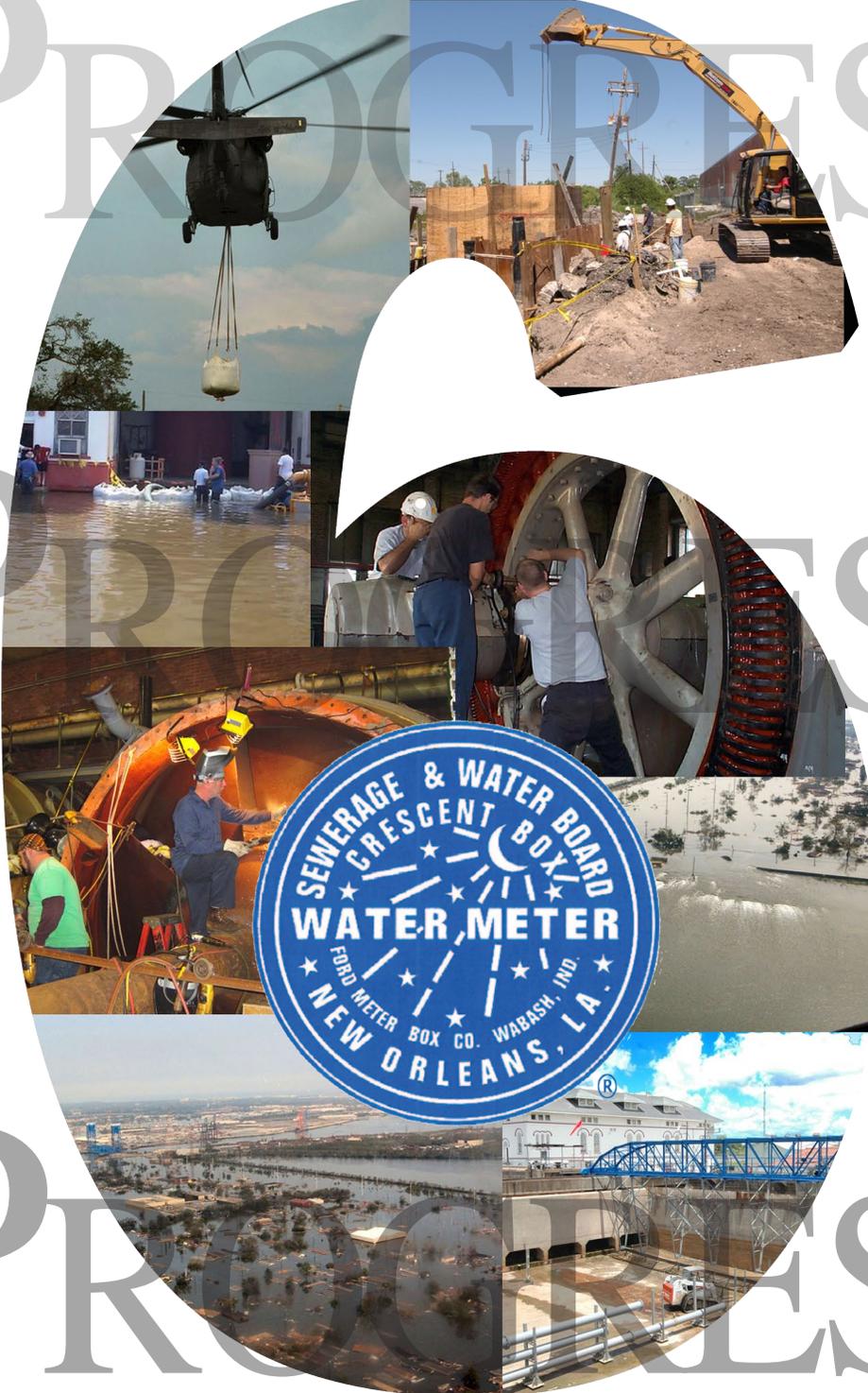


KATRINA

PROGRESS



PROGRESS

PROGRESS

YEARS LATER

PRESENTED BY THE SEWERAGE & WATER BOARD OF NEW ORLEANS

August 29, 2011

Katrina 6 Years Later

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The stories in this booklet were prepared on behalf of The Sewerage & Water Board of New Orleans by its Community and Intergovernmental Relations Department.



“RE-BUILDING THE CITY’S WATER SYSTEMS FOR THE 21ST CENTURY”

Sewerage & Water Board of New Orleans

Mitchell J. Landrieu, President
Tommie A. Vassel, President Pro-Tem

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To The News Media From The Sewerage & Water Board: An Introduction to “Katrina 6 Years Later...Progress, Progress, Progress”

The Board of Directors and the men and women of The Sewerage and Water Board of New Orleans are proud to be a part of rebuilding the water, sewerage, drainage and power systems devastated by Katrina.

The Board is providing this packet of information about our many achievements in the six years since Katrina so that the citizens of New Orleans know of our accomplishments. Enclosed is a review of many projects completed, ongoing or planned.

The total estimated project cost amount for all FEMA-related activity to date is approximately \$461,577,197. Of this amount \$372,754,365 is obligated by FEMA. Additionally, major projects scheduled before the storm have now begun, been completed or are underway.

These articles include information on the ongoing rehabilitation of the sewage collection system, the major rebuilding of the massive drainage system and improvements to the water system and the Board’s own power plant. Stories about the heroics of the Board’s own “first responders” who stayed on duty in dangerous situations and those that risked their lives to report to their duty stations are included.

Executive Director Marcia St. Martin said, “Our goal of full restoration remains, so that we can provide maximum service to those residents and business owners who stayed in the City and those who have returned, have opened new businesses or who are still planning to return. We are resolute in this challenge.”

CONSTRUCTION OF WATER, SEWERAGE & DRAINAGE IMPROVEMENTS ARE VISIBLE THROUGHOUT THE CITY



The Sewerage and Water Board of New Orleans and the U.S. Army Corps of Engineers are working on the \$49.1 million Phase One of the Florida Avenue Drainage Canal project on the west side of the Industrial Canal. The four-phase drainage improvement program consists of widening the canal from 25 feet to 42 feet and heightening the canal from 7 feet to 15 feet. It is part of the Southeast Louisiana Urban Flood Control Program (SELA). The area of construction extends from DPS#19 to Mazant Street. Once completed, the Florida Avenue Canal will provide increased drainage capacity for residents and businesses in that area of the city.

S&WB Troops Hit the Ground Working After Katrina

Large Number of Recovery Projects Proving To Be Most Aggressive, Crucial in N.O. History

The Board of Directors the Sewerage and Water Board of New Orleans, its management and employees knew they had an incredible restoration and re-building challenge after Katrina, once all the damages and devastation to facilities and equipment were assessed.

So immediately after Katrina hit six years ago, the staff achieved more than most thought they could. But, with an organized plan and the knowledge and skill of many on-staff experts, an incredible number of construction and repair projects were begun to once again provide quality and reliable water, sewer and drainage services for the citizens of the City. Many have been completed and numerous others are in progress, in the bid cycle or ready for bid. Funding of these projects have been a cooperative effort with the Federal Emergency Management Assistant (FEMA) and the Army Corps of Engineers.

To assure a rapid response and realizing the magnitude of the repair and re-building work, 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.

The total estimated project cost amount for all FEMA-related activity to date is approximately \$461,577,197. Of this amount \$372,754,365 is obligated by FEMA. Additionally, 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. These individuals stayed during Katrina or returned quickly to plan and restart operations immediately.

Executive Director Marcia St. Martin said, "Our goal of full restoration remains, so that we can provide maximum service to those residents and business owners who stayed in the City and those who have returned, have opened new businesses or who are still planning to return. We are resolute in this challenge."

"While we did get a fast start on repairs, we will not rest on our laurels. Instead, we are using 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."

She added, "And, while we still have a lot of critical work to do, I think it's important for our citizens to know we've already had many successes in all departments and there are many more to come."

These are just *some of the major undertakings* the Board staff and program managers have accomplished in the last six years:

FEMA has obligated (to date) \$124.3 million to the water system. Some of the projects in this area include:

- Repair of Old Carrollton Pumping Station and Central Yard Annex Building overall complete restoration repairs
- Modifications to Algiers Water plant disinfection system
- Removal of residential meters from abandoned accounts
- Since Katrina and through June 3, 2011, 113,244 water main leaks, and house service leaks, hydrant leaks, valve jobs and meter related repairs were made.
- Also, 16,096 fire hydrants were inspected for pressure, lubricated and painted. 4,202 valves related to hydrants were inspected. Corroded anti-theft devices,

which prevent water from being stolen, were replaced on the hydrants

- Some 7,224 paving jobs related to the repair of leaks were completed.

In the area of sewer projects FEMA has obligated (to date) \$136.6 million. Projects included are:

- Fluidized Bed Incinerator at the East Bank Sewage Treatment Plant
- Michoud and Lamb Sewage Pumping Stations replacement
- Mechanical repairs to various citywide sewage pumping stations
- Continued rehabilitation of the East Bank Sewage Treatment Plant destroyed by Katrina
- Emergency installation of bypass pumps around damaged sewage pumping stations
- Sewer line leaks and breaks repairs
- Electrical repairs to sewage pumping stations
- Following Katrina, the Sewerage and 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 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 this November. The first contract was awarded recently
- Completed the rehabilitation of 55 sewer pumping stations.
- Six (6) contracts are under design for the rehabilitation of various components of the Carrollton Water Power Complex.
- Eight to ten contracts are under design

for the rehabilitation of existing facilities located at the S&WB's Central Yard complex.

- Completed 200 sewer repairs related to the Emergency Sanitary Sewer Assessment project.

- Hurricane Katrina nearly destroyed the East Bank treatment plant and flooded almost every lift station on the East Bank.

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 executed. An additional \$48 million was obligated by FEMA for other drainage projects. SELA drainage projects included:

- A Corps of Engineers contract to build a concrete box culvert canal along Dwyer Road to improve drainage in eastern New Orleans.

- Construction of the new canal in Dwyer Road from Jourdan Road to the St Charles Canal is ongoing.

- Construction of the Florida Ave Canal from Mazant St to DPS No. 19 is ongoing.

- Contract to construct a new canal in Claiborne Ave from the Monticello Canal to Leonidas will be awarded by November 2011.

- Contract to construct a new canal in Napoleon Ave from Claiborne Ave to Carondelet Street will be awarded by October 2011.

Harrell Park was returned to the New Orleans Recreation Department after 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. The park was a priority of the Board to restore as a New Orleans Recreation Department NORD facility.

Overall, this work marks the most aggressive and important rebuilding of the water, sewerage and drainage systems in the 111-year history of the Sewerage & Water Board.



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.

Powerful Drainage System Constantly Helping Fight The Forces of Nature, Topography

When it comes to topography, New Orleans is like a saucer. Levees that have been built to keep out the Mississippi River and Lake Pontchartrain serve to keep in all the rainwater that falls. Many parts of the city are as much as 6 feet below sea level, requiring rainwater (an average of 58.12 inches a year) to be pumped out.

Six inches of rain across the city produces about 69.8 billion pounds of water. That's about 8.2 billion gallons, enough to fill a lake ten feet deep and two miles square. Because the river levees are higher than the lake levees, most storm runoff is pumped into Lake Pontchartrain.

Exceptions are the two West Bank pumping stations and two stations in Eastern New Orleans that pump into the Intracoastal Waterway or the Industrial

Canal, respectively.

Our drainage system of today dates back to the turn of the century. The New Orleans Drainage Commission was established in 1896 and merged in 1903 with the Sewerage and Water Board.

There are 24 Drainage Pumping Stations (DPS) in New Orleans. Station personnel are on duty 24-hours a day, seven days a week.

There are 7 unmanned pumping stations. Though fully automatic, S&WB personnel are sent to these unmanned stations during rainfall events.

There are also 13 underpass stations, each with two or three pumps that are automatically turned on by rising water. These pumps are checked every week and are monitored by field personnel during rain



The U.S. Army Corps of Engineers is building a 15-megawatt generator which will give the Sewerage and Water Board's Division of Pumping and Power the capability to improve the operation of its drainage, sewerage and water pumping systems in emergencies. For instance, it would be put into service when or if commercial power should fail or otherwise become unavailable, or if the Board's own power generation system goes down. The new generator is funded 100% by the U. S. Army Corps of Engineers as part of a storm-proofing project for Orleans Parish and will greatly enhance the reliability of the pumping operations. The cost of this project, located on the grounds of the Carrollton Water Purification Plant, is estimated to be \$3.5 million and is scheduled for completion by October 2011. This emergency generator, the size of a locomotive, will sit high atop the massive pilings shown here.

One element of the Board's post Katrina recovery is a Sewer Force Main Reliability Study, a field inspection using ultrasonic testing to determine the pipe wall thickness. The results are compared to the original design thickness of the pipe to determine the condition and remaining service life of the sewer force main. As many as 640 thickness measurements within a predetermined area are taken to complete the process.



New processes, systems, equipment and modern concepts are constantly explored—and many are implemented by the S&WB. One such new process system is underway at the Carrollton Water Purification Plant on South Claiborne Ave. Called the Sodium Hypochlorite Bulk Storage/Feed Facility, it consists of the conversion of a current gaseous chlorination system to a sodium hypochlorite system that will eliminate the need for transporting chlorine by rail and storing it on the plant grounds. Instead, the Board will be able to truck in the safer, yet effective, sodium hypochlorite for disinfectant purposes and easily store it in a nearby facility. This chemical increases safety for surrounding neighborhoods and Board employees

events.

The system's pumping capacity is over 50,000 cfs. (cubic feet per second) enough to empty a lake 10 square miles by 10.5 feet deep every 24 hours. That flow rate is more than the flow rate of the Ohio River, the nation's fifth largest.

The S&WB's drainage network includes approximately 90 miles of open canals and 99 miles of newer subsurface canals. Many of the subsurface canals are large enough to drive a bus through.

Millions of dollars were invested to upgrade the system after the flooding rains of the 60s, 70s, 80s and 90s, which ruined homes and businesses.

Then came Katrina, destroying the newer parts of the system as well as the older parts which served us so well for so long.

Fortunately, through the Board's long-term relationship with the Corps of Engineers, millions of dollars in projects were carried out when Board funding was not available.

Immediately following the storm, after the breaches were closed, it took the SWB employees 11 days to de-water the city. Then, the Corps worked with Board employees to repair the salt-water damaged motors by rewiring and baking them so that the pumps could continue to do the work of the drainage system

The Corps also spent \$39.6 million to repair and restore 23 of the hardest

hit stations and the Carrollton Frequency Changer Building to their Pre-Katrina levels of operation. The final station to be repaired in Orleans Parish was Elaine Street Pump Station, which was completed in October 2010.

Additionally, the Corps storm-



proofed stations throughout the City so that they can remain operable during and immediately following tropical storm events. This work strengthened the existing building, making

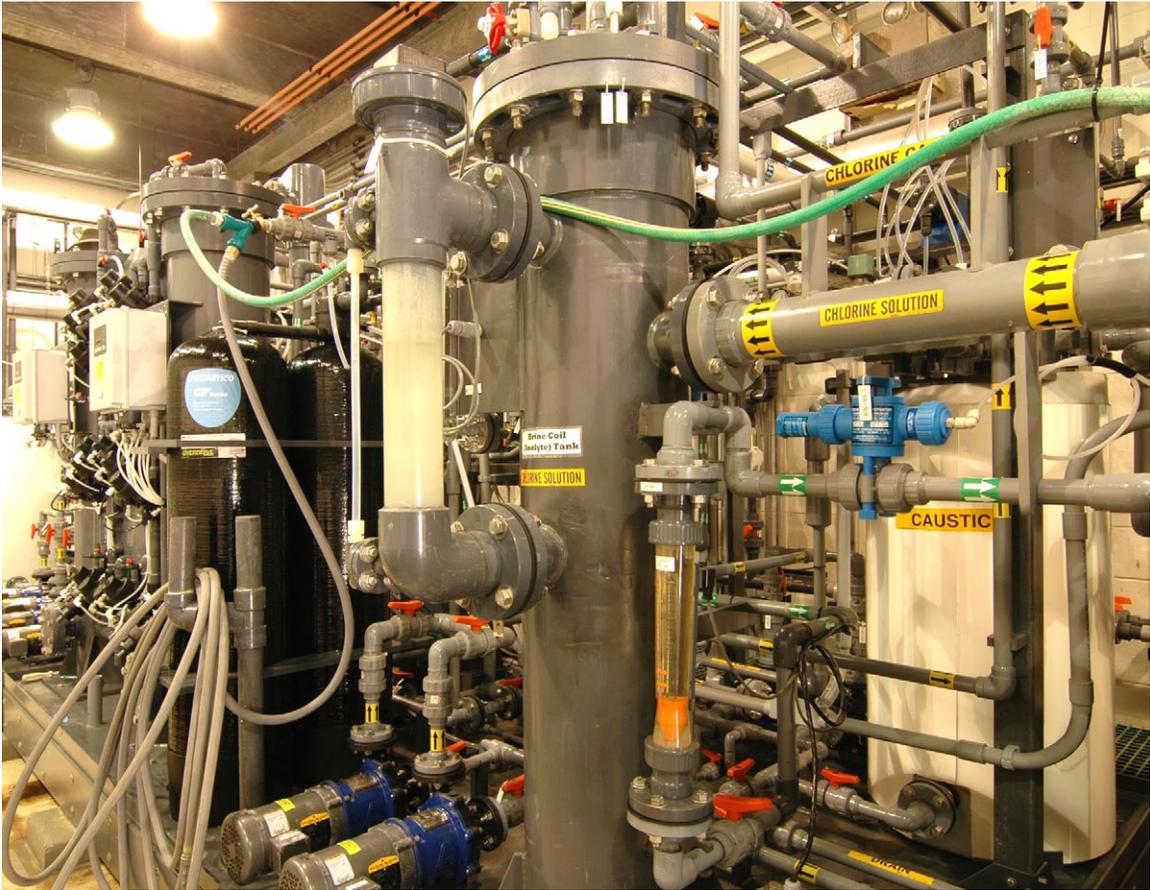
it safer for S&WB employees that stay on site, as they work throughout all significant weather events.

Also, in many cases the pumping stations have back up power making them more dependable. Commercial power losses can occur during a storm and adverse weather events.

The Board of Directors, the engineering staff and the Corps work together in the best interest of the citizens to continue to improve a most crucial asset—the Board's massive drainage system.



Mayor Mitchell J. Landrieu cuts a ribbon marking the completion of a \$39.6 million project to repair drainage pumping stations throughout the City following Hurricane Katrina. In all, the Corps restored 23 S&WB pump stations and the Carrollton Frequency Changer Building to their Pre-Katrina levels of operation. Mayor Landrieu presided over the ceremonies with officials from the Corps, the Board and the City.



A new \$2 million Klorigen Unit is now in operation at the Algiers Water Treatment Plant. The unit produces chlorine disinfectant on demand for the water treatment process by using food-grade salt and electricity. The driving force for using this system is risk reduction by eliminating the need to store tons of liquid chlorine onsite which could release to the atmosphere.



Work has begun to improve drainage in the the Gen. DeGaulle Canal in Algiers. It is a project funded by the Louisiana Department of Transportation and Development. The entire Algiers Area Drainage Improvements program is being evaluated by the Corps of Engineers for inclusion in the federally-funded Southeast Louisiana Urban Flood Control Project.

SELA Making Great Progress On New Drainage Projects And Remain On Schedule to Complete Those Interrupted by Katrina's Wrath

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

Citizens hurt most by the flooding formed drainage committees and called on The Sewerage and Water Board to upgrade its aging and inefficient network of canals and pumping stations.

A plan to greatly increase the capacity of the drainage system was prepared by the Board, but it did not have the massive funding to do all of the construction projects needed throughout the City.

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

This rain event caused serious damages to homes, business losses and major inconveniences associated with rainfall flooding in Southeast Louisiana. Citizens, and local officials in the tri-parish area of Orleans, Jefferson and St. Tammany requested Federal assistance in developing and implementing solutions to the flooding problem.

In 1996, Congress quickly 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 Project Cooperation Agreement executed by the Sewerage and 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%.

The S&WB files applications on a project-by-project basis, with the Statewide Flood Control (SWFC) program, administered by the Louisiana Department of Transportation (LaDOTD). The SWFC program provides 70% of the 30% 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.

Because of the increased construction costs in southeast Louisiana, as the region rebuilds from hurricane Katrina, in 2008 Congress appropriated an additional \$1.3 billion for SELA. 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 amount of \$ 224.8 million has been appropriated by Congress for the completion of authorized SELA projects.

SELA Orleans projects include 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 continued 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. Among them are:

Federal SELA Projects – Phase 2 – Construction started 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)

Through the combined forces of the Board and the Corps, drainage is being improved throughout the entire City through the many projects underway, nearing completion and under design—all to add protection against flooding.

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

Work On Sewage Collection System Continues

The sewage collection system operated by The Sewerage & Water Board of New Orleans serves an area of approximately 86 square miles and a population of approximately 350,000. Work on the system continues as the Sewerage and Water Board rebuilds and upgrades the infrastructure.

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 86 sewer lift 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 gallons per day (mgd).

Hurricane Katrina destroyed the East Bank treatment plant and flooded almost every lift station on the East Bank. The FEMA funds obligated to repair the sewer system to date is \$136.3 million.

Creative Project is Ongoing

The Sewerage and Water Board's Wetlands Assimilation Project when completed, will reestablish wetlands in the area of the East Bank Sewage Treatment Plant and protect parts of the City from suffering future devastation as experienced in the aftermath of Hurricane Katrina.

Following Katrina, the Sewerage and 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 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 later this year. The first contract for the project was awarded recently.

S&WB Receives Awards for Wastewater Treatment Operations

Nationally, the Sewerage and Water Board has received many high level awards for its work. For 2010 the Sewerage and Water Board earned a combination of Gold and Silver awards for operations at the West Bank and East Bank wastewater treatment facilities respectively. The awards were presented by the National Association of Clean Water Agencies (NACWA).

The Gold Award was presented to the West Bank Wastewater Treatment Plant for 100% compliance for an entire year. And the Silver Award went to the East Bank Wastewater Treatment Plant for no more than five-violations within a calendar year.

The awards were presented during the 2011 Summer Conference of The National Association of Clean Water Agencies held in Chicago, Illinois. Mention of the awards will appear in the Clean Water Advocate News Magazine and on the NACWA website.

Despite Katrina, Hard Work And Ingenuity Keep City's Water Supply Abundant And Safe for The Needs of Citizens

Like most other Sewerage & Water Board facilities and machinery, Katrina's flooding and winds heavily damaged the Carrollton Water Purification Plant.

Mechanical parts of the treatment process, like sediment basins, became inoperable, also buildings that stored chemicals and other machinery used in the treatment process.

The Algiers Treatment Plant had no damage, so it became the Operations Center for the Board and produced millions of gallons of water for firefighting and general purposes for the East Bank of Orleans Parish and other nearby parishes in need. Millions of gallons were also sold to FEMA.

On the East Bank, much of the damage to machinery has been repaired by the members of the Board's Facilities Maintenance Department, using manufactured parts from the Machine Shop. Other work was done by contractors.

The Carrollton Plant is operational today, but millions in improvements are still being made. One such project, which recently began, is the Sodium Hypochlorite Bulk Storage/Feed Facility at the Carrollton Water Purification Plant. It consists of the conversion of a current gaseous chlorination system to a sodium hypochlorite system that will allow the current rail tank system to be abandoned in favor of a safer liquid based process at the Plant on South Claiborne Avenue. This process is already used at the Algiers Water Treatment Plant.

The multi-million dollar system will eliminate the need for transporting chlorine by rail and storing it on the plant grounds. Instead, the Board will be able to truck in the safer, yet effective, sodium hypochlorite for disinfectant purposes, and easily store it in a nearby facility. This chemical increases safety for surrounding neighborhoods and Board employees.

On the distribution side since Katrina and through June 3, 2011, 113,244 water main leaks, and house service leaks, hydrant leaks, valve jobs and meter related repairs were made.

Also, 16,096 fire hydrants were inspected for pressure, lubricated and painted. 4,202 valves related to

hydrants were inspected. Corroded anti-theft devices, which prevent water from being stolen, were replaced on the hydrants at a cost of \$2.2 million. Some 7,224 paving jobs related to the repair of leaks were completed,

The Board's water system is made up of four raw water intakes along the river, which pump raw water to two treatment plants. There is a water plant on the East Bank, and one in Algiers.

The plants provide water of the highest quality to a population of 343,829 for personal and business use and to 1,500 fire hydrants. The two plants produce 143 million gallons per day. Treated water is pumped throughout the City via a network of 1,650 miles of underground mains. The Board's state-of-the-art water quality lab constantly checks water for purity and can test for 100,000 compounds.



“We’re Always Here. We Never Left.”

The 300 S&WB employees on emergency hurricane duty thought the worst was over when Katrina blew through New Orleans on August 29, 2005 with minimal rainfall and strong winds, but not as strong or damaging as predicted.

That same morning, reports of flooding began to come in—it was described as heavy, deep flooding. Reports came from employees at their duty stations and citizens from all parts of the City wondering if the massive S&WB pumping system was working.

Then the news came in—there were several floodwall failures in outfall canals along Lake Pontchartrain and the Industrial Canal, dumping millions, possibly billions, of gallons of water into some of the lowest parts of the City in an instant. Eventually, 80 per cent of the City was flooded.

The 300 employees on duty, and those who risked their lives to reach whatever Board facility needed help, knew a major catastrophe was taking place.

For the first time in the Board’s 110-year history, water service on the East Bank was interrupted when the Board’s power plant flooded, despite bold efforts by employees to build a sand bag barrier around it.

Efforts like this were taking place everywhere...even in drainage pumping stations where employees were stranded. Operators of two pumping stations on the Industrial Canal clung to rafters for days, with no food or water, until teams of employees and the Coast Guard could reach them.

Executive Director Marcia St. Martin said, “Some real heroics by our employees took place in the days after the flood to get systems up and running as quickly as possible.

“The 300 employees on duty and those who rushed to help did not know the fate of their families or friends who evacuated. But they did not leave. They did their jobs and did whatever they could to protect our facilities and help the struggling people of New Orleans.”

Rufus Burkhalter, now retired, is wet down with bottled water after fighting a fire at Drainage Pumping Station No. 6. The fire occurred during the recovery period soon after Katrina hit the city. Hundreds of S&WB employees, first responders after the storm, performed similar heroics to help get the systems up and running again. Pumping stations throughout the city were quickly repaired to help de-water the flooded parts of the city.



The heroic efforts of the Sewerage and Water Board employees were displayed as these workers, even in the fact of disaster, focused on their responsibility to keeping the water, sewer and drainage system operating. They immediately understood that if there was no water, no sewer or no drainage services there would be no city of New Orleans.

In a speech Mrs. St. Martin delivered to an nationwide professional water group in 2006, she stated, "With so much destruction of our facilities, equipment and heavy truck fleet, we relied on the skill, expertise, knowledge and determination of our employees to put our water, sewerage, drainage and power systems back in operation."

When experts said it would take months to de-water the system with our badly damaged drainage pumps, our staff was actually able to achieve the goal after breaches were closed, it took 11 days for the Sewerage and Water Board employees to dewater the city.

The extraordinary actions and reactions of the Sewerage and Water board employees garnered international, national and local media attention as indicated in the Times-Picayune Newspaper:

In the lead-up to Katrina's fifth anniversary, more than 50 water board workers and administrators gathered

Friday inside Pump Station No. 1 to retell survivor stories and to honor the work they've put in since, beginning with pumping the floodwater out of the city after the breaches were closed.

Many also bemoaned the fact that even though they report for duty during hurricanes just like other emergency workers – and put in their most strenuous work during the height of storms, when others hunker down – they don't seem to get the same respect.

"Especially right after Katrina, nobody was paying attention to our operators," said Bob Moeinian, superintendent of pump stations. "Everything was about first responders: Police Department, Fire Department. And our folks, who were trying to help the city get up and running, you weren't hearing much about.

"We kind of felt like we were left behind," he said. "We're always here. We never left."

Nevertheless, the men and women of the Sewerage and Water Board are extensively trained to meet the challenges presented by extreme weather events. They remain prepared to risk their lives by working through storms, hurricanes, and flooding, knowing full well that the city's survival and future existence depends on the availability of water, sewer and drainage services.

A group of S&WB Drainage Supervisors, along with an Army Corps of Engineers official, toured pumps at outfall canals to observe the operation in person. The Supervisors will coordinate pumping of runoff water with the Corps of Engineers during rain or storm events. The employees are, Left to Right: Andrew Fiorella, Jr.; Corps official, Gerald Tilton, Conard James, Renaldo Robertson and Kenneth Smith.



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.



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.

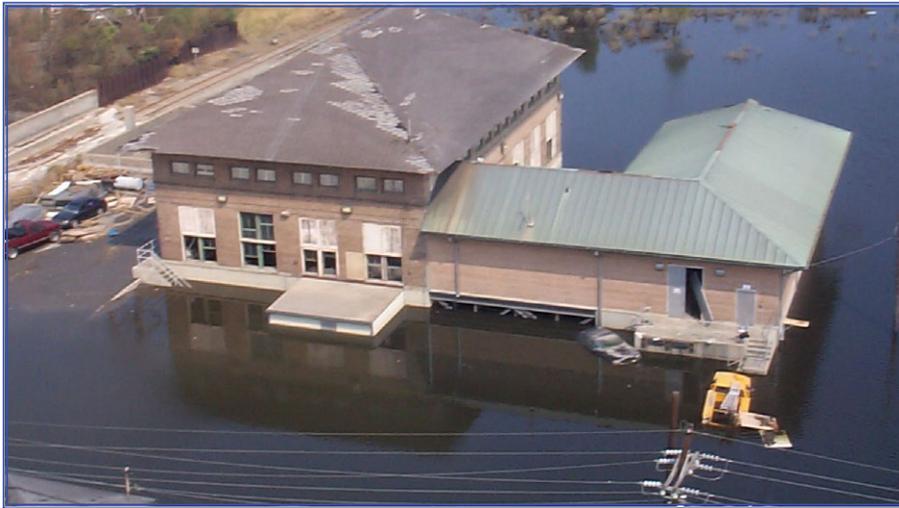
There are many stories of heroics by our employees to keep their facilities operating at great risk, to help citizens fleeing their flooding homes and to save the lives of fellow employees.

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.

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.

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



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.

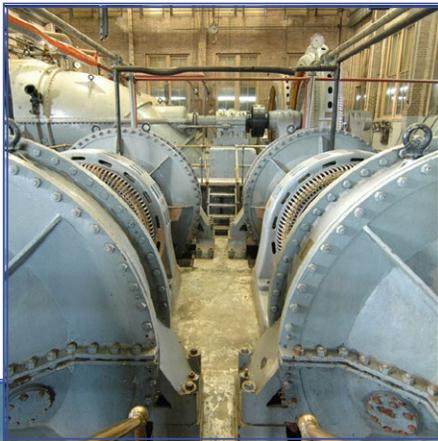
As more and more people returned to the City, water would be needed for personal and safety needs, clean-up efforts and fire fighting.

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



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

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.

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.

Sewerage & Water Board of New Orleans

Mayor Mitchell J. Landrieu
President

Tommie A. Vassel
President Pro Tem

Councilwoman-At-Large
Jackie Clarkson

Councilwoman District B
Stacy Head

Councilman District E
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