foundation reinforcements that are necessary in order to accommodate the additional load from a second floor, or to ensure that the existing ground floor structure and foundation are adequate to withstand the forces from an anticipated flood.	Acceptable. Homes with slab foundations and of masonry constructed are generally the best candidates for this method.
	<b>Raise the entire structure</b>	This alternative may require the removal of the structure from an existing foundation and constructing a completely new foundation to elevate the building above the base flood, or raising a home on an existing slab.	Adequate bracing may be necessary during the lifting process to maintain the integrity of the home.  Foundation design should accommodate all anticipated stresses resulting from flood and wind forces.  Additional considerations for particular types of foundations are outlined in more detail later in this chapter.	Preferred.



### 1 | Credit Criteria for FDN 1 credit:

ALL new buildings in the regulatory floodplain:

- a** | Must be constructed on foundations that are designed and sealed by a registered design professional as complying with the requirements of the International Building Code, the International Residential Code, or ASCE 24, and
- b** | Must not be constructed on fill.

### 2 | Credit Criteria for FDN 2 credit:

All new buildings constructed on fill in the regulatory floodplain:

- a** | Must be constructed on properly designed and compacted fill (e.g., fill that meets the criteria of (1) Section 1803.5.8 and Section 1804.4 of the International Building Code, (2) Section 2.4 of ASCE 24, or (3) their equivalent);

- b** | Must be on fill that has appropriate protection from erosion and scour; and

- c** | Must meet a compensatory storage requirement (for the building and fill) that meets the credit criteria of Section 432.a, Development Limitations (DL1a).

### 3 | Credit Criteria for FDN 3 credit:

All new buildings built on fill in the regulatory floodplain

- a** | Must be constructed on properly designed and compacted fill (e.g., fill that meets the criteria of (1) Section 1803.5.8 and Section 1804.4 of the International Building Code, (2) Section 2.4 of ASCE 24, or (3) their equivalent), and
- b** | Must be on fill that has appropriate protection from erosion and scour.



## SELECTING A FOUNDATION TYPE

Determining what type of foundation is best depends heavily upon an understanding of the site and building characteristics outlined previously and should be considered carefully and discussed with the engineer designing the foundation. There are two general types of foundations:

- 1 | open foundations, which allow flood waters to pass freely underneath the building; and
- 2 | closed foundations, which do not allow flood waters to pass beneath the building.

There are a number of types of both open and closed foundations.

Foundations must be designed to accommodate all of the forces anticipated to be exerted on the structure, such as hydrostatic pressure, hydrodynamic pressure, debris impact, impacts from erosion and scour, and lift from wind. These conditions, along with all site conditions, must be accounted for to prevent structural failure of the building. Foundation design must be sealed by an engineer and submitted to the Town of Jean Lafitte with an application to construct or elevate a structure in a flood zone.

	FOUNDATION TYPE	DESCRIPTION	KEY CONSIDERATIONS	APPLICATION TO JEAN LAFITTE
CLOSED FOUNDATIONS		Homes placed on mounds or fill result from placing soil or similar materials on a building site to increase elevation of grade supporting the foundation of the home.	Fill material can be vulnerable to scour and erosion issues as well as slope failure that could undermine the integrity of the structure.  The quality of fill material and appropriate compaction must be considered. The bearing capacity of the soil must be adequate to support the building and anticipated forces acting upon it.  Changing the topography of the site can alter flood levels on adjacent properties.	Using fill material to elevate structures above the base flood is prohibited. Exceptions are made on sites with greater minimum acreage established by the Town of Jean Lafitte and where an engineer certifies that the grading does increase flood risk to adjacent property and the fill material can maintain the structural integrity of the building it supports during fully saturated conditions. Slab on grade is generally only acceptable as an alternative where existing grade levels are above the base flood.
		Crawlspace foundations have a perimeter wall constructed of masonry or concrete with a system of beams and piers that support the structure.	Crawlspace foundations must have adequate openings designed to allow water infiltration under the home. The site must be graded to ensure that water is not trapped in the crawl space.	These type of foundations limit water flow and the height is not compliant with BFE requirements. It is recommended to prohibit these types of foundations.
		Stem wall foundations, or "chain walls," are similar to crawlspace foundations except the interior space within the foundation wall is backfilled with soils to support a floor slab.	Openings are not required in stem wall foundations.  Stem wall foundations must also be designed to resist lateral pressure from retained soils.	These type of foundations limit water flow and the height is not compliant with BFE requirements. It is recommended to prohibit these types of foundations.
OPEN FOUNDATIONS		Pier foundations are a type of shallow, open foundation where concrete or masonry piers rest upon footings placed in the ground.	Footing depth shall be below anticipated scour and erosion elevations, and designed to resist failure due to overturning, uplift and erosion.  Piers should be adequately reinforced to resist lateral forces from wind, flood, and debris impact.  Where possible a matrix of grade beams should be used in lieu of discrete pad-style footings.	Acceptable.
		Pile foundations are constructed of deep vertical piles that support the elevated structure. Piles are generally set deep within the soil, and generally resist scour and erosion.	Understanding the compressive strength of site soils is necessary to adequately design pile foundations.  There are three types of installation for pile foundation: driven, augered, and jetted.  Bracing may be necessary to support the foundation against anticipated lateral loads.  Consult an engineer regarding pile depths and type of installation necessary.	Acceptable. Driven pile is generally the preferred method of installation.



## TECHNICAL CONSIDERATIONS FOR THE STRUCTURE

These technical considerations represent key factors impacting structural performance of the foundation. Typically foundations carry gravity loads that transfer the vertical load from the building being supported to the ground. However, in storm events a number of additional loads act upon foundations supporting elevated buildings, requiring the foundation to resist horizontal loads such as wind, wave action, moving floodwaters, floatation/uplift, and debris as well.

**Some of the relevant technical considerations applicable in Jean Lafitte that should be discussed with a design professional or engineer are outlined below:**

### *Materials*

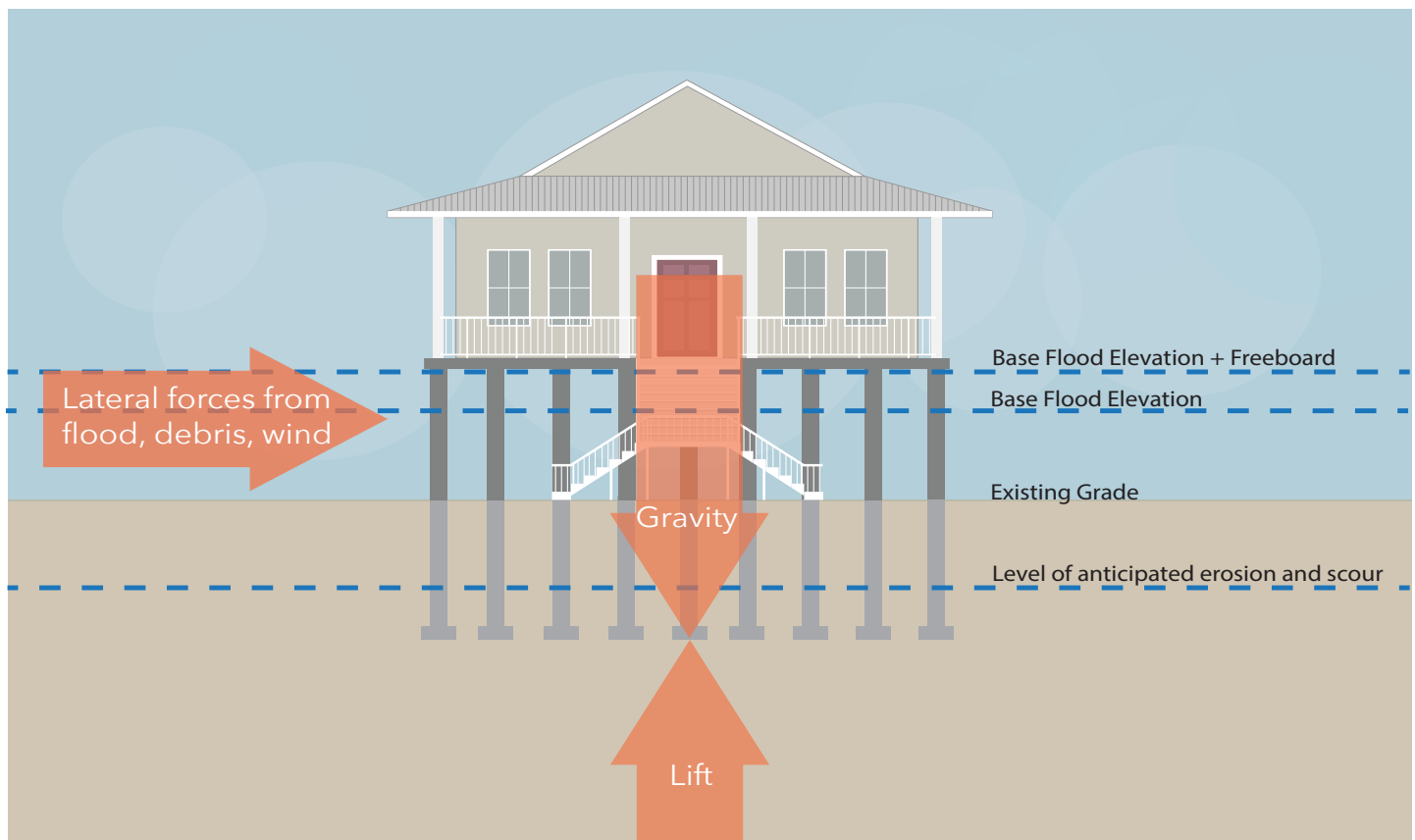
Foundation materials generally consist of either wood, concrete, masonry, or steel. While each of the materials can be acceptable in Jean Lafitte, materials should be resistant to exposure to flood damage, and should be adequately reinforced, and placed on appropriate footings to resist rotation and overturning. Additionally, there are specific application considerations for each type of material to ensure appropriate application for site conditions found in Jean Lafitte.

Wood should be treated to preserve and protect the wood from exposure and time. Chemicals in treated wood can be corrosive to metal connections and fasteners such as straps, hangers, nails, screws and bolts. Also, certain types of treated wood, such as those treated with borate, are not appropriate for areas exposed to floodwaters because of the possibility of leaching chemicals into the water. Use appropriate materials and separate direct contact between treated wood and metal by use of moisture resistant membranes.

Concrete can also be susceptible to saltwater intrusion during flood events. Consider concrete having a compressive strength of 5,000 psi or greater in order to reduce the likelihood of saltwater intrusion.

Water and moisture trapped behind masonry can result in mold. Masonry located below the BFE should be installed in order to minimize trapped moisture.

Structural steel comes in a different grades with varying levels of strength. Consult an engineer to determine which grade of steel is best suited for your conditions. Corrosion can also be an issue of concern in flood hazard areas such as Jean Lafitte, and should be discussed with your engineer. Certain applications of exposed structural steel should be avoided.



### ***Installation methods***

Piles differ from pier foundations in that pile foundations are not supported by any type of footing or pad. Piles primarily rely on friction between the pile and surrounding soils; therefore, pile embedment is an important factor in determining overall stability of the foundation. There are three types of installation methods:

- 1** | driven, where the pile is hammered into the ground;
- 2** | augured, where the hole for the pile is excavated prior to placement; and
- 3** | jetted, where water is used to place the pile.

There are specific considerations for each type of pile installation outlined below.

Driven piles are preferred, since they generally provide the highest bearing capacity per pile. A driving log that shows the number of blows required per foot should be required as a mechanism for understanding pile capacity.

Both augured and jetted installation methods can reduce the bearing capacity of the surrounding soil due to the loosening of the surrounding soil as a result of the installation method. Soils must be of sufficient composition to prevent cave in during augured installation, and could be appropriate for the clay soils found in Jean Lafitte. For sandy soils, jetted installation can be an appropriate method.

### ***Connections and Bracing***

Foundations typically work well with compressive vertical forces. However, loads from wind and floods can cause horizontal loads as well as uplift. In order to resist floatation and overturning, adequate bracing and connections are necessary. There are several types of bracing including, diagonal and knee.

Adequate connections, including straps, clips, and fasteners, are needed to ensure that structural members stay attached to one another to preserve the integrity of the structural system, and so that structures stay attached to their foundations when exposed to forces from wind and flood. This includes ensuring that the roof stay attached to the home during high winds.

Consult an engineer to ensure that connections and bracing are adequate and all factors impacting their performance are considered, including the appropriate use of corrosion-resistant materials to resist corrosion from exposure to salt water. Even metal fasteners and connectors that have been protected by a galvanized coating have been shown to weaken from corrosion, so material selection for these structural parts is very important to maintain integrity.

### ***Breakaway walls***

Ideally, foundations remain unenclosed in order to not impede the flow of floodwaters under the structure. Enclosures may also be used as a method to improve the appearance of space beneath the building and create a more consistent look for the structure and mitigate issues of scale. While certain enclosures of open foundations may be desirable in order to increase the utility of the space beneath the building in order to better accommodate parking or storage uses, allowing breakaway walls may limit the number CRS points available to the Town.

If the Town allows these types of enclosures, walls or enclosures located below the base flood shall be designed to fail under base flood conditions or less without detriment to the structural elements of the building. Minimum openings may also be required to accommodate floodwaters flowing under the structure.



Limiting the types of ground floor enclosures also provides CRS points:

- 1** | If the Town has regulations that prohibit any building enclosures, including breakaway walls, below the base flood elevation, 240 points are awarded, OR
- 2** | If the Town has regulations that prohibit breakaway walls and enclosures of areas of greater than 299 square feet below the base flood elevation, 100 points are awarded, AND
- 3** | If regulations require that the owner of a building sign a no conversion agreement that is filed with the deed and other property records, then
  - a** | 90 points, if the community will inspect the enclosed area at least once a year, OR
  - b** | 60 points, if the community is granted the right to inspect the enclosed area at any time,
  - c** | 30 points, if the agreement does not mention inspections

## **DESIGN CONSIDERATIONS**

### ***Use of ground floor/bonus space***

Since any use or materials below the base flood elevation have a likelihood to flood and experience loss, such ground floor levels shall not be used for habitable living space. Allowed uses are parking, building access, and storage. Uses other than those allowed could violate NFIP requirements and result in increased flood insurance premiums.

While structures in the Town of Jean Lafitte will generally need to have their lowest floors elevated approximately 7 to 8 feet above existing grade, careful consideration should be given to the utility of the space created below a structure as a result of the elevation process, and whether increasing the height to a full story above grade might improve the usability of the space below.

### Utility and AC placement

For relocation of existing structures above flood level, new utility connections will need to be accommodated. Utilities should be disconnected prior to relocation of the structure and the connections designed to accommodate the increased height of the lowest floor. Utility conduits and lines should be securely anchored to vertical structural members of the foundation and potentially insulated.

Additionally, utility boxes, gas meters, electric meters, and other items such as heating, ventilation, air conditioning equipment and plumbing, should be above the flood levels to minimize loss of services and impacts of storms upon the home. These facilities, including ductwork, shall be designed and/or located so that water cannot enter or accumulate within the components during a flood. Placement of the relocated utility boxes, AC units, and similar items should be to the side or rear of the main structure and screened to be as inconspicuous as possible.

## FOUNDATION ENCLOSURE AND SCREENING MATERIAL REQUIREMENTS

Appropriate measures should be taken to minimize negative visual impacts that result from the structure's increased elevation above the ground. The following represent allowed approaches to screening foundations:

### Cladding piers

Foundations may be open and unobstructed with no horizontal screening for the area under the house. Foundation piers must be clad with a flood resistant material, such as masonry, to improve the overall appearance of an open foundation.



### Landscaping

Foundations may be open, with the perimeter screened through use of vegetation used to minimize visual impacts of an open foundation. Foundations raised at least 36 inches above grade, should provide sufficient landscape screening to obstruct and soften the view of the foundation. Examples of how this could be done can be viewed on page 23.



### Breakaway enclosure required

If breakaway enclosures are allowed, cladding for foundation walls must be designed to breakaway during the base flood event without causing structural harm to the building. Appropriate cladding options include:

- a** | Lattice
- b** | Louvers
- c** | Mesh screening
- d** | Other approved materials
- e** | Any combination of the above



### Wall / Opening

For buildings where abandoning the lowest floor or extending the walls is determined to be the optimal solution or are similarly fully enclosed, building and foundation walls located below the base flood must be certified by a registered engineer or architect as having adequate openings to equalize hydrostatic pressure by allowing entry and exit of flood waters. Openings may not be required for foundations, such as stem wall, where soil is backfilled in the interior of the foundation enclosure.



If permitting enclosures **less than 299 square feet** is desired, implement the following standards:



New construction or substantial improvements of elevated buildings that include fully enclosed areas formed by foundation and other exterior walls below the base flood elevation must prohibit finished living space and designed to allow for the entry and exit of floodwaters to automatically equalize hydrostatic flood forces on exterior walls.

- 1** | Designs for complying with this requirement must either be certified by a professional engineer or architect or meet the following minimum criteria:
  - a** | Provide at least two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding;
  - b** | The bottom of all openings may be no higher than one foot above grade; and
  - c** | Openings may be equipped with screens, louvers, valves, or other coverings or devices provided they permit the automatic flow of floodwaters in both directions.
- 2** | Access to the enclosed area must be the minimum necessary to allow for parking of vehicles or limited storage of maintenance equipment used in connection with the premises or entry to the living area.
- 3** | The interior portion of such enclosed area may not be partitioned or finished into separate rooms.
- 4** | The total floor area of all such enclosed areas may not exceed 298 square feet.

## ACCESS

Doors accessing directly to habitable building space must not be below the BFE. Further, raising an existing house more than a few inches from its current foundation to a level that is above flood levels often results in the need to change the means of access to the living area. For instance, a home that used to be at or just above grade may not have had a need for stairs to reach the main living area, but will now require some means of vertical access from the ground to the home. Options to provide access to the elevated home are outlined below, and present an opportunity to create an architectural feature of the home.



### *Stairs*

The most common and frequently used means of access to employ for an elevated home is constructing one or more sets of stairs to connect the ground level to the main living area. Consider placement of stairs to treat them as an exterior feature of the home, and provide clear indication as a means of entry. Stairs shall be designed to resist flood loads or break away without causing structural damage to building or foundation. Stairs may also be retractable so that they may be raised above the base flood elevation.



### *Ramps*

Ramps should be considered as an option that increases the likelihood for being able to age place, or may be necessary for homes that need to accommodate residents with limited mobility or mobility issues. Slopes should be designed to accommodate easy wheelchair access, with adequate turning radius when switchbacks are necessary. Ramps generally require more land area than stairs, and depending on the length of the ramp, landings may be required. Ramps shall be designed to resist flood loads or break away without causing structural damage to building or foundation. Ramps may also be retractable so that they may be raised above the base flood elevation.



### *Elevators*

Elevators may be used to provide building access to elevated structures. Consult an engineer for specific considerations and requirements. Items to consider for elevators with components and elevator shafts located below the base flood elevation:

- 1 | Components should be constructed of flood-resistant materials and designed to withstand the base flood;
- 2 | Elevator shall be equipped to prevent the cab from descending into flood waters;
- 3 | Control panel and appropriate operational equipment shall be located above the BFE; and
- 4 | Other design and drainage accommodation requirements may be necessary.

When installing the elevator, aspects such as location to the house and general accessibility should be considered. During a storm event, elevators should be in "up" position to avoid damage.



## MISCELLANEOUS



### *Decks*

Decks and porches may be either attached or detached to the main structure. Decks and porches attached to the main structure:

- 1 | Must be located where the lowest horizontal part of the structure is above the BFE.
- 2 | Shall be designed to structurally function as part of the main structure, and supporting foundations must be designed to accommodate increased flood loads.

For decks and porches not attached to the main structure:

- 1 | May be located below the BFE;
- 2 | Should be designed and constructed to remain intact and anchored in place during a flood event. Structures that are not anchored in place should be designed to break apart and not negatively impact the main structure in the event of failure.
- 3 | Should not be used to park boats and vessels during a storm.



### *Chimneys and Fireplaces*

The base of chimney and fireplaces shall be elevated above the base flood elevation and shall be supported on a foundation similar to the rest of the structure which extends as deep as the rest of the structure, or deeper if required by the load from the chimney.



### *Tanks*

Since tanks are often necessary for backup electrical generation or to contain materials that should not be discharged into floodwaters if damaged, above ground tanks should be elevated above the Base Flood Elevation and on platforms that comply with foundation requirements. Below ground tanks shall be designed considering anticipated ground eroded elevation.

## IMPLEMENTATION MEASURES

Amend all appropriate ordinances to require that minimum foundation heights are adequate enough to accommodate the Base Flood Elevations delineated in the preliminary FIRM for Jean Lafitte, which are either eight feet or nine feet, depending upon location, plus an additional two feet of freeboard.

## LANDSCAPE DESIGN AND STORMWATER MANAGEMENT

The Town of Jean Lafitte currently does not have Landscape Design or Stormwater Management standards or guidelines. Providing for minimum standards and informational guidelines is important since Jean Lafitte is located on soil that is generally high in clay material and drains poorly. With its proximity to the Gulf, Jean Lafitte is also subject to the brunt of initial storm surge during storm events, and surface water from storms drains poorly adding to increased flood risk. As property owners develop or redevelop their property, an appropriate design of the landscape and careful consideration of existing as well as new vegetation can significantly contribute to

- a** | managing storm surge and surface water,
- b** | supporting native vegetation and
- c** | enhancing existing infrastructure design and function.

This section describes how individual property owners can plan their development to contribute positively to their neighbor's and the overall community's risk reduction. Specific guidance is given to factors to consider when planning a site for development, as well as a matrix to provide information on how to choose appropriate landscaping.

### Paving








In more developed areas, most paved surfaces are made of impervious concrete or asphalt, which do not allow water to filter through the material and into the ground. This becomes a problem when large volumes of water move quickly across impervious surfaces, causing flooding, scouring, and erosion.

Impervious paving materials are appropriate for uses such as heavily traveled roads and parking lots because they are strong enough to hold up to heavy use. Generally, porous or permeable paving materials slow down flowing water and allow water to filter through them. For lighter uses, such as residential driveways, patios, and light to medium use parking lots, there are a number of suitable paving materials that can help mitigate the effects of stormwater runoff.

	PAVING MATERIAL	RESIDENTIAL	COMMERCIAL	NATURAL
	Compacted earth			✓
	Wood planks	✓		✓
	Crushed stone, gravel or shell	✓	✓	✓
	Paver blocks	✓	✓	
	Grassed cellular plastic or concrete	✓	✓	
	Asphalt (conventional / pervious)	✓	✓	
	Concrete (conventional / pervious)	✓	✓	




## Channeling

It is often necessary to move water away from areas where it may cause damage to homes and other structures. Combine curb/gutter, pipe, with slower moving channeling methods. Also, mimic natural hydrology, channel water to natural water courses, or to large open space areas where it can be slowly absorbed into the ground.

	CHANNELING METHOD	RESIDENTIAL	COMMERCIAL	NATURAL
	Creeks	✓		✓
	Ditches	✓	✓	✓
	Swales	✓		✓
	Rip-rap channel		✓	
	French drain	✓	✓	
	Concrete pipe		✓	
	Curb and gutter	✓	✓	

## Storage

If water cannot be channeled away fast enough, it can be stored nearby using a number of methods including underground cisterns, detention or retention ponds. Stored water can be slowly filtered back in the ground, and it can also be used for irrigation, agricultural purposes, etc.

	STORAGE METHOD	RESIDENTIAL	COMMERCIAL	NATURAL
	Retention or detention pond	✓		✓
	Landscape or tree wells		✓	
	Underground pipe		✓	
	Vaults or cisterns	✓	✓	
	Convey to natural areas	✓		✓



## Filtration/Infiltration

As stormwater flows across surfaces, it picks up whatever sediments, oils, and other contaminants are on those surfaces. A number of filtration and infiltration methods can be used to protect the health of the water bodies into which this stormwater runoff ultimately flows. The use of certain plants in filtration methods such as constructed wetlands, rain gardens, and bioswales mimics the natural filtration ability of swamps and marshes.

In addition to filtering out pollutants from stormwater, areas like Jean Lafitte can benefit from allowing water to infiltrate the ground, which helps recharge and maintain the water table and reduce subsidence.

### Benefits of bioretention include:

- Maintain water table, in turn reducing subsidence, by allowing water to soak into the ground instead of being removed by pipes and pumps
- Reduce flash floods by detaining water into already overtaxed storm sewer pipes during a storm event
- Plants soak up pollutants from delayed stormwater before they enter the water system

	FILTRATION METHOD	RESIDENTIAL	COMMERCIAL	NATURAL
	Constructed wetland or marsh	✓		✓
	Filtration pond	✓		✓
	Natural vegetation or surface landscaping	✓	✓	✓
	Bio-swale	✓	✓	✓
	Rain garden	✓	✓	✓
	Roof garden	✓	✓	

## WHAT IS STORMWATER MANAGEMENT AND WHY IT SHOULD BE MANAGED

Stormwater is simply rainwater that runs off streets, lawns, and other sites. In areas with little or no development, this water is absorbed into the soil close to where it initially falls. From here, it recharges ground water sources and replenishes water bodies. In areas with more development and ultimately more impervious surfaces such as parking lots and roads, this water flows quickly across such impervious surfaces or it is channeled through pipes and can cause flooding, erosion, and serious infrastructure problems.

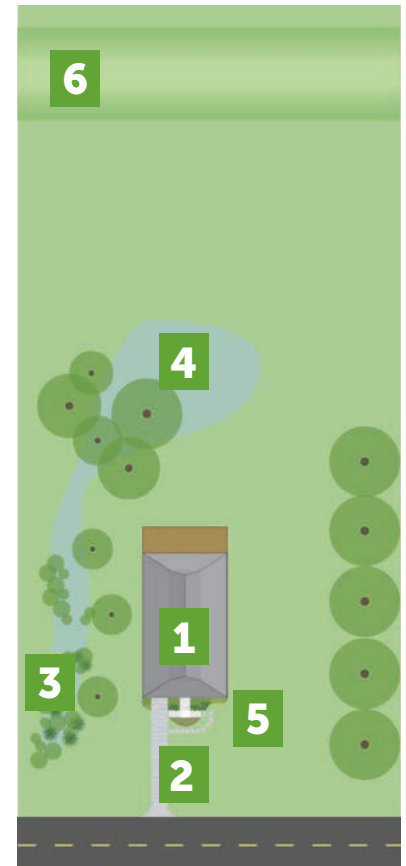
In areas prone to hurricanes and other intense storms, like Jean Lafitte, the management of stormwater through a variety of practices and methods at different scales is crucial to protect property and the surrounding environment from the damaging effects of these powerful storms. Despite our best efforts, flowing stormwater disregards property boundaries, and it flows from areas of higher elevation to lower elevations. With this in mind, it is important to view individual stormwater management practices as part of a larger, interconnected system.

There are a number of ways in which stormwater runoff can be managed so that its potentially damaging effects can be minimized. The best practices used in this document can be categorized under one or more of the following methods: appropriate paving, channeling, storage, and filtration.

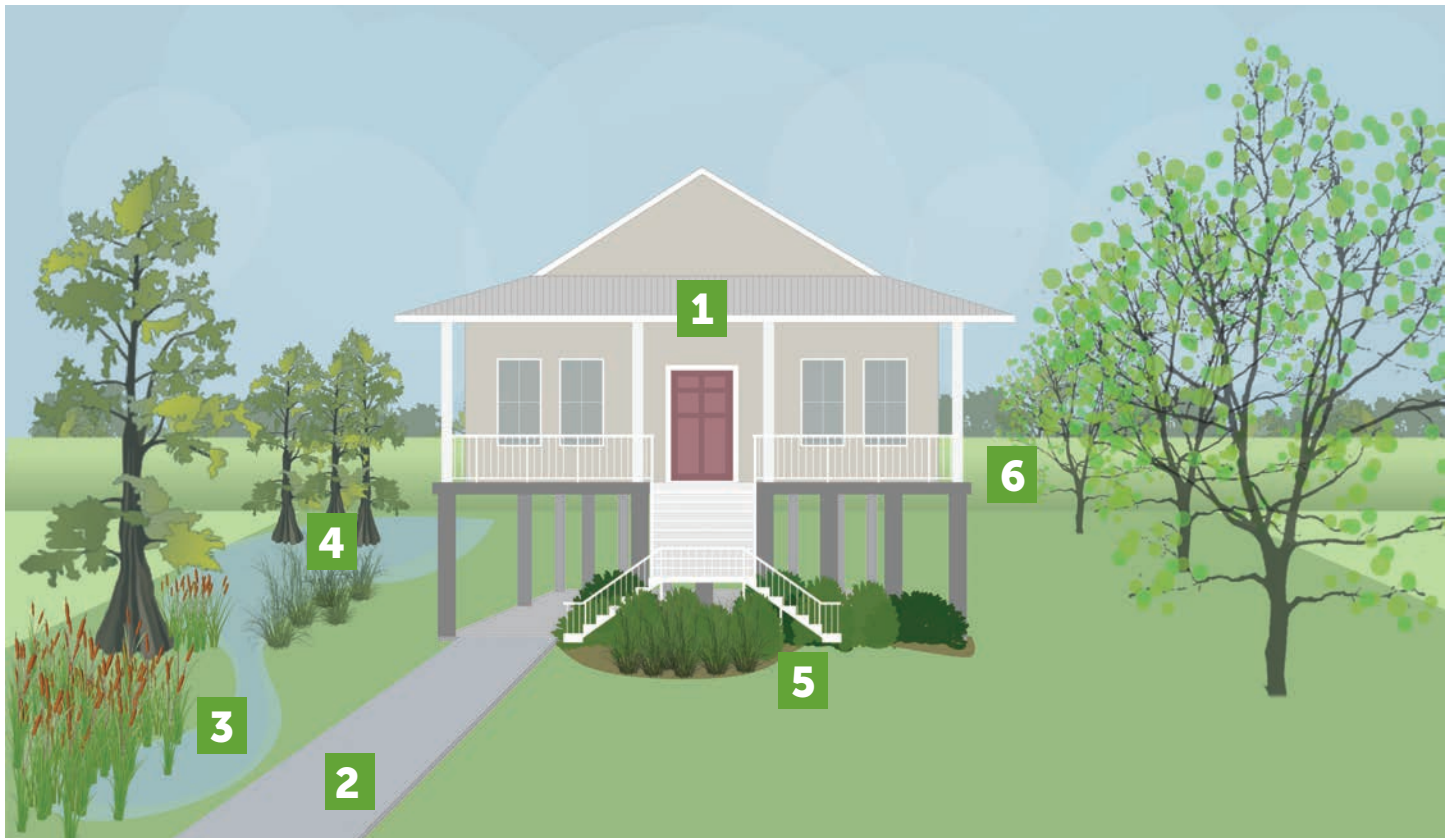


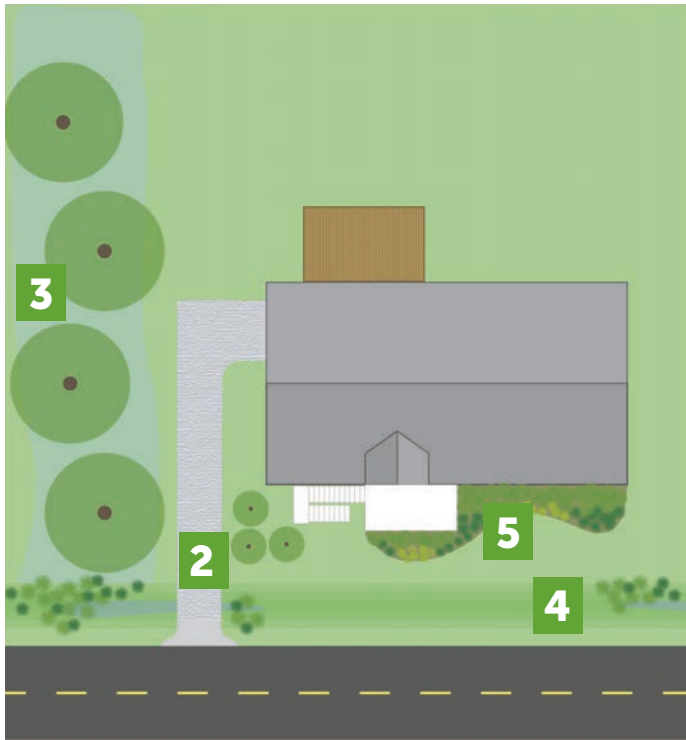
## LANDSCAPE DESIGN AND STORMWATER MANAGEMENT CASE STUDIES

- 1** Traditional, elevated structure with deep porches on a large rural lot
- 2** Permeable driveway made of gravel, crushed shells, or permeable pavements
- 3** Vegetated swale to accept stormwater and move it toward retention/detention areas
- 4** Retention/detention pond holds water on property, recharging water table. This water reduces the load on the Town's drainage system and it can be used for irrigation.
- 5** Landscape made of well-adapted native plant materials that have been selected for the site's specific conditions.
- 6** Protection levee with wetlands beyond



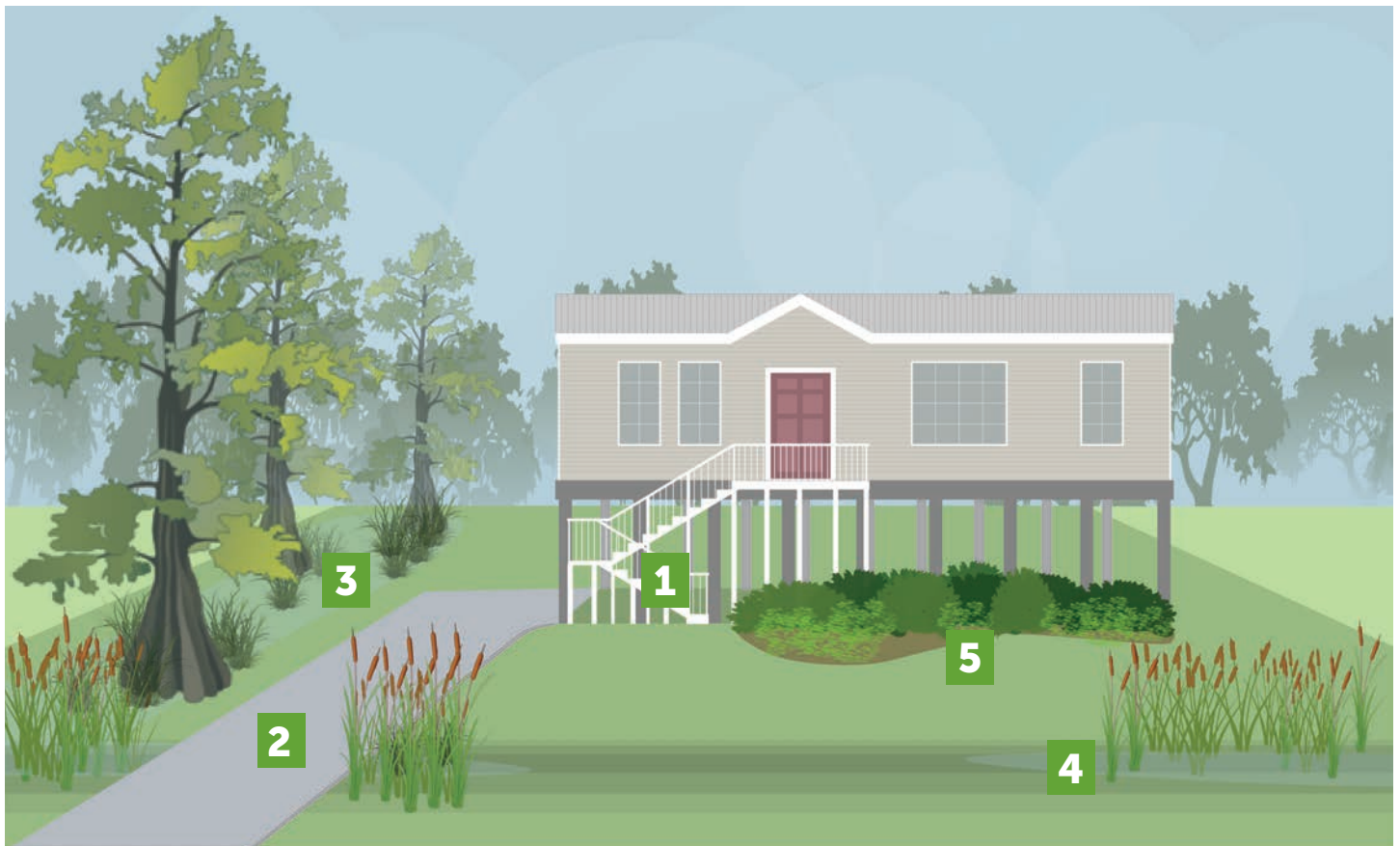
**Example 1: New home on Large rural lot**





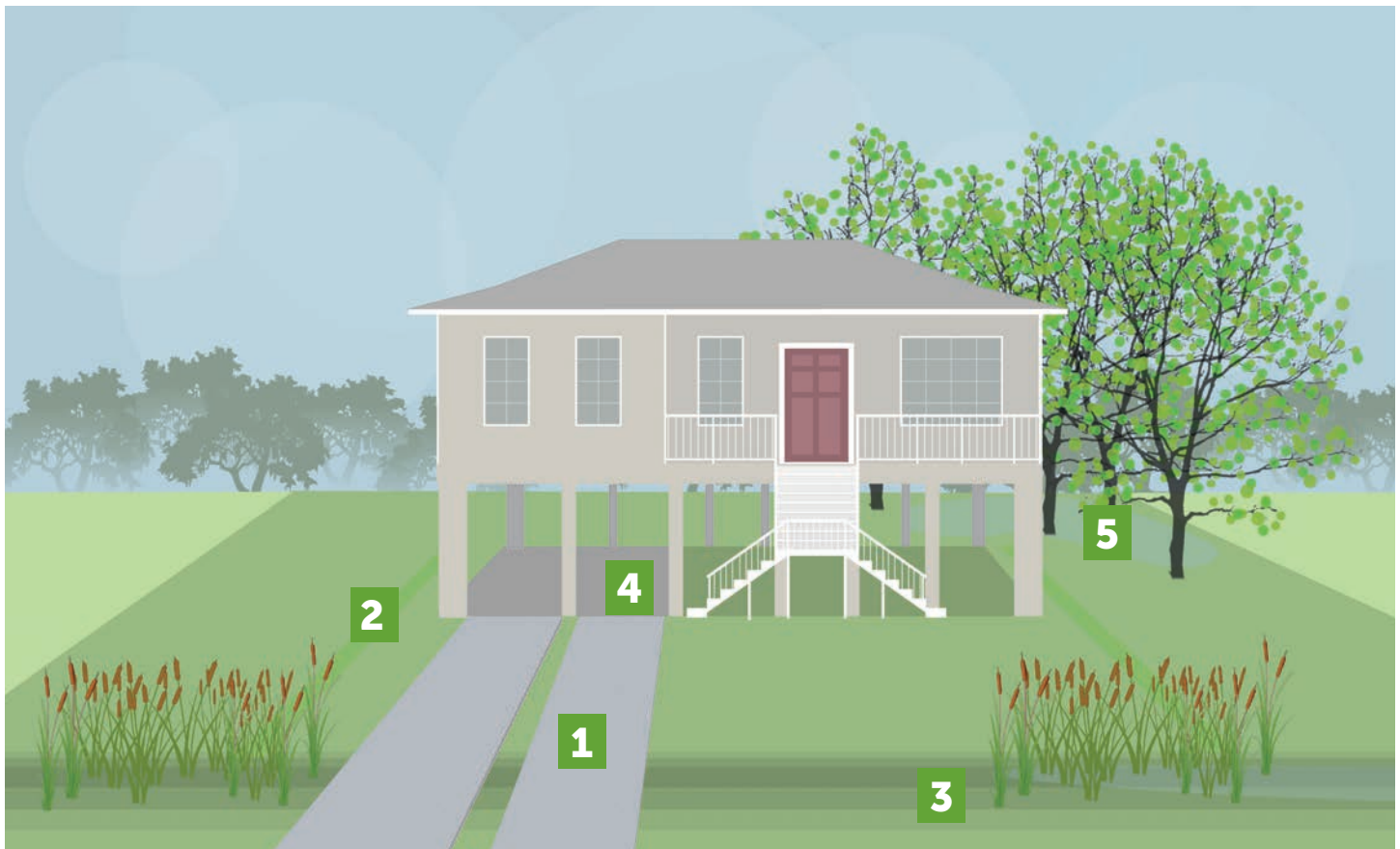
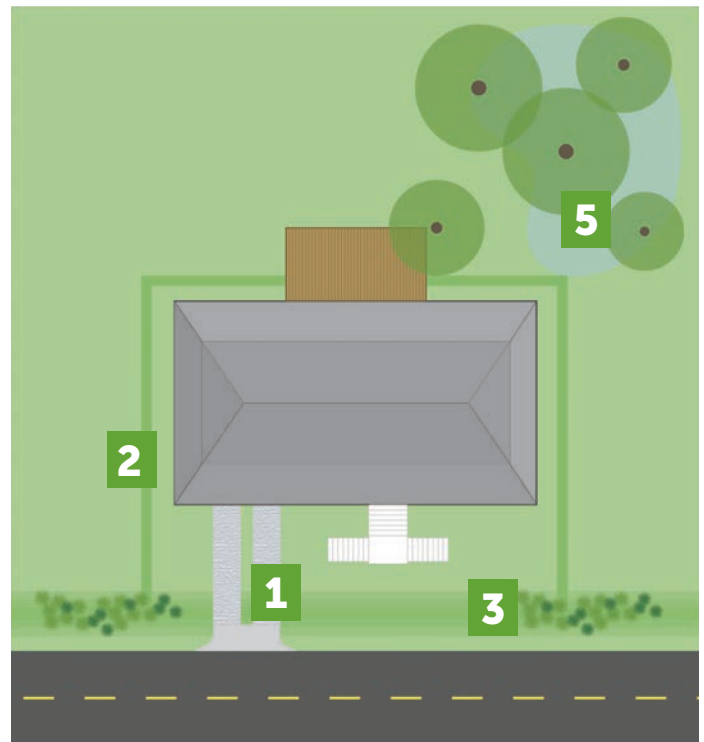
### Example 2: Elevated Manufactured Home

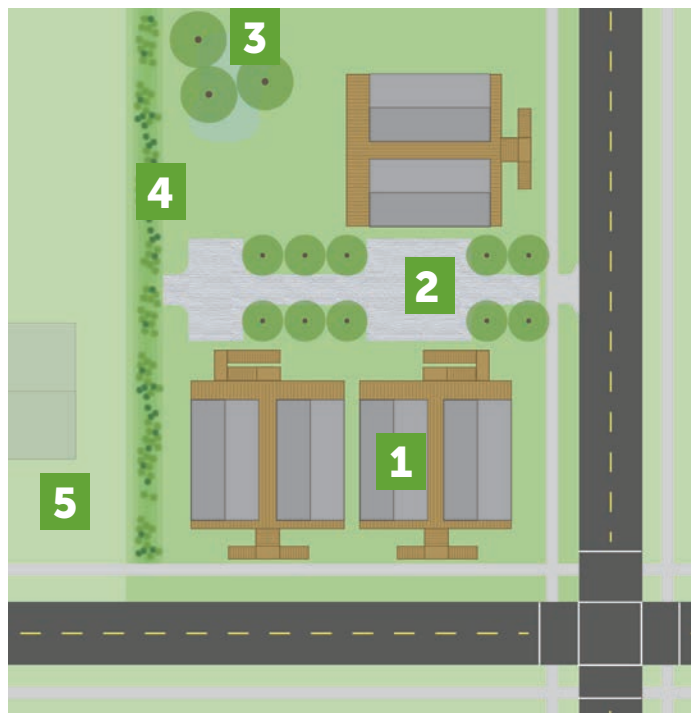
- 1** No paving under home reduces runoff
- 2** Gravel or crushed oyster shell driveway and parking area
- 3** Low lying area of property planted with trees and other plants that are well-adapted to wet soils
- 4** Open drainage ditch at street is planted with plant material that reduces erosion and cleanse stormwater
- 5** Sunken native landscape area accepts runoff from yard, acting as a rain garden



**Example 3: Elevated Existing Home**

- 1** Permaeable concrete driveway pads, with unnecessary concrete removed
- 2** Underground French drains channel water away from the house and allow it to infiltrate back into the soil
- 3** Open drainage ditch at street is planted with plant material that reduces erosion and cleanse stormwater
- 4** Space under home is only partially paved to reduce potential for runoff
- 5** Yard is sloped to existing low-lying areas that are planted with trees and plants tolerant of wet soils





#### Example 4: Elevated Multifamily Housing

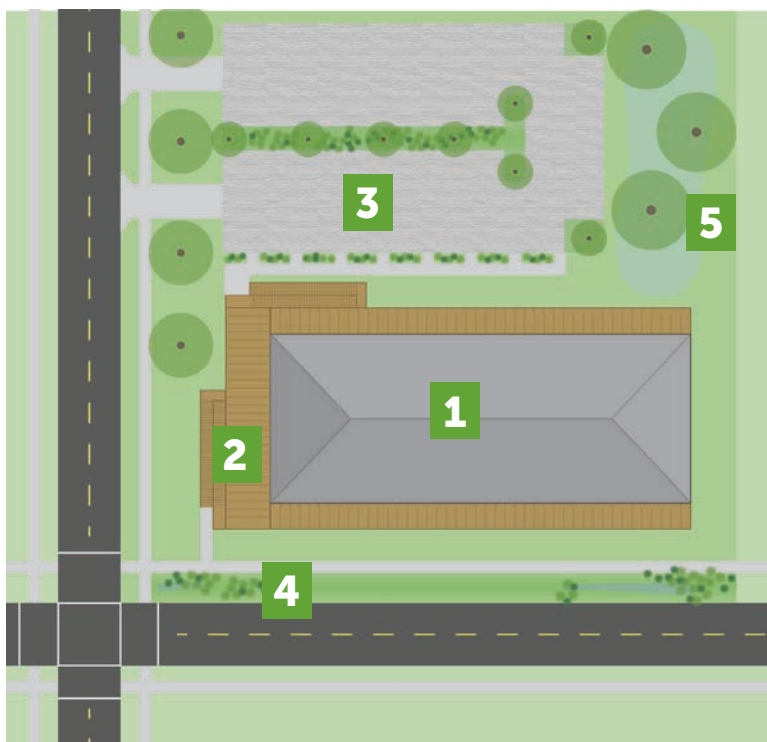
- 1** Elevated multifamily housing units maximize efficiency by sharing elevators, decks, and stairs, and foundation elements.
- 2** A permeable materials driveway and parking area is also shared.
- 3** Low lying area of property planted with trees and other plants that are well-adapted to wet soils
- 4** One side of the property utilized a planted bio-swale that filters stormwater, while providing a landscape buffer between the neighboring properties.
- 5** This multifamily development is appropriately scaled for surrounding single-family residential development.





### Example 5: Elevated Commercial Building

- 1** This elevated commercial building is designed to fit in with the existing character of the community.
- 2** Generous decks, access ramps, and stairs make the elevated building accessible.
- 3** The parking lot utilizes permeable paving and landscaped drainage areas to reduce stormwater runoff.
- 4** Open drainage ditch at street is planted with plant material that reduces erosion and cleans stormwater.
- 5** Low lying area of property planted with trees and other plants that are well-adapted to wet soils.



## Site Landscaping

### *Right Plant, Right Place*

To plan a successful, healthy, and beautiful landscape in Jean Lafitte, it is important to study and understand the specific conditions of the site so that the proper plants can be selected for that place. All plants are adapted to specific growing conditions, and some are more tolerant than others. The right plant for the right conditions and place will thrive.

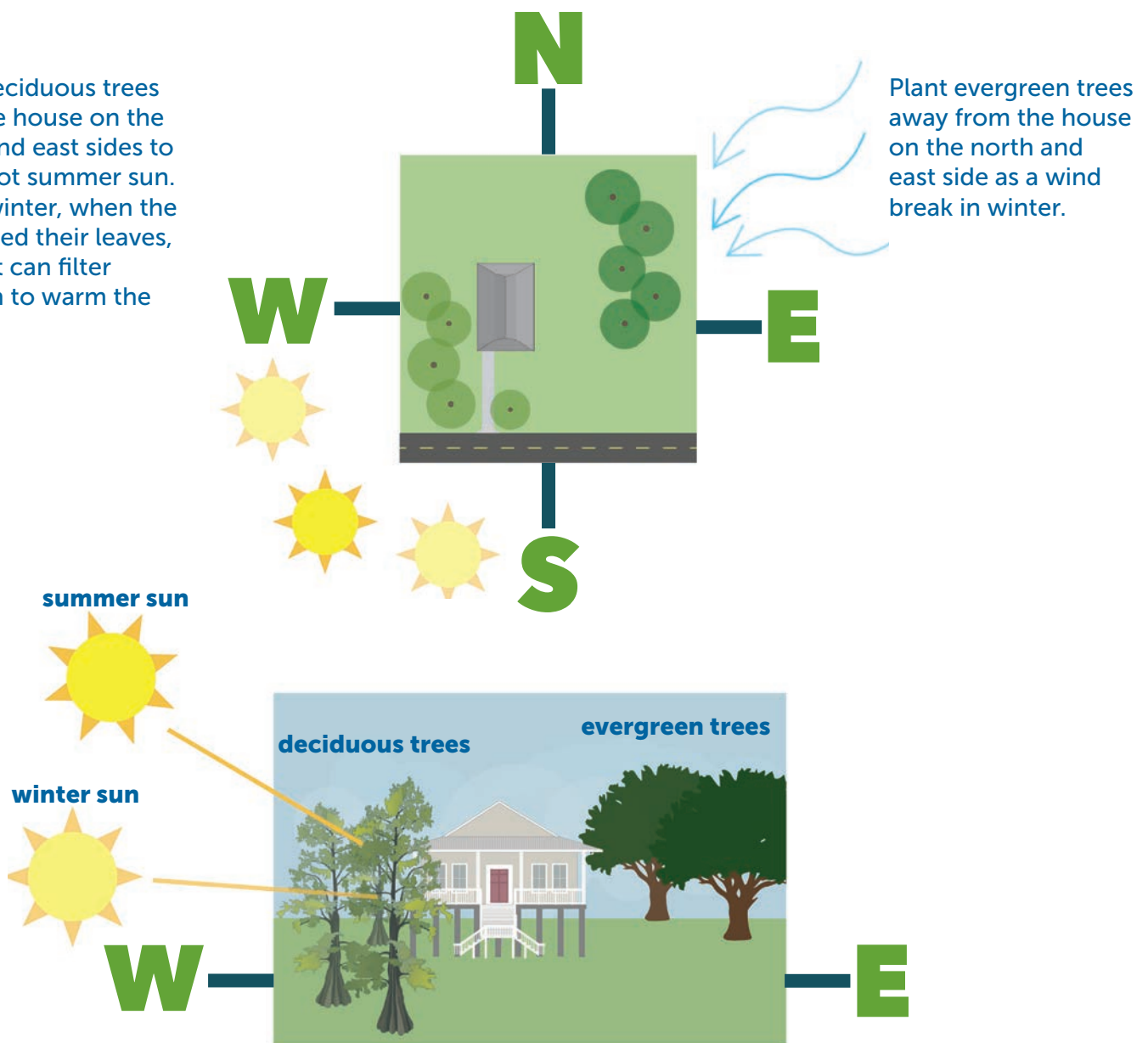
When choosing a plant, consider a number of things:

- Plants that are native to the area are well adapted to the conditions and generally require less maintenance;
- Soil type, i.e. clay soils that do not drain or sandy soils that drain quickly;
- Mature size, usually listed on nursery plant identification tags;
- Sun and shade tolerance;
- Cold hardiness;
- Plant's benefits, i.e. shade for homes, stormwater pollution treatment, erosion control, bank stabilization, aesthetics.

Passive solar techniques can utilize landscaping to warm a building in winter months using sunlight, cool a home using shade, or block wind. Deciduous trees can be placed along the southwest side of the building to shade the room from afternoon summer sun, yet allow the sun to warm the house in the winter. Evergreen trees can be placed along the eastern side of the yard to block cold winter winds. The diagrams below illustrate how to incorporate passive solar techniques into your landscape design to reduce energy costs and increase resiliency.

Plant deciduous trees near the house on the south and east sides to block hot summer sun. In the winter, when the trees shed their leaves, sunlight can filter through to warm the house.

Plant evergreen trees away from the house on the north and east side as a wind break in winter.



## Site Landscaping (continued)

*Jean Lafitte conditions to keep in mind when identifying plants:*

- Generally poorly drained clay soils
- Some areas may have flooding for prolonged periods of time, so plants that tolerate wet soils may be necessary
- USDA hardiness zone 9a
- Groundwater and floodwater tend to have a high salt content, which can be damaging to non salt-tolerant plant species
- Coastal storms can bring high wind speeds, so wind-tolerant tree species are recommended
- High temperatures during summer, so incorporating passive solar techniques can help reduce energy costs and increase comfort during hot months



The following are steps home and business owners can take to organize their thoughts and identify the types of plants, locations and landscaping:

**1**

Determine your budget

**2**

Identify your landscape needs

**3**

Evaluate your site and its constraints

**4**

Diagram your space needs

**5**

Identify drought-tolerant plants or irrigation
















**6**

Select plants and other landscape materials that are appropriate for your site and needs






















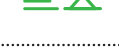


\* source: LSU Ag Center.com

## HOW TO USE THIS PLANTING MATRIX

This matrix includes a selection of plants that are generally well-suited to the environmental conditions in the Jean Lafitte area. Once your needs and site conditions have been determined, use the information listed for each plant to determine the best fit for trees, shrubs, perennials, and groundcovers. This small selection of plants are suitable for conditions in Jean Lafitte. However, there are other species that are also appropriate. When looking for plants that meet your specific needs, this chart shows plant characteristics to keep in mind.

Sun/Shade	 FULL SUN	 PARTIAL SUN	 SHADE			
Suitable Conditions	 WIND TOLERANT	 DROUGHT TOLERANT	 WET SOIL TOLERANT	 EROSION CONTROL	 INUNDATION TOLERANT	 SALT TOLERANT
Growth Rate	 FAST	 MODERATE	 SLOW			
Foliage/Perennial	 EVERGREEN	 DECIDUOUS	 PERENNIAL			

## GROUNDCOVERS, VINES AND TURF GRASS

sun/shade	suitable conditions	evergreen/deciduous/perennial	growth rate (slow, moderate, fast)	appropriate uses	mature size (H' x W')	common name	scientific name	native	picture number
				lawns, erosion control	2"	Zoysia turf grass	<i>Zoysia japonica</i>		<b>1</b>
				lawns, erosion control	2"	St. Augustine turf grass	<i>Stenotaphrum secundatum</i>		<b>2</b>
				lawns, erosion control, not as cold hardy	2"	Bermuda turf grass	<i>Cynodon dactylon</i>		<b>3</b>
				erosion control	2 x 4'	Trailing Lantana	<i>Lantana montevidensis</i>		<b>4</b>
				fast growing groundcover, erosion control	12-15"	Wedelia	<i>Wedelia trilobata</i>		<b>5</b>
				erosion control	18" x 4'	Shore Juniper	<i>Juniperus conferta</i>		<b>6</b>









































# GRASSES AND PERENNIALS

sun/shade	suitable conditions	evergreen/deciduous/perennial	growth rate (slow, moderate, fast)	appropriate uses	mature size (H' x W')	common name	scientific name	native	picture number
				aggressive erosion control	4'	Saltmeadow Cord Grass	<i>Spartina patens</i>	✓	1
				tolerant of multiple soil types	6'	Miscanthus	<i>Miscanthus sinensis</i>		2
				wet areas	2'-3' x 2'	Umbrella Plant	<i>Cyperus alternifolius</i>	✓	3
				wet areas	3'	Rush	<i>Juncus sp.</i>	✓	4
				color, wet areas	2'	Louisiana Iris	<i>Iris Louisiana Hybrids</i>	✓	5
				erosion control	2' x 4'	Trailing lantana	<i>Lantana montevidensis</i>		6
				erosion control	2' x 4'	Lantana/ Ham and Eggs	<i>Lantana camara</i>	✓	7
				drought tolerant groundcover	2-3' x 5'	Blue Plumbago	<i>Plumbago auriculata</i>		8
				rain gardens, wet areas	2'-6' x 2'-3'	Canna	<i>Canna X generalis</i>	✓	9
				rain gardens, wet areas	4'-6'	Wooly Rose Mallow	<i>Hibiscus lasiocarpus</i>	✓	10
				wet areas, brackish water	5'-6'	Salt Marsh Mallow	<i>Kosteletzkya virginica</i>	✓	11
				wet areas, swales	4'-6'	Cattail	<i>Typha latifolia</i>	✓	12
				wet areas, rain gardens	2' x 2'	Spider Lily	<i>Hymenocallis liriosme</i>	✓	13





# SHRUBS AND SMALL TREES

sun/shade	suitable conditions	evergreen/deciduous/perennial	growth rate (slow, moderate, fast)	appropriate uses	mature size (H' x W')	common name	scientific name	native	picture number
				stabilizes slopes	35' x 25'	Black Willow	<i>Salix nigra</i>	✓	1
				fast growing, large shrub	8' x 8'	Russian Olive	<i>Elaeagnus pungens</i>	✓	2
				good for wet soils and salt	10' x 8'	Wax Myrtle	<i>Myrica cerifera</i>	✓	3
				salt, drought, wind tolerant	10' x 8'	Oleander	<i>Nerium oleander</i>		4
				drought tolerant, erosion control	8' x 8'	Pampas grass	<i>Cortaderia selloana</i>		5
				edible, drought and salt tolerant	2' x 2'	Rosemary	<i>Rosmarinus officinalis</i>		6
				wet areas	8' x 10'	Buttonbush	<i>Cephalanthus occidentalis</i>	✓	7
				wet areas	8'-10' x 6'-8'	Dwarf palmetto	<i>Sabal minor</i>	✓	8
				tolerant of most conditions	8' x 6'	Groundsel bush	<i>Baccharis halimifolia</i>	✓	9



1



2



3



4



5



6



7



8



9





# CANOPY TREES AND PALMS

sun/shade	suitable conditions	evergreen/deciduous/perennial	growth rate (slow, moderate, fast)	appropriate uses	mature size (H' x W')	common name	scientific name	native	picture number
				Shade tree, low-lying and wet areas	50' x 25'	Bald Cypress	<i>Taxodium distichum</i>	✓	1
				shade, wind, wet soils tolerant	50' x 75'	Live Oak	<i>Quercus virginiana</i>	✓	2
				seasonal color, good for low areas	40' x 30'	Swamp Red Maple	<i>Acer rubrum</i> var. <i>drummondii</i>	✓	3
				fast growing tree, for most conditions	30' x 20'	Box Elder	<i>Acer negundo</i>	✓	4
				shade tree, wet soils	40' x 25'	American Sweet Gum	<i>Liquidambar styraciflua</i>	✓	5
				slow growing, best in drier soils	40' x 25'	Southern Magnolia	<i>Magnolia grandiflora</i>	✓	6
				good shade tree for most soils	40' x 25'	Nutall Oak	<i>Quercus nutallii</i>	✓	7
				wind resistant, drought tolerant	25' x 20'	Spruce Pine	<i>Pinus glabra</i>	✓	8
				wind resistant	60' x 30'	Longleaf Pine	<i>Pinus palustris</i>	✓	9
				wind resistant	25'	Cabbage Palm	<i>Sabal palmetto</i>	✓	10





# COMMUNITY SCALE TOOLS: LIVING WITH WATER GUIDELINES AND STANDARDS FOR JEAN LAFITTE

This section contains a description of community scale tools that can be adopted by the Town to increase planning and reduce the risk of flooding. Each of the recommended tools is described in this section, and example ordinances are provided in the third section of this document. In order for these tools to be implemented, the Town would need to prepare ordinance language, hold community meetings to obtain input on the proposals, and then have both the Planning Commission and Town Council review and act on the amendments.

## JEAN LAFITTE ZONING UPDATES

The Jean Lafitte Comprehensive Zoning Ordinance was adopted in 1978 and was last revised over 18 years ago in 1997. The ordinance establishes districts which regulate land uses, height, lot area and setbacks, and includes an Unrestricted District with minimum requirements. The zoning is reflected on a number of small maps that are maintained by the Planning Commission office.

The current zoning ordinance is out of date and in some areas contains standards that could keep desired development and improvements from occurring. The ordinance is also not consistent with the recently adopted Jean Lafitte Tomorrow Town Resiliency Plan. The Town zoning ordinance does not address flood risk and in some cases it may be a hindrance to mitigation activities.

### IMPLEMENTATION MEASURES

Given the age of the Jean Lafitte ordinances and the limited scope, the ordinance should be strategically updated to align with the Jean Lafitte Resiliency Plan and to more directly address flood risk reduction measures.

Suggested ordinance amendments include updating the Town ordinances to:

- Reflect current state requirements for administrative procedures;
- Update the subdivision regulations to comply with state requirements;
- Amend subdivision ordinance to include measures to help reduce flooding and damage from storm surge ;
- Create a use chart and other charts and graphics to make ordinance easier to use;
- Create design guidelines to ensure compatibility with Jean Lafitte's water culture;
- Review and revise setbacks to ensure that the desired types of development are allowed;
- Increase the minimum height of buildings allowed additional heights without a variance; and
- Add additional provisions to address flood risk reduction, including the provisions outlined in the following sections.

## FLOOD DAMAGE REDUCTION ORDINANCE

As a Town that participates in the National Flood Insurance Program, the Town should adopt the flood damage reduction provisions in the Louisiana Coastal Land Use Toolkit to clarify the federal and state requirements while enhancing select standards to better protect the community. These provisions will improve Jean Lafitte's position to receive reduced flood insurance premiums through FEMA's Community Rating System.

### EXAMPLE ORDINANCE

#### Provisions for Flood Damage Reduction

Generally, the provisions require that all new construction and substantial improvements in all areas of special flood hazard follow these guidelines:

- 1 | All new construction or substantial improvements must be designed or modified, and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- 2 | All new construction or substantial improvements must be constructed by methods and practices that minimize flood damage.
- 3 | All new construction or substantial improvements must be constructed with materials resistant to flood damage.
- 4 | All new construction or substantial improvements must be constructed with electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities that are designed and located to prevent water from entering or accumulating within the components during conditions of flooding.
- 5 | All new and replacement water supply systems must be designed to minimize or eliminate infiltration of flood waters into the system.



**Provisions for Flood Damage Reduction cont.'d**

- 6 | New and replacement wastewater sewer systems must be designed to minimize or eliminate infiltration of flood waters into the system and discharge from the systems into flood waters.
- 7 | On-site waste disposal systems must be located to avoid impairment to them or contamination from them during flooding.

**Certified Floodplain Manager**

A certified Floodplain Manager shall enforce the Town's floodplain management ordinances.

**Standards for Subdivisions**

- 1 | Base flood elevation data must be generated for any proposed subdivision, including manufactured home parks, or any other proposed development which is greater than 5 acres.
- 2 | Any application for subdivision or a manufactured home park must have adequate drainage provided to reduce exposure to flood hazards.
- 3 | All new streets, provided as part of a subdivision with a residential component, must be constructed so that the streets will be no more than six inches below the base flood elevation.
- 4 | Any public utilities and facilities such as sewer, gas, electrical and water systems planned as part of a subdivision, including manufactured home parks or any other proposed development which is greater than 5 acres, must be located and constructed to minimize or eliminate flood damage.

**Residential Construction**

- 1 | All new construction and substantial improvement of any residential structure must have the lowest floor, including any basement, elevated to two feet above the base flood elevation or higher.
- 2 | A registered professional engineer, architect, or land surveyor must submit a certification to the Floodplain Administrator that the above standard is satisfied.

**Nonresidential Construction**

- 1 | All new construction and substantial improvements of any nonresidential structure must either:
  - a | Have the lowest floor, including any basement, elevated to two (2) feet above the base flood elevation or higher; or coastal high hazard area
  - b | Be designed so that the area below two (2) feet above the base flood elevation, together with all utility and wastewater facilities, is watertight with walls substantially impermeable to the passage of water and with structural components resistant to hydrostatic and hydrodynamic loads and effects of buoyancy.
  - c | A registered professional engineer or architect must develop or review structural design, specifications, and plans for the construction, and must certify that the design and methods of construction are in accordance with accepted standards of practice for this provision.

**Critical Facilities**

Critical facilities must be constructed on properly compacted fill and have the lowest floor, including any basement, elevated to 12 inches above the 500year flood or higher. A critical facility must have access from a road that is no lower than six inches below the 500year flood.

**Manufactured Homes**

All manufactured homes that are placed or substantially improved within Zones A130, AH, and AE on the Town of Jean Lafitte's Flood Insurance Rate Map must be elevated on a permanent foundation such that the bottom of the longitudinal structural Ibeam of the manufactured home is elevated to 30 inches above the base flood elevation or higher and is securely anchored to an adequately anchored foundation system to resist flotation, collapse and lateral movement.

**Recreational Vehicles**

- 1 | Recreational vehicles placed on sites within Zones A130, AH, and AE on the Flood Insurance Rate Map must either:
  - a | Be on the site for fewer than 180 consecutive days; or
  - b | Be fully licensed and ready for highway use; or
  - c | Meet the permit requirements of Article 4. Section C, Permit Procedures, as well as the elevation and anchoring requirements for Article 5. Section B. 5, Manufactured Homes.
- 2 | A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

## STORMWATER MANAGEMENT

Just as individuals can improve water quality by managing runoff so that its potentially damaging effect can be minimized, it is extremely important that an overall system of stormwater management be implemented by the city, since runoff does not follow property boundaries, and all parts of the Town and region may be effected by the actions of one property. The following regulations provide a storm water management structure to strengthen and preserve the ecological function of the region's watersheds.

### EXAMPLE ORDINANCE

#### **Stormwater Management Standards**

The provisions of this section apply to all land development at construction phase and postconstruction phases. A Site Development Permit is required for any development activity.

##### ***Construction Phase***

Land disturbing activities which are in excess of 5,000 square feet or 500 cubic yards of earth moved must comply with the Construction Phase Stormwater Management standards of Construction Phase Stormwater Management

##### ***Post-Construction Phase***

The development or redevelopment of any lot or site 6,000 square feet in size or larger must comply with the Post Construction Stormwater Management standards.

##### ***Exempt Activities***

The following activities are exempt from all stormwater management requirements:

- 1 | Any emergency activity that is immediately necessary for the protection of life, property, or natural resources;
- 2 | Any temporary activity that lasts less than two weeks and returns the site to the preactivity conditions;
- 3 | Expansion in gross floor area or impervious area of less than 10 percent or 2,000 square feet, whichever is less; and
- 4 | Lands used for agricultural purposes.

#### **Stormwater Management Plan**

##### ***Plan Approval***

- 1 | Prior to the approval of a site development permit, the Administrator approves a stormwater management plan submitted by the applicant.
- 2 | Modifications to an approved stormwater management plan may be reviewed and approved by the Floodplain Administrator.

##### ***Plan Requirements***

- 1 | The stormwater management plan must contain plans for managing the impacts of stormwater during the construction phase and postconstruction phase of the project as applicable. Hydrologic parameters that reflect the fully builtout development must be used in all engineering calculations.
- 2 | All stormwater best management practices (BMPs) identified in the plan must be designed and constructed to meet the standards of this section.
- 3 | The postconstruction phase of a stormwater management plan must describe how the proposed project will or will not, address the following site design goals:
  - a | Manage rainfall as close to where it falls as possible;
  - b | Use simple, natural, costeffective stormwater BMPs that are appropriate to the context or character area of the project;
  - c | Preserve natural resources, and existing hydrologic patterns as framework for site design; and
  - d | Reduce consumption of land for the sole purpose of stormwater management.
- 4 | Stormwater management plans must be prepared under the seal of an engineer, or landscape architect licensed in the state of Louisiana.

##### ***Common Development Plans***

Projects with multiple lots or sites, developed under a common development plan, are considered a single development and may submit one stormwater management plan that describes how the project as a whole will use BMPs to meet the performance criteria for postconstruction stormwater management.

### Standards for Floodways

The following provisions apply to designated floodways.

#### Encroachments

Encroachments, including fill, new construction, substantial improvements and other development within the adopted regulatory floodways, are prohibited unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.

#### Lack of Designation

When a regulatory floodway has not been designated, no new construction, substantial improvements, fill or other development may be allowed within Zones A130 and AE on the Town of Jean Lafitte's Flood Insurance Rate Map, unless it is demonstrated that the cumulative effect of the proposed development, combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

### Standards for Coastal High Hazard Areas

Applicants for all new and substantially improved structures must submit the elevation, in relation to mean sea level, of the bottom of the lowest horizontal structural member of the lowest floor or basement.

- 1 | All new construction must be located landward of the reach of mean high tide.
- 2 | All new construction and substantial improvements must be elevated on pilings and columns so that:
  - a | The bottom of the lowest horizontal structural member of the lowest floor is elevated to two feet above the base flood elevation or higher; and
  - b | The pile or column foundation and structure must be anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used must be those associated with the base flood. Wind loading values used must be those required by the building code. A registered professional engineer or architect must develop or review the structural design, specifications and plans for the construction, and must certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting this provision.
- 3 | All new construction and substantial improvements must have the space below the lowest floor either free of obstruction, or constructed with non-supporting breakaway walls, open wood latticework, or insect screening intended to collapse under wind and water loads without causing collapse or other structural damage to the elevated portion of the building or supporting foundation system.
- 4 | Any breakaway wall must have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot.
- 5 | Use of breakaway walls may exceed a design safe loading resistance of 20 pounds per square foot if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:
  - a | The breakaway wall collapse must result from a water load less than that which would occur during the base flood; and
  - b | The elevated portion of the building and supporting foundation system must not be subject to collapse, displacement or other structural damage due to the effects of wind and water loads acting simultaneously on structural and nonstructural building components. Water loading values used must be those associated with the base flood and must be consistent with the building code.
- 6 | If breakaway walls are used, then the enclosed space may be used solely for parking of vehicles, building access, or storage. The enclosed space may not be used for human habitation.
- 7 | The use of fill for structural support of buildings is prohibited.
- 8 | The manmade alteration of sand dunes, mangrove stands, or bioshields that increase potential flood damage is prohibited.
- 9 | All manufactured homes placed or substantially improved within Zone V1 30, V, or VE of the Town of Jean Lafitte's Flood Insurance Rate Map must meet the standards of Article 5. Section B. 5, Manufactured Homes, as well as all of the provisions of this section.
- 10 | Recreational vehicles placed on sites within Zones V130, V, or VE on the Town of Jean Lafitte's Flood Insurance Rate Map must comply with the standards of Article 5. Section B. 6, Recreational Vehicles, as well as all of the provisions of this section.



## OPEN SPACE PRESERVATION AND CONSERVATION

Preserving critical floodplain areas and wetlands is critical to reducing risk from flooding. The Town of Jean Lafitte has informally established a “desired open space and preservation area” to target for future open space. Jean Lafitte should adopt the Map 1 as their Open Space Preservation Plan for the Town of Jean Lafitte. Future land acquisition and donations can be made consistent with this map to establish permanent open space of these properties. If properties are developed in these preservation areas, they should have a minimum acreage requirement of ten acres, with uses restricted to very low impact uses.



### IMPLEMENTATION MEASURES

- Formally adopt an Open Space Preservation Plan
- Establish a standard requiring a minimum of ten acres per low-impact use.
- Create a mechanism for property owners to retain ownership of the property and adopt deed restrictions that ensure that parcels credited for CRS open space credits will never be developed.

## Landscape Standards

Jean Lafitte currently does not have Landscape Standards. The following types of minimum landscape standards should be adopted for commercially zoned and used properties within Jean Lafitte. Minimum landscape standards, used in conjunction with stormwater management practices will significantly reduce flood risk.

### IMPLEMENTATION MEASURES

Implement minimal landscape requirements that include:

- A ten foot street yard along each street frontage.
- One tree per every 40 linear feet of property along a street, using trees indicated in a preferred tree list.
- A three foot hedge planted between the street and any parking areas located within 60' of the street
- Sidewalks in the designated walkable area of Jean Lafitte.



## Tree Preservation Standards

Trees and forests are valued natural and cultural assets in southern Louisiana. In order to preserve these cultural assets and use these natural assets to reduce risk, the Town should adopt the following tree preservation standards.

## EXAMPLE ORDINANCE

### Preservation of heritage trees:

A heritage tree is any tree or group of trees with the following characteristics:

- 1 | Any live oak, southern magnolia or bald cypress with a DBH of twenty (20) inches or more; or
- 2 | Any tree or group of trees specifically designated by the Town council for protection because of its historical significance, special character or community benefit; or
- 3 | Any additional tree designated on the Town's heritage tree list as approved by the Town council and maintained by the Town council.

### Heritage tree removal

- 1 | The removal of any heritage tree is prohibited unless the Town council issues a tree removal permit.
- 2 | The applicant for a tree removal permit must submit a heritage tree mitigation plan including, but not limited to, the following information:
  - a | Location and type of tree to be removed;
  - b | Number, size and type of replacement trees;
  - c | Location of replacement trees;
  - d | Whether the applicant will pay into to the tree mitigation fund.
- 3 | In the case of emergency, when a heritage tree is hazardous or dangerous to life or property, it may be removed without a tree removal permit.

### Heritage tree mitigation

Mitigation of the removal of a heritage tree may occur in one (1) of the following ways:

- 1 | On-site replacement. When an applicant is proposing to mitigate the removal of a Heritage Tree with on-site replacement, the following standards apply:
  - a | Replacement tree criteria.
    - i | Each Heritage Tree must be replaced at a ratio of 3:1 replacement tree DBH to heritage tree DBH.
    - ii | The replacement trees must be a minimum of two (2) inches DBH at the time of planting.
- 2 | Payment to tree mitigation / open space fund.
  - a | When heritage tree replacement is infeasible, the applicant may request that the Town council allow a payment-in-lieu of tree replacement to the tree mitigation fund.
  - b | The request for payment-in-lieu of tree replacement must be presented to the Town council for review and recommendations approval or denial.
  - c | The Town council may approve or deny an application for a payment-in-lieu of tree replacement to the tree mitigation fund.

### Exemptions

- 1 | Exempt activities.
  - a | Lands used for agricultural purposes.
  - b | The clearing of understory trees and shrubs necessary to perform boundary surveying or to conduct tree surveys or inventories.
  - c | Buildings and uses lawfully existing as of the effective date of this section may be renovated or repaired without providing additional tree conservation and heritage tree preservation, provided there is no change in use of existing floor area, or an increase of less than twenty (20) percent or two thousand (2,000) square feet in expansion or the addition of accessory buildings or structures.
- 2 | Exempt trees.
  - a | Any heritage tree or areas of tree canopy determined by the Town to be diseased, dying or dead.
  - b | Any heritage tree or areas of tree canopy determined to be causing a danger or be in hazardous condition as a result of a natural event such as hurricane, tornado, storm, flood or other natural event that endangers the public health, welfare or safety and requires immediate removal.
  - c | Any heritage trees or areas of tree canopy within twenty (20) feet of a residential building.
  - d | Trees or areas of tree canopy that interfere with the clear sight distance for roadways as determined by the Town engineer.

## USE OF FILL MATERIAL ON INDIVIDUAL LOTS AND BORROW PITS

While there is a strong preference for not allowing fill in Jean Lafitte, there may be circumstances where fill is needed or required. In those cases, and when use of fill is approved by the Floodplain administrator, the following regulations should apply.

### EXAMPLE ORDINANCE

#### Fill

No fill may be placed on an individual lot except as provided below.

- 1 | A maximum of 30 inches of fill material is allowed under the roof line of the principal building without using a retaining wall method of construction.
- 2 | If more than 30 inches of fill are used, then retainer methods of construction are required beyond the initial 30 inches allowed.
- 3 | Fill for all structures that taper to the natural grade at the edge must slope at a grade not to exceed three horizontal feet for every one vertical foot 3:1 . In any case, this fill may not extend out from any improvement or foundation more than six feet.
- 4 | No fill may be placed within six feet of the property line.
- 5 | No fill may be placed within six feet of a floodway.
- 6 | No fill may be allowed around existing trees or groups of trees that are required to remain on the lot.
- 7 | When multiple lots are combined for the purposes of a common development the Floodplain Administrator may treat them as a common lot.

#### Borrow Pits

The following standards apply to any borrow pit larger than 10,000 square feet located within Jean Lafitte.

- 1 | General Provisions
  - a | A borrow pit occurs in two phases. The site excavation phase and the site reclamation phase.
  - b | No borrow pits are allowed in Town of Jean Lafitte without an approved Site Development Permit issued in accordance with the Site Development Permit.
  - c | No borrow pits may be located on a site less 20 acres in size.
- 2 | Excavation and Reclamation Plan
  - a | No site development permit for a borrow pit may be approved without an approved excavation and reclamation plan. Every excavation and reclamation plan must contain the following elements:
- 3 | Excavation Site Plan - each excavation and reclamation plan must contain a site plan identifying the location, depth and design of the borrow pit, fill storage areas, sedimentation and erosion control methods, location and design of required buffer areas and the location and design of access drives.
- 4 | Environmental Impacts - all applicable state and federal permits must be attached as part of the excavation and reclamation plan.
- 5 | Excavation Schedule - each excavation and reclamation plan must contain an excavation schedule establishing the duration of the excavation phase and the times during which excavation activities may take place.
- 6 | Reclamation Plan - each excavation and reclamation plan must contain a plan for how the borrow pit will be reclaimed, excavation impacts mitigated, and include a post excavation site plan and reclamation phase schedule.
- 7 | Plan modifications - modification to an approved excavation and reclamation plan may be reviewed and approved by the Administrator.
- 8 | Excavation Standards:
  - a | No borrow pit may be located within 150 feet of a property line, public drainage ditch, water body, or wetland.
  - b | A 100 foot wide no disturbance area must be established around the perimeter of the borrow pit and between the borrow pit and any property line, water body, or wetland. The no disturbance area may contain a drive to provide site access.
  - c | Existing vegetation must remain within the 100 foot no disturbance area.
  - d | All borrow pits must have a barrier controlling access to the public while not in use.
  - e | Any nonworking face of an active borrow pit deeper than 15 feet must maintain a slope not to exceed 2:1. The working face of a borrow pit may exceed a slope of 2:1 .
  - f | The design and construction of all borrow pit site entrances and exits must be approved by the Jurisdiction Engineer and must be



## EXAMPLE ORDINANCE CONT'D

designed and constructed so as not to cause damage to any road.

g | Methods must be incorporated to prevent the blowing of dust or sediment from the site.

h | All utility easements must be observed and encroachment into the utility right-of-way is allowed only with written approval of the easement holder.

### 9 | Reclamation Standards

#### a | General Standards

- 1 | The stripping and stockpiling of the upper six inches of soil is required for the reclamation phase. These required stockpiles of soil must be seeded and only used for reclamation purposes.
- 2 | No inactive borrow pit may have a slope greater than 2.5:1 .
- 3 | All slopes must be stabilized, equipment and structures removed from the pit, stockpiled top soil placed and planted, banks and slopes rounded, and other reclamation activities completed in accordance with the reclamation plan within 18 months of the cessation of excavation activities.
- 4 | Borrow pits may be reclaimed as wetlands, ponds or lakes provided they are designed and constructed to support a healthy ecosystem.

#### b | Standards for Retention and Detention Ponds

- 1 | Any borrow pit that is reclaimed as a retention or detention pond, or as a lake or other water body deeper than five feet, must be designed and constructed to have an aquatic shelf or wetland bench that is planted with emergent plants and natural grasses.
- 2 | No slope of a retention or detention pond, or lake or other water body deeper than five feet may exceed a 3:1 ratio unless supported by a bulkhead.
- 3 | A pond aerator is required for any pond, lake or water body that is anticipated to maintain water for more than five days after a storm event.

#### c | Permit Revocation

- d | The Site Development permit for a borrow pit may be revoked if a borrow pit is not conducted in a manner consistent with the approved excavation and reclamation plan.

More CRS points are provided if the Town prohibits building on fill or requires compensatory storage if fill is used.



Freeboard	No filling restrictions	Compensatory storage required	Fill prohibited
1 foot	100	110	120
2 feet	225	250	280
3 feet	375	440	500



CENTER *for* PLANNING EXCELLENCE