REQUEST FOR INFORMATION
INTEGRATE MASTER PLANNING RFI
RESPONSE

SUBMITTED TO

SEWERAGE AND WATER BOARD OF NEW ORLEANS
SPECIAL PROJECTS

FEBRUARY 2020

PREPRARED BY

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SWBNO INTEGRATED MASTER PLANNING RFI
WRITTEN REPONSE

Background

The Sewerage and Water Board of New Orleans (SWBNO) recently issued a Request for Information (RFI) from firms interested in helping the SWBNO identify key issues that will impact delivery of drainage, water, and sewerage services over the coming years. This is the first step in development of a long-term, integrated master plan. Newell Engineering would like to assist in this process.

The stated goal of the planning effort is to develop plans that will:

- Build resilience in the face of a changing climate
- Reduce flooding
- Provide affordable and efficient services
- Improve public heath
- Improve public space and quality of life
- Provide workforce and economic development opportunities
- Protect the environment
- Create and sustain partnerships

The RFI was issued to assist the SWBNO in scoping the process further and to develop RFP's for future work under the planning process. After submission of written responses to the RFI, workshops will be hosted in which key issues will be further developed and discussed. Newell Engineering, LLC was founded and is managed by a consulting engineer and land surveyor with extensive engineering experience in local potable water, sewerage, and drainage systems. As a result, this response is generally focused towards a traditional engineering assessment. The SWBNO is aware of many of the challenges discussed in this response and has identified and quantified several of them as documented in the information included online. Newell Engineering hopes that our effort in preparing this RFI submittal will provide benefit to the SWBNO.

In this process we are asked to respond to any combination of the following three questions:

a. What will be New Orleans' biggest stormwater/drainage challenges in 50 years and what is the best approach to integrated long-range planning to address those challenges?

b. What will be New Orleans' biggest wastewater/sewerage challenges in 50 years and what is the best approach to integrated, long-range planning to address those challenges?

c. What will be New Orleans' biggest drinking water challenges in 50 years and what is the best approach to integrated, long-range planning to address those challenges?

Each of these questions relate to essential infrastructure needed to support the community. The critical challenge that faces the city over the coming fifty years is being able to sustain these services and have better and more resilient systems in place and functioning in fifty years. The goal of the planning efforts should be to create systems that are affordable and can be sustained over the ensuing decades. This is a difficult challenge. Some of the challenges that will have to be overcome to provide these services are faced by many other municipalities, others are unique to New Orleans.

Affordability is a major system-wide challenge. Documentation of maintenance and operation needs and setting the design level of service for each system are key. Each of the three systems has some basic similarities. There is a plant, e.g. pumping stations for drainage and treatment plants for drinking water and sewerage, and a peripheral system consisting of collection pipes for drainage and sewerage and a distribution system for drinking water. The cost of the peripheral systems is a very significant cost of the total cost of the system. As a result, the impact of maintenance and service level recommendations on the cost of peripheral systems should be carefully considered. It may be appropriate to provide replacements and upgrades, if justified, of these peripheral systems as part of an ongoing annual program. Most of the collection and distribution systems are within the streets of the city. Accordingly, their maintenance and upgrade should be coordinated with planned street replacement.

Obtaining the necessary services for maintenance, operation, and improvements will also be a critical challenge for all three systems. Services have traditionally been provided either in-house by the municipal agency (SWBNO) and through contracted operations, maintenance, engineering, and construction services. It is likely that this general model will continue, but changes have occurred in the industry. Such changes are likely to continue. For instance, the water and sewer systems could be privatized, more private operation and maintenance of systems could be employed, the services could be supplied through regional governing authorities, etc. Regardless, though, the challenges now faced by the SWBNO will have to be addressed. The SWBNO currently faces a challenge in providing in-house staff needed for critical agency functions. Having competent in-house staff that can make informed and timely decisions is critical to agency function; this function cannot be outsourced. Some of these capabilities can be contracted out through program management contracts, operations and maintenance contracts, design contracts, etc. Not everything, though, can be contracted out and as more and more is contracted out, demands on in-house managers increase. For instance, negotiation and procurement of large operations and maintenance contracts, large design contracts, large program management contracts, etc. require a high level of in-house competence. Other organizational challenges are placed on the agency by the consolidation of firms in the engineering and construction marketplace that has occurred over the past few decades. Much of this integration has been vertical, e.g. the operations and maintenance firm owns the design firms, construction firms, manufactures, vendors, etc. Strong in-house staffing will be needed to manage these contractual relationships. Project delivery methods are also changing with design, build, operate; construction management at risk, etc. being used more frequently in the public works market.

Coupling in-house capabilities with independent local consultants, industries, and research organizations will likely be beneficial, both through obtaining services from firms and individual living and investing in the community and through fostering development of a strong local engineering, construction, and research community. Use of local firms more often as the prime consultant will accelerate this

development. There are many opportunities for enhancing local capabilities. A few examples include physical hydraulic modeling of canal junctions; the SWBNO has traditionally used out of state organizations for this work; using local engineering firms as the prime consultant more frequently; supporting funding of more water and wastewater treatment research efforts in local universities, etc.

The following paragraphs address challenges posed for each of the systems included in this RFI:

a. What will be New Orleans' biggest stormwater/drainage challenges in 50 years and what is the best approach to integrated long-range planning to address those challenges?

The drainage systems in New Orleans are unique and the topography and soils of the city are challenging. Pumping is required for drainage since much of the city is below sea level. Since the city is relatively flat, elevation is critical. Also, the city is subject to subsidence. Subsidence is due to many factors. One is that the city is in a zone of tectonic plate subduction. Another is the normal consolidation of wetlands upon being drained. Additionally, sea level is predicted to rise, which, coupled with subsidence, places increasing demands on area levees and drainage systems. These factors complicate system planning, operation, maintenance, and design. There is no way to precisely know how much subsidence will occur over the next fifty years or how much sea level will rise. As a result, extensive upfront expenditures to mitigate against these effects are probably not warranted; although potential impacts should be assessed during planning and project development. A good example of critical drainage structures impacted by subsidence is that of pile support of box culverts. Traditionally, the Sewerage and Water Board has pile supported concrete box culverts. From a cost standpoint this may be the least expensive way to construct a culvert and is the best way to maintain a properly sloped invert. As subsidence occurs in shallower soils, though, adjoining areas including streets, lots, and homes settle while the box culvert does not. This reduces the effectiveness of the box culvert for drainage. The use of piles to support box culverts should be assessed. Recently, sheeting practice has changed with it being normal practice to abandon steel sheeting in place. This is extremely expensive. Sheeting of cuts for construction of large box culverts is another area that should be critically evaluated. Often, the cost of sheeting of the cut for construction of box culverts is more than all other costs of the project combined. This practice should be evaluated.

Another example of a challenge posed is that of maintaining project vertical control during implementation of large drainage improvement projects. The National Geodetic Survey (NGS) has adjusted the national level datum numerous times since the 1980's. Current practice is to continuously adjust the datum based on continuously operating ground control stations and GPS. The current datum is better than it has ever been, but the continuous adjustment of levels in the area leads to confusion. Apple to apple comparison of elevations determined using different datum epochs is at best difficult if not impossible. This can result in expensive blunders during construction if not properly accounted for in planning and design. The SWBNO should consider installation of a local control system, perhaps using Cairo Datum to avoid negative numbers, that is regularly tied to the NGS GPS datum and adjusted every five years or so. Another example of challenges arising due to subsidence and adjustment of datums is that of loss of storage in ponding areas due to increased placement of fill. Homes are now constructed higher than homes were constructed using earlier datums. Often the new construction is founded on a slab and fill is hauled in to bring the lot up to the level of the home. This reduces storage in the ponding area leading to increased levels of flooding. This practice should be evaluated. Subsidence and datum

adjustments also impact functioning of drainage pumping stations. Levees are being constructed higher than before, leading to more elevated discharges. Concurrently, subsidence may be contributing to lower intake levels. Potential impacts and future operating head of drainage pumping stations should be considered during planning and design efforts.

Many critical challenges must be addressed in the pumping and large canal systems which are essential to drainage in the city. Key issues include whether existing large, horizontal axial flow, electrically- driven, low-frequency pumps will be abandoned in favor of new pumps likely driven at a higher frequency. Recent operating problems at the SWBNO power generation facility at the Carrollton Water Treatment Plant have brought this issue to the forefront with consideration being given to using Entergy 60 Hertz Power in lieu of SWBNO supplied lower frequency power. Other considerations include whether a dry canal system or a wet canal system will be used and how much pumping and conveyance capacity will be provided. It is likely that additional capacity will be needed as the city develops. Where will new canals and pumps be provided? Is storage viable for reducing pumping requirements? Will some interior pumping stations such as DPS 6 be abandoned? These are complex issues and questions that will require substantial time and effort to assess and resolve. Pilot projects may be of benefit.

Defining the level of service that will be provided poses another challenge. Storage of floodwaters in New Orleans has traditionally occurred in streets with lot runoff retention not required. In previous generations, the street drainage systems were designed to convey the two-year storm and finished floors of homes were set above the largest expected flood level, more recently the one-hundred year flood level. In less populated areas served by wet canal systems, pumping rates were set at relatively low levels, perhaps up to .25 cubic foot per second (cfs) an acre, since ponding could be allowed in the lower areas near the pumping stations. A dry canal system was installed in the early 1900s in New Orleans with pumping capacity nominally set to .5 cfs. After flooding in the city in the 1980s, 1 cfs per acre was recommended for the 17th St. Canal Basin. Recently, planning recommendations are to increase on-lot storage of runoff and to use a wet system for collection of runoff coupled with the abandonment of interior pumping stations such as DPS 6 at the 17th St. Canal. The cost and benefits of on-lot retention of storm water should be carefully evaluated, perhaps by implementation of detailed desktop assessments and, if found feasible, by pilot studies. Ultimately the cost of implementation of on-lot retention should be compared with the cost of providing additional pumping and conveyance. Use of wet systems and abandonment of interior pumping stations may be feasible but will require careful and detailed evaluation. Requiring new buildings to be built one foot above the base flood elevation should also be considered since doing so may significantly reduce damage from large floods.

The increase in digital computing, databases, and mapping has markedly increased the level of detail available to system operators. This trend will likely continue, which will foster a better understanding of the drainage system. For instance, expected areas of flooding can likely be mapped and actual area of flooding catalogued. This may give insight into reasons for localized flooding and lead to recommendations for system improvement such as regrading of streets to ameliorate flooding. Drainage evaluations are normally undertaken using computer modeling. Many modeling efforts have been undertaken over the years in New Orleans with a new model typically developed for each investigation. Development and maintenance of a drainage models by local universities using open source code may be of benefit.

b. What will be New Orleans' biggest wastewater/sewerage challenges in 50 years and what is the best approach to integrated, long-range planning to address those challenges?

The sewerage system in New Orleans generally consists of gravity sewers, lift stations, and treatment facilities. The number of lift stations in the city is lower than that of many other developed areas in the region. This is achieved through setting the lift stations deeper. This leads to the use of deeper gravity lines. Gravity sewers provide excellent service but present many challenges. One is that their construction is very expensive, particularly when they are deep given the poor soils in New Orleans. Another is that breaks in lines undermine streets and sidewalks, etc. Gravity sewers are also subject to high levels of inflow and infiltration (I&I). Significant improvements have been completed to reduce system I&I. Many more will likely be needed over the coming years. Replacement or rehabilitation of critical gravity sewers in the system will likely be required over the coming decades. For instance, there is a large gravity collector that runs down Claiborne Avenue and provides sewerage collection for much of uptown New Orleans. An annual maintenance program of smoke testing, limited tv inspections, lining, lift station rehabilitation and manhole repairs is critical and will required continued support.

It may be cost effective to replace some gravity collection lines and lift stations with either more lift stations and shallower gravity lines or low pressure forced sewer systems. Forced systems provide significant benefit including lower capital costs, less propensity for piping leading to less damage to streets, and less I&I. Use of forced sewer systems, though, poses some operating challenges. For instance, the system includes installation of individual grinder pumps at residences which requires electric service and maintenance by the public agency. Capital cost savings, though, may warrant their use in some areas.

Currently, increased pumping and treatment capacity may also be needed to provide adequate service in areas that have wastewater volumes during rains that cannot be handled by the existing facilities. For instance, there are areas in which wastewater intrudes into the sewers of newly constructed buildings. In the near term, peak factors for design of force mains and treatment systems in some areas should likely be increased. Treatment and conveyance systems for increased quantities of a low strength wastewater will likely be beneficial is some areas. As I&I is reduced, though, treatment of a stronger wastewater will likely be required.

Use of "smart" systems in which automation is used to control pumping and force main systems will likely be implemented and provide benefit.

It is likely that increased discharge monitoring and permitting will be implemented over the coming decades. Reduction in discharge of grease and other pollutants will likely be required.

Increased use of low pressure forced systems will likely be warranted based on lower capital cost and better control and permitting of discharges into the system over the coming decades. In other areas, such as the Warehouse District, increased pumping and transmission capacities may be desirable. Desktop assessment for both low pressure forced systems and for increased pumping and transmission capacities should be undertaken for select areas, and, if shown beneficial, pilot projects should be implemented.

Discharge of effluents to the wetlands may prove beneficial to wetland restoration. This is currently being implemented at the East Bank Wastewater Treatment plant. Continued research and development would likely be beneficial. Use of local research organizations should be considered.

c. What will be New Orleans' biggest drinking water challenges in 50 years and what is the best approach to integrated, long-range planning to address those challenges?

The source of raw water for New Orleans is the Mississippi River. Treatment is provided at the Carrollton Water Plant on the East Bank and the Algiers Treatment Plant on the West Bank. The distribution systems in the city are ageing and many breaks occur in the system. Also, many valves are not functional. Boil water advisories have increased leading to increased focus on potable water operations by the community. This places added pressure on system operators to improve operations.

The Sewerage and Water Board does not charge certain agencies for water. Many of these "free accounts" are not metered. Metering all account, including "free accounts" and developing better metrics for water use and loss would likely help efforts to identify and reduce losses in the system.

Maintenance of the existing system is fundamental for a complete, working system. Pipe replacement and upgrade schedules should be developed and coordinated as much as practicable with street replacement projects. Replacement of existing lead service lines will likely be required over the coming years. An ongoing program of annual replacement may be beneficial. Exercising critical system valves regularly will likely provide benefit. Monitoring and replacement of cathodic protection of steel transmission pipelines should be an ongoing practice. Continuing existing plant maintenance activities is critical. For instance ongoing repairs to the filter gallery at the Carrollton Water Treatment Plant.

It may be possible to increase the reliability of the system through increased use of elevated storage tanks in the system. This could increase pressures in areas in which low pressure currently exists and provide for reduced treatment and transmission capacity requirements in the system. Existing hydraulic models of the system could be used to assess these advantages.

A potential challenge that the SWBNO could face over the coming decades is that of increased salinity levels in the Mississippi River. During low river periods, saltwater intrudes into the Mississippi River and, in the future, could reach the city water plant river intakes. This becomes more likely as the wetlands degrade and as the river channel is deepened to accommodate improved deep-water access along the river. SWBNO completed studies about 30 years ago of whether potable water could be obtained using wells in the city and found that local aquifers could not be used but that aquifers in St. Tammany Parish may be adequate. Awareness of the potential impacts of increasing salinity should be ongoing. It is possible that reservoirs for storage of river water during periods of low water or a new source for drinking water may be needed over the next 50 years.

SWBNO INTEGRATED MASET PLANNING RFI
FIRM PROFILE

Background

Newell Engineering, LLC was formed in August 2014 by Frank Newell, P.E., P.L.S., to provide consulting engineering and land surveying services in Louisiana. Frank is a native and resident of New Orleans and is the sole owner of the firm. The firm is licensed with the Louisiana Professional Engineering and Land Surveying Board to provide professional engineering and land surveying services. Firm Manager, Frank Newell, is a licensed environmental and civil engineer and land surveyor in Louisiana. Frank has been registered in Louisiana to practice engineering and land surveying for more than 30 years and has more than 30 years of experience in drainage, wastewater, potable water and land surveying in the New Orleans Metropolitan region.

In addition to Frank, the firm has a second professional engineer, two graduate engineers, and an office manager on staff. Newell Engineering is located in Metairie, Louisiana, at Suite 202, 700 Papworth Avenue. Office equipment includes five networked Dell workstations, AutoCAD 2018, AutoCAD Civil 3D 2018, Microsoft Windows, Office 365 email server, cell phones, normal office and engineering software, and VOIP phone system. Offices are staffed during normal business hours. Survey equipment includes a fully equipped truck, total station, and automatic levels. GPS equipment is rented on an as needed basis. The firm has professional liability insurance, worker's compensation insurance, and general liability insurance, all with limits meeting state contracting requirements. Newell Engineering and firm members have extensive experience in drainage, wastewater, drinking water engineering and land surveying services.

Drainage

Firm members have the training and experience needed to provide drainage engineering and land surveying services for SWBNO. They are experienced in all aspects of drainage engineering, including modeling of drainage collection and pumping systems; assessment of drainage systems; investigation of areas of flooding and development of programs to reduce flooding; and design of subsurface drains, retention ponds, box culverts, open canals, and pumping stations.

Frank has a thorough and detailed understanding of the Orleans, Jefferson, Plaquemines, and St. Bernard Parishes drainage systems, including extensive work in hydraulic and hydrologic modeling of the 17th Street Canal drainage basin in Orleans and Jefferson Parishes using SWMM, HEC-1, HEC-2, HEC-HMS, UNET, and HEC-RAS. He has directed numerous physical modeling programs for large canal junctions and drainage pumping station intake basins. He has significant experience designing drainage system improvements in Orleans Parish.

Frank has extensive experience in the 17th Street Canal Drainage Basin, including:

- Design of Metairie Road Bridge at the 17th Street Canal
- Design of 17th Street Canal widening, Palmetto Canal to Hoey's Cut
- Design of 17th Street Canal improvements at Hoey's Cut

- Lower Hoey's Canal System hydraulic design.
- Hydraulic design of 17th Street Canal interim closure gates pumping system
- Preliminary design, permanent Canal closure pumps
- SELA modeling of system improvements in Hoey's Basin
- Design of the Prichard Pumping Station and canal
- Geisenheimer Canal drainage improvements
- Geisenheimer Basin drainage study
- Design of the Hoey's Cut Box Culvert at the 17th Street Canal

Other drainage experience includes:

- Expert witness for Jefferson Parish Katrina Pump Station Evacuation case
- Assistance to USACE for pump specification, interim closure structures, Orleans Canals
- Post-Katrina assessment of all major pumping stations in Orleans, Jefferson, Plaquemines, St. Bernard, and St. Tammany Parishes
- SWMM modeling of St. Bernard Parish drainage system
- Cuddihy Drive drainage improvements, Old Metairie
- East and West Livingston drainage improvements, Old Metairie
- Labarre Business Park drainage improvements, Jefferson Parish
- Design of a new 800-foot long 12 x 8 concrete box to replace a structurally-failed box culvert along Airline Drive in Old Metairie
- Design of new subsurface drains and roadways at East and West Livingston Place in Old Metairie
- Drainage improvements, Russell Drive, Jefferson Parish
- Storm proofing pumping stations, Orleans, St. Bernard, and St. Tammany Parishes

Since Hurricane Katrina, Frank has assessed all the major drainage pumping stations in Orleans, Jefferson, Plaquemines, St. Bernard, and St. Tammany Parishes. He was a leader of the team that designed the pumping systems for the interim closure structure at the 17th Street Canal and assisted the United States Corps of Engineers with selection and specification of drainage pumps for the interim closure structures at the 17th Street, Orleans, and London Avenue Canals. He was the engineer of record for the new 600 cubic foot per second drainage pumping station serving the Lower Ninth Ward of New Orleans.

Frank was retained by Burglass and Tankersley, LLC to be the expert witness for Jefferson Parish in the Jefferson Parish Hurricane Katrina Pump Evacuation case. He provided technical and forensic engineering services concerning drainage pumping operations, drainage pump stations, drainage canals, and modeling of the Parish drainage system, and presented that information during the trial. The case was decided in Jefferson Parish's favor. When the judgment was appealed, the Firm was retained to assist in drainage assessments and forensic engineering for the appeal. The case was recently successfully concluded.

Wastewater

Firm members have the training and experience needed to provide sewerage engineering for SWBNO. They are experienced in all aspects of sewerage engineering, including modeling of sewage collection and pumping systems; assessment of sewerage systems; investigation of areas of overflow and surcharge; development of programs to reduce overflows and surcharging; and design of collection systems, lift stations, force mains, treatment systems, and pumping stations.

Frank has many years of sewerage engineering experience. He has a thorough and detailed understanding of local sewage collection and treatment facilities. He has completed numerous collection system modeling programs, grant applications and planning projects. He has significant experience designing sewerage system improvements, including development of a long-term capital program for reducing overflows in the Belle Chasse sewage collection system; new sewage collection systems throughout Plaquemines Parish; rehabilitation of the Port Sulphur Sewage Treatment Plant; inflow and infiltration reduction studies; expansion of the Belle Chasse Sewage Treatment Plant and the Kenner Wastewater Treatment Plant No. 3. He developed specifications for solicitation and retention of a private operator for the Plaquemines Parish sewerage system. This contract was successfully used for over fifteen years for contract operation and maintenance in Plaquemines Parish.

Drinking Water

Firm members are experienced all aspects of water engineering including modeling of water system distribution and pumping systems; assessment of water systems; investigation of areas of low pressure and development of programs to increase treatment and distribution system capacity; and design of distribution systems, service pump stations, water transmission, distribution piping, treatment systems, booster pumping stations, and water towers.

Frank has many years of water engineering experience. He has a thorough and detailed understanding of local water distribution and treatment facilities. He has completed numerous distribution system modeling programs, permit applications, and system-wide planning programs. He has significant experience designing water system improvements, including development of a long-term capital program for improving the Plaquemines Parish Water and Sewerage system; new water distribution and transmission lines throughout Plaquemines Parish; booster pumping stations; service pumping stations; rehabilitation of elevated storage tanks; water plant expansions; replacement and rehabilitation of rapid sand filters with dual filter media; treated water storage reservoirs; and treatment plant expansions. He also developed specifications for solicitation and retention of a private operator for the Plaquemines Parish water system. This contract was successfully used for over fifteen years for contract operation and maintenance in Plaquemines Parish.

Other Experience

Frank has administered the construction of hundreds of millions of dollars of infrastructure improvements. Frank has broad structural engineering experience, having performed many structural inspections throughout New Orleans, including properties in the French Quarter; design of numerous residences, commercial buildings, and public works facilities; design of many foundations for canal systems and pumping stations; bridge design; and structural design of hydraulic structures including reservoirs, filter buildings, settlement basins, and pumping stations.

Frank has extensive transportation project experience, including the Metairie Road Bridge crossing of the 17th Street Canal in Metairie and the recent raising of Tidewater Road in Venice, Louisiana.

Frank is a registered land surveyor and has many years of land surveying experience including numerous topographic surveys for drainage and street projects; boundary surveys of commercial and residential properties in Orleans Parish; and determination of flood elevations for major floods, including the May 8, 1995, flood and flooding during Hurricane Katrina. Firm members also have the training and experience to provide topographic, boundary, right-of-way, elevation, finished floor, flood, GPS and monitoring surveys; right-of-way research; construction layout; development of level networks; and forensic services. Firm surveys are planned and overseen by an engineer who is also a surveyor. Field work is overseen and led by civil engineers who are competent in land surveying. This improves the level of understanding of critical elements needed by designers that impact survey requirements. Through years of design and survey experience, Firm Manager Frank Newell has developed an in-depth understanding of drainage, water, sewerage, road systems and land surveying in the region. Recently he completed assessment and design of GPS leveling techniques required by the United States Corps of Engineers for project construction. This comprehensive understanding of infrastructure and elevation datums is unmatched by other engineering and land survey firms in the area.

Summary

Newell Engineering, LLC has significant experience and knowledge of drainage, water and sewer engineering and land surveying in the New Orleans Metropolitan area. We hope our efforts in preparing this RFI submittal prove beneficial to the Sewerage and Water Board of New Orleans and ask that we be selected to participate in future workshops.

PART 2 – FIRM PROFILE (CONTINUED)

Project Name and Location	Project Description and Nature of Individual or Firm's Responsibility	Project Owner and Contact Information	Completion Date	Estimated Cost
1) Evaluation of Drainage Metairie Road Jefferson Parish, LA	Metairie Road is a state highway in Jefferson Parish and is the busiest two lane highway in the State. It floods during heavy rainfalls. Given the nature of the roadway, Jefferson Parish authorized a hydraulic and hydrologic assessment for the roadway to improve drainage of this critical facility. G.E.C., Inc. is the Prime. Newell Engineering, LLC is sub to G.E.C. and will provide hydraulic modeling of existing sub-basins using SWMM, conceptual design of drainage improvements, cost estimates, hydraulic assessment and recommendations for improvements.	Mitchell T. Theriot, P.E., Director Jefferson Parish Drainage Dept. (504) 736-6751 and Mike Hattaway, Engineer; G.E.C., Inc. (504) 838-6009	2020 (est.)	$120K (fee)
2) Wood Park Waterline Relocation Plaquemines Parish, LA	This project includes the construction of approximately 3,000 linear feet of a new 12" waterline. The existing waterline required relocation for a new flood wall planned by the U.S. Army Corps of Engineers (USACE) . Newell Engineering, LLC was retained by Plaquemines Parish to provide the design for the relocation. The line services a community on the west bank of Plaquemines Parish. Service had to be maintained continuously. Phased construction was developed to coordinate levee and waterline construction to keep the line in service. Newell Engineering provided preliminary and final design, surveys, designs, plans, specifications, and provided assistance to the USACE for the bid phase and the construction phase.	Ken Dugas Parish Engineer Plaquemines Parish Government Engineering & Public Works Department 8056 Highway 23 Suite 300 Belle Chasse, LA 70037 (504)- 934-6116	2019	$600K
3) Forensic engineering services; Jefferson Parish Hurricane Katrina Pump Evacuation Case	Frank Newell was retained to provide drainage and forensic engineering services concerning drainage pumping operations, drainage pump stations, drainage canals and modeling of the Parish drainage system to be presented during trial. The case was decided in Jefferson Parish's favor. When the case was appealed, the Firm was retained to assist in drainage assessments and forensic engineering for the appeal. The case was successfully concluded.	Chris Tankersley Burglass and Tankersley 5213 Airline Drive Metairie, LA 70001 (504) 717-2096	2016	$50K
4) Palmyra Street Topographic Survey SWBNO New Orleans, LA	Topographic Survey of Palmyra Street from S. Solomon Street to center of Carrollton Avenue for construction of new sewer force main. Full topographic survey of 500 foot road including right-of-ways, invert elevations, underground utilities, surface features, elevations and preparation of plan;	New Orleans SWBNO; Christopher Bergeron, P.E. 504-865-0630	2016	$5K (fee)
5) Rehabilitation of the Bohemia Spillway Salinity Control Structure – Phase 1 Plaquemines Parish, LA	Newell Engineering, LLC was retained to provide hydraulic assessment of Mardi Gras Pass. Mardi Gras Pass formed when the Mississippi River breached the Bohemia Spillway Salinity Control Structure, leading to a direct connection between the Mississippi River and adjacent marsh. The initial hydraulic assessment indicated that Mardi Gras Pass would continue to grow quickly and that it could grow to a very large size. This prediction has proven true. Newell Engineering provided conceptual designs for restoring flow control at Mardi Gras Pass for the rehabilitation of the Bohemia Spillway Salinity Control Structure. Work included development of construction plans and specifications for Phase 1 of the work which consists of the construction of a rock weir and sheet piling to stabilize the channel. Newell Engineering also provided permitting, assessment of future rehabilitation alternatives and environmental assessment for the project. A Hydrologic Modification Impact Analysis was developed by Newell Engineering for the project.	Ken Dugas Parish Engineer Plaquemines Parish Government Engineering & Public Works Department 8056 Highway 23 Suite 300 Belle Chasse, LA 70037 (504- 934-6116	2020 (est.)	$8000K (Phase 1) $16000 (Phase 2)