

REPETITIVE LOSS AREA ANALYSIS #5

Bayou Liberty Study Area • St. Tammany Parish, Louisiana



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University of New Orleans

Center for Hazards Assessment, Response and Technology



<http://floodhelp.uno.edu>

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Repetitive Loss Area Analysis

Bayou Liberty Study Area

St. Tammany Parish, Louisiana

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List of Abbreviations /Acronyms

FEMA – Federal Emergency Management Agency

CHART – Center for Hazards Assessment, Response and Technology at the University of New Orleans

NFIP – National Flood Insurance Program

FIRM – Flood Insurance Rate Map. Flood Insurance Rate Map. An official map of a community, on which FEMA has delineated both the Special Flood Hazard Areas and the risk premium zones applicable to the community

DFIRM – Digital Flood Insurance Rate Map

SFHA – Special Flood Hazard Area. The base floodplain delineated on a Flood Insurance Rate Map. The SFHA is mapped as a Zone A. In coastal situations, Zone V. The SFHA may or may not encompass all of a community's flood problems.

BFE – Base Flood Elevation – elevation of the crest of the base or 100-year flood.

ABFE – Advisory Base Flood Elevation – A FEMA issued advisory BFE that is used until FEMA releases the new FIRM maps.

GIS – Geographic Information Systems

SELA – Southeast Louisiana Urban Flood Control Project

ICC – Increased Cost of Compliance. See page 24.

LRA – Louisiana Recovery Authority

Background

The National Flood Insurance Program (NFIP) is continually faced with the task of paying claims while trying to keep the price of flood insurance at an affordable level. It has a particular problem with repetitive loss properties, which are estimated to cost \$200 million per year in flood insurance claim payments. Repetitive loss properties represent only one percent of all flood insurance policies, yet historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners.

The University of New Orleans' Center for Hazard Assessment, Response and Technology (UNO/CHART) received a special grant from FEMA to collect data and analyze the repetitive loss areas in Louisiana. Using geographic information system (GIS) and flood insurance claims data, repetitive loss areas and properties are being prioritized for attention and analysis. An "area analysis" follows FEMA guidelines to determine whether acquisition, elevation, or other flood protection measures are appropriate and feasible for the repetitively flooded buildings.

UNO has conducted an area analysis case study in the Bayou Liberty neighborhood, an unincorporated area of St.

Tammany Parish just west of incorporated Slidell, Louisiana. The study area was selected for analysis because it contains 94 properties on FEMA's repetitive loss list, 18 of which are considered "severe" (see definitions in the box).

The area: The Bayou Liberty repetitive loss study area is shown on the maps on the next page. It is a suburban neighborhood in St. Tammany Parish, located just west of the city of Slidell. The study area is a portion of a larger area known as "Bayou Liberty" which lies between Bayou Bonfouca and Bayou Liberty, a half mile inland from Lake Pontchartrain. The northern boundary of the study area is Hwy 433, also known as Thompson Road or Bayou Liberty Road.

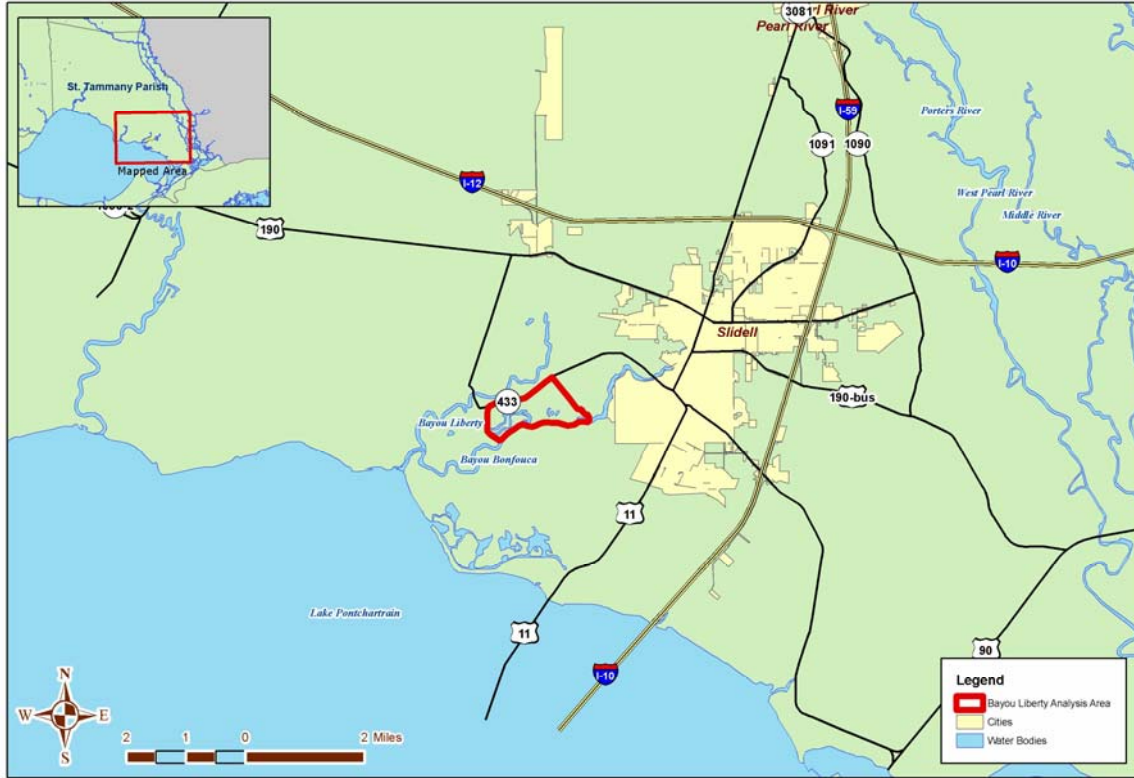
Terminology

Area Analysis: An approach to identify repetitive loss areas, evaluate mitigation approaches, and determine the most appropriate alternatives to reduce future repetitive losses.

Mitigation: According to FEMA, Hazard Mitigation is defined as any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.

Repetitive loss: An NFIP-insured property where two or more claims of more than \$1,000 have been paid within a 10-year period since 1978. To focus resources on those properties that represent the best opportunities for mitigation, a sub-category has been defined: the Severe Repetitive Loss Properties.

Severe Repetitive Loss Properties: As defined by the Flood Insurance Reform Act of 2004, 1-4 family residences that have had four or more claims of more than \$5,000 or two to three claims that cumulatively exceed the reported building's value. The Act creates new funding mechanisms to help mitigate flood damage for these properties.



Area map showing the location of the Bayou Liberty study area



The Bayou Liberty study area

Process: This area analysis follows a FEMA-prescribed five step process:

Step 1: Advise all property owners in the repetitive loss study area that the analysis will be conducted.

Step 2: Collect data on each building and determine the cause(s) of the repetitive damage.

Step 3: Review alternative approaches and determine whether any property protection measures or drainage improvements are feasible.

Step 4: Contact agencies or organizations that may have plans that could affect the cause or impacts of the flooding.

Step 5: Document the findings, including a map showing all parcels in the area.

Prior to beginning the analysis, UNO-CHART undertook several preparatory steps to ensure a more effective outcome of this effort. First, a particular area which meets the criteria for selection, such as local interest and high concentration of repetitive loss properties, was identified. The area was then proposed to the Parish and a decision was made to either proceed with the analysis or to modify the selected area.

The original area proposed by UNO-CHART was smaller than the final area selected. The St. Tammany Office of Homeland Security and Emergency Preparedness suggested a much larger area to ensure a better representation of residents and a greater variety of homes. Once the area was selected, base maps were prepared and all structures were plotted. At this point the five step process prescribed by FEMA was initiated.

Neighborhood Notification

The first step in the area analysis process was to advise the neighborhood about the project. On August 22, 2006, the St. Tammany Parish Office of the Parish President sent a letter to property owners notifying them of the work. (See Appendix A for a copy of the notice). The letter included a data sheet, which is shown on page 29. The back side of the data sheet included UNO/CHART's address and a stamp.

After completing the sheet, the respondent was instructed to fold the form up and return it by mail. Of the 303 property owners to whom a letter was sent, 86 responded. Additionally, 97 letters were returned as undeliverable due mostly to home vacancies and home demolition in the aftermath of Hurricane's Katrina and Rita.

Following the Parish's letter, the UNO/CHART project team met with several members of the Bayou Liberty Homeowner's Association to review the project's objectives, approach, and timetable. The Association provided a great deal of support, particularly in providing the project team with access to data, including several published reports, as well as tours of several historic sites in and around the area. Association members took the team on a tour of Bayous Liberty and Bonfouca. This was crucial to an understanding of the area.

On November 9, 2006 the UNO/CHART team presented a draft copy of this report to the Bayou Liberty residents at a public meeting. The draft was then made available to residents to review and make comments on before this final draft was prepared.

Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. Seven sources of information were used for this: flood studies, flood insurance records, Parish data, the St. Tammany Parish *Hazard Mitigation Plan*, other studies and reports, property owners, and on-site surveying.

Flood Studies

UNO-CHART obtained and reviewed the following studies:

- Flood Insurance Study (FIS), 1989
- Flood Insurance Rate Map (FIRM), April 2, 1991
- FEMA Flood Recovery Guidance, November 30, 2005
- Master Drainage Plan, 1983, Burk & Associates, Inc.
- Bayou Liberty Watershed Management Plan, 2003, Burk-Kleinpeter, Inc.

St. Tammany Parish receives an average of 64 inches of rain each year. The rain comes from tropical storms, thunderstorms, and storms caused by the interaction of warm moist air with colder air from the north. The Parish's precipitation is not spread out evenly over the year. The amount of rain that falls varies from storm to storm and varies over an area. Where this rain goes depends on the watershed.

A "watershed" is an area of land that drains into a lake, stream or other body of water. The runoff from rain is collected by ditches and sewers which send the water to small streams (tributaries), which send the water to larger channels and eventually to the lowest body of water in the watershed (the main channel, Lake Pontchartrain or the Gulf). When one of these conveyance channels receives too much water, the excess flows over its banks and into the adjacent area – causing a flood. St. Tammany Parish has seven major watersheds including Bayou Liberty.

Bayou Liberty begins north of LA Highway 36 and flows 14.5 miles downstream to its outfall into Bayou Bonfouca near Lake Pontchartrain. The existing channel is 20 feet wide at Journey Road and 140 feet wide at its outfall. The water surface elevation of the bayou falls from 13.4 feet above sea level to sea level, a drop of one foot per mile. Both bayous are affected by tidal flow from Lake Pontchartrain.

Approximately 20,000 acres of land comprise the Bayou Liberty Drainage Basin. This watershed, 42% of which is in the floodplain, is bounded by the Bayou Paquet Basin on the west, LA Highway 36 on the north and Bayou Bonfouca – Bayou Vincent Basin on the east. The upper reaches of this basin consist of managed woodlands or tree farms. Some residential development has occurred north of Interstate 12; however, the majority

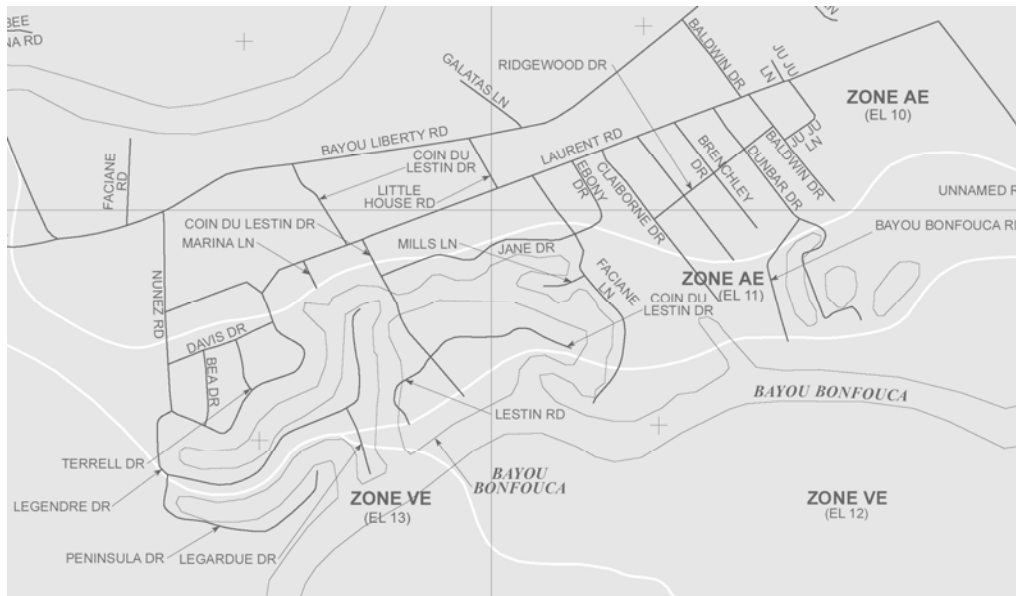
of the existing subdivisions are located south of the Interstate. The land use projections in the 1983 Burk study, predicted a continuation of this pattern. According to the 1993 study, after the watershed is developed, the bayou would need to be able to carry 200% more water than the capacity existing at the time.

Flood Insurance Study: According to the 1989 Flood Insurance Study the area is subject to periodic flooding from rainfall, high tides, and storm surge. The following table shows the flood elevations at Hwy 190 and at I-12.

Location	10 year	50 year	100 year	500 year
Highway 190	10.0	11.2	13.1	16.0
Interstate 12	16.7	17.1	17.6	19.0

Flood Insurance Rate Map: The 1991 FEMA Flood Insurance Rate Map (FIRM) was due to be replaced by a new one in 2005. The preliminary 2005 FIRM for the area is shown below. In the Bayou Liberty area, the flood zones and elevations did not change. However, a new FIRM is expected in 2007 which may change the Base Flood Elevations.

The study area is completely within a Special Flood Hazard Area, most of it designated as a Zone AE. A narrow strip of the Bayou Bonfouca shoreline is designated as Zone VE. In these zones, homeowners are required to carry flood insurance as a condition of Federal financial assistance or a mortgage.



Excerpt from Panel 490 of the July 28, 2005, preliminary Flood Insurance Rate Map for St. Tammany Parish.

FEMA’s insurance and development regulation programs are based on the 100-year flood level, which is called the base flood elevation (BFE). According to the FIRM, the BFE for the northern part of the study area is 10 feet (above sea level). For the southern part, subject to flooding by Bayou Bonfouca, the BFE is 11 feet. A strip of the Bayou Bon-

fouca shoreline designated as Zone VE has BFEs of 12 and 13 feet above sea level. New construction in VE zones are subject to additional requirements to protect them from wave action during a storm.

Advisory base flood elevations (ABFE) were issued by FEMA after Hurricane Katrina devastated the Greater New Orleans area. The ABFEs in this part of St. Tammany Parish are one foot above the BFEs shown on the 2005 preliminary FIRM. The Parish Council has adopted the ABFEs in this area as the official regulatory flood elevations.

Master Drainage Plan, 1983: This study was authorized in response to the rapid growth in this area and recurring flood problems. According to the study, the Bayou Liberty watershed is one of the Parish's areas most prone to flooding, a problem which has been exacerbated by the increased runoff from development. This plan discussed the need for flood control work in the area, although specific projects were not discussed. The plan also stated that funds were not available for routine maintenance.

Bayou Liberty Watershed Management Plan, 2003: This flood study is discussed later in the report.

Flood Insurance Data

The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this report does not identify the repetitive loss properties or include claims information for any individual property.

The table on the next page shows the dates of flooding, rainfall totals, the number of repetitive loss (RL) claims, and the amount paid in claims to the repetitive loss property owners in the case study area.

As the table indicates, flood claims have occurred quite often. The 225 claims that were paid to repetitive loss properties before Hurricane Katrina totaled \$5,756,880, an average of \$25,586 each. The 77 claims from Katrina's flooding totaled nearly \$8 million and averaged \$103,792, which reflects the deeper flooding from the storm.

The table also shows the frequency of past flooding. Floods that resulted in insurance claims to repetitive loss properties in the study area have occurred on an average of once each year since 1979.

Bayou Liberty Analysis Area Flood Claims			
Date(s) of Flooding	Rainfall Totals	# of RL claims	Total Claims
April 22, 1979	None Available	6	\$45,758.34
April 12, 1980	7.08 inches	2	\$25,628.47
January 20, 1983	None Available	3	\$41,790.21
October 28, 1985	Hurricane Juan	17	\$218,821.15
May 14, 1991	None Available	1	\$12,163.97
May 24, 1991	None Available	4	\$35,790.75
August 26, 1992	Hurricane Andrew	9	\$108,687.03
September 15, 1994	None Available	1	\$1,642.93
April 11, 1995	6.21 inches	1	\$1,070.97
May 8-12, 1995	24.01 inches	23	\$442,934.01
April 13-15, 1996	7.59 inches	1	\$1,642.93
October 6, 1996	Hurricane Josephine	5	\$118,138.02
January 4-7, 1998	10.15 inches	1	\$1,494.23
September 10-13, 1998	7.27 inches / Frances	10	\$216,903.18
September 27, 1998	None Available /Georges	27	\$448,853.99
October 2, 1998	None Available	1	\$2,541.60
June 6-11, 2001	14.5 inches / Allison	1	\$19,889.51
September 25, 2002	Hurricane Isidore	77	\$3,419,410.31
October 3, 2002	Hurricane Lili	2	\$10,191.33
June 30, 2003	None Available	7	\$74,939.97
May 10, 2004	None Available	3	\$21,226.75
September 16, 2004	None Available	3	\$104,785.12
October 10, 2004	None Available	19	\$335,675.26
August 25, 2005	None Available	1	\$46,900
August 29, 2005	Hurricane Katrina	77	\$7,992,052.11
Totals:		302	\$13,748,932.14
Claims data valid through May 31, 2006. Rainfall data collected from gauge located at Airport Station #16-8543-6 and totals are for the dates of flooding.			

Parish Data

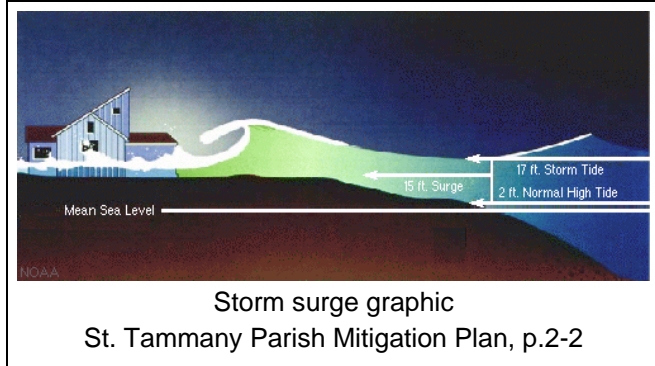
Readily available data from the Parish were accessed including addresses, streets, ordinances, Residential Substantial Damage Estimator findings, streams, census blocks, building footprints and soil types.

RSDE: The Residential Substantial Damage Estimator (RSDE) is a FEMA software program that is used to estimate whether a flooded property was substantially damaged. RSDE data were available for 183 properties in the area. Of these 183 properties, 95 had less than 50% damage, and 88 had more than 50% damage. The 88 properties considered substantially damaged may need to elevate if they are currently below the new Advisory base flood elevations.

2000 Census Data: According to the 2000 census, the study area has a population of 747 individuals within 292 households. Of these individuals, 85% are under the age of 65. Household income varies widely with 24% earning less than \$20,000 and 13% over \$100,000.

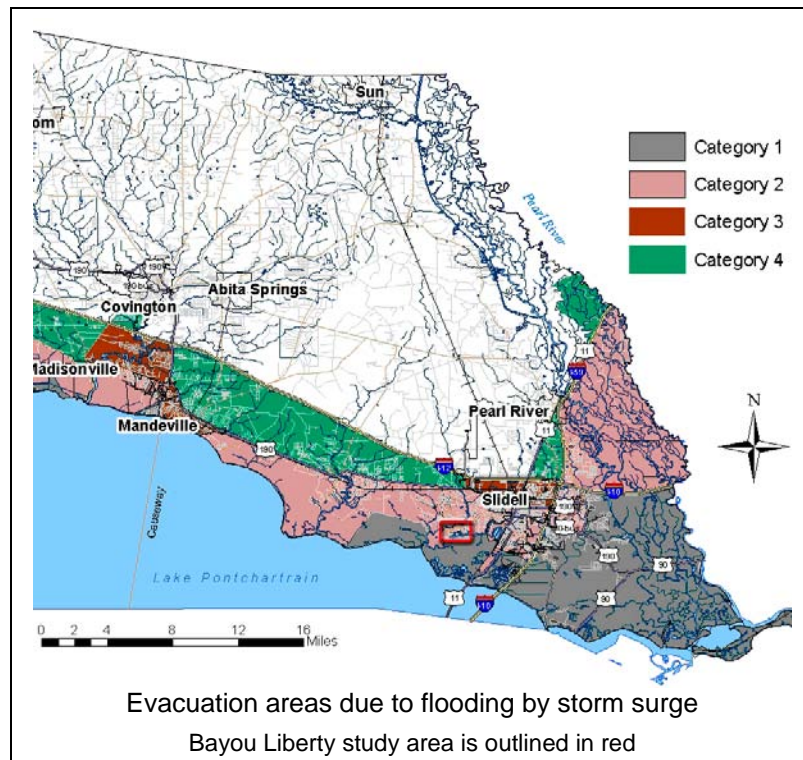
Hazard Mitigation Plan

Chapter 2 of the Parish's 2004 *Hazard Mitigation Plan* states that a flood great enough to have St. Tammany Parish declared a Federal Disaster Area has occurred every 3-4 years on average, over the last three decades. The Plan also discusses tropical storms and hurricanes, stating that tropical storm surge is a problem along Lake Pontchartrain. The plan noted "When a storm makes landfall at high tide, the water level and wind driven waves are even higher. This combination can bring flooding up to 15 feet or more above normal sea level. In a flat area like St. Tammany Parish, 15 feet can cover large areas along the coast." (page 2-2



The 100-year storm surge elevation drops only one foot each 2.75 miles inland. Low lying and coastal areas south of I-12 are reported to be most subject to storm surge flooding. The map below shows the Parish's hurricane evacuation zones. The Bayou Liberty study area is in a zone that should be evacuated in advance of a category 2 hurricane.

The Mitigation Plan concluded that repetitive flooding is one of the Parish's major natural hazards challenges. It identified several clusters of repetitive loss properties. The Bayou Liberty study area was designated as "area 6" (page 2-22). The plan set six overall goals for all of the Parish's hazard mitigation activities. Goal 6 was "Give special attention to repetitively flooded areas" (page 4-3).



Other Reports

The area analysis research looked at other studies and reports on the Bayou Liberty study area. These included a 1988 University of New Orleans Archaeological Survey and a

later report by the Louisiana Department of Culture, Recreation and Tourism's Division of Historic Preservation that noted that some properties may be eligible for listing on the National Register of Historic Places.

In 1999, the Louisiana Department of Wildlife and Fisheries conducted an evaluation to determine if Bayou Liberty should be considered a scenic bayou, in part for historic preservation considerations. Residents on the bayou were asked how they felt about the scenic designation and 40 were in favor and 11 opposed. At the present time no portion of Bayou Liberty has been officially designated as a scenic bayou

Bayou Liberty Association: The Bayou Liberty Association provided a great deal of information on the area, particularly regarding its efforts to preserve the bayous and litigation regarding proposed development projects. In short, the Association filed four lawsuits in recent years in an effort to stop or curtail development. Among other concerns, the Association held that the development projects would increase stormwater runoff into Bayou Liberty. A summary of these efforts is included in Appendix B.

Property Owners

Eighty-six of the property owners returned completed copies of the data sheet shown on page 29. Considering that 303 data sheets were sent, of which 97 were undeliverable, this mailing had a 42% response rate among homeowners who were located. This response rate is considered excellent for this type of mailing, indicating a high degree of interest in flooding and flood protection in this neighborhood. Many homeowners provided extensive comments and some expressed a desire to speak to team members and share their experiences.

The results from the data sheets are summarized in the table on page 11. They show that flooding is seen as a significant problem by the residents in the Bayou Liberty area. The following findings are worth noting:

- 99% of all respondents have experienced flooding.
- Flooding appears to have increased dramatically after 2002
- 81% of respondents flooded in Hurricane Katrina, and 5% have flooded in 2006
- 87% of first floor flooding was over four feet deep.
- 25% of respondents have had flood durations of over 1 day
- 99% of all respondents cite storm surge as the cause of their flooding, 54% cite overbank flooding from the bayous, 10% cited drainage problems.
- All 10 individuals who reported that their flood control measures had been effective had elevated their homes; two of these individuals reported losing all belongings stored underneath the home.
- One respondent reported having elevated his or her home but not to a sufficient height.
- 13 of those individuals who reported that their flood control measures had failed had moved their contents/utilities to a higher level but found that the depth of the flooding was simply too great.
- 76% of the respondents are interested in pursuing flood protection measures.

Responses from the Property Owner Data Sheets			
Question	Number of Respondents		
1. In what year did you move into the home at this address?	1960s – 3 1990s – 18	1970s – 13 2000s – 24	1980s – 18
2. What type of foundation does your House have?	Slab – 39 Slab & Posts/Piles – 6 Slab & Crawlspace – 3		Posts/Piles – 29 Crawlspace – 4
3. Has the property ever flooded or had a water problem?	Yes - 84		No – 7
4. In what year(s) did it flood?	2006 – 4 2005 – 69 2004 – 10 2003 – 11 2002 – 36 2001 – 2	1998 – 9 1997 – 1 1996 – 2 1995 – 6 1992 – 3 1991 – 1	1989 – 1 1988 – 1 1985 – 6 1983 – 2 1980 – 1 1979 – 1
5. What was the deepest that the water got?	Over first floor: 4-7 feet – 37 > 7 feet - 20 1-3 feet – 11 < 1 foot – 2 In yard only: >7 feet – 27 1-3 feet – 11 3-7 feet – 2 < 1 foot – 1		
6. What was the longest time that the water Stayed up in the house?	Unsure – 22 6-12 hours – 10 > 1 day – 21		1–6 hours – 9 12-24 hours – 11
7. What do you feel was the cause of your flooding?	Storm surge from Lake Pontchartrain – 84 Overbank flooding from Bayou – 47 Clogged / undersized drainage ditch – 19 Drainage from nearby properties – 9 Sanitary sewer backup – 6 Standing water next to house – 4 Hurricane – 4 Erosion of barrier islands – 2 Development – 2 Lot clearing – 1 New Orleans levees -1		
8. Have you taken any flood protection measures on your property?	Elevation – 17 Sandbagged - 11 Installed drains or pipes – 2 Tear down house and build higher – 2 Demolished home – 2 Clean out ditches – 1 Abandoned first floor – 1 Waterproofed outside walls 1 Followed FEMA directive – 1		
9. Did any of the measures in #8 work?	No – 17	Yes – 10	Don't know yet – 6
10. Do you have flood insurance?	Yes – 80		No – 5
11. Are you interested in pursuing measures to protect the property from flooding?	Yes – 56		No – 6

On-Site Survey

During the month of September 2006, a crew from UNO/CHART visited every property in the area (although it should be noted that some properties were inaccessible due to growth or fences). Basic information was collected for each property including the following:

- Whether or not the property was occupied
- Type of residence
- Type of foundation
- Condition of foundation
- Type of structure
- Condition of structure
- Number of stories
- Estimate of the height of the first floor above grade
- Estimate of the height of the grade above the street
- Presence of appurtenant structures
- A photograph was taken of each house

The following is a summary of the data collected by the surveying:

- Occupancy Status:
 - 135 (41%) appear to be occupied
 - 80 (25%) appear to be vacant and do not have a trailer in front of the home
 - 77 (24%) have a trailer in front of the home
 - 22 (7%) have been demolished and are empty lots
 - 12 (4%) were undeterminable.
- Type of Residence:
 - 276 (85%) properties appear to be single family homes
 - 2 (<1%) appear to be multi family homes
 - 2 (<1%) are commercial
 - 36 (11%) are either demolished or inaccessible.
- Type of Foundation:
 - 144 (44%) properties are on a slab
 - 91 (28%) are on piles or piers
 - 32 (10%) are elevated basement homes
 - 21 (6%) have a crawlspace
 - 3 (<1%) have a mix of types
 - 36 (11%) are either demolished or otherwise inaccessible.
- Condition of Foundation:
 - 288 (88%) are in good condition
 - 2 (<1%) are in fair condition
 - 1 (<1%) is in poor condition
 - 36 (11%) are either demolished or otherwise inaccessible

- Type of Walls:
 - 149 (46%) are wood frame
 - 111 (34%) are masonry
 - 24 (7%) are brick faced
 - 2 (<1%) are manufactured homes
 - 1 (<1%) is a metal frame
 - 36 (11%) are either demolished or otherwise inaccessible
- Condition of Structure:
 - 282 (87%) are in good condition
 - 9 (3%) are in fair condition
 - 5 (1%) are in poor condition
 - 36 (11%) are either demolished or otherwise inaccessible
- Number of Stories:
 - 170 (52%) have one story
 - 61 (19%) have two stories
 - 51 (have one and one half stories
 - 3 (<1%) have two and one half stories
 - 36 (11%) are either demolished or otherwise inaccessible
- Height of the First Floor Above Grade:
 - 137 (42%) are 0-1 feet above grade
 - 35 (11%) are 1-2 feet above grade
 - 11 (3%) are 2-3 feet above grade
 - 18 (6%) are 3-4 feet above grade
 - 8 (2%) are 4-5 feet above grade
 - 81 (25%) are over five feet above grade
 - 36 (11%) are either demolished or otherwise inaccessible
- Height of Grade Above Street:
 - 216 (66%) have the adjacent grade 0-1 feet above the street
 - 44 (13%) have the adjacent grade 1-2 feet above the street
 - 28 (9%) have the adjacent grade 2-3 feet above the street
 - 7 (2%) have the adjacent grade 3-4 feet above the street
 - 4 (<1%) have the adjacent grade 4-5 feet above the street
 - 1 (<1%) has an adjacent grade of over 5 feet above the street
 - 36 (11%) are either demolished or otherwise inaccessible.
- 27 (8%) homes have appurtenances such as a garage or shed



A home on Legendre Drive one year after Hurricane Katrina. This home has since been demolished.

Certain streets exhibited a greater amount of Hurricane damage than others. Legendre Drive in particular, a street with mostly slab homes, appeared to have suffered greatly.

Problem Statement

Based on the data collected in step 2, the following bullets summarize the repetitive loss problems in the Bayou Liberty study area:

- The Bayou Liberty study area is crisscrossed by small waterways. Most homes are not very high above sea level and many are on the waterfront.
- The area is subject to flooding from heavy rains that cause the bayous to flow over their banks and from storm surge from Lake Pontchartrain.
- Most flooding is slow onset and fairly deep. However, storm surge flooding, while fairly predictable, occurs much more rapidly. The duration of flooding can be fairly long, with many residents reporting a duration of more than 24 hours.
- The 94 repetitive loss properties in the Bayou Liberty study area accounted for almost \$14 million in flood loss since 1978.
- Prior to Hurricane Katrina, flooding of the 94 repetitive loss properties resulted in 225 flood insurance claims for the area at a cost of \$5,756,880.03. Hurricane Katrina produced only 77 claims, for a larger total amount, \$7,992,052.11.
- Roughly 75% of the homes are not elevated above flood levels.
- Hurricanes Katrina and Rita caused extensive damage in the area. Most homes on Legendre remain uninhabited. Many homes have been demolished. 48% of homes for which data are available appear to be substantially damaged and may be required to be elevated above the 100-year flood level.
- Residents report increased flooding as a result of new subdivisions and are concerned over maintenance of the drainage ways and full enforcement of the regulations on new development.
- Most residents have flood insurance.

Alternative Mitigation Measures

After determining the flooding problem and the types and condition of the buildings in the area, the third step in the area analysis procedure can be undertaken: a review of alternative approaches to protect properties from future flood damage. Property owners should look at these alternatives but understand none are guaranteed to work 100%. Nine approaches were analyzed:

- A flood control project that would stop flooding from Bayou Liberty
- Acquiring and clearing properties in the hazardous area
- Elevating the houses above the 100-year flood level
- Reconstruction (replacing a damaged house with one protected from flooding)
- Constructing small levees or floodwalls around one or more houses

- Dry floodproofing
- Wet floodproofing
- Development regulations
- Purchasing flood insurance coverage on the building

Each approach has its pros and cons. The last eight of these measures are considered “nonstructural” approaches, which are usually recommended when structural approaches, such as drainage improvements, are not feasible. A more detailed discussion of nonstructural approaches can be found in the references listed at the end of this report. Except for flood insurance, all of these measures require a permit from the Parish.

While this section proposes different alternative mitigation approaches, there are instances when a property owner’s freedom of choice is limited. Chapter 7 of St. Tammany Parish’s Code of Ordinances prescribes minimum requirements for land use and control measures for floodprone areas of the Parish. Section 7-019.01 defines *substantial improvement* as “any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either before the improvement or repair is started, or if the structure has been damaged and is being restored, before the damage occurred.”

Section 7-042.00 requires that “New construction and substantial improvement of any residential structure shall have the lowest floor (including basement), elevated to or above the base flood elevation.” Therefore, elevation, reconstruction or demolition are required by law for those buildings that were substantially damaged by Hurricane Katrina or any other cause.

Flood Control

Large structural flood control projects, such as dams and levees, have regional or watershed-wide implications and can be very expensive. Because of this, they are often planned, funded and implemented at a regional level by agencies, such as the U.S. Army Corps of Engineers and the USDA Natural Resources Conservation Service.

Several residents mentioned a proposed levee which would affect the Bayou Liberty area. However, no records of such a project could be found and St. Tammany Parish does not currently have plans for such a project. Given how close houses are to the water and the length such a levee would have to be, it is doubtful if one would be cost-effective or eligible for Federal funding support.

SELA: The Southeast Louisiana Urban Flood Control Project, or SELA, was authorized by Congress after the May 1995 floods in Orleans, Jefferson and St. Tammany Parishes. It is specifically charged with dealing with rainfall flooding. The U.S. Army Corps of Engineers is the lead Federal agency. The Corps identified seven areas of severe flood threat or repetitive flooding that could qualify for a flood control project under SELA, but none of the projects would benefit the Bayou Liberty repetitive loss area.

Hazard Mitigation Plan: The St. Tammany Parish *Hazard Mitigation Plan* includes one chapter on flood control. The chapter explained the Parish's approach to flood control (page 8-7):

Since flood control is generally the most expensive type of mitigation measure in terms of installation costs, maintenance requirements and environmental impacts, a thorough study of alternatives is needed before choosing a project. The best way to do this is with a master plan at the watershed level.

A master plan starts with a computer model of the watershed. The model accounts for factors like rainfall, terrain features, runoff characteristics, existing and proposed development, channel dimensions, and "roughness" of the overbank floodplain. Different storms can be routed through the model to see what happens. Past storms are used to calibrate the model with actual experiences.

Retaining runoff onsite is not always the best way to manage stormwater. With all areas retaining and releasing water at the same time, downstream basins are discharging to a stream at the same time that upstream basins are. There might be less water in the channel if downstream areas were allowed to drain during the storm. By the time upstream basins discharge, stream flows would be back down and better able to handle the flows. A watershed model can calculate these flows, their timing and their impacts.

Once developed, the models can perform several services, including:

- Provide an up-to-date map of the 100-year floodplain, which can be used to revise the official FEMA Flood Insurance Rate Map,
- Determine the impact of alternative flood control projects, such as improving a channel here or building a reservoir there,
- Revise floodplain maps, after projects are constructed and operating,
- Determine the impact of new development on stream flows and whether they should retain runoff on site or speed their excess runoff directly to a large receiving body of water, and
- When coupled with real-time rain or river gage readings, provide an early flood warning service.

The watershed models will be completed during the first half of 2004. Because watershed modeling is the best way to design flood control projects (and has the other advantages listed above), the Parish's Department of Engineering has embarked on an extensive master planning program.... The program is starting with the smaller, more floodprone areas, south of I-12.

Full implementation will depend on having sufficient funding. Current plans are to have each basin pay for its own projects, after they are identified.

The chapter makes the following parish-wide recommendations (pages 8-14 – 8-15):

1. The current approach to flood control projects with watershed modeling and planning should be pursued, provided they meet the following criteria:
 - a. Each project's study should look beyond the immediate project site to ensure that no other properties will be adversely impacted.

- b. Each project should be based on a watershed master plan or, at a minimum, coordinated with other projects in the same watershed.
 - c. Each project’s study should consider alternative non-structural approaches to protect the affected properties from flood damage.
 - d. Opportunities for stream and natural areas restoration should be incorporated wherever feasible.
 - e. Communities and property owners that may be affected by the project should be notified.
 - f. All relevant federal, state and local permits should be obtained.
2. New, dependable sources of funding for flood control, drainage improvements, and drainage maintenance should be sought. More funds are needed for Parish projects and for meeting the cost-share requirement for state and federal projects.

Bayou Liberty Watershed Management Plan: One of the watershed studies implemented pursuant to the Parish’s master planning program was for the Bayou Liberty watershed. It was completed in 2003. The plan considered a total of five individual projects and one combined project to reduce flood levels. None of the alternatives would be located within the repetitive loss study area, although they would have impacted the area. In order to mitigate general flooding problems as well as address specific points of concern, the following alternatives were considered.

Bayou Liberty Watershed Management Plan Alternatives		
Alternative	Purpose	Affect on Flood Level
1. Camp Villere Detention Pond	Control peak flows with up-stream regional detention ponds	The maximum reduction in the 100-year profile is 0.5 feet
2. Upper Watershed Detention Pond	Control peak flows with up-stream regional detention ponds	The maximum reduction in the 100-year profile is 3.9 feet
3. Huntwyck Village Detention Pond	Site specific detention pond	The maximum reduction in the 100-year profile is 0.1 foot
4. Tammany Trace Bridge Improvements and Obstruction Removal	Raising a bridge obstruction	The maximum reduction in the 100-year profile is 0.4 feet.
5. Snag the Channels	Remove channel obstructions	The maximum reduction in the 100-year profile is 1.4 feet
6. Master Plan	Combines alternatives 1, 4, and 5	The maximum reduction in the 100-year profile is 2 feet

The Watershed Plan found that none of the alternatives have a positive benefit/cost ratio, nor do they significantly impact flood levels or storm surge flooding. Accordingly, the Parish does not plan to pursue these flood control alternatives. However, the Parish does plan to require new developments to construct detention ponds similar to those considered in the Watershed Plan.

Acquisition

This measure involves buying one or more properties and clearing the site. If FEMA funds were to be used for buyouts, the following three requirements would apply:

1. The applicant for FEMA funds must demonstrate that the benefits exceed the costs, using FEMA's benefit/cost software.
2. The owner must be a willing seller. The high number of vacancies, both from demolished properties and owners who have yet to return, may mean that some owners are indeed willing to sell.
3. The parcel would be deeded to a public agency that agrees to keep it in open space. Some parcels, or groups of parcels in the area, might serve as a historic site or simply a resting spot on the bayou.

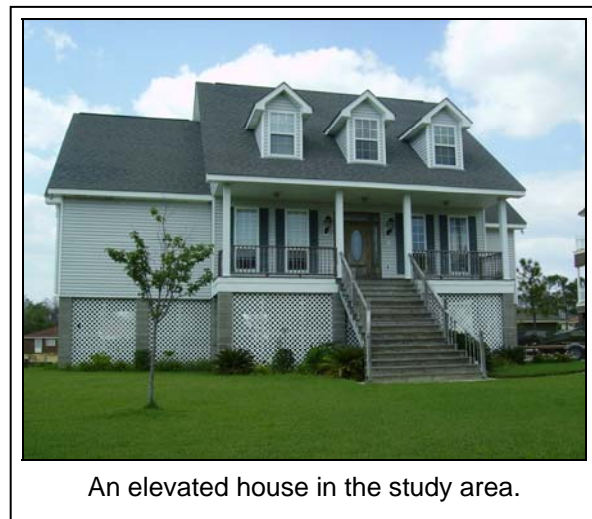
St. Tammany Parish has sponsored acquisition projects and has one application pending from a homeowner in the area.

Elevation

Raising the structure above the flood level is generally viewed as the best flood protection measure short of removing the building from the floodplain. Most of the cost to elevate a building is in the setting up and foundation construction. Because of this, raising the structure to the 100-year flood level costs relatively little more than going to the 10-year level.

FEMA will only fund a project in a Special Flood Hazard Area that raises the lowest floor to at least the advisory base flood elevation (see discussion on page 6). In the Bayou Liberty area, this would mean most houses would have to be elevated approximately ten feet above ground level.

Elevation is usually cost-effective for buildings on crawlspaces or piles/piers because it is easiest to get lifting equipment under the floor and disruption of the habitable part of the house is minimal. There are 91 homes on pilings or piers and 21 on a crawlspace within the target area, some of which may already be above the advisory base flood elevation.



Some properties in the area have already been elevated as a result of previous floods and some may be required to elevate if they are substantially damaged and below the advisory base flood elevation. Additionally, some residents have expressed a desire to elevate in their responses to the data sheet.

Reconstruction

FEMA has recently experimented with a different approach. Formerly called “demo/rebuild,” “Pilot Reconstruction Grants” can be used to demolish a floodprone house and replace it on site with a hazard resistant one that meets all current wind and flood code requirements. Certain rules must be followed if the owner wants to qualify for Federal funds for a reconstruction project:

- Pursuing this option is only possible after a structural engineer concludes that it is not feasible to elevate the existing building.
- Funds are only available to people who owned the property before Hurricane Katrina.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building’s square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.
- The maximum Federal grant is 75% of the cost up to \$150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.



Barriers

Small levees, berms or floodwalls could be constructed around one or more properties. Such barriers are not recommended for flood depths greater than three feet. The depth of flooding in Bayou Liberty is often greater than this.

A second concern is the permeability of the soil. Permeable soil will allow floodwaters to seep under the barrier or through a levee made of local material. This is a particular problem when floodwaters stay up for a long time, as they do in Bayou Liberty.

According to the St. Tammany Parish Soil Survey, most of the properties in the study area are on Myatt Fine Sandy Loam, Stough Fine Sandy Loam and Allemands Muck. These soils have “severe limitations” for levees because of the threat of piping and seepage (Soil Survey, page 123 – 124). Therefore, barriers are not recommended.

Dry Floodproofing

This measure is intended to prevent floodwaters from entering a building. Walls are coated with waterproofing compounds or plastic sheeting. Openings (doors, windows, and vents) are closed, either permanently, with removable shields, or with sandbags. Because it employs the building itself as part of the barrier to the passage of floodwaters, dry floodproofing is generally only recommended for buildings with slab foundations.

Even if the building is in sound condition, tests by the Corps of Engineers have shown that dry floodproofing should not be used for depths greater than 3 feet over the floor – water pressure on the structure can collapse the walls and/or buckle the floor.

There are 144 buildings in the area with slab foundations. One home in the area was previously dry floodproofed but the measure failed. The reason for its failure is unknown. However, dry floodproofing can be quite effective *to its design level* and *when constructed properly*. This measure can be used by some homes to protect against shallow flooding, but will *not* be effective against storm surge or deeper flooding. Accordingly, it is only recommended for slab homes and for protection against local drainage problems.

Wet Floodproofing

The wet floodproofing approach allows water to enter the building. Everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace and water heater are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms. Several homes in the Bayou Liberty area have raised air conditioning units.

Wet floodproofing has one advantage over the other approaches: no matter how little is done, flood damage is reduced. Thousands of dollars in damage can be prevented simply by moving furniture and electrical appliances upstairs

The major disadvantage of wet floodproofing is that the lower area of the structure cannot be finished. While the area can still be used, there should be no carpeting, furniture, insulation, and other materials subject to water damage that cannot be removed in time. There are 32 “elevated basement” foundations where the first floor has been finished. However, in some cases, the owners have opted not to refinish them after they were flooded.

A wet floodproofed raised basement house can be considered an elevated building under FEMA guidance. In other words, the first floor (or basement) can be wet floodproofed and the second story becomes the new lowest floor. This would be done instead of elevating the entire structure, which would be much more expensive. Such an approach greatly reduces the homeowner’s cost of meeting the requirements for substantially damaged homes. Flood insurance premiums would be greatly reduced, too.

Development Regulations

There are two ways to prevent flooding problems from being aggravated by new construction:

- Require new development to hold their excess runoff on site, so it won't overload the existing drainage ways.
- Set construction standards so buildings are protected from floodwaters.

Modern subdivision regulations require new development to ensure that the post-development peak runoff will not be greater than under pre-development conditions. This is usually done by constructing retention or detention basins to hold the runoff for a few hours or days, until flows in the system have subsided and the downstream channels can accept the water without flooding

Section 40-061.01 of the Parish's subdivision regulations requires a hydrological study for all new subdivisions to design the appropriate retention/detention facility. The standards for the facility are in subsection 4:

4. All drainage structures will be designed to provide for reductions in peak rate of runoff for all storm events up to the 100 year storm. The peak rate of runoff for the 25, 50 and 100 year storm shall be reduced by 25%. At no time shall the rate of runoff exceed that of the pre-development conditions of the subject parcel.

It should be noted that, as with most communities' stormwater management regulations, the requirement focuses on the peak rate of runoff, i.e., the maximum amount of water that leaves the site at any one time. More and more communities are realizing that this approach does not address all the problems that new development puts on a community's drainage system.

For example, while the peak flow may be the same or reduced, the total amount of runoff increases with development. Instead of soaking into the ground, rain that falls on pavements and rooftops will be collected and stored in a retention pond. The water will be released over a longer period of time than under natural conditions, which can add to bank erosion and other problems downstream.

A second concern is that water held on site and released over a longer period of time can have an adverse "timing" effect, if the receiving stream is running full from the runoff from other sites. As one reviewer of a proposed development on Bayou Liberty noted,

"...the analysis in the report indicates that the water that runs off the pre-development site does so between the first and third hour, while post development the large volume of runoff would continue for about twice as long. If the peak in runoff from the post-development site is closer to the maximum stage condition in the Bayou, it could result in an increase in flood stages in the Bayou, not withstanding the decrease in peak discharge from the site."

Letter from Dr. Joseph N. Suhayda to Bayou Liberty Association, August 6, 1998

There are two ways to counter these shortcomings. One is to require that the excess flows be kept on site. They could be diverted for irrigation or other use or just allowed to

soak into the ground or evaporate. The other way is to use a master watershed model to calculate and track flows and identify the optimum timing and release rates for each retention pond.

The *Hazard Mitigation Plan* noted that there were other ordinances with regulatory standards that differed or conflicted with these regulations. These problems would be eliminated with the passage of regulations that would replace the “one size fits all” requirement for drainage structures with rules that were tailored to the watershed.

Most communities with a flood problem participate in the National Flood Insurance Program (NFIP). The NFIP sets *minimum* requirements for the participating communities’ standards for development, subdivision of land, construction of buildings, installation of mobile homes, and improvements and repairs to buildings in the mapped floodplain. The Parish has adopted these rules in its Flood Hazard Area Ordinance, Chapter 7, Division 2 of the Parish’s Code of Ordinances. There are three basic requirements for protecting buildings:

- New buildings must be protected from damage by the base flood. In riverine floodplains, the lowest floor of residential buildings must be elevated to or above the base flood elevation (BFE).
- Development in the coastal high hazard area (shown as a V Zone on the FIRM) cannot obstruct the flow of waves, so the lower areas of an elevated building must remain open.
- A “substantially improved” building is treated as a new building. The NFIP regulations define “substantial improvement” as 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 before the start of construction of the improvement. This requirement also applies to buildings that are substantially damaged.

The Parish’s *Hazard Mitigation Plan* reviewed and critiqued these regulations. It found that “The Parish’s Flood Hazard Area Ordinance meets all of the NFIP’s floodplain regulatory requirements.” (page 6-19) But, it reported that FEMA conducted a community assessment visit in 1999 which found numerous “potential violations.” The visit report also recommended that the Parish adopt some standards that are higher than the national minimums.

The report concluded (page 6-28)

- “7. The Parish’s floodplain regulations barely exceed the minimum national requirements. Both the standards and enforcement could be strengthened in several ways.
- “8. The Parish has excellent standards and requirements for new subdivisions and drainage regulations.

“9. The Parish’s programs for drainage regulations and coastal zone and wetlands protection are good. The former will be greatly improved with the adoption of the proposed Watershed Protection Regulations.”

It recommended:

“9. The Parish should review and strengthen its procedures for administering and enforcing its floodplain regulations. In particular, procedures are needed to require permits and conduct inspections after a flood or other disaster....

“12. The Parish Council should adopt the proposed Watershed Protection Regulations.”

Flood Insurance

Although not a mitigation measure that reduces property damage from a flood, a National Flood Insurance Program policy has the following advantages:

- A policy will cover damage caused by any surface flooding from any source. It is an excellent “backup” for a floodwall or elevation project where the flood is higher than the protection level.
- Repetitive, highly localized flooding is unlikely to reach conditions severe enough for a disaster declaration. Therefore, flood insurance may be the only source of assistance to help owners of damaged property pay for cleanup and repairs.
- A policy is always in effect, although new policies do have a 30 day waiting period – there is no need for human intervention.
- Coverage is available for the contents of a home as well as for the structure.
- Renters can buy contents coverage, even if the building owner does not buy coverage for the structure itself.

Cost: The table to the right shows the rates for a policy with \$150,000 coverage on the building. Pre-FIRM buildings are those constructed prior to the first Flood Insurance Rate Map for the area, i.e., before January 1, 1975. These pre-FIRM buildings are eligible for “subsidized” flood insurance premium rates. The table shows that a post-FIRM building, such as one built in 1998, is subject to actuarial rates. Rates vary depending on the building’s elevation.

If a pre-FIRM house was elevated, the owner can benefit from the much lower post-FIRM rates. It should be noted

Example Flood Insurance Premiums	
Policy/Building Exposure	Premium
Pre-FIRM (“subsidized”) rate	\$1,491
Post-FIRM (actuarial) rates	
2 feet above BFE	\$400
1 foot above BFE	\$569
At BFE	\$989
1 foot below BFE	\$3,550
Annual premium is for \$150,000 in building coverage and \$60,000 in contents coverage for a one-story house with no basement and a \$500 deductible.	
<i>Oct. 1, 2006, Flood Insurance Agent’s Manual.</i>	

that the rates are based on the lowest floor, not the first floor. Therefore, owners of pre-FIRM buildings with finished elevated basements pay less with pre-FIRM rates

Funding Sources

There are several possible sources of funding for mitigation projects:

FEMA programs

Most of the FEMA programs provide 75% of the cost of a project. The owner is expected to fund the other 25%. Each program has different Congressional authorization and slightly different rules. For example, some are not allowed to fund reconstruction projects.

The most active program currently is the Hazard Mitigation Grant Program (HMGP). HMGP funds are made available following a disaster declaration which authorizes HMGP assistance, as in the case of the declaration following Hurricane Katrina. These funds can be used to protect public or private property, as long as the project fits within certain guidelines. St. Tammany Parish has focused on mitigating severe repetitive loss properties and is offering three mitigation measures: acquisition, elevation, and reconstruction.

The St. Tammany Parish Office of Emergency Management is currently administering the applications process for the Parish. At the present time eleven homeowners in the Bayou Liberty area have applied for funds: two acquisition, eight elevation, and one reconstruction project. An estimated twenty properties have used HMGP funds following prior flood events.

Flood insurance

There is a special funding provision in the NFIP for insured buildings that have been substantially damaged by a flood, "Increased Cost of Compliance." ICC coverage pays for the cost to comply with floodplain management regulations after a flood if the building has declared substantially damaged. This payment is in addition to the damage claim payment that would be made under the regular policy coverage, as long as the total claim does not exceed \$250,000.

ICC will pay up to \$30,000 to help cover elevation, relocation, demolition, and (for nonresidential buildings) floodproofing. ICC is available for any flood insurance claim and, therefore, is not dependent on the community receiving a disaster declaration. Although a building subject to shallow flooding may be unlikely to be substantially damaged, it could become repetitively damaged by floods. In certain cases, an ICC claim can be paid if the building is repetitively flooded and has had two or more claims averaging 25 percent or more of the building's value within a 10-year period. However, the Parish's ordinance would have to be amended to require that such repetitively flooded properties comply.

Coverage under ICC does have limitations:

- It covers only damage caused by a flood
- The building's flood insurance policy must have been in effect during the flood
- ICC payments are limited to \$30,000 per structure
- Claims must be accompanied by a substantial or repetitive damage determination made by the local floodplain administrator

FEMA has not yet implemented a change to ICC that is authorized by the Flood Insurance Reform Act of 2004. Instead of being triggered only by actual flood damage to an insured building, the Act authorizes payment of an ICC claim as part of a FEMA mitigation grant offer.

Louisiana Recovery Authority

LRA grants of up to \$30,000 can be used to help elevate a house, even if it was not substantially damaged. A separate program funds "individual mitigation measures," including installing a backflow valve and elevating utilities such as an air conditioning unit, washer, dryer, water heater, furnace, or electrical panel.

In order to be eligible for LRA money, a homeowner must have owned and occupied the home as a primary residence prior to August 29, 2005 if affected by Hurricane Katrina, or September 24, 2005 if affected by Hurricane Rita. The homeowner must have registered with FEMA and have had FEMA categorize the home as 'destroyed', having suffered 'major', or 'severe' damage. The home must be a single or double unit structure.

Homeowners who were required to carry flood or hazard insurance but chose not to are eligible; however, they will incur a 30% penalty. To apply for these funds, individuals first have to register with the Louisiana Recovery Authority, and then fill out an application. Individuals can do this on the internet at www.road2la.org or by calling 1-888-road-2la.

Additional information on funding sources can be found in Appendix C.

Coordination

There are many different agencies and organizations that could participate in a flood mitigation project for the Bayou Liberty area. The following were contacted by UNO-CHART:

- FEMA and LRA were contacted about their latest grant program rules.
- The St. Tammany Parish Department of Engineering
- The St. Tammany Parish Public Information Department
- The St. Tammany Parish GIS Department
- The St. Tammany Parish Permits Department
- The problems and possible solutions were discussed with the St. Tammany Parish Office of Homeland Security and Emergency Management.

- The US Army Corps of Engineers, St. Tammany Parish, was contacted for studies on the Bayou Liberty area.

Findings

Residents in the Bayou Liberty study area are subject to deep and frequent flooding. In the past, the 94 repetitive loss properties have received nearly \$14 million in flood insurance claims. In order to reduce their exposure to repetitive flooding, nine mitigation approaches were reviewed. The advantages and disadvantages of these approaches are summarized in the table below.

Summary of the Alternative Mitigation Measures		
Measure	Advantages	Disadvantages
Flood Control	Protects yards and streets as well as buildings	<ul style="list-style-type: none"> • High cost • Studies have not identified projects that should be funded • Environmental disruption
Buyout	100% Flood Protection; 75% funding support available; ICC can help pay 25% owner's share	<ul style="list-style-type: none"> • High cost • Need source of non-FEMA cost share • Need interested public agency to take over the land • Not desirable for historic properties.
Elevation	Good for deep flooding; Flood insurance rate reduction; 75% funding support available; ICC can help pay 25% owner's share	<ul style="list-style-type: none"> • High cost • Owner pays 25% non-FEMA share • Loss of use of basements in raised basement homes • Many lots subject to flooding over 8 feet • More difficult with slab homes
Reconstruction	Good for deep flooding; Flood insurance rate reduction; 75% funding support available; ICC can help pay 25% owner's share	<ul style="list-style-type: none"> • High cost • Owner pays 25% non-FEMA share • Loss of use of basements in raised basement homes
Barriers	Effective for shallow flooding	<ul style="list-style-type: none"> • Subject to seepage if water stays up for a long time • Most lots subject to fairly deep flooding of longer duration • Inappropriate soils
Dry Floodproofing	Low Cost; Effective for shallow flooding on slab foundation	<ul style="list-style-type: none"> • Subject to seepage if water stays up for a long time • Not effective for flood depths over 3 feet • Few homes are on slab foundations
Wet Floodproofing	Low Cost	<ul style="list-style-type: none"> • Owners lose finished lower areas
Development Regulations	Cost of new projects borne by the developer	<ul style="list-style-type: none"> • Focuses on preventing future problems, not on reducing damage to existing development • Some measures are hard to enforce
Flood Insurance	Always in effect; Works for all flood levels; Under ICC, can be a source of funds for buyout or elevation	<ul style="list-style-type: none"> • Does not prevent flood damage (but does provide funds for repairs) • Limited coverage for property in basements

In sum, the table on the previous page shows that

- Large scale flood control projects have not been shown to be feasible. The area will continue to be flooded.
- Acquisition, elevation, reconstruction, and wet floodproofing homes with elevated basements are the best flood protection options for area homeowners.
- Flood insurance can help all homeowners, even those whose homes are already elevated.
- The Parish can use development regulations to minimize the impact of future development on the repetitive flood loss problem and to provide some flood damage reduction benefits.

Recommendations

1. Owners interested in pursuing an acquisition, elevation, or reconstruction project should contact the Parish's Office of Emergency Management and the Louisiana Recovery Authority to learn more about funding possibilities.
2. Owners interested in pursuing wet floodproofing or dry floodproofing should learn more about the measures by checking the references listed in the next section.
3. All property owners should obtain and keep a flood insurance policy on their homes.
4. The Parish should implement the development regulation action items recommended by the *Hazard Mitigation Plan*.
5. The Parish should establish an office to provide technical assistance to property owners interested in pursuing a flood protection project on their own.

References

- *CRS Coordinator's Manual*, FEMA-15, 2005
- *Engineering Principles and Practices for Retrofitting Floodprone Residential Buildings*, FEMA-259, 1995
- Flood insurance data provided by FEMA, May 2006
- *Flood Insurance Study and Flood Insurance Rate Map* for St. Tammany Parish, FEMA, April 2, 1991
- *Flood Recovery Guidance*, FEMA, November 30, 2005
- *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding*. FEMA-312, 1998. <http://www.fema.gov/mit/rfit/>
- St. Tammany Parish *Natural Hazards Mitigation Plan*, 200?
- *Protecting Building Utilities from Flood Damage*, FEMA-348, 2000
<http://www.fema.gov/library/lib06b.htm>

- *Reducing Damage from Localized Flooding – A Guide for Communities*, FEMA-511, 2005.
- Rainfall data through 2001 from Airport Station #16-8543-6 from National Weather Service Forecast Office
- Soils data found at ortho.ftw.nrcs.usda.gov from Natural Resources Conservation Services
- Bayou Liberty Association, Inc. vs. US Army Corps of Engineers; Walmart; and Home Depot, 2000
- Several articles from the Times Picayune
- Several articles from Slidell Sentry-News
- Letter from Bayou Liberty Association to Kevin Davis on November 3, 2000
- Joint Public Notice July 13, 2001
- Letter from Bayou Liberty Association to Slidell City Council on April 16, 2001
- Joint Public Notice February 21, 2001
- Bayou Liberty Letter in Response to Public Notice March 23, 2001
- Bayou Liberty letter 8-21-01
- Letter from Bayou Liberty Association to St. Tammany Parish Zoning Commission
- Letter from Bayou Liberty Association to St. Tammany Parish Council
- St. Tammany Historical Gazette, 1986
- Archaeological Survey of Bayous Liberty and Bonfouca, UNO, 1988
- Census Data, 2000
- Letter from Dr. Joseph N. Suhayda to Bayou Liberty Association, August 6, 1998

Appendix A. Letter to Residents



ST. TAMMANY PARISH
OFFICE OF THE PARISH PRESIDENT
COVINGTON, LA 70434
PHONE: (985) 898-2700
FAX: (985) 898-5237
kdavis@stpgov.org

Kevin Davis
Parish President

August 22, 2006

RE: St. Tammany Parish Repetitive Flooding Project

Dear Bayou Liberty Resident:

The St. Tammany Parish Mitigation Office is reviewing ways to reduce some of our repetitive flooding problems. Your property is located in a part of the Bayou Liberty community that has tentatively been designated a target repetitive flood area.

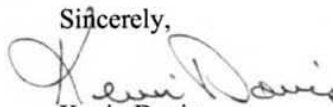
As part of this project, a team from the University of New Orleans' Center for Hazards Assessment, Response and Technology (CHART) is preparing an "area analysis" for the target area. Information specific to your property needs to be collected in order to determine what, if anything, can be done to protect homes in the area from flooding. UNO/CHART staff will be in the area during the day later in August, collecting general information from the street, such as the type of foundation and walls for each home. They will not need to go into your house, but they may need to walk around it.

This work would be greatly improved with additional data that you might be able to provide. Attached is a data sheet that we hope you will complete and return by August 30th. After you fill the form out, please fold it up, tape it, and mail it to the address on the flip side. A stamp has been provided.

After the analysis is completed, some preliminary recommendations will be developed. Later in the fall, we will invite you to a meeting with us and the UNO/CHART team to review the findings.

If you have any questions about this project, please feel free to call Butch Badon of the St. Tammany Parish Mitigation Office at 985/898-3078 or Alessandra Jerolleman at UNO/CHART, at 504/914-6648.

Thank you for your assistance in helping us to complete this project.

Sincerely,

Kevin Davis
Parish President

Attachments

St. Tammany Parish Repetitive Flooding Analysis

Flood Protection Data Sheet

Name: _____

Property address: <<Address>> <<Street>>, Slidell

6. In what year did you move into the home at this address? _____
7. What type of foundation does your house have? Slab Crawlspace Posts/piles
8. Has the property ever been flooded or had a water problem?
 Yes No (if "no," please complete items 8 – 11)
9. In what year(s) did it flood?

10. What was the deepest that the water got?
 Over first floor: _____ deep
 In yard only: _____ deep
 Water kept out of house or building by sandbagging or other protective measure
11. What was the longest time that the water stayed up in the house? ___ hours or ___ days
12. What do you feel was the cause of your flooding? Check all that affect your building.
 Overbank flooding from nearby bayou Storm sewer backup
 Storm surge from Lake Pontchartrain Sanitary sewer backup
 Clogged/undersized drainage ditch Standing water next to house
 Drainage from nearby properties Other: _____
13. Have you taken any flood protection measures on your property?
 Moved utilities/contents to a higher level Elevated all or parts of the building
 Regraded yard to keep water away from building Waterproofed the outside walls
 Installed drains or pipes to improved drainage Built a wall to keep water away
 Sandbagged when water threatened Other: _____
14. Did any of the measures checked in item 8 work? If so, which ones? If not, do you know why they didn't work?
15. Do you have Flood Insurance? Yes No
16. Are you interested in pursuing measures to protect the property from flooding?
 Yes No If yes, please include your full mailing address.

~~ Please return this data sheet by August 30. ~~

Appendix B. Summary of Recent Lawsuits

The Bayou Liberty Association has been active in fighting against proposed development projects, four of which are located near the intersection of I-12 and Airport Road; a short distance from the study area. Of these four projects, two have already been constructed and one has been blocked by the Parish in court on procedural grounds.

The reasons for the Bayou Liberty Association's opposition to these development projects were similar. Their primary concerns were:

- The Army Corps of Engineers' findings of "no significant impact" were based on a methodology that does not account for the cumulative impact of many projects on the drainage system.
- The proposed development will worsen traffic in an already congested area.
- The water retention requirements for new construction are insufficient and existing retention ponds do not function at design levels and overflow at lesser floods.
- New construction will add to the pollution in the bayou which already has a mercury advisory in place for pregnant women and children.
- The City of Slidell utilized annexation measures that did not follow proper legal procedures.
- Unknown archaeological sites may be damaged.
- Many of the areas to be developed already flood extensively.
- Developers have failed to adequately search for alternative sites.
- The continuous paving and filling in of the floodplain will increase total flooding to residential areas in the watershed.
- The amount of wetland loss is often undercounted by developers and mitigation banking does not make up for the loss to area residents.
- Retention ponds are graded towards homes and will cause flooding if they fail.

At the time of this analysis, the Bayou Liberty Association was attempting to prevent a new subdivision just North of Bayou Liberty Road. The reasons for the opposition of this new subdivision are listed below:

- The proposed subdivision is too dense for the area and violates Land Use Ordinance 523
- The proposed site floods frequently, a condition which has worsened due to persistent logging.
- The area does not have any gravity drainage.
- The proposed site is mostly wetlands in the 100 year floodplain

- Thompson Road (Bayou Liberty Road and Hwy 433 in some sections) is the only way out for the all residents and new development may exceed the road's carrying capacity in case of an evacuation.

According to the Bayou Liberty Association in March of 2001:

- 350 acres of the floodplain were affected by development of Northshore Mall Complex; 240 already developed and 190 slated for development
- Most of these acres will be covered with impermeable surfaces
- Northshore Mall covered 90 acres of the 500 year floodplain
- Wal-Mart, Home Depot, and Sam's Club covered 60 acres, loss of 40 acres of pine Savannah and Pine Flatwood wetlands mostly in 100 year floodplain; loss of volume from 155,000 cubic yards of fill
- Northshore Village covers and fills 40 acres
- Intradel site is 18 acres in the 100-year floodplain
- Subdivisions north of 12 have filled and covered east bank of floodplain

Resident Affidavits: Several residents have completed affidavits regarding their experiences with flooding as a result of the various lawsuits which have been filed by the Bayou Liberty Association. These residents report the following:

- An increase in flooding beginning in 1995. Some residents report never having been flooded prior to 1995.
- An increase in flooding during moderate rainfall events.
- An increase in the elevation of water in the Bayou and a greater tendency to overflow.
- Residents blame the flooding on runoff from new commercial development near Airport Road and I-12.
- Concern that development will continue at its current pace and flooding will increase.
- Some residents are concerned that they may need to abandon their homes.

Appendix C Mitigation Funding

	Hazard Mitigation Grant Program (HMGP)	Flood mitigation Assistance (FMA)	Pre-Disaster Mitigation (PDM)	Repetitive Flood Claims (RFC)	Severe Repetitive Loss (SRL)	Louisiana Recovery Authority (LRA)	Increased Cost of Compliance (ICC)
Who is the money for	Owners of severe repetitive loss properties currently insured under the NFIP	NFIP policy holders	NFIP policy holders	NFIP policy holders with at least one flood claim	Owners of severe repetitive loss properties currently insured by the NFIP	All Louisiana homeowners affected by hurricanes Katrina or Rita	All NFIP policy holders with the ICC rider
Type of projects	(1) voluntary acquisition (2) relocation of the structure (3) elevation (4) reconstruction (5) Constructing certain types of minor and localized flood control projects	(1) voluntary acquisition* (2) demolition* (3) relocation of structure* (4) elevation (5) dry flood proofing non residential structures	(1) voluntary acquisition* (2) relocation of structure* (3) structural and non structural retrofitting	(1) voluntary acquisition* (2) demolition* (3) relocation of the structure*	(1) voluntary acquisition (2) demolition* (3) relocation of the structure* (4) elevation (5) floodproofing (6) minor physical localized flood control projects (7) reconstruction	Individual mitigation Measures: (1) window protection (2) Hurricane straps and clips (3) bolt walls to foundation (4) Install backflow valve (5) elevate utilities Elevation funding (1) elevation (2) raised basement conversion	Projects that will bring a substantially damaged home into current code compliance
Maximum amount available per household	For elevation: no maximum; for reconstruction: \$150,000	Contact FEMA	Contact FEMA	Contact FEMA	Contact FEMA	\$7500 for individual mitigation measures; \$30,000 for elevation projects	\$30,000
how much the homeowner has to pay	25%	25%	25%	0%	25%	depends on the project**	0%
How does the homeowner apply	Contact the City	Contact the City	Contact the State	Contact the State	Contact the State	Contact LRA	Contact Flood Insurance underwriter

*: The lot must be deed restricted as open space

**: If the project costs more than the allotted amount, then the homeowner must pay the remainder of the total project cost.

