6. Drainage

Challenges facing the parish

Frequent flooding

Livingston Parish is relatively flat. From approximately sea level in the southern portion of the parish, the land rises very gently to slightly more than 10 feet above sea level at Interstate 12. The north end of the parish is only approximately 40 feet above sea level. As a result, runoff from rainstorms drains very slowly towards the south-southeast at about 3 feet per mile until it reaches sea level at Lake Maurepas. This very gentle gradient makes runoff slow, causing water to back up and flood, but it also means that flooding occurs with relatively low energy and poses less threat to downstream areas.

However, the downstream areas are subject to tidal flux and when heavy rainfall events are coupled with high tides or tidal surges, these areas have an extremely high probability of flooding. This flooding is exacerbated when driven by the high winds that accompany hurricanes.

Over half of the unincorporated parish is considered to be within a 100-year floodplain[17]. The Federal Emergency Management Agency (FEMA) has recently updated the floodplain maps of the parish and increased the designated floodplains slightly in a number of areas.

Significantly increased development in the last decade has likely contributed to increases in the frequency of backwater flooding in the Amite drainage Sub-basin around areas such as Denham Springs, Watson, Walker, and between 4-H Club Road and Highway 16.


The Livingston Parish News

THURSDAY, JANUARY 10, 2013

75 CENTS

Washed out

Deluge floods roads across parish

SCHOOLS STAYED OPEN, THE Courthouse didn't, a casualty of heavy rainstorms that began Tuesday.

Figure 38: Headline in the Livingston Parish News

With the recent experience of Hurricane Isaac (2012) and other rainfall flooding events almost as significant, there is growing recognition of the need to increase system

A Snapshot of Flooding Events 1973 to 2013

April 1973 – 6" of rain. The Amite River spilled over its banks and over 1,800 homes and 70 businesses were flooded.

January 1977 – Hard rain caused extensive flooding. Farmers were hit hard.

May 1977 – Many rivers in the Parish overflowed their banks.

May 1979 – Over 10" of rain. Over 400 people evacuated to shelters. Flash flooding of streams was common.

April 1983 – Over 1,300 homes were destroyed. Over 5,000 people evacuated. Approximately 170 miles of roads were flooded. Water levels were the highest in 90 years.

April 1991 – 10"-15" of rain fell in two days and caused extensive damage. Numerous homes were flooded.

February 1993 – Over 12" of rain. Many homes sustained flood damage. Many roads and businesses were closed.

June 2001 – Over 600 homes and businesses were flooded. The Town of Livingston recorded over 18" in four days. The Amite River crested at 38.24', the fourth worst flood since 1961. 75% of the roads in Port Vincent flooded. Damage estimated at $8.9 million.

August 2013 – Isaac severe weather event.

[17] *Areas with a statistical probability of flooding of 1% in any given year.*

capacity, which is especially undersized in the highly developed areas in the western portion of the parish.

The drainage network of Livingston Parish

Stormwater drainage in Livingston Parish consists of a network of natural bayous and lakes as well as man-made swales, ditches, and lateral canals.

There is no general subsurface storm sewer system. For the most part, roadside drainage ditches are not lined with concrete and many are deeply eroded. Parish subdivision regulations set forth slide slope requirements and stabilization measures, but many ditches were constructed prior to these ordinances.

Man-made detention ponds have been required for most new site development since the subdivision ordinances were approved in 2001. No major retention areas (serving a broad area) have been constructed, but some natural depressions and wetlands are used to retain storm water, particularly in the heavily vegetated areas and wetlands in the northern half of the parish. The wetlands in the south part of the parish are influenced by tides and subject to storm surge during hurricane season, but otherwise function relatively well to retain storm runoff storage most of the year.

Sub-basins and watersheds

Drainage follows watersheds—broad valleys (often barely perceptible in flat areas) that convey water to creeks and bayous. Collections of watersheds that flow together to a common river or lake are called sub-basins. Figure 39 shows the portions of three hydrological sub-basins in the parish.

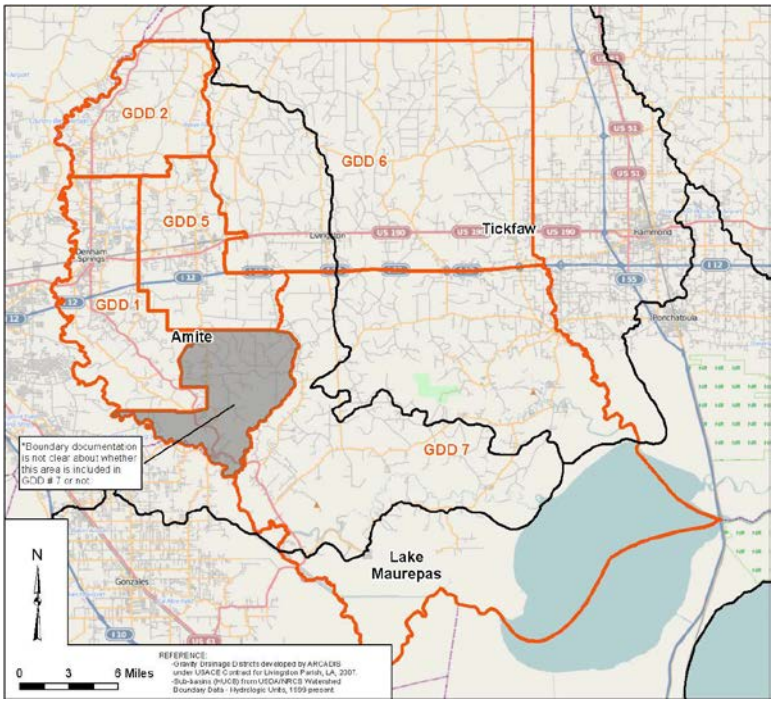

Figure 39: Three hydrological sub-basins in the parish: Amite, Tickfaw, and Lake Maurepas.

Figure 40 shows the watersheds within the sub-basins. The Amite-Lake Maurepas watershed covers the western edge of the parish, crosses into Ascension Parish, and

crosses back into Livingston north of Lake Maurepas, creating two segments within the parish boundary.

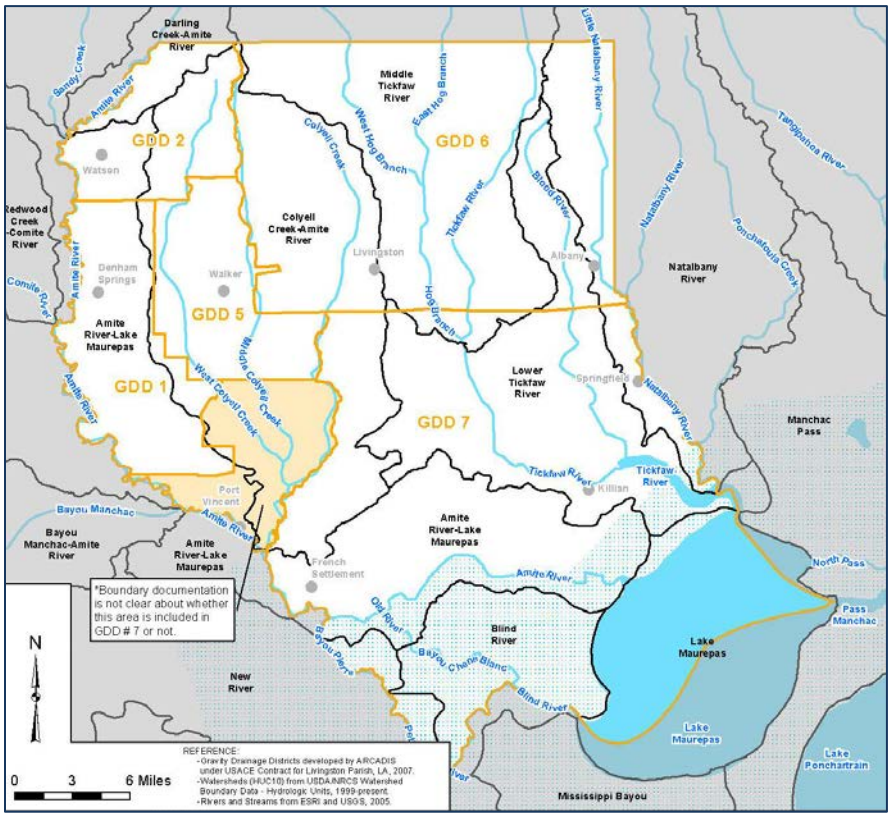

Figure 40: Watersheds.

Buildings and paving in the watersheds

Hard surfaces, such as buildings, roads, and parking lots prevent rainfall from absorbing into the soil, and increase the speed of runoff. Thus, development increases the need for man-made structures to hold runoff back so as not to exceed the capacity of the natural drainage ways—otherwise increased flooding results. As shown on Figure 41 the watersheds in the parish contain varying degrees of development.

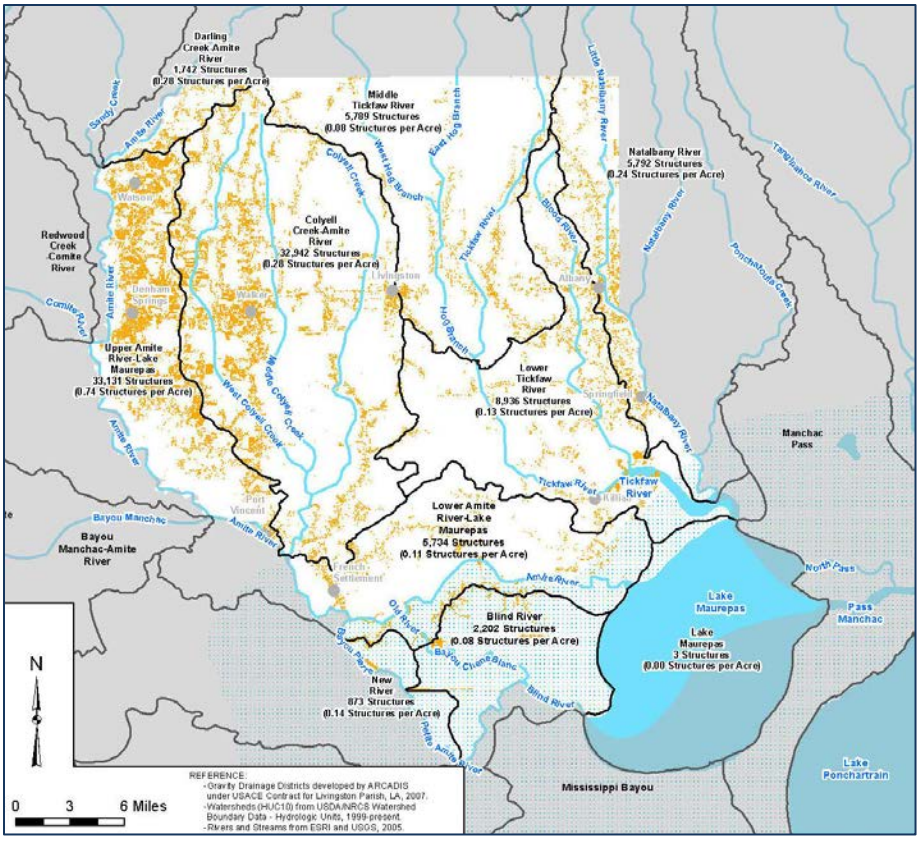

Figure 41: Streams and structures by watershed

Management of the drainage systems

The drainage system is constructed and maintained by several different entities.

Roadside swales and ditches:

- along state roads (between 1200 and 1600 linear miles) are managed by the state;
- along municipal streets are managed by the municipality;
- along parish roads (between 1350 and 1800 linear miles) are managed by the Parish Department of Public Works.

Natural drainage features are maintained by the governing drainage district, if active, or the Parish Department of Public Works in areas where the drainage district is not active.

Subdivision laterals are constructed by the developer, then after an 18-month maintenance period are turned over to the parish or to the drainage authority, if there is one.

Detention ponds are the responsibility of the developer for 18 months, then are either turned over to the homeowners association, a site occupant, or remain the responsibility of the developer.

Gravity drainage districts

Five gravity drainage districts (GDDs) have been created to operate and maintain public drainage works in the parish. The GDD boundaries are shown on Figure 42.

Three GDDs are funded; two remain unfunded.

Each GDD is a political subdivision of the parish and is governed by a board of five commissioners appointed by the Parish Council.

Although only about one-fifth of the land area of the parish is covered by a funded GDD, directors of the GDDs and the parish personnel report that the system works relatively well. The three active GDDs and the Parish Department of Public Works cooperate on an informal basis and share resources and information as needed. Figure 42 illustrates the jurisdiction of each active GDD; the area not covered by a GDD is managed by the parish.

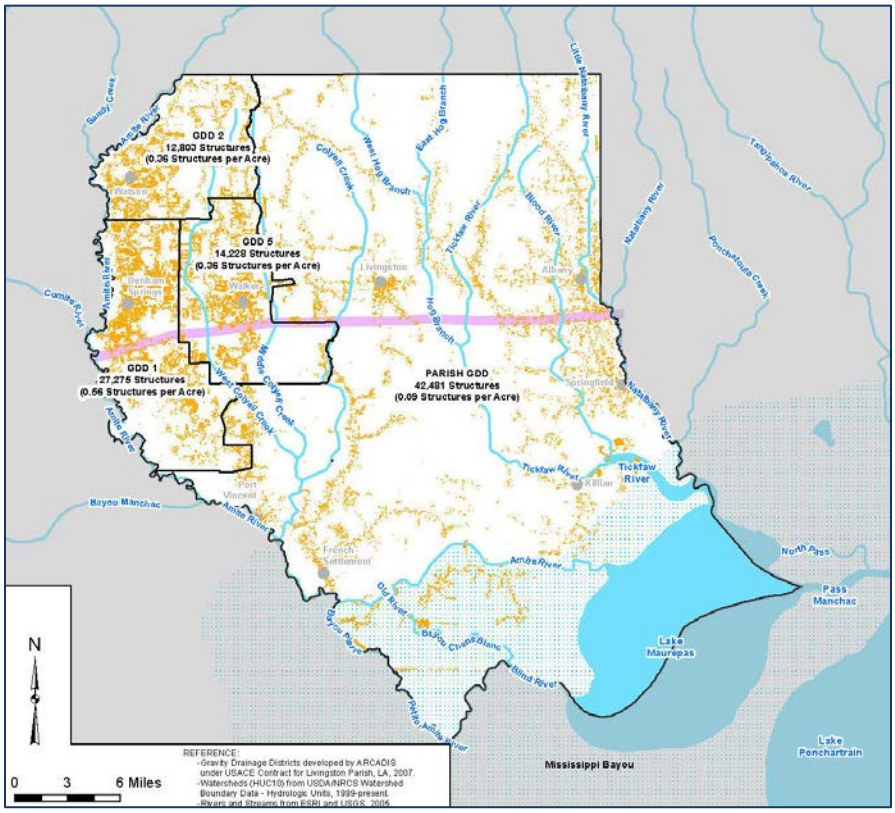

Figure 42: Jurisdiction of each active Gravity Drainage District.

Inter-district issues such as drainage conveyances that cross GDD boundaries are managed among the districts and parish. The GDDs do not feel they have issues with maintenance of the conveyances outside of their jurisdictions.

Funding of drainage improvements and maintenance

The funded GDDs generally levy a ½-cent sales tax, with the tax renewed by vote every 10 years. Some GDDs also collect a property tax, which in some districts is permanent and does not require renewal. Taxes dedicated to a GDD do not revert to the parish general fund.

State drainage operation and maintenance is funded through the Louisiana Department of Transportation and Development operations budget. Parish drainage is funded by the parish general fund.

While the GDD, municipal, and parish revenues are expected to increase with sales tax growth in the near term, the parish and municipal general fund budgets have many interests competing for funding. Only property tax millages and GDD sales taxes are dedicated to drainage. The state budget for drainage is likely to drop as gasoline tax revenues decline.

Drainage planning and coordination

In Livingston Parish, each drainage jurisdiction manages its own inventory and mapping of drainage systems, as resources allow. Coordination among the various drainage authorities is cooperative and informal; responses to blockages and other issues are often undertaken by the party with the best available resources, even when the problem occurs in areas outside their jurisdiction.

There is no comprehensive inventory or mapping of drainage features in the parish, but the regulations reference a master plan with the words "until such time as a Master Plan is adopted by the Parish Council."

Parish development regulations regarding drainage

In the unincorporated areas of the parish, a developer of a subdivision or roadway is required to provide a drainage plan as part of an approved site or construction plan. There is no long-range or master drainage plan for how the overall system will keep pace with development, although reference is made to a Master Drainage Plan in the parish code.

Detention basins are not explicitly required by parish regulations, but are usually the preferred choice for developers to meet the requirement to minimize downstream runoff. When used, detention basins are required to detain enough stormwater to limit the increase of off-site volume to not more than 10 percent. Parish regulations allow the developer/applicant to propose downstream improvements as another measure for minimizing the drainage impacts of new development, subject to approval by the review engineer.

Drainage study requirements and exceptions

A drainage impact study is required for each site proposed for development. Parish ordinances stipulate that the study should provide recommendations for actions that will prevent adverse impacts to surrounding properties; however, no specific net impact limit is stipulated. The informal "rule of thumb" policy is to maintain the same volume of pre-development flow off-site after the development has been completed.

Several exceptions to the requirement for a drainage impact study are listed in the drainage ordinances. A drainage impact study may not be required if a proposed development:

- creates no more than 20 percent impervious surface.
- results in an increase in impervious surface of no more than 10 percent.
- results in no more than a 10 percent increase in peak discharge.

- is already served by a network of public storm drainage facilities.

Servitudes and system management

In accordance with Livingston Parish Code, drainage servitude width can vary from 15 feet (for storm sewers and swales) to greater than 50 feet, depending on functional needs. Local drainage districts may request modifications to facilitate future maintenance; the parish review engineer may also allow variations based on sound engineering practices with the approval of the drainage district, where there is one.

Implementation

Strategies

1. Although the parish drainage system functions relatively well under typical conditions, increasing development in the parish is likely to challenge existing standards. The parish needs to carefully evaluate the cumulative impacts of its current policies (e.g. excepting less than a 10 percent increase from a drainage plan).
2. As development increases, wetlands and natural retention and detention areas will be filled in requiring replacement with man-made features. Costs of construction, and wetlands permitting and mitigation are expected to continue to rise.
3. Servitudes platted and approved prior to recent regulations may not be wide enough to allow sufficient access for even current maintenance or width for future widening that may be needed. Retrofitting existing developments to meet the current standards is needed, but likely not a recoverable expense. Revenue sources need to be explored, including drainage taxes.
4. Liability may be significant for substandard or incomplete drainage features that were approved by the parish and then transferred to the Gravity Drainage Districts. This needs to be addressed. Similarly, current inspection and approval practices remain informal, allowing for undocumented exceptions and variances from accepted standards.
5. The cooperative relationship that exists today among the various drainage authorities will be strained as more demands are placed upon fewer resources at the state and parish levels. More formal policies and procedures may be needed.
6. Wetland permitting has become a time-consuming and expensive task for the drainage authorities, who need permits to clean canals and ditches and clear maintenance servitudes. A combined permit (similar to the "nationwide" wetland permits for roads) should be sought collectively.
7. Although a wetlands mitigation plan is required for preliminary plat approval for subdivisions with improvements, the regulation relies upon the developer to determine whether wetlands occur within the site or not. The magnitude of the liabilities from a lack of wetlands permitting data and potential Section 404 violations needs to be assessed and avoided.

8. Because drainage management is governed by a variety of authorities, no one group appears to be an advocate for the pursuit of grant funding and implementation for drainage mitigation or planning. Cooperative action may be advantageous to all.

Actions

1. Schedule regular meetings of all drainage entities to formalize their cooperation and increase sharing of data, technology, and expertise.

   For example: Walker Office of Louisiana Department of Transportation and Development (LADOTD) completed a blanket Section 404 permit in 2010 for all its ditches in Livingston Parish. The permit manager for LADOTD is an expert in this kind of permitting and could provide guidance for other drainage authorities.

2. When considering creating or funding additional Gravity Drainage Districts (GDDs)

   a. Use the opportunity to align their boundaries with watershed boundaries.

   b. Focus resident approval on areas with most population and highest growth potential.

      For example: GDD No. 6 includes the Middle Tickfaw Watershed, a vast area of undeveloped forest that is sparsely populated with limited revenue sources. Drainage in this area is a lower priority than in the portion of the Natalbany River Watershed that includes Albany and Springfield, where a GDD would be sustainable and popular, particularly as new residents spillover from Tangipahoa Parish.

3. Create a Master Drainage Plan for the growth areas of the parish.

   a. Work through a coalition with GDDs, parish and municipal Departments of Public Works, LADOTD maintenance office, and other agencies.

      For example: The parish-wide GIS could include layers of natural drainage features and surface waters in the parish. This map can be combined with the separate existing drainage maps (Alvin Fairburn Associates has the information), and the drainage map managed by LADOTD, to create a basemap of existing drainage features. (GDD and municipal data will have to be converted from database descriptions to GIS.) Funding for this project may be available through the United States Army Corps of Engineers GIS project.

   b. Seek grant funding utilizing the drainage basemap as the point of departure.

      For example: The directors of GDD Nos. 1, 2, and 5 have expressed an interest in developing a coordinated plan for their districts. Funding for a drainage mitigation plan was secured in 2009 from Federal Emergency Management Agency and Governor's office of Homeland Security and Emergency Preparedness (OHSEP) for the Colyell Creek-Amite River Watershed, which includes GDD No. 5. A contractor was selected in

2012. However, the project contract had not been executed as of July 2012. This funding is part of a phased Hazard Mitigation Grant application awarded for a hydraulics and hydrology study, topographic survey, design preparation and permitting. If the engineering work produces a feasible project, the cost of the drainage improvements will be paid through a $1.5 billion federal appropriation for mitigation projects available to communities in accordance with Section 404 of the Stafford Act following Hurricanes Katrina and Rita.

4. Update parish ordinances to require proof of a jurisdictional determination for any site being developed in the floodplain, or an affidavit that no wetlands are present within the site. If wetlands are present, require a copy of the Section 404 permit application, approved permit, as well as the executed mitigation contracts as a requirement for final approval. These data can then be compiled at the permitting office and mapped over the drainage basemap to determine what activities have been permitted and when the permit expires.

   For example: According to the subdivision procedures, the permitting of a subdivision with improvements follows a logical path from preliminary plat through final plat and bonding. This sequence is followed by an 18-month maintenance period before the developer is released from his bond. Section 404 permitting follows a similar course and can be sequenced with permit milestones as shown in the table below.

Development Permit		Section 404 Permit
Informal Discussion	⇔	Pre-application meeting with USACE
Preliminary Plat	⇔	Request for Jurisdictional Determination
Drainage Impact Study	⇔	Section 404 Permit Application
Construction Plans	⇔	Execution of Mitigation Contract
Final Plat and Bonding	⇔	Permit Issued
Bond Cancellation	⇔	Certification of Completion (Postcard)

5. Require that final plats, drainage plans, jurisdictional determinations, and permit drawings be submitted in digital (ideally GIS) format so that the information can be captured in the parish-wide GIS. If not submitted in GIS format, a small fee could be instituted to cover the cost of digitization.

6. Conduct an engineering evaluation of the cumulative impact of the10% thresholds exemptions from having to do a drainage study.