

KATRINA 5 YEARS LATER: A Brief Glimpse Back With Full Focus On The Future



PRESENTED BY THE SEWERAGE & WATER
BOARD OF NEW ORLEANS
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About the Cover:

The center photo shows the extent of flooding in the Ninth Ward. At least three floodwalls failed, causing flooding in 80 per cent of the City. On a positive note, the other pictures demonstrate the strong will of the men and women of the Sewerage & Water Board to quickly rebuild its damaged facilities and equipment. The Sewerage Treatment Plant, which was extremely damaged by flood waters, is located in the Lower Ninth Ward.

Top Right: Construction is underway for a new Michoud Sewage Pumping Station to replace the one destroyed by Katrina. The \$1.5 million project began in November of 2008 and is scheduled for completion later this year. Two pumping units can transport 2,800 gallons of sewage per minute to the East Bank Sewage Treatment Plant. It is located on Michoud Boulevard near Chef Menteur Highway and serves the Gentilly Boulevard, Michoud and Chef Menteur areas. Under FEMA mitigation guidelines, the Sewerage & Water Board is replacing the old underground facility with the new above ground, state-of-the art station.

Bottom Right: The flooding from Katrina caused catastrophic damage to mechanical equipment, electrical switches, motors, controls and other operational parts of 83 sewage lift and pump stations. All of the equipment in the station's vault was submerged for several weeks and the above-ground electrical enclosures were partially submerged for several days. Many of the stations have been restored, but others need more work before being put back into service.

Bottom Left: The Algiers Water Treatment Plant, which did not flood or sustain wind damage, was established as a command center on Aug. 31, 2005. The plant was in full operation, with power and phone service. The plant was also used to provide housing, food and water for employees on duty or reporting for duty. It served as a staging area from which food and water could be delivered to other employees at duty stations reachable only by boat or helicopter. Additionally, water produced at the plant was sold to FEMA via tanker trucks that distributed it to citizens in New Orleans and other areas ravaged by the storm. Tankers were lined up waiting for the water for transport. FEMA purchased approximately 31,770,000 gallons. The plant was also able to supply water to the New Orleans Fire Department pumpers to help fight the many fires throughout the City.

Top Left: The Dwyer Road Drainage Pumping Station project consists of building a new station with a capacity of 1,050 cubic feet per second (cfs). It is located at the intersection of Dwyer Road and Jourdan Road and includes a new building to house three pumps and all the necessary mechanical and electrical components. Hurricane Katrina disrupted the project's progress, but construction has resumed and it is scheduled for completion later this year at a cost of \$19.3 million with 75 per cent Federal funding and 25 per cent local funds. Other associated projects are a new \$58.8 million concrete box culvert beneath Dwyer Road to be completed in 2010 and an Outfall Canal, which was completed in 2004. The station will improve flood protection for a large portion of eastern New Orleans, including the Academy Park, Pines Village and Kenilworth areas.

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Photos of the men and women of the S&WB are shown throughout this review at work immediately after the storm and through the present recovery and restoration projects.

This document was prepared by the Community & Intergovernmental Relations Department, Robert B. Jackson, Director, on behalf of the dedicated men and women of the Board and its Board of Directors.

This entire document is posted on the Sewerage & Water Board website:
www.swbno.org.



A view of the City's skyline from atop the Lakefront Bridge over Bayou St. John.

Foreword

Everyone in our great City was deeply affected by Hurricane Katrina and its aftermath—the incredible flooding due to breaches in several floodwalls.

These levees were supposed to protect our lives, homes and businesses, but instead they caused 80 per cent of the City to flood, bringing death, destruction and despair.

We should take a brief glimpse back for this fifth anniversary of Katrina, but we really need to put our full focus on the future. This overview shows how the men and women of the Sewerage & Water Board of New Orleans dealt with the challenges of

the past and are now moving quickly and efficiently to the rapid recovery of the future.

It is important that we move to initiate the implementation of the 21st century plan for capital projects that will serve the City of New Orleans in future years.

The Sewerage & Water Board has already accepted the inauguration charge of Mayor Landrieu's to "Rise up off of your knees New Orleans, let's get to work" by handling the mammoth job of strengthening and rebuilding the sewer, water and drainage infrastructure from below the ground up.

Introduction

By Marcia St. Martin
Executive Director
Sewerage & Water Board of New Orleans



Many people wrote New Orleans off after the wrath of Katrina and the subsequent flooding.

All the words of doom: New Orleans will never come back, it will never be the same, and it will be a ghost town. But we tend to agree with Washington reporter Carl Bernstein, of Watergate fame, who said, "...this has never happened in this country. We have never lost an American city or come this close to losing one. And I don't think we'll lose New Orleans, because finally people are recognizing how important New Orleans is."

We agree, Mr. Bernstein...New Orleans will make a full recovery because New Orleanians are survivors, having overcome epidemics, floods, heat waves, hurricanes, mosquitoes and military invasions.

So, we know that all the negative forecasters were wrong.

Much of New Orleans is back as a vibrant City and a close-knit community with a lot of hope for the future.

The men and women of the S&WB never had a doubt that they would repair all of the damaged facilities and that the City

would come back even better and stronger. They remained at their post because it is their duty and responsibility to do so. Immediately following the storm they began repairing the systems.

Look around and you will see new construction of drainage canals, drainage pumping stations, storm proofing of facilities and the modernization of drinking water and waste water plants.

After losing all of the sewage lift stations, today 50% of the east bank facilities and almost 100% of the west bank have been reconstructed. We are adding a back-up generator for the power plant as protection in case power from commercial sources fail.



Drainage Pumping Station No. 6 on the Seventeenth Canal—the largest drainage station in the world.

The Corps of Engineers is funding the flood proofing of the power plant

Those who came before us designed magnificent water, sewerage, drainage and power systems, but even the best systems need updating, replacement and repair.

We are investing millions of dollars to bring the system to Pre-Katrina functionality. The most ever dedicated in the 110-year history of the Board.

We cannot rest on our laurels.



Sediment basins at the Carrollton Water Purification Plant were damaged by Katrina and are now under repair.

Work Began Immediately After Katrina's Destruction **Sewerage & Water Board's Recovery Is Successful Because of Rapid Response, Ingenuity, Hard Work and Dedication**

Incredible Number of Post-Storm Projects Are Most Aggressive, Important and Expensive In History of the Board

Immediately after Katrina hit the City with all its fury and unexpected mass flooding, the management and employees of the Sewerage & Water Board of New Orleans, with the support of Board members, began a most-challenging recovery process.

With no time at first to draw up a formal action plan for such an unprecedented disaster, everyone was working on instinct, experience, knowledge and existing emergency procedures of the water, sewerage, drainage and power systems.

They knew they faced an incredible number of construction and repair projects to be

able to provide quality and reliable services for the citizens of the city. So it was critical to rebuild the massive sewer, water, drainage and power systems.

As more and more formalized planning and strategies came into place, the Board went on a record-breaking pace to begin, continue, complete or put out to bid numerous crucial projects.

After a thorough search, the Board contracted with three program managers, one each for water, sewerage and drainage recovery projects. The Board also contracted with design firms to help speed the construction process.

Major projects scheduled before the storm have now begun, been completed or are underway.

The Sewerage & Water Board's recovery efforts began the day after Katrina hit and have continued constantly thanks to the dedication of the Board members, management and employees.

Executive Director Marcia St. Martin said, "With the full support of our Board of Directors, our goal then, was and still is, full restoration, providing maximum service to those residents and business



Approximately \$6.3 million in repair costs was needed to fully restore the Fluid Bed Incinerator at the East Bank Sewage Treatment Plant which was severely damaged by Katrina.

owners who stayed in the City and those who are planning to return.

"We did get a jump on repairs, but we did not rest on our laurels. Instead, we used our minds, expertise and knowledge of our systems to restore many of our pumps, machinery, equipment, computers, facilities and vehicles and put them back into service more quickly than expected.

"We know we still have a lot of critical work to do, and that's why we want our customers to be aware that we have put together a most competent team which has already had many successes in the rebuilding process in all departments."

Here are just some of these major undertakings the Board staff and program managers have accomplished in the last five years:

- Repair of Old Carrollton Water Pumping Station \$500,000
- Central Yard Annex Building Complete Restoration Repairs \$449,000
- Fluidized Bed Incinerator at the East Bank Sewage Treatment Plant \$6.4 million
- Modifications to Algiers Water plant

disinfection system \$1.25 million

- Removal of residential meters from abandoned accounts \$6.4 million
- Water leak repairs \$51 million and climbing
- Michoud and Lamb Sewage Pumping Stations replacement \$1.9 million and \$1.4 million respectively

- Mechanical repairs to various citywide sewage pumping stations \$56 million.

- Electrical repairs to sewage pumping stations \$3.7 million and \$46.5 of sewage pumping station currently under

construction.

- Harrell Park located on the Carrollton Water Plant site has been restored with a \$1.2 million construction of a new football field and track. This NORD park was used to house SWB employees whose homes were destroyed so they could return to work.

- Rehabilitation of the East Bank Sewage Treatment Plant destroyed by Katrina \$46.4 million expended to date

- Emergency installation of bypass pumps around damaged sewage pumping stations \$6 million

- Re-start of a \$58.8 million Corps of Engineers contract to build a concrete box culvert canal along Dwyer Road to improve drainage in eastern New Orleans.

- Construction has begun on a \$3.5 million, 15-mega watt generator on the grounds of the Carrollton Water Purification Plant. It will give the Board's Division of Pumping and Power the capability to improve the operation of the pumping system in emergencies, including water system emergencies

The generator, the size of a locomotive,

would be put into service if commercial power would fail or become unavailable. The \$3.5 million project is funded 100% by the U. S. Army Corps of Engineers as part of a \$204 million storm-proofing project for Orleans Parish and will greatly enhance pumping and power operations.

The generator is scheduled for completion in October of 2011.

Sewer line leak and break repairs \$26 million.

Electrical repairs to sewage pumping stations \$3.7 million and \$46.5 of sewage pumping station currently under construction.

Since Katrina and through June of 2010, **80,855** water main leaks, and house service leaks, hydrant leaks, valve jobs and meter related repairs were made by board personnel.

More than **14,000** fire hydrants were inspected for pressure, lubricated and painted. Corroded anti-theft devices, which prevent water from being stolen, were replaced on the hydrants at a cost of \$2.2 million.

Some **11,651** paving jobs related to the repair of leaks were completed.

Additionally, **8.5** miles of water mains and 74 valves were installed under the City's

Department of Public Works Paving Program the S&WB's Capital Improvements Program.

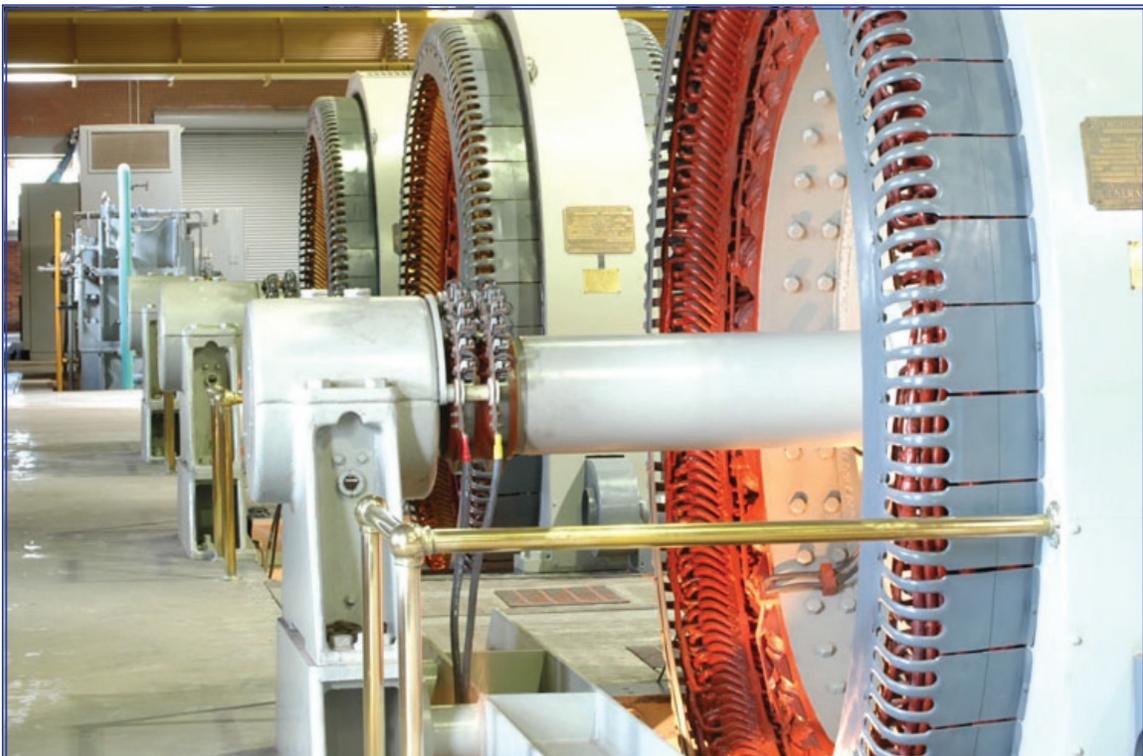
Following Katrina, the Sewerage & Water Board of New Orleans, Environmental Affairs Division was successful in obtaining a \$400,000 grant from the Delta Regional Authority to develop feasibility and pre-design for the Wetland Assimilation Project.

The Environmental Affairs Division was also able to obtain a \$10 million grant from the state's Coastal Impact Assistance Program (CIAP) to construct the first phase of the estimated \$65 million wetland assimilation project. Construction of the project has commenced with a 20-acre demonstration project adjacent to the East Bank Sewage Treatment Plant. Ground breaking is expected in upcoming months.

A history-making completion of a Memo of Understanding with the Corps of Engineers and the State for \$1 billion in SELA urban drainage projects throughout the City was signed in January 2009.

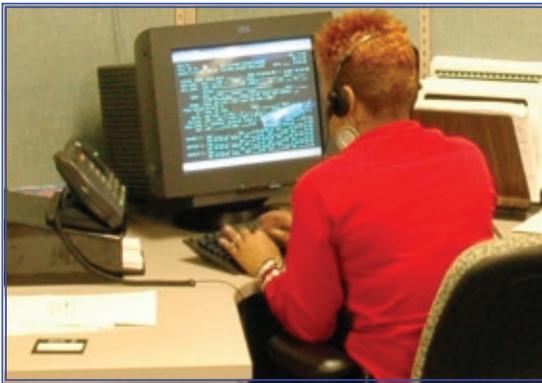
Overall, this magnitude of all of the work after Katrina marks the most aggressive and important rebuilding of the systems and drainage systems in the 110-year history of the Sewerage & Water Board.

Numerous drainage motors were damaged by salt water and were carefully dried and restored.



All S&WB Employees Had A Crucial Role in Recovery

Employees of the S&WB Networks Division are on duty 24 hours a day for emergencies and scheduled repairs. Here, two members of a crew repair a sewer line. In the months and years following Katrina, a record number of broken sewer and water lines, house connection and fire hydrants were repaired by S&WB employees.



Customer service handles 1,500 calls a day. The information the representatives received during the early recovery period helped the Board's Networks Division track the worst areas with water line breaks and damaged fire hydrants.



The Board's Machine and Welding Shop, a part of the Facilities Maintenance Department, can fabricate parts as small as a screw or as large as an impeller for the Board's drainage pumps to exacting specifications. With this capability, the shop can supply in-house manufactured parts (no longer available commercially) to employees in the field, enabling them to restore service to customers in record time. The shop's team takes pride in its ability to manufacture parts no longer available "off the shelf" for the many unique pumps, valves and equipment used throughout the water, sewerage and drainage systems.

Sewerage & Water Board's Emergency Response To Katrina Shared With International Water Utility Professionals

(The following is from a March 13, 2006 speech presented by Marcia St. Martin, executive director of the Sewerage & Water Board of New Orleans, at a Water Quality Conference of the Association of Metropolitan Water Agencies. This information serves as a model response for similar catastrophes facing water utility operators.)

Like many of you and other water utility managers throughout the nation, the week of August 22nd through August 26th, 2005 was a typical one for meetings with staff, Board members and engineers working on a host of enforcement and environmental projects detailed in a consent degree my agency signed with EPA and DOJ in 1998.

It was the week following a meeting of our Board of Directors, so there were actions to be implemented and newly approved projects to be started.

Little did I know that in just a few days, one of the most devastating storms to ever strike the United States would thrust me directly into one of the most massive utility recovery and reconstruction projects ever undertaken by a City or a major utility like ours—The Sewerage & Water Board of New Orleans.

I, along with most members of my fam-

ily, and 80 per cent of our 1,200 employees lost our homes when several levees were breached, allowing a sea of water to flood 80 per cent of the City and destroying more than 200,000 homes and businesses.

The Sewerage & Water Board suffered massive losses of water, drainage and wastewater facilities, equipment, supplies, tools and numerous fleet vehicles, including heavy field equipment.

It is true...the devastation is so much worse than can be depicted in television reports or in newspaper accounts or photos. Even seasoned reporters, emergency experts, insurance company officials and Congressmen express disbelief upon seeing the destroyed areas for the first time.

Today we'll discuss the role of the Sewerage and Water Board in the City's full recovery, but first, let me give you some background on this unique and historical agency.

The Board's Power Plant flooded, leaving much of the water and drainage systems without primary power.





Floodwall breach on the Seventeenth Street Canal

In 1896, a Drainage Commission was organized to carry out a master plan for drainage developed by the City. In 1903, the commission was merged with the Sewerage & Water Board to consolidate sewer, water and drainage functions under one Board.

The Board membership is the Mayor, three councilpersons, seven citizen members with overlapping nine-year terms and two members of the Board of Liquidation, City Debt.

Today, the Drainage System consists of 24 major pumping stations with a combined capacity of 30 billion gallons per day or 50,268 cubic feet per second. The system can create a water flow to match that of the Ohio River. It drains 59,000 acres in the developed parts of the City and 2,250 acres in adjoining Jefferson Parish.

A network of subsurface drain pipes, 93 miles of covered canals and 82 miles of open canals transports runoff from the streets to the pumping stations.

The Water Department operates two water plants, one on the East Bank of the Mississippi River and one on the West Bank, with a combined capacity of 270 million gallons per day.

Purified water is distributed to 143,000

service connections and 17,000 fire hydrants via 1,610 miles of mains.

The Board operates a state-of-the art Water Quality Lab capable of detecting 100,000 compounds, a necessity since our only source of raw water is the Mississippi River.

We operate two wastewater treatment plants—one on the East Bank and one on the West Bank—with a combined treatment capacity of 142 million gallons per day.

Three major pumping stations and 83 lift stations; trunk sewers and force mains transport effluent through the gravity collection system, which consists of 1,450 miles of lateral and trunk sewers.

The Board also operates its own electrical generator plant, which can support all three systems. The 25-cycle plant has a 61,000-kilowatt capacity, an output sufficient to serve a city with a population of 80,000 people.

Now, with that background, I will detail for you the challenges the men and women of the Sewerage and Water Board faced immediately after the storm and what has been accomplished in the last six months.

We knew we had to face Katrina head on, using all the skills, training, experience, ingenuity, planning and dedication of our management and employees and the leader-

ship and support of the Board of Directors.

Katrina's attack left many Board facilities, vehicles and equipment inoperable, completely disrupted normal communication channels and put the lives of many employees who were on duty in jeopardy.

A decision was made by top management early on to protect those assets not damaged and to focus on the business of providing water services (sewer, water and drainage) for the City of New Orleans and other communities devastated by the hurricane as quickly as possible.

Since the Board already had tried and tested hurricane plans and procedures in place for short-term hurricane rainfall runoff, we knew extraordinary and immediate action would need to be taken to offset this type of devastation... and destruction caused by the catastrophic levee breaches, which allowed water to flow into the city for days and remain in our "soup bowl" for weeks.

With a force of 300 employees already on duty, and many more reporting to duty in the next few days following the storm, a number of crucial actions were taken to begin restoration of the systems and to put business procedures in place.

Among them were:

- Establishment of a command center

Helicopters carried giant 3,000-pound bags of filter medium from the Carrollton Water Plant



at the Algiers Water Treatment Plant on **Aug. 31**. The area had not flooded and the plant was in full operation, with power and phone service. The plant was also used to provide housing, food and water for employees on duty or reporting for duty.

It also served as a staging area from which food and water could be delivered to other employees at duty stations reachable

80 PER CENT OF OUR 1,200 EMPLOYEES LOST THEIR HOMES

only by boat or helicopter. Inoculations for tetanus and hepatitis a and b were also available to employees through the location.

Water produced at the plant was sold to FEMA via tanker trucks, which distributed it in New Orleans and other areas ravaged by the storm. 31,770,000 gallons were produced for sale to FEMA.

- On **Aug. 30**, we dispatched staff to the state's command center to secure diesel fuel to run the Algiers plant and other key operations and to obtain cement for a dam to prevent flooding of the Board's crucial electrical generating plant on the East Bank.

- On **Sept. 5**, we opened an administrative office in Algiers and another on **Sept. 10**, in Baton Rouge, located 80 miles west of New Orleans. The BR office gave the S&WB access to the state's command center where FEMA and other key agencies were set up.

- On **Aug. 31**, we contacted GE seeking specialists to help with damage assessment and emergency repair of drainage pumping stations and power plant turbines, motors and pumps. GE began work on **Sept. 3**.

- On **Sept. 6**, established a toll-free phone number for employees to notify management of where they were and how they could be reached for work assignments.

- Held first staff meeting on **Sept. 6** to assess damage, outline an action plan and coordinate activities. Restoration of damaged systems began two days after the storm's passing.

- Set up special communications sys-



Breach in the Industrial Canal Flood Wall

tem through Central Control's radio system when all other forms of communications failed.

- By **Sept. 3**, key staff were located and 350 personnel were on duty to provide services throughout the City at drainage pumping stations, sewer plants, Central Yard, power plants, water treatment plants, Central Control, Water Quality lab and the Engineering Department.

- By **Sept. 5**, the Computer Center was functioning at the Main Building on St. Joseph St. to begin business processes and assist the field operations in any way possible with damage assessment and restoration.

- On **Sept. 7**, the Board sought assistance from FEMA for temporary housing, medical support, food, water and other provisions for staff who had been working constantly since the storm. FEMA began providing assistance on the East and West Banks via boats and helicopters on **Sept. 9**.

- **Oct. 16** restored primary treatment at the East Bank Waste Water Treatment Plant.

- Leased a fleet of vehicles to replace those flooded when the levees failed. This allowed for staff to carry out duties in areas

not flooded and other areas when they were drained.

- **Nov. 16** restored secondary treatment at the East Bank Waste Water Treatment Plant.

- Worked with water, sewerage and engineering associations in posting the needs of area utilities on websites and seeking volunteers from the water profession to assist during the crisis.

There are many stories of heroics by our employees to keep their facilities operating at great risk, to help citizens fleeing their flooding homes and to save the lives of fellow employees.

But all of those employees who worked during and after the storm are part of a

special team, which is a major part of the process of participating in the most massive reconstruction and restoration project in the 107-year history of the Sewerage and Water Board of New Orleans.

THE FEDERAL GOVERNMENT WILL PAY 80% OF THE \$300 MILLION FOR THESE AND OTHER REPAIRS

All of this first stage work helped us achieve one of two primary goals—repair parts of the field systems so that services would be available to citizens and businesses and to accommodate the rebuilding and restoration of the City.



vent disease and allow customers to live in areas, which did not flood and allow hotels, restaurants and other businesses to re-open.

Drainage, of course, would be needed to protect the City from flooding, should additional rainstorms occur.

The other goal was administrative functions to assess damages, file for FEMA funds and insurance claims and to ensure that revenue was collected for those services still being provided.

As more and more people returned to the City, water would be needed for personal and safety needs, clean-up efforts and fire fighting.

Sanitary sewer service would help pre-

A key element in the field and administrative recovery process is the Board's extensive Computer Center which generates operational and financial reports, provides budget reports, processes customer bills, analyses and tracks field work, maintains inventories of supplies, equipment and vehicles, does payroll and maintains the Board's email network and website.

The Center was operational almost immediately—just days after Katrina hit. Its capabilities were of great importance to management in assessing damages, tracking expenses, filing insurance claims, helping determine the extent of damage in the field and to communicate internally and externally.

Through computer-generated reports and analyses, management was able to quickly forge and carry out a comprehensive plan to



Drainage Pump Station 5 on the Industrial Canal had flood waters inside the station and has since been re-built.



restore services, file claims and to re-start a much-needed revenue stream.

I was pleased to report at the January Board Meeting of progress we have made in the field since the storm.

Though we had some \$300 million in damages on the East Bank of Orleans Parish, we are projecting that the sewer and drainage systems will be ready for the heavy spring rains.

Initial inspections of the East Bank wa-

ter distribution system revealed some 3,900 leaks, many of which were from lines broken by tree roots when they were toppled by high winds. By

March 5 approximately 11,853 breaks had been repaired by local contractors hired by the Board board forces and volunteers.

It is still important and a priority to repair the leaks quickly to ensure a safe supply of potable water to all parts of the City and to prevent the costly waste of water.

The Federal government will pay 80 per cent of the \$300 million for these and other repairs.

We suspect that many leaks that are draining the underground pipe system of millions of gallons of water daily have yet to be found, especially in parts of the Lower 9th Ward.

We know we're not finished, because we are pumping 120 million gallons a day, but our population should be using about 40 million.

An inspection of 92 percent of the East Bank's sewer system lines has shown that about half of the system still is blocked, either because water remains in the pipes or because there is no electricity in the area to power

the pumps to move the water. To solve the problem, we are using emergency discharge systems or generators to make the pumps work. The process, known as bypass pumping, is under way or complete at 18 stations, and preparations are being made at seven more.

At this point after Katrina's Aug. 29 impact, we estimate that the board would be collecting about 30 percent of what it had received before Katrina to provide funds the board needs.



The S&WB was able to produce water for NOFD pumpers at the Algiers Plant which was not damaged.

With leaner income in mind because of a drop in revenue from this source, the board has approved a budget for this year that, at \$96.5 million, is almost 19 percent below the

2005 figure of \$118.8 million.

Even though customers may not be occupying their pre-Katrina homes, everyone still owes a flat fee for S&WB services, even though the other part of the bill, for usage, would be virtually nil.

To get an even better grasp on the future customer base and revenue projections, we are embarking on a study to best determine what a pre-Katrina population of 500,000 will be in the future.

We will use flood maps, overlaid by pre-Katrina zip code delivery figures, to determine the per cent of population living in the City. This, combined with actual water usage from meter reading in a zip zone, should give us a base for accurate revenue projections.

The Board expects 30 per cent of Pre-Katrina revenue and recovery expenses of 200 per cent over normal expenses.

So with the expected loss of revenue and

increased costs for restoration, the Board is restructuring its debt, will borrow from the Community Disaster Program and continue to apply for disaster funds.

Before I close today, I would like to take this opportunity to publicly and sincerely thank three water utilities who answered our urgent call for help in the days and weeks after the storm struck.

While we received numerous offers of assistance from throughout the nation, the help these three groups could provide best matched our needs at the time. They are The Portland (Oregon) Water Bureau, The Lafayette (Louisiana) Utilities System and Central Arkansas Water, which serves Little Rock.

Lafayette Utilities dispatched pipeline crews and equipment to help repair numerous breaks in major water lines caused by roots from trees toppled by high winds.

Numerous broken hydrants and water lines were common throughout the City and difficult to repair in a timely manner, after the storm



WE ARE DETERMINED TO ACCOMPLISH OUR LONG TERM GOAL OF “TACKLING THE WORLD’S TOUGHEST WATER CHALLENGES.”

Restoring water service and pressure was crucial for citizen needs and to fight fires occurring throughout the City.

Lafayette also ran hundreds of bacteriological samples from the water supply system at its lab, allowing the Sewerage & Water Board to advise citizens of the quality of water in various parts of the City.

The Little Rock crews supplied staff, equipment and four gate trucks and greatly helped us in the repair and replacement

of valves and pipelines.

I will go into more detail of the Portland team’s work, because their plan is being cited as a model for future disaster assistance for major catastrophes.

Their response included a fleet of gate and maintenance trucks and backhoes and a 35-member emergency response team trained in operations and damage assessment required by FEMA to ensure loss reimbursement under its Public Assistance Program.

The Portland initiative is different than others, which provide short-term help. Its self-contained team is prepared to stay for weeks with its own rations and emergency shelter.

The efforts of these three outstanding utilities are greatly appreciated by our Board, staff and the citizens of New Orleans. Their help was invaluable.

Thank you for allowing me to address you today and to describe what we experienced in New Orleans from Hurricanes Katrina and Rita.

I will also tell you that the men and women of the Sewerage and Water Board, our Board of Directors, our citizens and elected officials are all committed to the full renovation and restoration of our systems and one of the greatest, most resilient and unique cities in the nation—New Orleans..

We are determined to accomplish our long-term goal of “Tackling The World’s Toughest Water Challenges.”

Come visit us soon.

S&WB Employees Had A Crucial Role in Recovery



The Board's Water Quality Laboratory is considered one of the best in the nation, capable of detecting more than 100,000 compounds, which could be found in the City's only source of raw water--the Mississippi River. Through the expertise, hard work and dedication of the entire Water Department, New Orleans' drinking water has met all federal and state drinking water standards since the Environmental Protection Agency established regulations in the 1980s. A "Quality Water" report is mailed to all customers each year.



It was crucial to dry out and repair generators, motors and wiring quickly before salt water destroyed them. Crews were working on the day after the storm passed.



Skiffs and large boats were used to rescue workers and transport staff and supplies to their work stations to assess damage to pumping stations and electrical equipment.



A new concrete subsurface box canal beneath South Claiborne Avenue is just one of many SELA projects completed, underway or in the design stage.

SELA Moves Full Speed Ahead With Start of New Projects and Continuation Of Those Interrupted by Katrina

Hheavy rainfalls in the late 70s, 80s and 90s caused frequent flooding of thousands of homes, businesses, streets and cars in the City, with damages in the millions.

Citizens formed drainage committees and called on The Sewerage and Water Board to upgrade its aging network of canals and pumping stations.

The Board had developed a plan to greatly increase the capacity of the drainage system, but did not have the funds to do all of the massive construction projects needed throughout the City.

But then came the rain event of May of 1995, when as much as 18.75 inches of rain fell on the City, causing massive flooding and, again, millions in damages.

Prompted by the severity of damages associated with rainfall flooding in southeast Louisiana and pressure from citizens, local officials in the tri-parish area of Orleans, Jef-

erson and St. Tammany requested Federal assistance in developing and implementing solutions to the flooding problem.

In 1996, Congress authorized the design and construction of the Southeast Louisiana Urban Flood Control Project (SELA), in a partnership with the U.S Army Corps of Engineers.

Most of the SELA projects were large and expensive construction or improvements to canals, pumping stations and power facilities.

The SELA program consists of several individual project components that are being designed and constructed throughout the tri-parish area.

The Project Cooperation Agreement executed by the Sewerage & Water Board of New Orleans (S&WB) in January 1997 required that the Federal government provide 75% of the total cost of the SELA projects in Orleans Parish, and that the S&WB provide 25%.

On a project, by project basis the S&WB

files applications with the Statewide Flood Control (SWFC) program, administered by the Louisiana Department of Transportation (LaDOTD). The SWFC program provides 75% of the 25% S&WB cost share for projects approved by the SWFC program.

The Phase One

SELA projects, completed before Katrina through August of 2005 at a cost of \$238 million were:

- Expansion of Drainage Pumping Station No. 1 at S. Broad and Martin Luther King Jr. Blvd. by 2,400 cubic feet per second (cfs).
- New concrete box canals beneath Napoleon Ave. from S. Broad to S. Claiborne; on Claiborne from Nashville Ave. to Jena St. and on Claiborne from Jena to Louisiana Ave.
- New canals in Hollygrove beneath the railroad right of way and Eagle, Forshsey and Dublin streets,
- And the Dwyer Road Pumping Station Outfall Canal in eastern New Orleans.

In the years immediately preceding hurricane Katrina, the Federal funding level

did not support the start of many projects that had been approved as SELA projects in

Orleans Parish. But, in the aftermath of hurricane Katrina, Congress appropriated \$228.8 million to accelerate the completion of SELA projects. This appropriation was 100% federally funded.

ADDITIONAL FUNDING OF \$224.8 MILLION HAS BEEN APPROPRIATED BY CONGRESS FOR AUTHORIZED SELA PROJECTS

Because of the increased construction costs in southeast Louisiana as the region rebuilds from Hurricane Katrina, the Supplemental Appropriation was not enough to fund the remaining project components of SELA. Subsequently, in 2008 Congress appropriated an additional \$1.3 billion for SELA for the region. These funds are to be cost shared at 65% Federal and 35% local with payback via a 30-year plan granted by the Administration.

Following Hurricane Katrina, the Federal government acknowledged that the interior drainage of Orleans Parish by its many canals and pump stations is an integral part of the Federal hurricane and storm protection system for Orleans Parish.

To this end, additional funding in the

Drainage pumping station renovations are a key part of SELA's work.



amount of \$ 224.8 million has been appropriated by Congress for the completion of authorized SELA projects.

The SELA projects completed with this funding will be at 100% Federal expense. It is anticipated that this funding will be used to complete the SELA Orleans projects of a new Dwyer Road Drainage Pump Station, a new Dwyer Road Intake Canal and a new subsurface canal along Dwyer Road –6,800 feet of 12-by-10-foot culverts from the St. Charles canal to the pump station at Jourdan Road.

Also underway are the Florida Avenue Canal Phase One improvements. This \$49.1million project is the first phase of a four-phase Southeast Louisiana Urban Flood Control Program (SELA) drainage improvement program. It consists of widening the canal from 25 feet to 42 feet and heightening the canal from 7 feet to 15 feet.

Because of increased construction costs in the area post Katrina, the SELA program required even more funding to construct the balance of the SELA projects. Congress therefore appropriated in 2008 an additional \$1.3 billion Supplemental Appropriations.

A new Project Partnership Agreement was executed in January 2009 which provides that 65% of the total project cost will be Federal, and 35% will be S&WB. Also, the agreement allows for the S&WB to pay its share over a 30-year period. It is anticipated that over \$800 million of this money will be utilized to complete SELA Orleans projects.

Federal SELA Projects – Phase 2 – Construction starts in 2010 and beyond:

The next Federal SELA projects to be constructed in Orleans Parish with post-Katrina 6th and 7th Emergency Supplemental Funds of \$838M with a 65/35 cost share (\$545M Federal/\$293M S&WB):

- Florida Ave. Canal Phase 2 (Mazant to Piety) Florida Ave. Canal Phase 3 (Piety to St. Ferdinand)
- Florida Ave. Canal Phase 4 (St. Ferdinand to Deers & Peoples)
- Louisiana Ave. Canal (Claiborne to Constance)
- Napoleon Ave. Canal Phase 2 (Claiborne to Carondelet)
- Napoleon Ave. Canal Phase 3 (Carondelet to Constance)
- Jefferson Ave. Canal Phase 1 (Claiborne to Dryades)
- Jefferson Ave. Canal Phase 2 (Dryades to Constance)
- S. Claiborne Canal Phase 1 (Monticello to Leonidas) S. Claiborne Canal Phase 2 (Leonidas to Lowerline)

So, as citizens travel around the City, they will see that millions in drainage improvements are underway, nearing completion and under design—all to add protection against flooding.

For more info on SELA and projects, see the S&WB website: www.swbno.org. On the home page click Current Projects and then select Drainage (SELA).

The capacity of Drainage Pumping No. 1 was increased by 2,400 cubic feet per second (CFS) with the addition of two new pumps. The station is located at South Broad St. and Martin Luther King Jr. Blvd.



S&WB Employees Aid in City's Recovery

When one of the pumps at Drainage Pumping Station No. 3 began to "chatter" and make a loud noise, it was discovered that 5 of the 8 impeller blades were cracked. The Board's own employees from Facility Maintenance disassembled the pump, gouged out the cracked areas and weld-repaired the blades. Additional work was done on the shaft while the casing was off. The pump, which has been in service for more than 80 years, was reassembled, test run and put back in service. The station is located at North Broad and the London Avenue. On many jobs, the Board's employees can make repairs more cheaply and quickly than contractors not as familiar with the Board's complex machinery.



Flood waters from Hurricane Katrina submerged many of the giant motors which power the massive pumps of the S&WB's Drainage System. Within three days of the storm's passing, the Board had arranged for a team of experts from the General Electric Corporation to come to the City to work with S&WB staff to dry the motors and begin the re-winding process.

After the storm, an automobile was found at the intake basin of the St. Charles Pumping Station in Eastern New Orleans. Crews removed it before it damaged the station.





Smoke testing is one of the methods used to detect leaks or breaks in sewage lines.

SSERP Back on Track Post-Katrina

Rehabilitation of the City's Sewage Collection System Improves the Environment and Reliability for Citizens

The Sewerage & Water Board of New Orleans began a major rehabilitation and capacity upgrade of its aging sewage collection system in 1996 called SSERP (Sewer System Evaluation and Rehabilitation Program.)

Like most of the nation's major metropolitan areas, New Orleans' underground water and sewer systems are at least 50 years old and, in many cases, up to 100 years old. Factors common to this area, such as unstable soil conditions and large numbers of tree roots, contribute to a higher-than-normal number of breaks and deterioration of the sewer pipes.

At a public meeting in 1996, the S&WB's staff and consultants provided details of a \$631 million multi-year program to the public, environmental, preservation and neighborhood groups, elected officials and the news media.

SSERP was eventually incorporated into a consent decree the S&WB signed with the EPA in 1998 to ensure that system repair work was done on a fixed schedule. At that time,

timetables and deadlines were established for the work.

SSERP is used to identify and address structural and mechanical deficiencies in the wastewater collection system.

A number of new processes are being used for the testing, including a state-of-the-art trenchless method which allows for rehabilitation of buried pipe and manholes without the need for excavation and the disturbance to residents that it causes.

Other testing methods are smoke and dye tests, water flow and rainfall monitoring, manhole inspections and surveys and closed circuit televising (CCTV) of the lines. Sonar technology is also employed to determine the condition of sewer lines that cannot be de-watered.

With the implementation of repairs identified and completed in SSERP, the S&WB will

not only be in compliance with federal regulations, but it will also be accomplishing its goals of protecting the environment and increasing the sustainability of the sewer system.

Hurricane Katrina struck in 2005, causing extensive damage to the sewer collection system. As was evidenced by the extent of damage in the areas where SSERP repairs had not yet been completed, it was shown that the work completed under SSERP is greatly improving the resiliency and dependability of the S&WB's sewer system.



SSERP work was interrupted

due to the storm, and the S&WB invoked force majeure (conditions beyond control) with respect to its obligations under the Consent Decree.

Between 2006 and 2009, the S&WB presented to the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Justice revised schedules for SSERP, reflecting the disruption of work and new activities associated with recovery of the sewerage systems from the damages sustained in August 2005.

On March 22, 2010, the S&WB entered into a Modified Consent Decree (MCD) that maintains the same basic structure of the original 1998 Decree. The MCD set new schedules for completing the remediation of the sewer collection system.

The Sewerage & Water Board is responsible for the coordination of the numerous engineers and contractors carrying out the planning, design and construction of improvements to the sewer system.

As a result of initial planning, the city was divided into the following ten service basins:

Lakeview, Central Business District/French Quarter (CBD/FQ), Gentilly, Uptown, Mid-City, Lower Ninth Ward, Carrollton, New Orleans East, South Shore, and Algiers. The sewer rehabilitation in the tenth basin, Algiers, is not required under the Consent Decree.

The S&WB has been in compliance with every aspect of the original Consent Decree.

Four of the basins (Lakeview, Central Business District/French Quarter (CBD/FQ), Gentilly, Uptown) were completely remedied in accordance with the requirements of the Decree.

For the schedule and progress in the other districts, and the methods used to determine needs and the unique processes to repair the system, visit the S&WB website; www.swbno.org, then click on About the Board, click on Sewerage and click on GOSSERP.

SSERP expenditures to date are \$209 million including rehabilitation and capacity related design, construction, and program management services.

Rebuilding New Orleans' Underground

Currently, the sewage collection system serves an area of approximately 86 square miles and a population of approximately 350,000. It consists of over 1,300 miles of gravity collection and trunk sewers ranging in size from 8-inches to 84-inches in diameter and over 120 miles of force mains ranging in size from 6-inches to 72-inches in diameter. There are 83 pump stations which help convey wastewater to the City's two wastewater treatment plants, one on the East Bank and one on the West Bank (Algiers) of the Mississippi River with a combined capacity of 132 million



SSERP uses trenchless “no dig” techniques whenever possible to repair sewer lines. Here, a polyester felt liner is inserted inside a damaged pipe, then cured in place with hot water to the shape of the broken pipe. The lining system fills breaks in the line without needing to dig into the street at every break in the line.

gallons per day (mgd).

The Sewer Rehabilitation Future

Thus far, the S&WB and its contractors have met the tight consent decree timeline for the initial phases of the project—most ahead of schedule.

At this time, discussions of future funding options are underway by the S&WB, its financial advisors and bond counsel. The future of SSERP, naturally, depends on the availability of funds to complete the projects in accordance with EPA deadlines to avoid large fines of up to \$15,000 per day.

The S&WB has kept the public informed of the SSERP projects through billing inserts, its website, news releases, media briefings, public

hearings and meetings, special neighborhood meetings and participation in meetings scheduled by the Mayor or councilpersons.

Because of the high visibility of smoke and dyed water testing and televising of the sewer lines conducted in conjunction with the sewer evaluation surveys, the S&WB schedules special demonstrations of the tests prior to work beginning. Invited to the demonstrations are area residents, neighborhood and civic associations, environmental groups, elected officials and the media.

For more information regarding the S&WB’s Sewer System Evaluation and Rehabilitation Program (SSERP) visit the SSERP website at www.gosserp.com.

A major part of SSERP’s work, is rehabilitation of sewer manholes.



S&WB Employees Aid in City's Recovery



Lingering floodwaters made it difficult to get crews, supplies and equipment to damaged facilities.



The S&WB arranged for a FEMA trailer park for those employees who lost their homes. Others slept in tents or "in-place" at or near their work places.



Harrell Park, a NORD Playground on S&WB property at South Claiborne and Leonidas, was used for a trailer park for S&WB employees for several years. It was recently refurbished and returned to NORD for recreational use.



The Central Business District as seen from the Algiers Water Purification Plant.

The Future

By Tommie A. Vassel

President Pro Tem Sewerage & Water Board of New Orleans

The men and women of the Sewerage & Water Board have done an outstanding job over the past 5 years since Katrina in its efforts to continue to provide water, sewer and drainage to the citizens and businesses of the New Orleans community.

These men and women clearly understand how critical their services are to daily life in the entire community and especially during a disaster such as Katrina. Over three hundred essential employees risked their lives by continuing to remain on duty. They are truly some of the unsung heroes of Katrina.

The team of Sewerage & Water Board employees that stayed on the job and never left their post were integral in getting the Board up and running just days after Katrina. **This enabled the Board to dewater the City in 11 days after the levees were stabilized. That was truly the beginning of the recovery for the City.**

The Board's management team, led by our Executive Director Marcia St. Martin and our General Superintendent G. Joseph Sullivan, was complemented by some dedicated Board Members to assure that sound financial man-

agement and logistical decisions were made. Those decisions that were made shortly after August 29, 2005 have resulted in the many successes that the Board has attained to date. However, the Sewerage & Water Board's five year Capital Program is estimated at \$3 billion with a \$1 billion dollar shortfall.

A total estimated project cost amount for all FEMA related damages is approximately \$385.8 million. Of this amount, \$294.2 million is obligated by FEMA at this time.

What FEMA and the United States government have failed to provide for, however, is the loss of customer revenue that we suffered as a result of hurricane Katrina. Stop for a moment and think about the fact that we sell water and sewer services to every house and business in our City and then ponder the number of businesses and houses that have not been rebuilt or reoccupied.

Our City and the Board are still reeling from the many citizens and businesses that have not and may not ever return. The Board's customer base is down by at least 20,000 accounts and many of these accounts are only open accounts without water usage. The Sewerage & Water Board has lost many major

accounts that include housing developments, hospitals, shopping malls, apartment complexes and small businesses. Our housing connections are down significantly as a result of citizens opting not to return and others struggling to get the funds needed to complete renovations.

Despite those factors, we must continue to provide quality drinking water, remove sewer from homes and businesses and drain the City from rainstorm water whether there is a home or business there or just a vacant lot.

One of the most critical assets to keeping our Water, Sewer and Drainage systems operating, especially during hurricanes, tropical storms and normal electrical outages is our Power Plant. Until Katrina, it had operated without interruption since 1903 and is truly

the engine that drives our entire system. It flooded in Katrina and was further damaged by Rita, Ike and Gustav. It is the key to keeping our systems running and carries a price tag of \$150 million for restoration.

For all of the Sewerage and Water Board's financial needs (immediate, mid term and future) we have been appealing to the federal government, White House, Congress and state government. We will continue to appeal until we get the critical funds needed for the sewer, water, drainage and power generation systems.

As we move into year 6 and the future of our agency and the City's ability to not only recover, but to get better, the infrastructure needs of our agency must be funded and restored NOW.

As, I've said so often, No Water, No Sewer, No Drainage—No New Orleans! The Sewerage & Water Board touches every aspect of the

City's recovery! As we have for the past 5 years, we will continue to ask for the funding that we need to restore our systems to pre-Katrina functionality. We're only asking the Federal government to do what was promised to our City back in 2005 and again in 2008!

As I see it, the Sewerage & Water Board's motto must be, one of the mottos of our Super Bowl Champion New Orleans Saints, "**Finish Strong!**" In order for the Sewerage & Water Board of New Orleans to **Finish Strong** we must attain the funding—now—from the U.S. government to restore our systems back to Pre-Katrina functionality, receive the funding to restore and update our Power Plant, have FEMA declare our water and sewer system more than 51% damaged as a result of Katrina, build the most effective permanent pump system

at our three outfall canals, rebuild our hospitals and other major institutions, renovate and rebuild our housing stock, remind the business community that we're open for business and, finally, invite our citizens from around the

**NO WATER, NO SEWER NO DRAINAGE
THERE IS NO NEW ORLEANS AND
WITH THIS FOREMOST IN OUR
MINDS, SEWERAGE & WATER BOARD
EMPLOYEES NEVER LEFT AFTER
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THIS STARK REALIZATION BECAME
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WATER BOARD AND ENERGIZED ALL
THE EFFORTS SINCE KATRINA AND
THROUGHOUT THIS RECOVERY.**
Tommie Vassel, President ProTem, Board of Directors September, 2005

country to come back home.

When those things happen, we can then declare a VICTORY in the restoration of the sewer, water, drainage and power generation systems of the Sewerage & Water Board.

And while we have come a very long way in five years, we must continue to be creative and resourceful in finding funds from every source available so that the Sewerage & Water Board will continue to make a positive economic impact on the City of New Orleans for years to come.

Sewerage & Water Board of New Orleans

Mayor Mitchell J. Landreiu
President

Tommie A. Vassel
President Pro Tem

Alan C. Arnold

Councilwoman-At-Large
Jackie Clarkson

Councilman-At-Large
Arnie Fielkow

Councilman District E
Jon D. Johnson

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Dr. Gerald Williams

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Marcia A. St. Martin
Executive Director

Joseph R. Becker
General Superintendent

G. Joseph Sullivan
General Superintendent, Emeritus
