

City of Shoreacres  
Coastal Engineering Services for  
Shoreline Restoration and  
Environmental Improvements  
Statement of Qualifications

ORIGINAL

Issue | December 19, 2013

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 601245-03

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**ARUP**

Your ref RFQ 2013-01  
Our ref 601245-03

# ARUP

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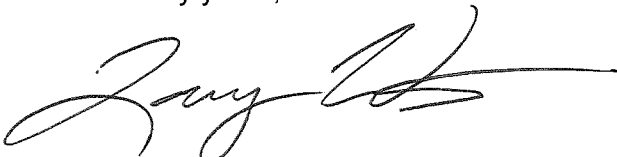
December 19, 2013

Dear Mr. Stall,

Request for Qualifications No. 2013-01  
Coastal Engineering Services for Shoreline Restoration and Environmental  
Improvements

On behalf of the Arup Texas Team, thank you for this opportunity to submit our attached Statement of Qualifications RFQ referenced above. We understand the ultimate objective is to deliver a civic improvement based on a consensus of community and stakeholders. The Arup Texas Team commits to providing services from inception through use by the public and we consider ourselves as an extension of the City's staff in ensuring the project is designed within budget and schedule, and that human and neighborhood issues be identified and addressed. The individual members have the expertise and experience required to perform this work. The firms are Houston based companies which have successfully performed numerous similar projects. The team greatly desires to provide these services to the City and we look forward to a favorable response.

Sincerely yours,



Larry A. Wise, P.E.  
Associate

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# 1 Introduction

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Arup is a global firm of planners, designers, engineers and business consultants. We provide a diverse range of professional services to clients around the world, exerting a significant influence on the built environment. The firm is the creative force behind many of the world's most innovative civil engineering, transport and buildings projects and design technologies. Our success is founded on understanding our clients' needs, combined with the application of leading edge technology and proven management excellence.

Established in 1946, Arup has more than 10,000 employees based in more than 90 offices across 37 countries, working on up to 10,000 projects at any one time. Its unique structure, with the firm held in trust on behalf of its employees gives us complete independence. Our multidisciplinary approach means that any given project may involve people from any or all parts of Arup. Our aim is to achieve excellence in all we do by bringing together the best professionals in the world to meet our clients' needs.

Arup Texas, Inc. (a wholly owned subsidiary of Arup) has been a presence in Houston since 2000. Currently, Arup's Houston office has 23 engineers and designers on staff. As needed, this team is supplemented by 1,000 employees in the United States, Canada and Brazil. Arup's work in Houston has ranged from energy developments to civil engineering, transportation, coastal engineering, and building engineering projects.

A substantial portion of the firm's income is invested every year to improve technical standards and ensure that Arup can continue to offer the latest design and management solutions. Arup has a recognized responsibility to the environment, and is committed to sustainable design, to its increasing incorporation in projects and to industry-wide sustainability initiatives.

Arup's global reach makes it possible to deliver a wide range of challenging work, with the flexible and efficient organization of its staff making sure that the right people are always working on the right project, regardless of the location. A worldwide network of technical expertise, combined with local knowledge and personal service, help meet and exceed clients' expectations. Arup's work is characterized by outstanding solutions, innovation and value.

Coastal engineering requires a truly multidisciplinary approach and our strength lies in the full integration of the core skills required including master planning, feasibility studies, engineering design, project management and construction supervision of coastal engineering projects. Arup's breadth of expertise across the full range of engineering disciplines allows us to provide an integrated service with multidisciplinary teams of specialists.

Our maritime team provides expert advice across a broad range of services including:

- Ports and Harbors
- Jetties, Quays and Maritime Structures
- Recreational Marine Facilities and Waterfront Developments
- Coastal Defense and Ecology
- Ship Impact and Scour Design
- Canals and Maritime Hydraulics
- Marine Energy
- Naval Architecture
- River and Flood Defenses
- Inspection & Assessment, and Diving Services

We also offer clients a broad range of expert advice from all the disciplines within Arup that have skills which compliment coastal projects including: Urban Redevelopment and Regeneration, Reclamation, Industrial Facilities, Environmental Services, Planning and Economics, Transportation Planning, Geotechnics, Project Management and Security Consulting.

Whether by natural causes or as the result of man-made structures and developments, the coastal and estuarine regions of the world are continually changing. From managed retreat to beach nourishment and sediment management, Arup has been involved in numerous projects aimed at developing either natural shore systems or more traditional hard shore protection schemes, depending on which is the most suitable solution. We also fully integrate environmental, economic and other factors as required.

Our capability covers all stages of project development from concept design and feasibility stage desk studies through to detailed design and construction supervision, numerical and physical modeling, and post-construction monitoring. Our coastal expertise ensures the greatest value for our client on any project involving coastal engineering.

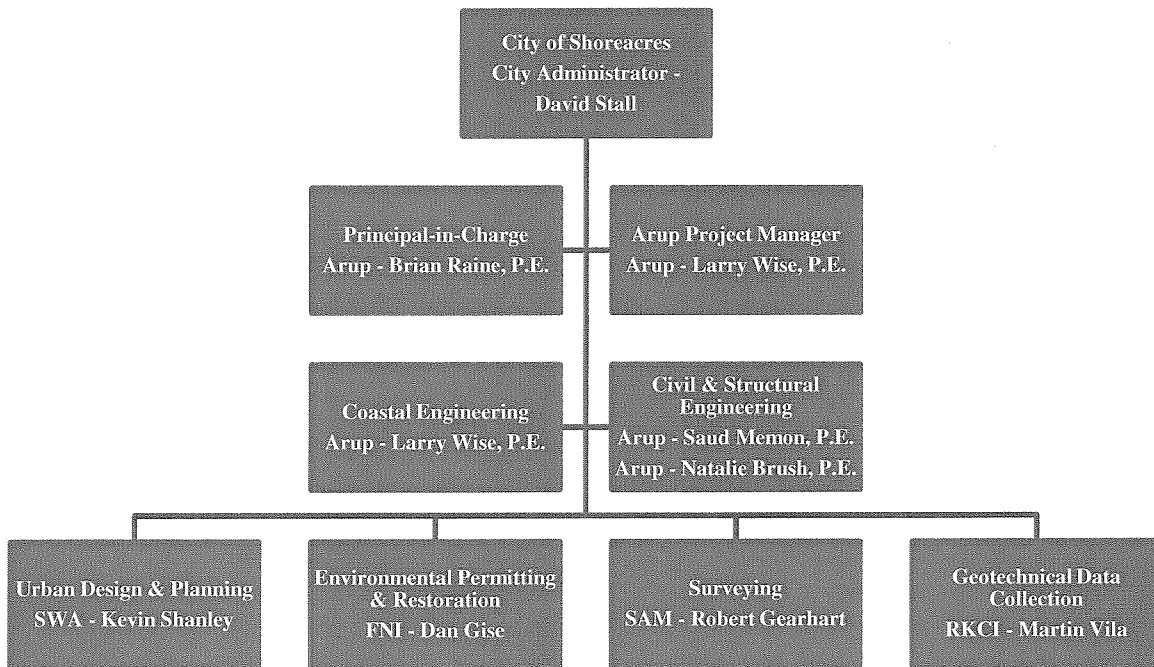
Our skills encompass shoreline monitoring, survey methodology and scoping, shoreline management plans, environmental impact assessments, strategic environmental assessment, ecological risk assessments, survey results appraisal and diving services.

We consult and liaise with regulatory agencies and non-governmental nature conservation organizations in order to achieve project objectives while assigning appropriate weighting to the importance of the marine environment and conservation objectives.

Arup's relevant project sheets are provided in Appendix A.

## 2 Project Team Profile

Arup has assembled a team specifically to address the Shoreacres Miramar Park shoreline restoration project. This team includes members from Arup who will lead the project and focus on the engineering design of the project as well as key subconsultants chosen for their specific expertise.



As referenced in the organizational chart and following personnel introductions, Arup team members will serve in a variety of leadership roles. These proposed leaders are based in Houston, but bring extensive global project experience and perspectives to the team.

**Brian Raine, Principal-in-Charge** – Brian serves as Arup’s Global Energy Leader, as well as Houston Office Leader. Brian brings over 25 years of experience providing structural engineering design and analysis and design management of onshore/offshore structures, and civil/industrial facilities and buildings.

**Larry Wise, Project Manager** – Larry’s realm of expertise includes coastal, marine, civil and environmental engineering on projects that have involved shore protections, coastal processes, and environmental restoration. Larry will manage the day-to-day functions related to the Shoreacres project.

**Saud Memon, Lead Civil Engineer** – Saud is a civil engineering associate based in the Houston office. He has served in project management and lead engineering roles on projects involving roadway and rail design.

**Natalie Branch, Lead Structural Engineer** – Natalie is a structural engineer with project experience spanning several sectors, including energy and civil engineering. Natalie is based in Houston, but has provided management and structural design on projects around the world.

Arup staff resumes with detailed project experience are included in Appendix B.

Our team incorporates subconsultant firms with exemplary reputations for delivering quality results. They include:

**SWA Group (Tab C)** – SWA will assist the team in developing a consensus based vision for the Miramar Park shoreline. This will include not only the immediate infrastructure at the shoreline, but also its relation to the larger community.

SWA is a global firm with offices in Houston and Dallas focusing on landscape architecture, planning, and urban design. SWA's work is fueled by a deep appreciation for nature and the beauty of natural systems. SWA are also inspired by the complexity of human-made systems and the human interactions they influence. Their projects have become recognized for their visionary aesthetics, exceptional functionality, and keen understanding of social design, as well as their emphasis on environmental sustainability. At SWA's core is a passion for imaginative, solution-oriented design that adds value to land, buildings, cities, regions, and people's lives.

SWA has developed community spaces ranging from the Kemah Boardwalk to Eleanor Tinsley Park and Cross Creek Ranch. SWA understands that the vision for such an important local asset must be developed from within the community, not imposed upon it based on others' concepts. Firm CEO, Kevin Shanley, has been a local leader for the last 16 years in developing a new vision for Houston's bayous and finding the funding, through grants and local philanthropists, to bring the vision to reality. Since Hurricane Ike, Kevin has been a key proponent of the Severe Storm Protection, Education, and Evacuation from Disasters (SSPEED) Center at Rice University which is advocating for and doing basic research on new ways of protecting the Galveston Bay region.

**Freese and Nichols, Inc. (Tab D)** – FNI will lead the permitting and environmental coordination efforts for the project, as well as providing design input for environmental restoration components as may be required. Headquartered in Fort Worth since 1894, Freese and Nichols has earned the reputation for providing clients with practical solutions to complex environmental regulations. Freese and Nichols' environmental scientists, geologists, wetland

scientists, arborists, foresters, and GIS analysts can quickly assess environmental challenges and regulatory requirements to identify strategies that often enable our client to avoid costly and time-consuming regulatory obstacles.

Freese and Nichols has extensive experience with permitting, wetland delineations, and mitigation regarding projects impacting wetlands or other waters of the U.S. They have conducted hundreds of field studies to identify waters of the U.S., including wetlands, to assist clients with U.S. Army Corps of Engineers Section 10/Section 404 permitting requirements. Freese and Nichols' biologists and wetland scientists work closely with clients and engineers to design projects that minimize environmental impacts while still fulfilling client and design needs. Keeping client interests foremost while finding solutions to permitting and other regulatory issues sets FNI apart from other consultants.

Freese and Nichols has produced numerous documents and reports fulfilling the requirements of the National Environmental Policy Act (NEPA). These services have been performed for a number of federal agencies as well as state and local entities that were required to meet NEPA requirements for projects with a federal funding component. Their philosophy for providing environmental review and assessment services is to comply with the appropriate regulations in a cost-effective manner in the time frame allotted to meet each project's schedule. Whether the project involves documenting a Categorical Exclusion (CE) or preparing an Environmental Impact Statement (EIS), Freese and Nichols has the staff, experience and capability to respond to and perform these environmental studies.

**Raba Kistner Consulting, Inc.** (Tab E) – RKCI provides quality Geotechnical Engineering and Construction Materials Engineering and Testing Services. Their specialized team of engineers and field technicians partners with clients to maximize efficiency and assure projects are completed on time and under budget. They are one of the leading engineering consulting firms in our field and have been providing these services since 1968. Headquartered in Texas, RKCI has provided these services across the southwest region of the United States. RKCI's multi-disciplined team consists of civil, geotechnical and construction materials engineers; scientists; lab and field technicians; and support personnel. More than 75% of their team holds licensure or certifications in their areas of expertise. Furthermore, RKCI's Geotechnical and Construction Materials Testing staff and laboratories are among the largest in the State.

**Surveying and Mapping, Inc.** (Tab F) – SAM will provide topographic, boundary, and hydrographic surveying services for the project. Founded in 1994, SAM, Inc. is a leader in providing complete geospatial solutions.

SAM's professional land surveyors and field crews utilize the latest dual-frequency GPS surveying receivers and fully robotic Trimble Total Stations and Motion Computing tablet data collectors to provide a full range of surveying and

construction staking services, including terrestrial, mobile, and airborne LiDAR. Technicians use fully integrated CAD stations equipped with the latest software, including AutoCAD, MicroStation, GEOPAK, PLS-CADD, BlueSky AlignDB, and more.

Their hydrographic survey team brings state-of-the-art technology to your project, utilizing single- and multi-beam echo sounders, side-scan sonars, magnetometers, sub-bottom profilers, RTK GPS receivers, motion sensors, gyroscopes, sound velocity meters, and water level gauges. They specialize in shallow water hydrographic surveys for energy, water, environment and transportation projects in near-shore and inland waters.

SAM's experienced team of professionals uses the latest subsurface utility engineering technologies, including radio frequency, acoustic, sonic magnetic sensing, ground penetrating radar and nondestructive vacuum excavation equipment. Their underground utility locating services designate, locate and accurately map underground utilities, as well as assist clients in utility coordination. SAM's utility coordination section is headed by seasoned professionals and backed by a knowledgeable team of right-of-way and land agents. With comprehensive experience in utility coordination at all levels on both public and private projects, their team can determine the best method to resolve utility relocation conflicts and recover the cost of providing a resolution.

### 3 Project Understanding

Shoreacres is a hidden jewel on Galveston Bay with Miramar Park as the heart of the community. From the neighbors across the street to the farther reaches of the city, the shoreline is the focal point of life in Shoreacres. Community members enjoy leisurely strolls, jogging and cycling, wade fishing, and kayaking and paddle boarding from the park. Stretching from north of the fishing pier to the gates of HYC, this gracious space is enjoyed by active users and appreciated by all for its scenic view of the Bay. This open view of the Bay is an asset to the community and a distinguishing feature of Shoreacres.

The community's appreciation for Miramar Park is the greatest driver for advancing this project. However, it is also the greatest challenge. Creating a unified vision within the community for the future of Miramar Park is the first and most critical task of this project. The Arup team will join with the community through open dialogue to help residents understand the options and build consensus. With the community's vision, the Arup team will proceed with the final design and permitting process. Arup understands that failing to develop a consensus from key stakeholders – adjacent neighbors, the citizens as a whole, HYC, resource and permitting agencies, and grant funding agencies – can jeopardize the entire project.

The timeline below illustrates our team's proposed schedule for delivery of major actions and deliverables.

Month	1	2	3	4	5	6	7	8	9	10	11	12
Project Kick-Off Meeting												
Community Input & Plan Development												
Field Data Acquisition & Analysis												
Preliminary Design												
Permit Application Development												
Environmental Assessment												
Permit Processing & Approval												
Final Design												

#### 3.1 Project Kick-off

The Arup team will start the project by meeting with the City to better understand the current state of Miramar Park, the key issues as perceived by the City, and the history of the project. This meeting would be conducted at Shoreacres City Hall and will include all the key team members. The project schedule and approach will be confirmed with the City at the kick-off meeting.

### 3.2 Community Input and Plan Development

Arup will work in close partnership with SWA Group to develop the community consensus plan for protecting and restoring the Miramar Park shoreline. The project team, including SWA, will develop a series of community workshops and outreach activities to gather from the stakeholders what their visions are for the shoreline and Miramar Park as a whole. From this interaction the overall goals and objectives for the restoration will be developed. New funding sources and opportunities, such as environmental enhancement and storm surge wave reduction, for restoration of the park will be identified. From this and development of the basic physical parameters working on the shoreline – such as storm surge, wind waves, and ship generated waves – the previously proposed alternatives will be reviewed, refined, and refreshed with new ideas and alternatives as they are proposed by the City, stakeholders, or the team members. High-level estimates of construction costs will also be developed at this stage to ensure that community expectations are in-line with potential for obtaining outside funding for the project. A matrix of community concerns, objectives, and constraints will be developed and used to assess the various alternatives. Project team environmental scientists will review the project with the client and the design team to determine potential engineering options for the site as well as the proposed end result of the project.

With this work done, a second round of workshops and outreach will be used to develop a consensus based concept for the shoreline restoration. With the results of the second round of public coordination completed, the Arup team will work with the City to craft a plan that addresses as many stakeholders' issues as possible while achieving the project goals.

### 3.3 Field Data Acquisition and Analysis

During the process of developing a consensus plan for the shoreline restoration, the team will also begin the data acquisition necessary to identify the design constraints. This includes conducting the geotechnical field investigation and laboratory testing. A series of borings, most likely all shore based, will be conducted along the length of the shoreline to identify the soil types and strengths for the project area. As needed, a series of offshore shallow grab samples will be obtained to identify the nearshore sediments as well. All of the geotechnical data collection and analysis will be conducted by Raba-Kistner, Inc.

Simultaneously, the project surveying will be conducted by Surveying and Mapping, Inc. (SAM). These surveys will include both onshore topographic and boundary surveys as well as nearshore hydrographic surveys. The surveys will be tied in to existing benchmarks and, if necessary, temporary construction benchmarks will be established near the park. The surveying data required to file a State of Texas submerged lands boundary survey (by a License State Lands



Surveyor on the SAM team) will also be obtained on the assumption that such a survey will be required to be submitted by the Texas General Land Office.

During this period, a wetland delineation will also be conducted. The initial step in the environmental documentation and permitting process will be to visit the project site, take photos and familiarize the project team with any issues and environmental setting of the project. Freese & Nichols, Inc. (FNI) scientists will document the limits of waters of the U. S. to determine the impacts of the project on these areas for permitting purposes, including mitigation. This information will be used to develop the Wetlands/Waters of the U.S. delineation report which in turn will be appended to the Preliminary Jurisdictional Determination Report. It is likely all impacted waters would be jurisdictional waters and would require authorization from the U.S. Army Corps of Engineers (USACE) prior to any activities that would result in the placement of dredged or fill material into these waters.

### 3.4 Preliminary Design

With a conceptual design chosen by the community and the basic physical environment for the project defined by the field data, Arup will develop the preliminary design of the project. This will include basic design (to approximately 30% design level), permitting assessment, and development of a more accurate cost estimate. The design of the project will inherently have a heavy coastal engineering emphasis; however, other key disciplines will also be involved in the design process, depending on design chosen, including FNI addressing wetland and habitat restoration and SWA addressing urban design issues. The design will address the basic dimensions, quantities, and materials in sufficient detail to begin the USACE permitting process.

While the exact design analyses to be conducted cannot be determined until the conceptual design is chosen, in general the Arup team will focus on using available data to the maximum extent possible. It is anticipated that there is sufficient data available from efforts by the USACE and the Federal Emergency Management Agency (FEMA) to provide most needed coastal engineering design parameters. The amount of numerical modeling required for this project is expected to be relatively minimal, with the savings from these services being used to focus on the early, community consensus and concept design phases of the project.

Design standards will be based on USACE Engineering Manuals, including the Coastal Engineering Manual. The team's knowledge of local contractors, materials, and equipment will be used to help ensure that the design is economically constructible. Depending on the design requirements, local contractors may be surveyed to help develop the constructability analysis and costing for the project.

## 3.5 Permitting

Once the preliminary design is sufficiently advanced and the environmental team is familiar with the project, the team will request a Pre-Application Meeting with the USACE. At this meeting the project team will review the project, discuss project design, and assess environmental issues potentially associated with the project. This meeting will be arranged upon approval of the client and would include the environmental team, the project engineer and, if desired, the client's representative along with the USACE assigned project manager. Secondly, depending on the degree of impacts, a Joint Evaluation Meeting (JEM) may be held. The JEM brings all the regulatory agencies that may have oversight of the project together to discuss environmental issues and conflicts that may impinge on the project. A key discussion may be the presence of threatened and endangered species in the project area and agency concerns regarding the impact of the project on these species. The objective of these meetings will be to facilitate permitting by identifying issues early in project development and make design changes or modifications where feasible to reduce project impacts and the mitigation required. The steps to prepare a permit application and acquire authorization for the project are discussed below.

### 3.5.1 Permit Application

Once the project design is sufficiently complete to the point where it is not likely to change (normally, at the 30 to 60% design stage), the permit application will be completed for submittal to the USACE. The permit application will be submitted to the USACE for processing and authorization. The permit application will be submitted in standard USACE format (ENG Form 4345) with all appropriate maps, photo graphs, design drawings and supplemental information sheets. The project team will attend any site visits or meetings with the USACE during the permit authorization process. Project team environmental scientists have reviewed the project and believe that the most likely vehicle for this project is an individual permit (IP) or a Letter of Permission (LOP) 1. LOP 1 can be used to permit projects conducted, sponsored, or funded, in whole or in part, by the USACE, U. S. Fish and Wildlife Service (USFWS), U. S. Environmental Protection Agency (EPA), Natural Resources Conservation Service (NRCS), Texas Parks and Wildlife Department (TPWD), Texas Commission on Environmental Quality (TCEQ), or the Texas Water Development Board. This project is funded at least in part by the USFWS, so it may be eligible for this permit. In addition, the project team will explore the use of various Nationwide Permits to determine the suitability of these permits for authorization of the project since the time and effort to authorize the project by NWP is considerably less than via an IP or LOP 1. At this time the project team does not believe an NWP could be used for this project but the various options will be reviewed with the USACE. In addition, design changes could be considered that might make the project feasible for authorization under an NWP. In addition to the USACE permit, other permits or authorizations may be required. These permits include an Essential Fish Habitat

(EFH) Assessment through the National Marine Fisheries Service, Coastal Use Easements from the Texas General Land Office, and Marl, Sand, Gravel, Shell, and Mudshell permit from the Texas Department of Parks and Wildlife.

### 3.5.2 Environmental Assessment

The project team will meet with the City of Shoreacres to determine the preferred restoration alternative, including the type(s) of land reclamation or restoration desired, such as parkland, marshes (wetlands), or native upland vegetation. Note: if wetlands will be created, the City should investigate with the USACE whether the wetlands could be used as mitigation for other projects the City may be proposing. The project team will prepare an environmental assessment report that defines the existing environment, describes the intended use of the reclaimed or restored area and outlines the process by which the land reclamation or restoration will occur. The project environmental team will work with the engineers to design the restoration areas according to the requirements of the City and the land use type desired. This restoration plan would be submitted to the City for review and comments prior to finalization. The use of federal funding for project development often triggers the preparation of the appropriate National Environmental Policy Act (NEPA) documentation for environmental clearance. The project team will meet with the City to determine if a NEPA document is required, the type of document needed, i.e. Categorical Exclusion or Environmental Assessment, the stage of completion of any document that has been initiated and the amount of effort required to write or complete the document. This information would be used to develop or complete any required NEPA document.

### 3.6 Final Design

The final detailed design stage of the project will commence as permitting constraints which may affect the design become apparent. A basis of design document will be prepared and reviewed with the City to document and control the key requirements, data, and assumptions underpinning the project. The final design outputs will include a set of plans and specifications which the City can use to bid the construction of the selected shoreline restoration. The plans and specifications will be produced at 60% and 95% design levels for review by the City.

The final design will be based on analyses of the coastal engineering aspects of the project, likely including armor design, dredging and filling, and sediment transport. The final design stage will also include design work and coordination as needed for utilities modifications or relocations, temporary construction facilities and staging areas, and any other ancillary project features – such as potential modifications to the existing fishing pier or boat ramp. All analyses and design work will be documented in a final design memorandum.

During this project stage a design review will be conducted with the City to make sure that all requirements are being met and to keep the City informed as to design issues. This process will be conducted sufficiently in advance of the completion of the design such that input can be incorporated. Internal constructability and permit-ability reviews will be conducted with Arup and FNI personnel to ensure that the design can be permitted with the minimum possible issues and fastest schedule and that it can ultimately be constructed safely and economically.

### 3.7 Coordination Management Systems

Throughout the project, coordination with the City, implementation of Arup's quality control, and maintaining project controls are the keys to a successful project. Arup will maintain coordination with the City through regular meetings, bi-weekly progress reports, and formal coordination at key points during the project. As part of its ISO 9001 quality management, ISO 14001 environmental management, and ISO 18001 health and safety certifications, Arup applies stringent quality, environmental, and health and safety control requirements to all projects, regardless of the size. These controls are part of the fundamental operation of the firm and will be fully applied to the Shoreacres project.

## 4 References

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Arup has performed services for a number of Texas public agencies from local governments to transportation agencies and higher education institutions. The following are provided as references.

### 4.1 University of Houston Practice Football Field Monument Relocation

As part of an on-call contract with the Metropolitan Transit Authority of Harris County (METRO), Arup performed project management and design services related to the relocation of three University of Houston gateway monuments to accommodate the new METRO Southeast Light Rail line. Services included civil, drainage, utilities, geotechnical and survey work. Arup also designed retaining walls at the relocation site, and developed a storm water pollution prevention plan.

**Agency** METRO  
**Contact** Jose Enriquez  
**Address** 1900 Main  
Houston, TX 77002  
**Phone** 832-255-4954  
**E-mail** Je10@ridemetro.org



### 4.2 San Antonio Downtown Transportation Study

The San Antonio Downtown Transportation Study (DTS) supports San Antonio's long-term livability, sustainability and economic goals by providing a detailed roadmap for future transportation developments. As a subcontractor to Pape-Dawson, Arup led the development of a street typology framework to help prioritize future downtown development projects, using criteria such as connectivity, transportation function, land use, and local context.

**Agency** City of San Antonio  
**Contact** Luis Maltos  
**Address** Capital Improvement Management  
Municipal Plaza Building  
114 West Commerce, 5<sup>th</sup> Floor  
San Antonio, TX 78205  
**Phone** 210-207-8140  
**E-mail** luis.maltos@sanantonio.gov



## 4.3 Washington Avenue Corridor

A subcontractor to Asakura Robinson, Arup provided transport planning for the Washington Avenue Corridor as part of the Houston-Galveston Area Council's Livable Centers study. The Livable Centers initiative seeks to develop walkable, mixed-use neighborhoods which incorporate multi-modal transportation solutions for improved environmental quality.

**Agency**     **Houston-Galveston Area  
Council**  
**Contact**     Amanda Thorin  
**Address**     3555 Timmons Lane  
                    Houston, TX 77027  
**Phone**        713-993-4587  
**E-mail**        Amanda.thorin@h-gac.com



A

# SFDPW As-Needed Geotechnical Services Contract San Francisco, CA



## Client

- San Francisco Department of Public Works (SFDPW)

## Project owner

- City of San Francisco

## Key services provided

- Geotechnical investigations
- Field testing
- Quality assurance/  
Quality control
- Cost estimating

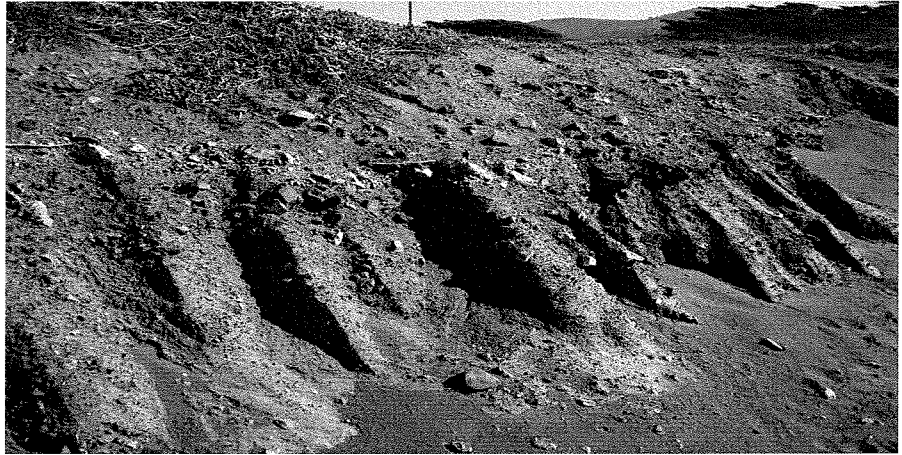
Since 2009, Arup has provided geotechnical engineering services on an as-needed basis to the City and County of San Francisco Department of Public Works.

Since 2009, Arup has been working with SFDPW under an As-Needed Geotechnical Engineering Services Contract. Under this contract, Arup has successfully completed, or is currently working on, the following projects: (1) Sharp Park Sea Wall Assessment, (2) Great Highway Emergency Slope Stabilization, (3) Pier 96 Sinkholes and Sea Wall Assessment, (4) Griffith Yard Facility Improvements, (5) Pier 92 Dynamic Pile Testing, (6) Telegraph Hill Rock Slide Assessment, (7) War Memorial Veterans Building Seismic Upgrade, (8) North Shore Channel Force Main Improvement, (7) Fire Station Nos. 5 and 16, (8) Sunnydale Auxiliary Sewer Phase II, and (9) Muni Sunset Tunnel Portals. Details of some of these projects are provided below:

**Telegraph Hill Rock Slide Assessment** – Initially performed emergency services to evaluate rock slide and risk to building residents, and to provide City with temporary mitigation measures. Current phase of services includes: (1) checking utility services for leakage; (2) performing ground-based LIDAR and vegetation surveys; and, (3) developing a work plan for detailed mapping and analyses to determine appropriate remediation strategies.



# SFDPW As-Needed Geotechnical Services Contract San Francisco, CA

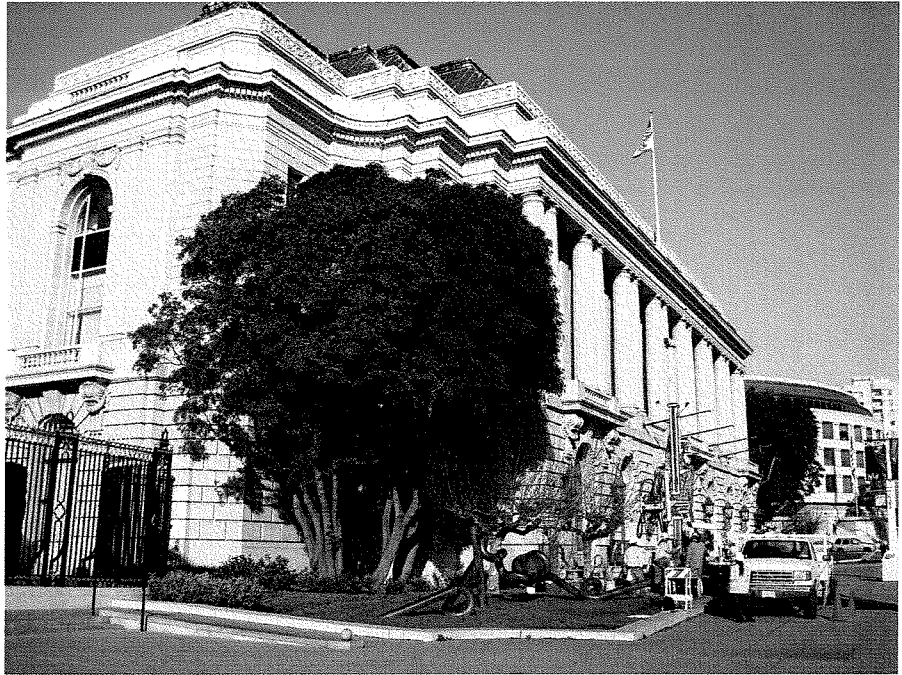


**Sharp Park Sea Wall Assessment** – Performed a condition assessment report of the existing Sharp Park Sea Wall protecting the Sharp Park golf course and existing wetlands located in the City of Pacifica. The portion of the sea wall assessed is approximately 3,200 feet long and includes an approximately 300 foot-long armored portion at the south end. Our services included an assessment and ranking of the current condition of the sea wall, to evaluate performance under projected sea level rise in years 2040 and 2060, to assess saltwater intrusion into the wetlands, to provide recommendations for appropriate capital improvements and/or maintenance/repair strategies, and to provide general cost estimates for each of the recommended strategies.



**Great Highway Emergency Slope Stabilization** – Performed engineering and construction monitoring services for emergency slope stabilization of the bluff toe along a portion of the Great Highway from north of the Southwest Ocean Outfall to Fort Funston Bluffs. The purpose of our services was to engineer a short-term emergency repair to protect the bluff toe and the Lake Merced Tunnel, and assist the SFDPW with field monitoring during construction.

# SFDPW As-Needed Geotechnical Services Contract San Francisco, CA



## **San Francisco War Memorial Veterans Building Seismic Upgrade**

Performed additional geotechnical exploration for establishing geotechnical design parameters and provided seismic engineering services, including site-specific seismic hazard analysis and evaluating liquefaction potential for the proposed seismic upgrade and improvements. Also provided geotechnical analyses and recommendations for a new PG&E vault located outside the existing War Memorial Veterans Building footprint.



**Pier 96 Sinkholes and Sea Wall Assessment** – Provided an assessment of the existing condition and deficiencies of the sea wall along Pier 96, and cause(s) for the two sinkholes that have developed along an outfall sewer at the pier. We performed a reconnaissance inspection from bayside and on land of the Pier 96 sea wall, prepared a technical memorandum documenting the sea wall conditions and any deficiencies, developed a priority list of immediate, interim and long-term actions, and made recommendations for additional geotechnical investigations, steel sheet pile inspection and testing, underwater investigations and testing of wharf concrete.

# Long Branch Sustainability Masterplan, Long Branch, NJ



© Arup

## **Client**

Thompson Design Group

## **Project owner**

City of Long Branch

## **Key facts**

Two miles of public oceanfront

Partnered with FEMA

Long-term resiliency plan for a sustainably restored waterfront amenity for Long Branch

## **Key services provided**

Structural engineering

Civil engineering

Geotechnical engineering

Maritime engineering

The study was based upon preliminary site observations after Superstorm Sandy, non-survey data, and pertinent best practice measures from around the world to mitigate future damage.

Storm damage from Superstorm Sandy along the City's Oceanfront severely impacted the City's "first line" of coastal protection, namely, the Bulkhead, Seawall, and Bluff. A combination of storm surge and swell imposed impact damage and extensive scour which undermined the boardwalk, roadway, and promenade elements as well as the utilities supported by them.

The City partnered with FEMA and State agencies to add long term resiliency into the replacement and reconstruction along the 2-mile oceanfront. This included both detailed observations and recommendations for repair and hardening of the affected structures and infrastructure. The study focused primarily on major infrastructure issues and opportunities concerning civils, geotechnical, coastal defenses, and structural elements.



# Allegheny Riverfront Park, Pittsburgh, Pennsylvania



© Edward Massey

## **Client**

City of Pittsburgh

## **Project owner**

Pittsburgh Cultural Trust

## **Key collaborators**

Michael Van Valkenburgh  
Associates

## **Key facts**

4,000ft long, 24ft wide  
Completed 1998

## **Key services provided**

Structural, electrical, and plumbing  
engineering  
Acoustic consulting

## **Selected awards**

*United States Progressive  
Architecture*, Architectural Research  
Award, 1996

The park is 4,000ft long and 24ft wide. The challenge was to create an urban space that could maximize the potential of the site.

Located on the banks of the Allegheny River, just upstream from the confluence of the Allegheny, Monongahela and Ohio rivers, the park is tightly squeezed between the river and a 4-lane highway.

Arup utilized a number of structures to maximize the park's potential. A cast-in-place concrete overlook platform at the entrance to the park helps capture park views.

Sculpted cast-in-place concrete ramps connect the multiple park levels. Long lengths of park cantilever out over the river providing more area. Design challenges included the impacts from ice-flows and barges and frequent flood conditions that cause the river to rise 30 feet.

# East River Masterplan, New York, New York



© Ari Burling Photography

## Client

Confidential

## Key services provided

Transport planning

Site planning

Traffic engineering

Capacity and intersection

Road capacity

Multi-modal transport planning

Arup is the prime consultant working to revitalize a neglected section of riverfront land in lower Manhattan and transform it into a spectacular waterfront esplanade.

There has never been an accepted comprehensive vision for New York's lower East River waterfront. Over the recent years the area underwent positive but piecemeal change. Arup's proposed masterplan focused on the waterfront and its immediate hinterland, and placed the East River Waterfront in a broader Downtown Manhattan context. It proposed the conversion of this currently neglected and under-used section of waterfront into an important and vibrant part of Manhattan's open space. It addressed the entwined issues of transportation, land use and urban design in a way that when implemented, would allow this area's potential to be fully realized.

Arup is reconnecting the communities of lower Manhattan and East River by creating a people-friendly promenade with a bikeway, pier for vessels, and an eco-park.

# Washington Avenue Livable Center, Houston, TX

## LEGEND

### Circulator 4A

- 4A Circulator
- 4A Circulator Bus Stops
- 1/4 Mile Distance from Bus Stop
- 1/2 Mile Distance from Bus Stop

### Existing Line

- METRO Rail Main Line
- METRO Rail Main Line Station

### New Lines Under Construction

- Southeast LRT Line
- North LRT Line
- Southeast LRT Line Station
- North LRT Line Station

### Proposed Line

- Proposed Uptown Line LRT
- Proposed Uptown Line LRT Station

**Circulator 4A**  
Route Length:  
Roundtrip:  
Stops:  
1/4 Mile Pop:  
1/2 Mile Pop:

12.3 Miles  
40 Min  
32  
7,206  
20,302

### Estimated Daily Ridership

Headway: Circulator 10 min  
Base Route 36 Ridership (including all original stops): 351 (4.9% of 1/4 Mile Pop)  
Projected Circulator Ridership  
Short-Term Ridership (1 yr): 617 (8.6% of 1/4 Mile Pop)  
Long-Term Ridership (3 yr+): 839 (11.6% of 1/4 Mile Pop)

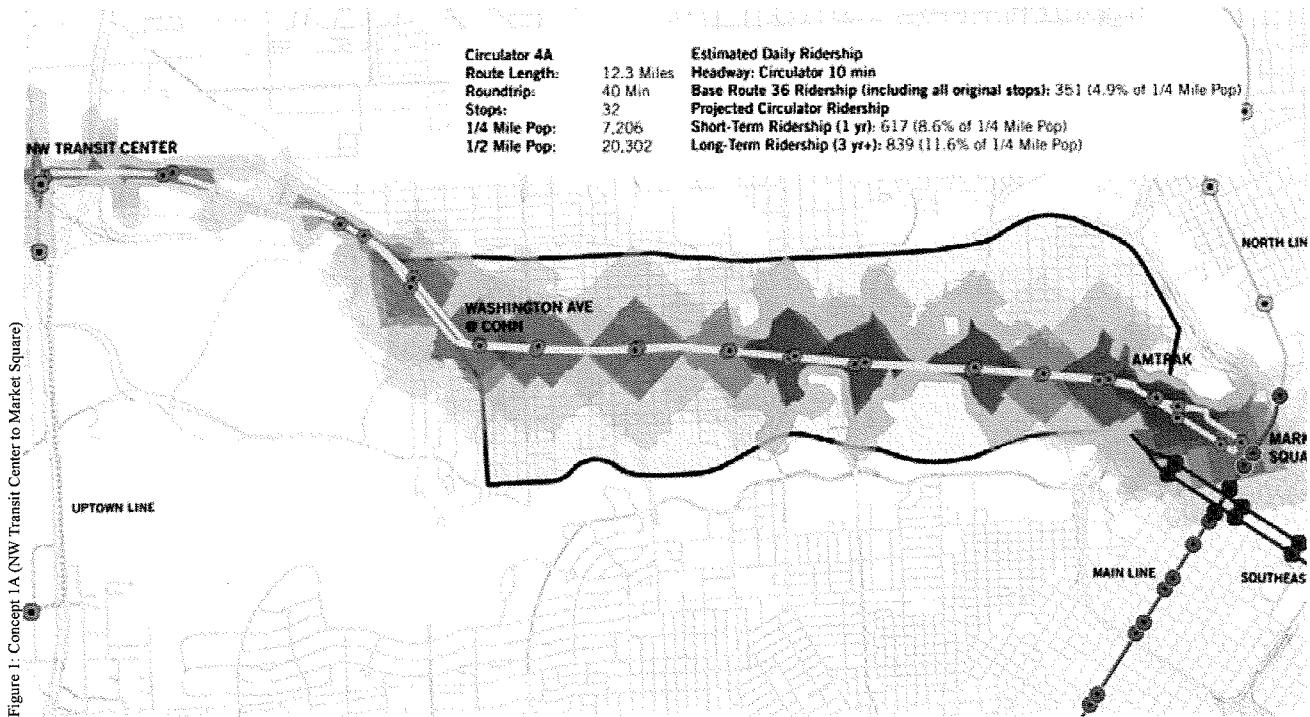


Figure 1: Concept 1A (NW Transit Center to Market Square)

## Client

Asakura Robinson Company

## Key collaborators

Morris Architects  
RCLCO  
SWA Group

## Key facts

The Livable Centers program seeks to create walkable, mixed-use places that provide multi-modal transportation, improve environmental quality and promote economic development

Estimated completion in 2013

## Key services provided

Transport planning

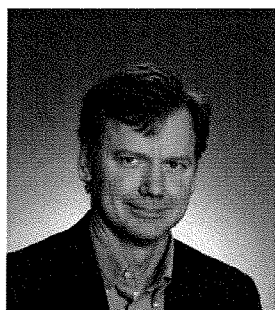
The study is engaging area residents and workers, government agencies, businesses and institutions to develop recommendations for improvements to the area.

The Houston-Galveston Area Council, in partnership with Better Houston, the City of Houston and TIRZ 15, is conducting a Livable Centers study of Houston's historic Washington Avenue Corridor, bounded by I-45 on the east, I-10 on the north, Westcott Street on the west and Buffalo Bayou on the south.

Arup teamed up with our client, Asakura Robinson to provide transport planning services for this project. We developed proposed circulator concepts along the Washington Avenue corridor, to provide high frequency, high quality service to the neighborhood's residents and visitors, and tested these concept using a model produced specifically for the project. The model incorporates factors such as access walk time, travel time and headways to determine an overall generalized cost.

B

## Brian Raine, PE



### Profession

Civil Engineer

### Current Position

Principal and Arup Energy Global Business Leader

### Joined Arup

1987

### Years of Experience

25+

### Qualifications

MEng Management, Curtin University, Western Australia, 1998

BEng (Hons), Civil Engineering, Curtin University, Western Australia, 1986

Diploma in Civil Engineering 1982

Cert's in Mechanical and Structural Eng Drafting 1979

### Professional Associations

PE, State of Texas

Member, Institution of Engineers, Australia

### Committees

Concrete Institute of Australia (CIA) Western Australian Branch (1997-1998)

### Publications

Gravity Based Substructure Solutions for Arctic LNG, John Powell, Gordon Jackson,

Brian Raine, Somchat Suwan, Osama Safaqah, ISOPE, Vancouver, July 2008.

Offshore LNG Storage in Concrete Gravity Caissons: Project Development and Procurement, B. Raine J. Powell, G. Jackson G. Thomas, OTC18981, May 2007.

Technical Issues associated with the integration of LNG production and storage facilities using floating

Brian Raine is the Houston office business leader, project manager and lead design engineer with Arup Energy specializing in design and design management of oil and gas and LNG production and receival facilities. His last 10 years has been involved in the conceptual to execution phase involvement of onshore and nearshore LNG facilities of various forms from onshore, nearshore and floating. He has more than 25 years experience in the design of onshore and offshore structures, civil / industrial facilities and buildings. His particular skills include structural engineering design, structural analysis and design management. Offshore structure experience includes offshore concrete and steel gravity based and skirted base structure (GBS and CGS) design for a range of structure types and environments. Design leadership activities include liaison with maritime, geotechnical engineers, structural analysts, naval architects and offshore installation engineers.

His early career was spent in the Western Australian building and industrial structural design sectors.

Brian Raine's design leadership activities include liaison with maritime, geotechnical engineers, structural analysts, naval architects, and offshore installation engineers

### Energy

#### White Rose Extension Project CGS, Canada

Project Director for wellhead CGS Concept, pre-FEED and FEED studies in 110 m waterdepth in sub-arctic conditions. The innovative year-round drilling solution is an alternative to high cost seasonal drilling from a floating platform.

#### Sengkang LNG Storage and Export Facility, Indonesia

Project Director for concept design of LNG tankage, marine facilities, boil-off gas handling and LNG piping. Project director for membrane tank and jetty detailed design.

#### Malampaya Self Installing ACE Gravity Based Platform, Philippines

Project Director and structural concept designer for a tubular ACE Platform supporting a gas compression platform. The ACE substructure supported on pad footings on sand in 43m water depth. The self installing solution will be towed to the site on its own buoyancy. The conceptual design phase was completed and was followed by 9 month FEED and 3 month Bridge to Detailed Design. Detailed Design and Construction Phase participation to follow in



concrete sub structures, B. Raine,  
A. Kaplan, G. Jackson,  
OTC15299, May 2003.

Development of Economic Self-  
Installing Steel Gravity Platforms,  
G.Jackson, D.J.Collier, B.A.Raine  
– Arup Energy, OTC12970, 30  
April 2001.

2012.

### **Costa Azul LNG Terminal, Mexico**

Owner's Engineer for the marine terminal including 300m trestle and berth & 650m long caisson breakwater to be constructed in 25m waterdepth. Arup scope included preliminary engineering, permitting documentation and preparation of EPC bid documents followed by bid evaluation. Studies included assessment of offshore gravity based solutions, marine structures, a tug facility and LNG tank studies.

### **Compass Port LNG Terminal, AL**

Project Director for a LNG GBS FEED study for an offshore terminal. Issues studied included review of breakwater protection, in-place stability and constructability of the proposed concrete structure. Execution plans, cost and schedule estimates were prepared.

### **NAWC LNG Terminal Cost Estimate, Mexico**

Project Manager for a preliminary design and cost estimate for a 125,000m<sup>3</sup> tank in a severe seismic design. Comparisons with aseismic conditions were prepared. Concept designer for civil works estimates for seawater intake and outfall systems and selected civil engineering works.

### **Brass LNG Marine Terminal, Niger Delta, Nigeria**

Project Director for caisson breakwater in 8m water depth for LNG facility in Niger Delta. Marine constructability was a key driver in the FEED.

### **NNWA-Bilah CGS Constructability Study, Various Locations, Nigeria**

Project Director for a concrete gravity based substructure construction facility location and feasibility study. The study considered a range of sites along the Nigerian coastline and costed the construction of an LNG concrete based facility in Nigeria.

### **Maritime**

#### **Humber Sea Terminal, Hull, UK**

Design Engineer for a Design & Construct tender bid roll-on, roll-off berth pontoon to be located in the River Humber.

### **Rail**

#### **Stirling and Joondalup Railway Stations for the Northern Suburbs Railway, Perth, Australia**

Scheme and detailed structural design of retaining walls, station platforms, superstructures and a multi lane bus bridge spanning over a freeway and railway. Site supervision and contract administration of the Stirling bus bridge piling contract. Site inspection of the bridge and platform works.

## Larry A. Wise, P.E.



### Profession

Professional Civil Engineer (Lic. in TX)

### Current Position

Associate

### Joined Arup

2013

### Years of Experience

18

### Qualifications

M.S., Civil (Ocean) Engineering  
B.S., Civil (Environmental) Engineering

### Professional Associations

American Society of Civil Engineers (ASCE) & Coast, Oceans, Ports, and Rivers Institute

Permanent International Assoc. of Navigation Congresses (PIANC)

American Shore and Beach Preservation Association – Treasurer, Texas Chapter

Western Dredging Association

### Committees

Permanent International Assoc. of Navigation Congresses (PIANC) – Initial U.S. young professional representative on WG 55 “Safety Aspects of Berthing Operations of Oil and Gas Tankers”

### Publications

“Mozambique LNG – A Catalyst for Prosperidade” ASCE Ports 2013

“Texas City Channel Deepening - A USACE Design-Build First,”

Mr. Wise’s responsibilities have included serving as both Project Engineer and Project. Mr. Wise has more than 18 years’ experience in engineering research, design, and project management functions for a variety of coastal, marine, civil, and environmental engineering projects. Experience includes a wide range of projects involving shore protection, coastal processes, geographic information systems (GIS), and environmental restoration. Roles and responsibilities have included project management, project engineering, numerical modeling, on-site construction oversight, permitting, research, and engineering design. Project experience includes dredging, dredged material management planning, propeller scour analysis, wave forces modeling, navigation channel design and permitting, bay and open coast shoreline protection, beach nourishment, marsh restoration, and soft sediment shoreline protection.

Larry Wise has both project management and practical engineering experience in a wide array of fields to bring practical solutions to real world problems.

### City of Shoreacres, Bayfront Erosion Study, Texas\*

Used GIS to integrate historic aerial photography, digitized shorelines from aerial photography, and topographic / hydrographic surveys and analyze erosion rates and causes. Worked with community members to develop potential solutions for erosion and evaluate feasibility and costs for each alternative. A funding strategy and implementation plan were also developed for use by the City.

### City of Baytown, Bayland Marina Reconstruction, Baytown, Texas\*

Engineer of record for reconstruction of marina destroyed by Hurricane Ike. Reconstruction included demolition of remaining facilities, debris removal and dredging, refurbishment of utilities, and new concrete floating dock system. Managed review of predicted storm surges and 2D wave model of Galveston Bay to determine required top of pile elevations. Coordinated with Federal Emergency Management Agency and City emergency management coordinator on project funding and payment.

### Houston Yacht Club, Hurricane Ike Recovery and Rebuild, Shoreacres, Texas\*

As an independent consultant, provided input on restoration of 200-slip marina nearly completely destroyed by Hurricane Ike.

WEDA 32 / TAMU 43 Technical Conference 2012,  
Awarded Best Technical Paper

“Desktop Methodology for Estimating Maintenance Dredging Requirements for Widened and Deepened Navigation Channels,” Coastal Sediments 2007

“Feasibility Analysis of Shore Protection Alternatives for Rockefeller Wildlife Refuge in the Chenier Plain of Southwestern Louisiana (USA)”, Coastal Structures ’03

“Response of concrete armor units to wave-induced hydrodynamic loads,” Computers and Structures (Journal)

“Modeling Wave Forces on A-Jacks Armor Units,” Coastal Structures ’99

Provided input on storm conditions and development of master plan for marina. Coordinated procurement for fixed docks and floating dock systems to meet marina requirements.

#### **Galveston Bay Foundation, Pine Gully Restoration, Seabrook, Texas\***

Led efforts as part of a negotiated agreement between the Port of Houston and the City of Seabrook to restore Pine Gully after siltation had damaged much of the intertidal marsh. Through a public coordination effort a proposed restoration plan was developed and the plan progressed through engineering design and permitting. Developed design for combined breakwater and jetties to prevent siltation from ship generated waves as well as excavation and removal of excess sediment.

#### **Federal Emergency Management Agency, Coastal Hazard Analysis for Orange, Jefferson, Harris, and Brazoria Counties, Texas\***

Managed effort to provide coastal hazard analysis for revised Flood Insurance Study and Flood Insurance Rate Maps for large portion of upper Texas coast. Analysis included estimation of nearshore waves and transformation of these waves over flooded lands to determine location of high velocity zone (V-Zone) boundary.

#### **Weeks Marine, Inc. – Texas City Design-Build, Texas City, Texas\***

Lead engineer and designer-of-record for \$65M channel deepening project. Managed final design team for first ever U.S. Army Corps of Engineer major navigation design-build project. Worked closely with contractor (Weeks Marine) and owner on design through final construction including on-site construction administration. Improvements also included raising levees on two existing placement areas and repair shoreline protection damaged by Hurricane Ike. Design efforts were fast tracked and included oversight of geotechnical subconsultant. Project included providing on-site construction phase services.

#### **U.S. Army Corps of Engineers, Galveston Bay Regional Sediment Management (RSM) Programmatic Sediment Management Plan, Galveston, Texas\***

Managed project to develop a programmatic sediment management plan as the initial step toward a comprehensive Regional Sediment Management (RSM) Plan for Galveston Bay. The region incorporates 12 Federal navigation channels along with numerous other projects affecting sediment. A set of recommended implementation projects and strategies was created and prioritized.

\*Experience prior to joining Arup

# Saud Memon, PE



## Profession

Civil Engineer

## Current Position

Senior Civil Engineer

## Joined Arup

2009

## Years of Experience

15+

## Professional Qualifications

M.Sc, Bradley University, Peoria, IL. 1998.

B.S, Civil Engineering, NED University of Engineering and Technology Karachi, Pakistan. 1996.

PE, State of Wisconsin (36391, 2003)

PE, State of Texas (97839, 2006)

ENV PV, Sustainability Credential, Institute for Sustainable Infrastructure

## Professional Associations

Member, American Society of Civil Engineers (ASCE).

Member NACE (Corrosion Society)

Member, Institute of Transportation Engineers (ITE).

Member, AREMA

Member of Chi Epsilon and Sigma Lambda Chi, National Civil Engineering Honorary Societies

## Publications:

Steve Clark, Saud Memon, Anthony Combs "Installation Of Rail Lubrication On Embedded Track" Metropolitan Transit Authority of Harris County Texas (METRO), AREMA

Annual Proceedings 2010.

Saud Memon is a member of the Arup Americas Civil Practice Executive, and the Arup Rail Executive. He is an associate with over 14 years of experience in designing, executing and managing technical projects in the railway and highway design industry.

Saud has a strong background in railway and highway and provides a range of consulting services to clients across the nation. Key areas of Saud's experience include analysis and assessment of existing and planned track infrastructure condition, alignment design for high speed rail, analysis of vehicle-track and wheel-rail interface behavior, general track behavior problem solving, analysis and assessment of vehicle-track and stray current analysis.

On the Highway side Saud's expertise include geometric design of complex interchanges and urban highways, QA/QC for overall schematic design and PS&E projects, authoring design summary reports and technical provisions, roadway traffic signal design and interconnect plans. He also has experience designing ramps, elevated direct connectors, collector distributors, general purpose lanes, tunnels, and surface managed lanes. Additional areas of his expertise includes utility coordination, geometric design of highways, county roads and interchanges using Microstation and GeoPak, and feasibility studies of coastal roads.

Saud Memon's experience ranges from high speed rail passenger service, wheel rail interface to design of complex interchanges, and municipal and state client coordination

## Rail

### Texas Central Rail High Speed Rail Design, Houston – Dallas, TX

Saud is the Deputy Project Manager for Preliminary Engineering and Planning team to US Japan High Speed Rail and Lone Star High Speed Rail LLC for a new 330 km/hr high speed rail line between the cities of Houston and Dallas, Texas. Saud's responsibility includes preliminary alignment for the entire section, highway-rail grade crossing study and design, and the preparation of various reports including the alternative analysis and the grade crossing report.

### Wayside Rail Lubrication Installation Support, METRO LRT, Houston, TX, USA

METRO acquired the services of Arup to upgrade its process of manual application of the grease at curve locations along the METRO LRT with automated application. As the Project Manager Saud designed and prepared construction drawings for wayside rail lubrication system; for embedded tracks for nine locations along the

Saud Memon "Understanding Stray Current Mitigation, Testing and Maintenance on DC Powered Rail Transit Systems", 2013 JRC Conference Proceedings.

Metro Red line. Saud also provided the installation support by providing on-site assistance to observe and lead through the technical process of the first lubricator installation including the boring process, wheel sensor, solar panel, reservoir, conduit and the wiper bar installation. Considering the innovative nature of the project the topic was selected as a paper to be published in the 2010 AREMA Annual Proceedings.

### **Denver Eagle P3 Lender's Technical Due Diligence, Denver, CO, USA**

Saud was a Technical Reviewer in the Lender's Technical Advisor Team to Macquarie Capital for the estimated \$2.5bn, 32-mile East-Gold Line Commuter Rail P3 project. His responsibility also included the preparation of various reports including the Technical Review report. The project is part of the Denver RTD FasTracks program, and includes design, build, finance, operate, and maintain concession for a 40-year term.

### **Private**

#### **Woodall Rogers Deck Plaza, Dallas, TX, USA\***

The Woodall Rodgers Deck Park is a planned elevated park construction project in downtown Dallas, Texas; the park will be built over it and will connect uptown and downtown Dallas. This is a project with a construction cost of \$67m. Its objective was to stimulate economic revitalization in the area and promote mixed development. Saud's responsibility included co-authoring design specifications & technical specifications and performed the QA/QC on geometric design.

### **Highways**

#### **LBJ Freeway Procurement Engineering Project, Dallas, TX, USA\***

Project Engineer; responsible for the preliminary engineering and preparing the design schematic for the IH 635 Managed Lane 3P Project.

#### **IH 35E Freeway PS&E Project, Carrollton, TX, USA\***

Designed alternatives that would improve the operational efficiency of proposed IH 35E freeway General Purpose and Managed Lanes at the IH 35E & PGBT interchange.

#### **Interstate Highway 74, Illinois Department of Transportation, Peoria, IL, USA\***

This Interstate 74 Project for Illinois Department of Transportation (IDOT), District 4, was the largest road reconstruction project in the history of downstate Illinois. Saud was lead design engineer for Section 5 of the project that focused on the interchange between Interstate 74 and Main Street (U.S. Route 150/Illinois Route 116) in East Peoria.

\*experience prior to joining Arup

## Natalie Camille Brush



### Profession

Structural Engineer

### Current Position

Senior Structural Engineer

### Joined Arup

2008

### Years of Experience

10

### Qualifications

Licensed Professional Engineer,  
Texas, Civil, #103436

M.S. in Civil Engineering,  
Texas A&M University,  
College Station

B.S. in Civil Engineering,  
Texas A&M University,  
College Station

### Professional Associations

Council on Tall Buildings and  
Urban Habitat (2005-2009)

Structural Engineers Association  
of Illinois (2004-2008)

Structural Engineers Association  
of Texas (2002-2004)

### Committees

Americas Region Structural Skills  
Networks Houston Representative  
(2009-2011)

CTBUH Newsletter Editor (2006-  
2009)

CTBUH Coordination Committee  
(2007-2009)

SEAOI Young Engineers  
Committee (2005-2008)

SEAOI Website Committee Chair  
(2005-2008)

Natalie Brush is a senior structural engineer that has worked in a variety of sectors including commercial, residential, healthcare, and offshore structures. She currently works for the Energy group in Houston and worked for a buildings consultant in Chicago prior to joining Arup.

She has designed structures with many different materials ranging from concrete, steel, precast concrete, timber, masonry, cold-formed steel, and prestressed concrete.

Natalie's capabilities include general structural engineering analysis and design, weight and stability control of floating structures, construction site assessment and experience in general project management, office and project quality management and is an Arup internal auditor.

Natalie Brush brings a wide range of experience from projects such as concrete high-rises, timber barns, underwater structures, LNG tanks, and construction site assessments

### Malampaya Phase 3 Substructure, Philippines

Local project engineer for the FEED and DD design of steel gas depletion compression platform during 1-yr assignment in Philippines. Established and lead weight control assessment during FEED and design phase, corrosion mitigation methods for the substructure, as well as design work and review related to naval architecture, fatigue analysis, and wave kinematics. Responsibilities also included setting up project quality control and HSSE requirements / procedures and managing systems during FEED phase.

### Sengkang LNG Terminal, Indonesia

Structural engineer for the preliminary design of a LNG tank roof structure on the island of Sulawesi, Indonesia. Responsible for assessment and comparison of traditional and innovative roof construction and installment methods to minimize material, cost and schedule.

### Scarborough LNG GBS Site Selection Study, SE Asia

Deputy Project Manager and engineer for dry dock site selection study for GBS requiring 20m depth dock and tow-out channel. Efforts included initial assessment of 20 sites down to short list of 2 sites. Study included preliminary designs for site development, labor and material plans, and commercial plans. Natalie was key liaison for most all information routing for the project between Arup offices

around the globe as well as the client and sub-consultants.

**Barge Hull Repair, Nigeria**

Structural engineer for the preliminary assessment of methods to repair an existing steel barge hull. Responsibility included engineering review of three alternatives for technical feasibility.

**Hebron Field CGS Study, Newfoundland**

Structural engineer for preliminary concrete CGS scheme study. Completed stability analysis for the float-out and inclined installation of various CGS geometries and ballast compartmentalization.

**Water Intake Structure, Lake Mead, NV, USA**

Structural engineer for the preliminary design of concrete intake structure located on the 140m deep lakebed for new facilities of the Southern Nevada Water Authority. Completed initial 3D CAD modeling and calculations for structural weight control during offshore construction.

**Miscellaneous Projects/Tasks, Halvorson and Partners, P.C., Chicago, IL, USA\***

Performed schematic design of concrete core and outrigger lateral system for 30-story residential tower. Analyzed and designed 6-story truss systems for a convention center ballroom addition during schematic design. Investigated a one-way post-tensioned slab for 2-story Whole Foods grocer during design development. Designed 3- and 5-story masonry and plank structures from design development through construction document phase.

**Elysian Hotel and Residences, Chicago, IL, USA\***

Managed construction of 60-story high-rise in downtown Chicago. Responsibilities included weekly interfacing with architect, contractor, and owners, main contact and reviewer of shop drawings and RFI's, and weekly site visits. Updated design of lateral and gravity systems during design-build construction and designed lateral and gravity system for 6-story steel framed motor-court and lead shop drawing reviewer for project.

**McKinley Park Lofts, Chicago, IL, USA\***

Lead engineer on the conversion of 3-story 1940s concrete warehouse into 5-story loft condominiums including all tasks from evaluation of existing structure to construction of new steel framed stories.

\*experience prior to joining Arup

C





## SWA FIRM PROFILE

### VALUES:

The SWA Group is an urban planning, design and landscape architecture firm working worldwide from seven offices. Throughout its 50+ year history, The SWA Group has embraced the idea that planning and design can shape the environment in fundamental ways. The firm is structured to facilitate the role of design and planning in building memorable places that have clarity in function, identity and meaning. Our focus continues to be balancing the natural and built environments, social cultural and economic objectives to create value for our clients and the communities our work supports.

Unique to The SWA Group is the strong, continuous connection between planning and design. Our practice is dedicated to dealing with larger social, economic and environmental issues with equal sensitivity to the final outcome as we apply to our project-work. Our planning (deciding what should occur on the land) and our design (deciding what shape and character that should be) constitute a seamless process.

Our work is to create place and community with inspiration. Some of our most successful works do not seem consciously "designed." However, we are not completely satisfied until our work evokes feelings that transcend the creation of place and community - even though these are significant achievements in themselves. We constantly search for a special place, a unique community, one that reflects the hand of the designer and stimulates a fresh response.

Our practice is a constant search for a better approach, or more interesting and informed response, to the wide array of urban and regional challenges brought to us by our clients who may be developers, corporations, cities or universities. Our collaborative approach extends to our clients with whom we work and to architect colleagues with whom we explore new prototypes and new attitudes toward the man-made world. We appreciate working with people who share our goals and who have equally strong points of view. Our stake lies not only with the intricacy or complexity of designing and building a place, but also in discovering the intrinsic qualities of that place. Everything aims toward that accomplishment.

### CORE SERVICES:

SWA areas of practice include Revitalization-Reuse, Community Planning, Urban Design, and Landscape Architecture.

#### Urban Planning

For urban projects, we offer master planning, preparation of design guidelines, and full design services. These urban design and planning services can be applied to entire districts, as well as street systems, city blocks, public park and plaza spaces, waterfronts, and the smallest of urban areas. We are skilled at addressing both the redevelopment of an urban area—including infill development and land use changes—as well as the design of new urban environments.

#### Urban Design

SWA has developed a national reputation in urban planning and design through a history of successful urban projects. By carefully integrating design goals with infrastructure needs, SWA provides designs that create and enhance the visual and functional quality of urban hardscapes and landscapes. Strong design in the public realm serves as the "backbone" of a city. This backbone includes streets, highways, greenways, parks, plazas, waterfronts, open space, civic areas and other public spaces. SWA designs urban hardscapes and landscapes that provide a sense of place for urban dwellers.

#### Company Name

SWA Group

#### Company Type

Corporation: DUNS #054514052  
(employee owned)

#### Year Established

1957

#### Predecessor Company(s)

Sasaki, Walker, Roberts Associates, Inc.	1973
Sasaki, Walker Associates, Inc.	1965
Sasaki, Walker, Lackey Associates	1964
Sasaki, Walker & Associates, Inc.	1957

#### Locations

Sausalito, CA	(415) 332-5100	62 employees
San Francisco, CA	(415) 836-8770	23 employees
Laguna Beach, CA	(949) 497-5471	23 employees
Los Angeles, CA	(213) 236 9090	23 employees
Houston, TX	(713) 868-1676	43 employees
Dallas, TX	(214) 954-0016	12 employees
Shanghai, China	86 21 6074 5050	30 employees

#### Corporate Address

2200 Bridgeway Boulevard  
Sausalito, California 94965

#### Officers / Directors

Kevin Shanley, CEO	(713) 868-1676
Scott Cooper, CFO	(415) 332-5100
Gerdo Aquino, President	(213) 236-9090
Margaret Leonard, Controller	(415) 332-5100

#### Financial Status

SWA is one of the largest companies in its industry in the country. Specific questions on the company's financial conditions may be obtained from:

Margaret Leonard, Controller  
2200 Bridgeway Boulevard  
Sausalito, California 94965  
Telephone: (415) 332-5100

For more information please see [www.swagroup.com](http://www.swagroup.com)



## SWA FIRM PROFILE

### **Community Planning**

SWA maintains expertise in master planning and land use planning at both the local and regional levels. In the course of more than forty years of planning and designing successful communities, SWA has developed a planning approach that produces living environments of exceptional quality. Because our work is land-based, we're able to create plans that sensitively make the best use of terrain, landform, natural systems, landscape, and urban spaces, and integrate those elements with the required infrastructure, buildings, and other improvements. We apply these same skills to projects involving the use and restoration of natural systems. We provide expertise in site planning to implement the land use concept and successfully integrate the project program with the site. The firm assists public and private clients with all scales of master planning, land use planning and project-level site design. Our planning services extend to a wide array of development and redevelopment projects. Additionally, we provide design and planning services for environmental infrastructure, preservation and restoration projects.

As a part of our larger-scale land planning services, SWA employs sophisticated Geographic Information Systems (GIS) and remote sensing technologies. SWA's ability to provide and interpret digitized data for client's property holdings helps to make critical land management decisions in a cost-effective way.

### **Landscape Architecture**

SWA offers a full range of services in landscape architecture, from site planning through full construction documents and construction observation. From the start of a project we have an eye toward how we can transform a strong landscape concept into reality. This requires careful analysis and early collaboration with clients, consultants and contractors. In addition to schematic design and design development, we create the necessary construction drawings, specifications and cost estimates. We also provide construction observation to help ensure that construction is consistent with our design intent.

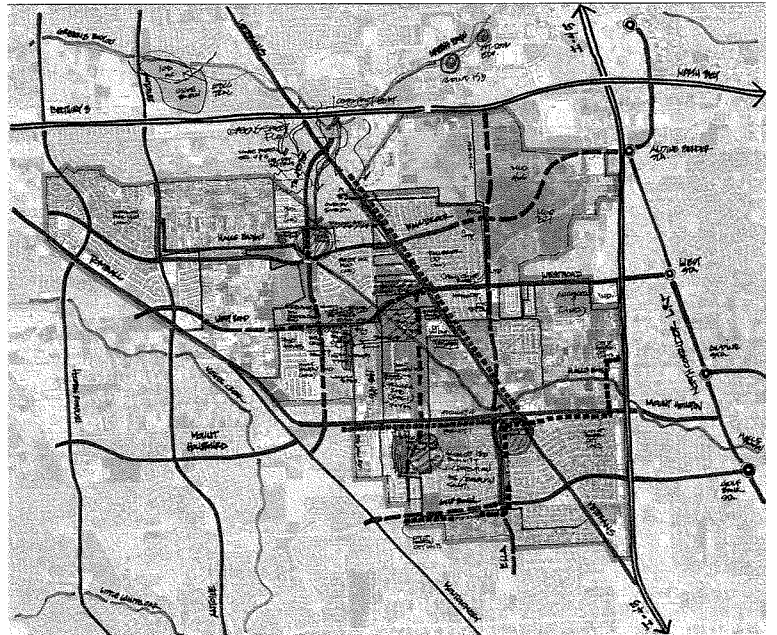
### **Revitalization & Reuse**

The revitalization of under-utilized land is essential to the health of our cities and regions. SWA's revitalization and re-use projects range from small urban infill sites to large land-based projects involving infrastructure and natural systems restoration. This experience has built a proven reputation for bringing challenging assignments to fruition with the ability to integrate multiple concerns – environmental, economic, community – with a strong vision for the ultimate form and function of the project.

### **SCHEDULE OF WORK:**

SWA is engaged on a large number of projects at all times, both domestic and international. The company's seven offices share staff and frequently collaborate on assignments. This allows SWA the flexibility to respond forcefully with its 190+ person staff to new and interesting clients and their projects. In general terms, SWA is highly mobilized to serve our clients and their aggressive schedules.

# Halls Bayou



SWA is the urban design sub-consultant to a team of civil engineers, hydrologists, fluvial geomorphologists and Public Engagement specialist for this watershed "vision" and flood damage reduction project. Halls drains an area of 44.6 miles for a population of 196,000 located on a north, northeast arc of Houston between the Intercontinental Airport and Downtown. Repeated flood damage to homes and businesses have precipitated a number of actions over the past decades including the buy-out of hundreds of homes and the construction of a regional storm water basin. But progress has been intermittent and slow. The local flood control agency, HCFCD, facing significant delays and funding challenges through the Federal COE implementation program and continued flooding in the watershed, has launched this project as a locally funded initiative. With greater flexibility in demonstrating cost / benefits, HCFCD has included a community redevelopment component to look broadly at opportunities to make public improvements and partner with other entities to coordinate invested dollars. SWA is leading the creation of a community framework plan and developing the conceptual ideas to enhancing flood control elements including the main channel, detention basins, and tributaries for improved water quality, habitat restoration, recreation, neighborhood connectivity, and higher real estate values.

## Location

Houston, Texas

## Client

Harris County Flood Control District  
Brown & Gay Engineers

## SWA Scope

Master Planning - Urban Design

Develop a watershed master plan and design recommendations for multi-use channel and storm water storage basins

## Size

20.24 miles

# Cypress Creek Overflow Study

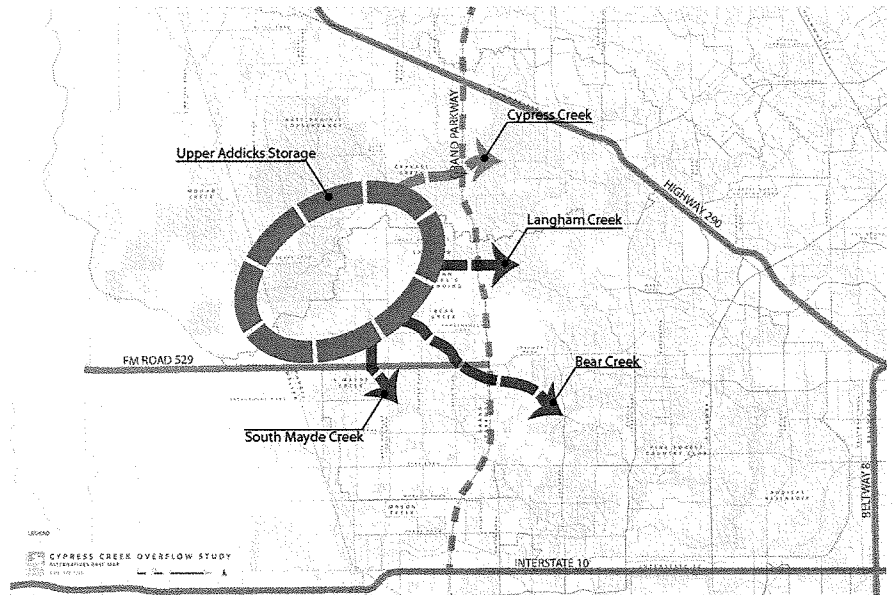
KATY PRAIRIE CONSERVANCY + HARRIS COUNTY PUBLIC LAND

WETLAND AREA + PRAIRIE AREA

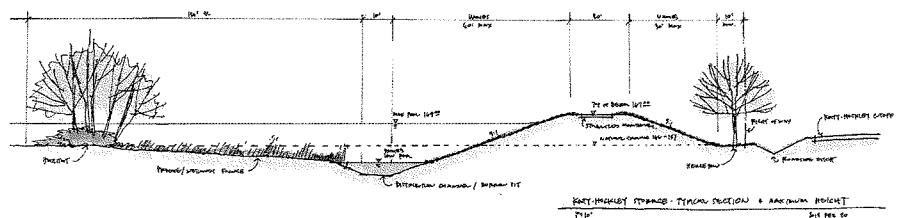
FLOODPLAIN

DEVELOPMENT DENSITY

CYPRESS OVERFLOW STUDY AREA



STUDY AREA STRATEGY



KATY - HOCKLEY STORAGE TYPICAL SECTION AT MAXIMUM HEIGHT

SWA has been commissioned as part of a multi-disciplinary team to study an area of approximately 60-square miles of the Upper Cypress Creek watershed located on the far west side of the City. Western and Northwestern Harris County are anticipated to experience a surge of land development activities in the near future with the population currently about 340,000 anticipated to nearly double in the next 50 years. The objective of the study is to establish a set of policies, technical criteria and guidelines that will allow the Flood Control District and Harris County to plan for and implement programs that reduce flood risks and take into account the unique hydrologic conditions in upper Cypress Creek and the drainage areas upstream of two of the region's principal reservoirs. This area drains Addicks and Barker Reservoirs, which are designed to mitigate flooding in the downtown Houston area. The trend in land development will convert many acres of prairie land and rice farms into a suburban environment. Drainage is complicated by the fact that when storm events exceeding a 10-year event occur in the upper northwest areas of the county, runoff overflows from the Cypress Creek watershed into the tributary watersheds draining into the Addicks and Barker reservoirs. SWA Group and the Team are working with a steering committee of key stakeholders to identify the array of issues associated with the competing land interests and drainage issues in the study area. The steering committee includes representatives from Bayou Preservation Association, City of Houston, Harris County, Katy Prairie Conservancy, US Army Corps of Engineers, Waller County, West Houston Association and HCFCD. The principal product of the study will be a series of design guidelines and an implementation plan for moving forward.

## Location

Harris County Texas

## Client

Harris County Flood Control District

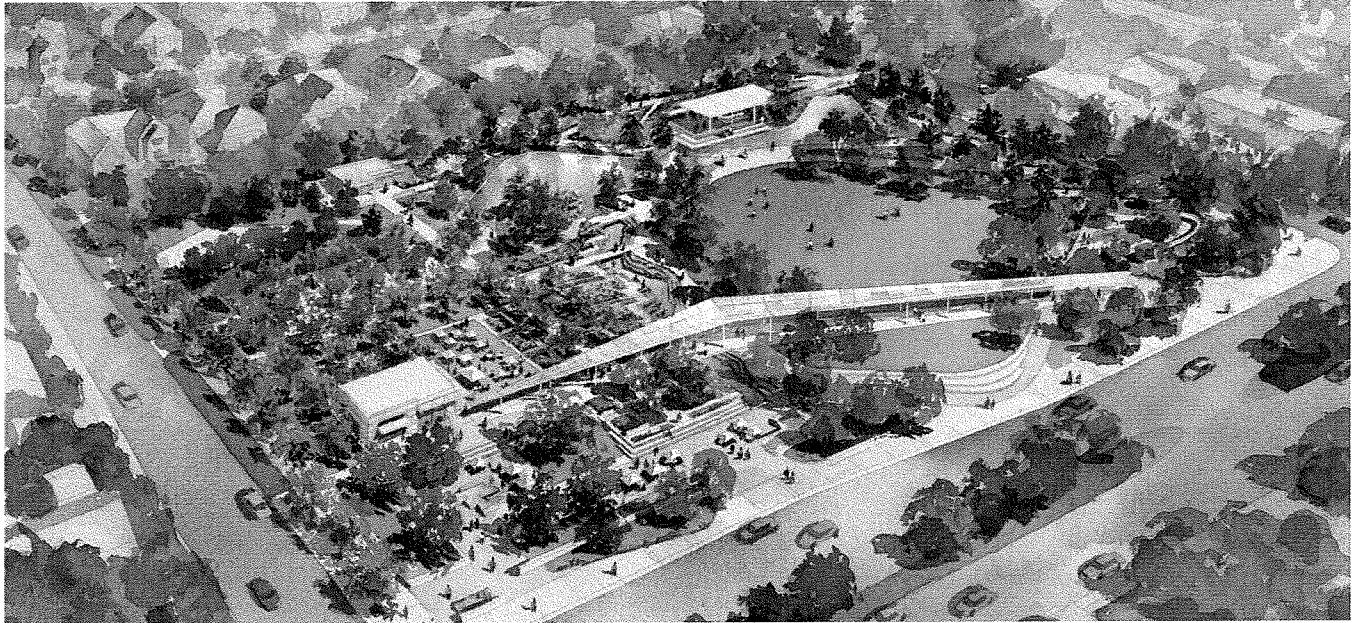
## SWA Scope

Watershed Development Strategy Study

## Size

60-square miles

## Evelyn's Park


**Project**

Evelyn's Park

**Location**

Bellaire, Texas

**Client**

Evelyn's Park Conservancy

**SWA Scope**

Conceptual Master Plan

**Size**

4.93 acres

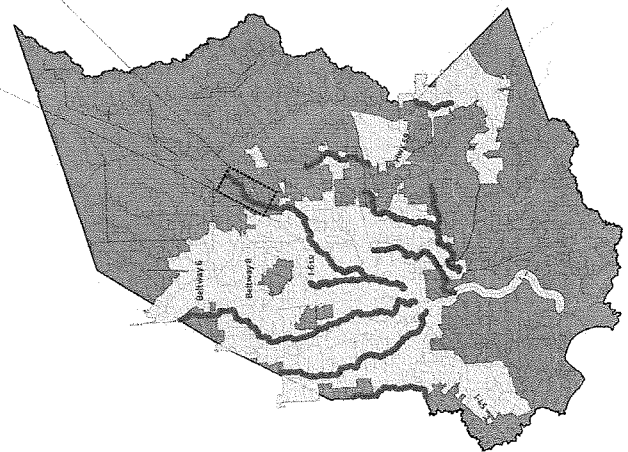
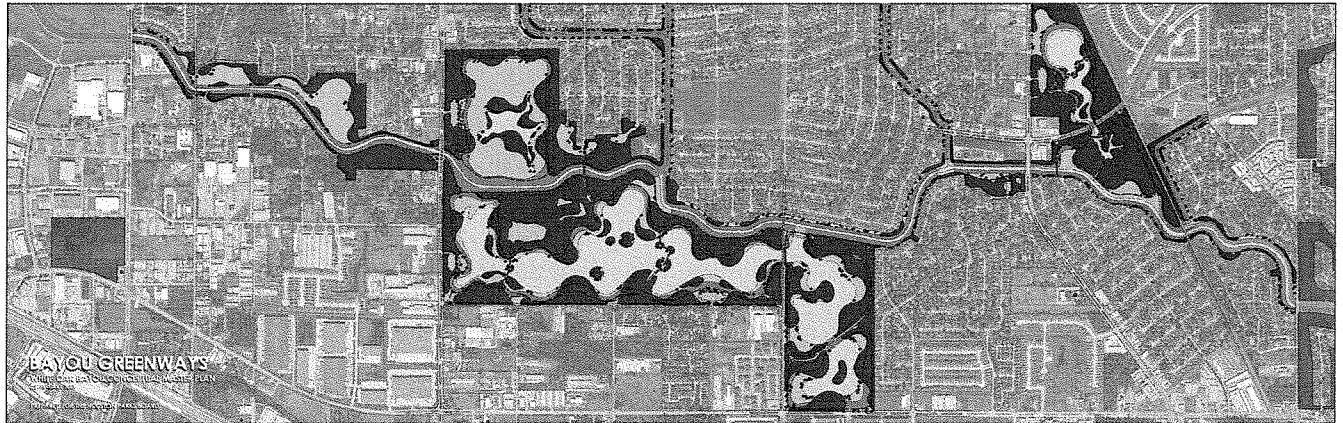
Through the creation of the not-for-profit Evelyn's Park Conservancy, the goal is to design, fund and build a park with primarily private rather than public funds, while engaging the public in determining its design and development. SWA Group provided a conceptual master plan and relational layout of park assets that considers space allocations, adjacencies and development timeline. SWA Group worked with stakeholders to identify concepts and prioritize functional elements and features that are unique, attractive and representative of the Bellaire community and values.

The size and visibility of the park site provide a unique opportunity for the City of Bellaire to enhance its

identity as a place. Shaping the community's vision for a park that transcends expectations for a traditional suburban sport-centric environment is an important part of the conceptual development of the plan. The design is highly influenced by the prominence of the park's location along the busy Bellaire Boulevard at the gateway entrance to the City of Bellaire. The potential iconic dimension of the park supports developing the front of the site as an active urban gathering space with striking landscape and architectural features. The interior of the park unfolds in a series of sophisticated themed gardens, that will wrap around the great lawn and a lake.



## Bayou Greenways

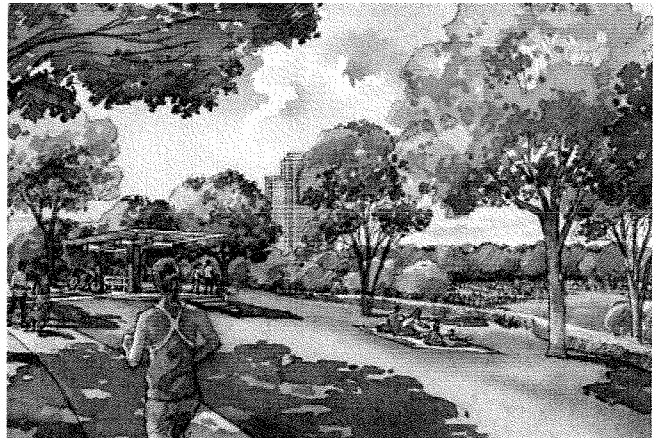
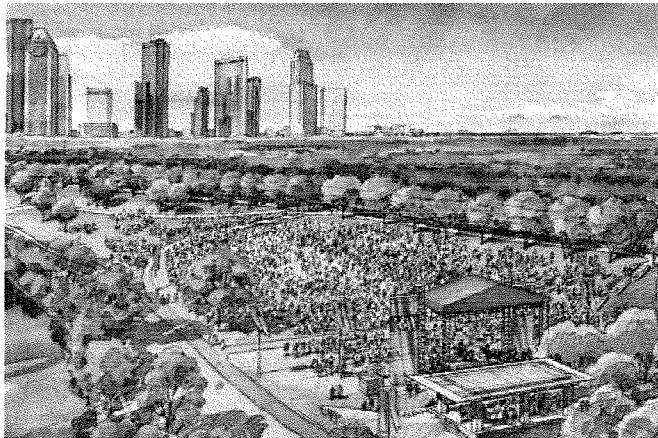
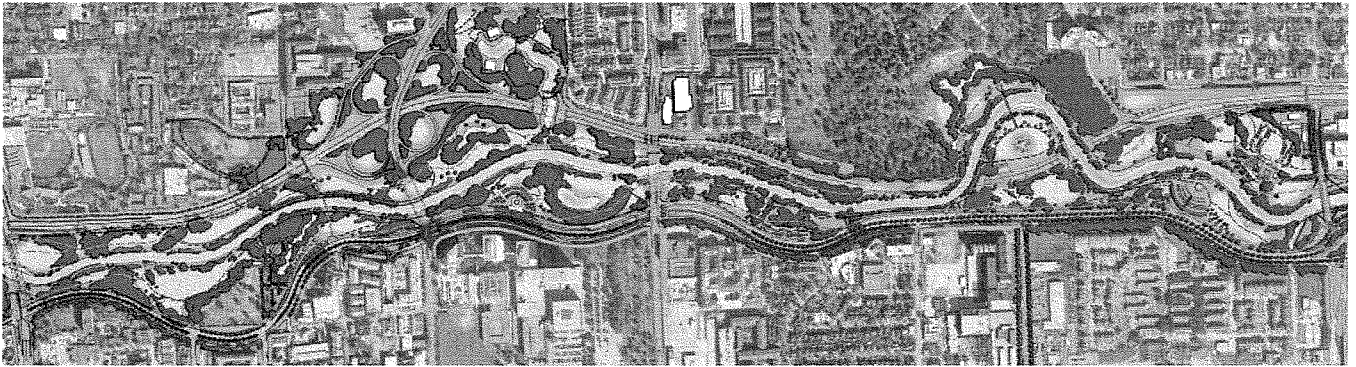
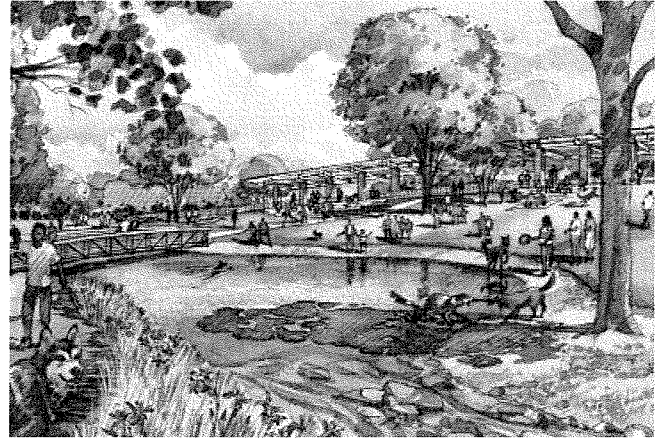
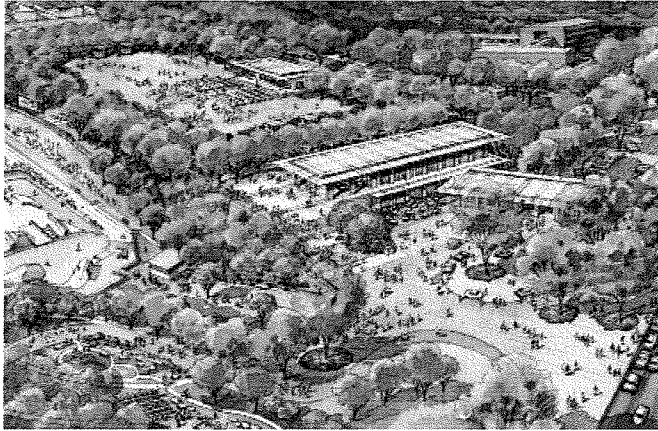


Potential Greenway  
 City of Houston  
 Harris County

Bayou Greenways is a +\$450 million project that will be implemented by many public and private stakeholders in several phases over 10 -15 years. SWA has been commissioned to prepare the conceptual framework plan for the program. When complete, the greater Houston area will have 4,800 acres of new and equitably distributed open space that can also serve the function of flood control and storm water quality enhancement. Three hundred miles of continuous all-weather hike and bike trails will meander through those greenways — an amenity unparalleled in the nation. The program will build upon and leverage City, County, State, and Federal water quality, flood control, and environmental investments to help create a world-class parks and trail system. SWA is developing the conceptual framework that includes potential property acquisitions, basic trail alignments, recreation amenities and other project features.

**Location**  
 Houston, Texas  
**Client**  
 Houston Parks Board  
**SWA Scope**  
 Conceptual Framework Plan

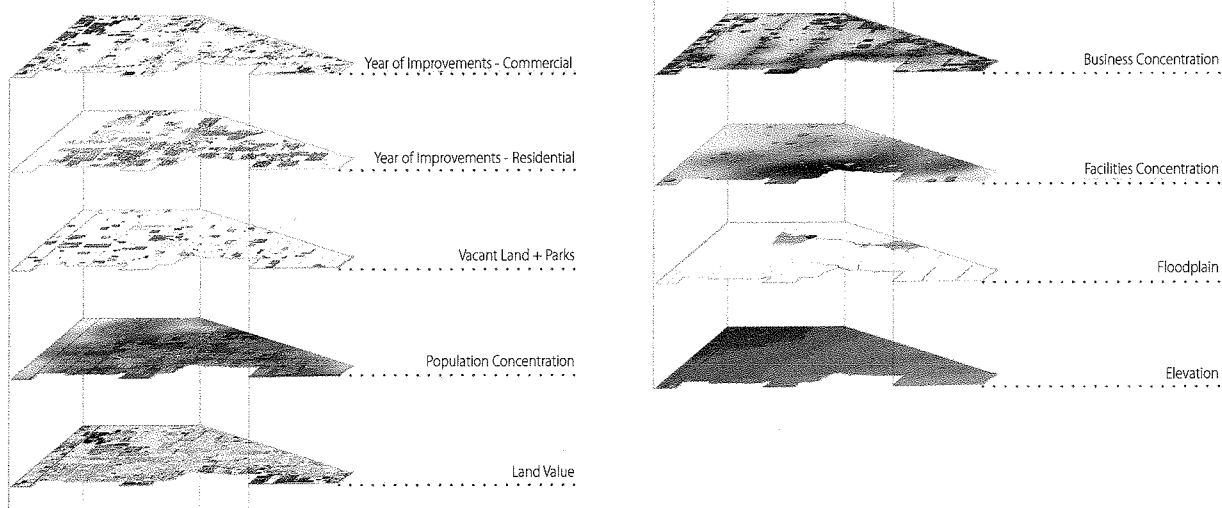
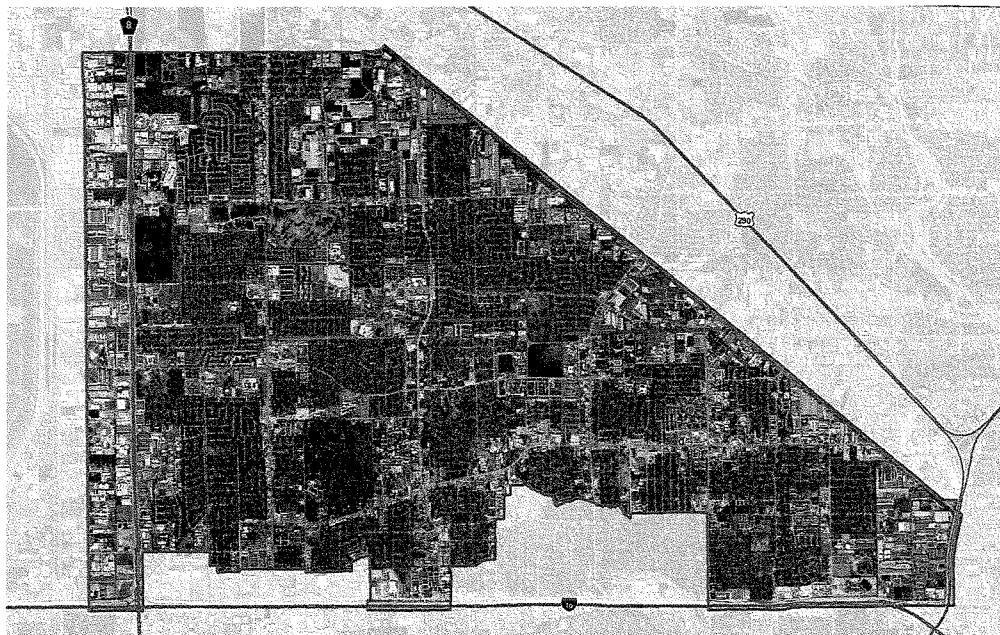
## Buffalo Bayou Promenade Shepherd to Sabine Master Plan



Located in the heart of Houston, Texas, Buffalo Bayou is the most significant stretch of open space in the region. However, increased urbanization, lack of maintenance and post-war efforts to increase its capacity for conveyance of stormwater have severely compromised this treasured parkland. This master plan seeks to address a number of issues currently facing the park and endeavors to find a balance between competing uses seemingly at odds. Channel modifications will help to increase conveyance of stormwater, mitigate ongoing erosion and siltation problems and return the bayou to something closer resembling its 'natural' condition. Enhanced circulation and the development of a series 'people places' will broaden the types of activities currently accommodated for in the park, while also allowing a larger segment of the population to make use of the park and enjoy its natural beauty. A series of pedestrian bridges and park portals will serve to celebrate both the entry into and passage through the bayou.

**Location**  
Houston, Texas  
**Client**  
Buffalo Bayou Partnership  
**SWA Scope**  
Master Plan  
**Project Size**  
Site: 175 acres

## Spring Branch Comprehensive & Service Plan 2015 - 2030



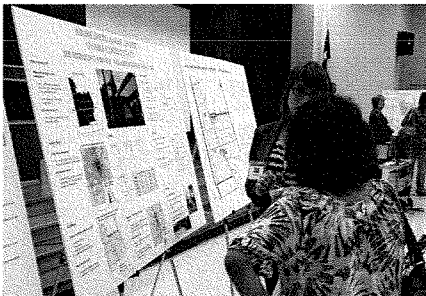
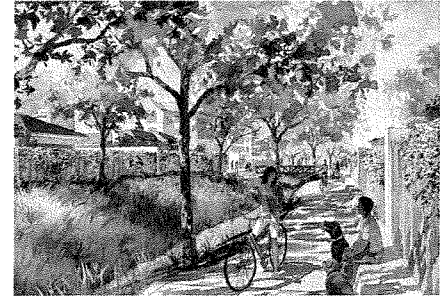
**Location**  
Houston, Texas  
**Client**  
Spring Branch Management District  
**SWA Scope**  
Planning  
**Size**  
19 square miles

One of Houston's first, close-in suburban communities, Spring Branch is situated on 19 square miles and located on the near west side of the City. It is one of the most ethnically-diverse areas in Houston. Bounded on all four sides by major freeways - Interstate 610, Interstate 10, Beltway 8 and US 290, all but US290 are entirely new or completely reconstructed facilities. Because of its strategic, geographic location and the superior, supporting transportation infrastructure, Spring Branch is experiencing a resurgence in redevelopment. Most of the current activity is associated with the recent transportation investments. The proposed plan seeks to harness the redevelopment energy and direct investment to certain, strategic areas of the District as a focus for broader community renewal. Development-oriented transit including housing, office, retail, education and community services will co-locate in these new centers of the District. The SWA Team includes planners, engineers, urban designers and real estate developers. The team is working closely with a community board of directors and the larger community it represents through a rigorous engagement process.



## Airline Livable Centers Study

### Market Mile, Houston, Texas



The goal of the Airline Improvement District Livable Center Study is to devise a District vision and framework plan that builds upon infrastructure projects currently underway and provides plans or recommendations for other neighborhood improvements. The District is challenged by incomplete infrastructure including major thoroughfares, collector and local streets; lacking safe and convenient pedestrian connectivity; and subjected to repetitive flooding from Halls Bayou.

To address these significant deficiencies and to build on vital entrepreneurial dynamics of the District's flea markets, the framework plan is comprehensive in scope. Implementation strategies include short, medium and long term capital projects. These public investments are expected to catalyze and leverage private investment to grow the local economic base of the District and increase the area's quality of life.

#### **Location**

Harris County, Texas

#### **Client**

Houston-Galveston Area Council  
Harris County Airline Improvement District

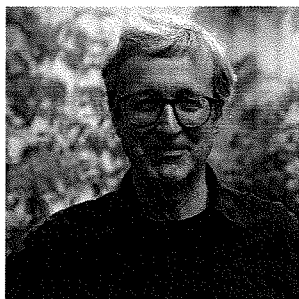
#### **SWA Scope**

Planning and Urban Design Study  
Public Outreach and Participation

#### **Size**

Site: 4.2 Square Miles (10.9 km<sup>2</sup>)

## Kevin Shanley, FASLA , Hon. AIA Principal & CEO



### Education

Studies in Landscape Architecture,  
Harvard University Graduate School of Design,  
1978

Studies in Philosophy,  
University of Santa Clara, 1972

### Professional Affiliations

American Society of Landscape Architects

American Institute of Architects, Honorary  
Member

Bayou Preservation Association, Chairman of  
the Board

Buffalo Bayou Partnership, Advisory Board  
Member

White Oak Bayou Association, Advisory Board  
Member

Willow Waterhole Greenspace Conservancy,  
Advisory Board Member

### Registration

Registered Landscape Architect,  
Texas No. 2271

### Select Awards

ASLA Honor Award, Analysis & Planning, Coastal Roulette: Planning Resilient  
Communities for Galveston Bay 2012

ASLA Texas Chapter Honor Award, Constructed Public, Shenzhen Bay Waterfront, 2012

ASLA Honor Award, Analysis and Planning - Brays Bayou Greenway Framework, 2009

ASLA Texas Chapter Honor Award, Planning & Analysis – Brays Bayou Recreation  
Greenway, 2008

ULI Finalist for Award for Excellence: The Americas - Buffalo Bayou Promenade, 2007

Shenzhen Bay International Design Competition - Shenzhen Bay Coastline Park and  
Restoration, 2004

ASLA National Honor Award - San Antonio River Master Plan, 2001

American Planning Association of Texas Honor Award - TxDOT Green Ribbon Project, 1999

Texas Chapter ASLA Award of Excellence - Baytown Nature Center, 1998

### Select Project Experience

**Arthur Storey Park Detention Basins.** Houston, Texas. Harris County Flood Control District. SWA prepared conceptual studies for the regional detention basin complex and detailed construction documents for wetlands and reforestation on this 250-acre parcel of land along Brays Bayou in west Houston.

**Baytown Nature Center.** Baytown, Texas. City of Baytown Parks and Recreation Department. Crouch Environmental Services, Inc. SWA Group and Crouch Environmental Services having provided master planning, land planning and landscape architectural services for the restoration of Brownwood Marsh, the City of Baytown again hired the team to provide master planning services for the Baytown Nature Center on the same site.

**Brays Bayou Federal Recreation Plan.** Houston, Harris County, Texas. Harris County Flood Control District. This master planning study within Houston examines opportunities for active and passive recreation along a centrally located waterway known as Brays Bayou.

**Brays Bayou Landscape Improvements.** Houston, Texas. Harris County Flood Control District. SWA provided master planning services for a 30-mile long corridor of the bayou to include hike and bike pathways, lighting, planting, and bridge improvements.

**Brownwood Marsh Restoration.** Baytown, Texas. Crouch Environmental Services, Inc. City of Baytown Parks and Recreation Department. Preparation of a master plan, land planning and landscape architectural services for this 60-acre wetlands parcel.

**Buffalo Bayou Detention Study.** Houston, Texas. Harris County Flood Control District. SWA was contracted to provide alternatives to in-stream and off-line detention in about six miles of the bayou. The resolution needed to be a working part of Houston's urban infrastructure and contribute to the attractiveness of the City environment.

**Buffalo Bayou Landscape Improvements, Bagby to Sabine.** Houston, Texas. Buffalo Bayou Partnership, City of Houston, Texas Department of Transportation, Harris County Flood Control District. SWA provided landscape architectural services for a 1.2-mile reach of Buffalo Bayou in downtown Houston. The improvements include pathways, lighting, planting, a pedestrian bridge, and connections to the city streets above.

**Clear Creek Federal Project Review.** Harris County, Texas. Harris County Flood Control District. Dannenbaum Engineers. The Corps of Engineers. A special team was formed to

review the project with the goals of matching the flood control benefits of the project and maintaining Federal funding while minimizing damage to the environment.

**Clear Creek Planning, Clear Creek Watershed.** Harris, Brazoria, Fort Bend, Galveston Counties, Texas. Crouch Environmental Services. US Army Corps of Engineers. SWA was hired to provide Planning Advisory Services in context of a bigger Federal Flood Control Project aimed at finding the best possible solutions for flood damage reduction in the Clear Creek watershed.

**Cypress Creek Park Detention Basin.** Houston, Texas. SWA provided concept, schematic and landscape design planning services for this project, to accommodate Northwest Houston's rapid urban growth that has resulted in the need for new open park space and improved flood damage reduction.

**Flewellen Creek.** Fulshear, Texas. Trendmaker Homes. The Flewellen Creek Restoration Project restores a denuded agrarian drainage way into a functioning natural stream corridor based on fluvial geomorphologic concepts, native vegetation, and multi-recreational uses. Design and restoration studies were developed in conjunction with BioHabitats.

**Halls Bayou Watershed - Halls Ahead.** Houston, Texas. Brown & Gay Engineers. Harris County Flood Control District. SWA is the urban design sub-consultant to a team of civil engineers, hydrologists, fluvial geomorphologists and Public Engagement specialist for this watershed "vision" and flood damage reduction project. SWA is leading the creation of a community framework plan and developing the conceptual ideas to enhancing flood control elements including the main channel, detention basins, and tributaries for improved water quality, habitat restoration, recreation, neighborhood connectivity, and higher real estate values.

**Harris County Flood Control District.** Houston, Texas. Design of open space and floodwater management strategies resulting in acres of multiple use park space for the citizens of Harris County.

**Harris County Watershed Master Plan.** Harris County, Texas. Harris County Flood Control District. SWA Group Houston has been retained by Harris County Flood Control District to develop efficient, environmentally responsive channel and detention templates for the Harris County Watershed Master Plan.

**Horsepen Bayou Detention Basin Update.** Houston, Texas. Harris County Flood Control District. SWA is creating preliminary conceptual layouts for two stormwater basins located on Horse Pen Bayou and Langham Creek that will be transformed from sand and clay mines into stormwater basins with the potential to serve as multi-use parks.

**Meyer Tract Detention Basin.** Houston, Texas. JF Thompson, Inc. SWA provided concept and schematic design services for this project: the Meyer Tract itself is planned to become a multipurpose detention basin that will provide immediate mitigation for City of Houston drainage improvements being made elsewhere in the watershed and it will provide for future recreation, habitat, and aesthetic benefits to the surrounding community.

**San Antonio River Improvements Project.** San Antonio, Texas. SWA was selected to develop conceptual guidelines for the restoration of approximately 13.5 miles of river corridor to a more natural appearance introducing a dynamic equilibrium using the principals of Fluvial Geomorphology.

**Sims Basin Detention Master Plan.** Houston, Texas. U. S. Army Corps of Engineers. Harris County Flood Control District. SWA has been working with citizen groups, the local flood control district, the US Army Corps of Engineers and private property owners to create a long-term vision for regional storm water management facilities. The Sims Basin project is part of that vision, creating over 22,000 acre-feet of off-line floodwater storage.

**Sims Woods Conservation Area Master Plan.** Houston, Texas. Harris County Flood Control District. SWA group was employed to create The Sims Woods Conservation Area Master Plan – a 50 page written and illustrated document that provides an outline of the basic land area, opportunities and constraints surrounding the creation of the conservation area.

**Visioning Brays.** Houston, Texas. Harris County Flood Control District. SWA is working with a large team of specialists researching funding mechanisms, organizational structures, community coalitions, design concepts, property acquisition, surplus property, among other strategies. Vision Brays is being done in tandem with SWA's design work on Project Brays.

**Willow Water Hole Detention and Conservation Reserve.** Houston, Texas. Harris County Flood Control District; The Brays Bayou Association; Willow Water Hole Greenspace Conservancy. SWA was retained by the citizen's task force to create a visionary plan and to gather support for the project in the surrounding communities through a series of public meetings.

D

Freese and Nichols, Inc. (FNI) is a privately owned, multi-discipline professional consulting firm serving municipal and county governments, water districts and river authorities, federal and state governments, military and higher education clients. For 119 years, FNI has built its practice on a strong foundation of client service and a continued commitment to project excellence. FNI's outstanding reputation for quality work results in more than 90 percent of our work coming from repeat clients. FNI provides clients with innovative approaches and practical results for the full spectrum of clients across Texas.

With 16 offices across Texas and North Carolina, our 550 employees provide planning, engineering, architectural, environmental science and program management services to clients throughout the United States.

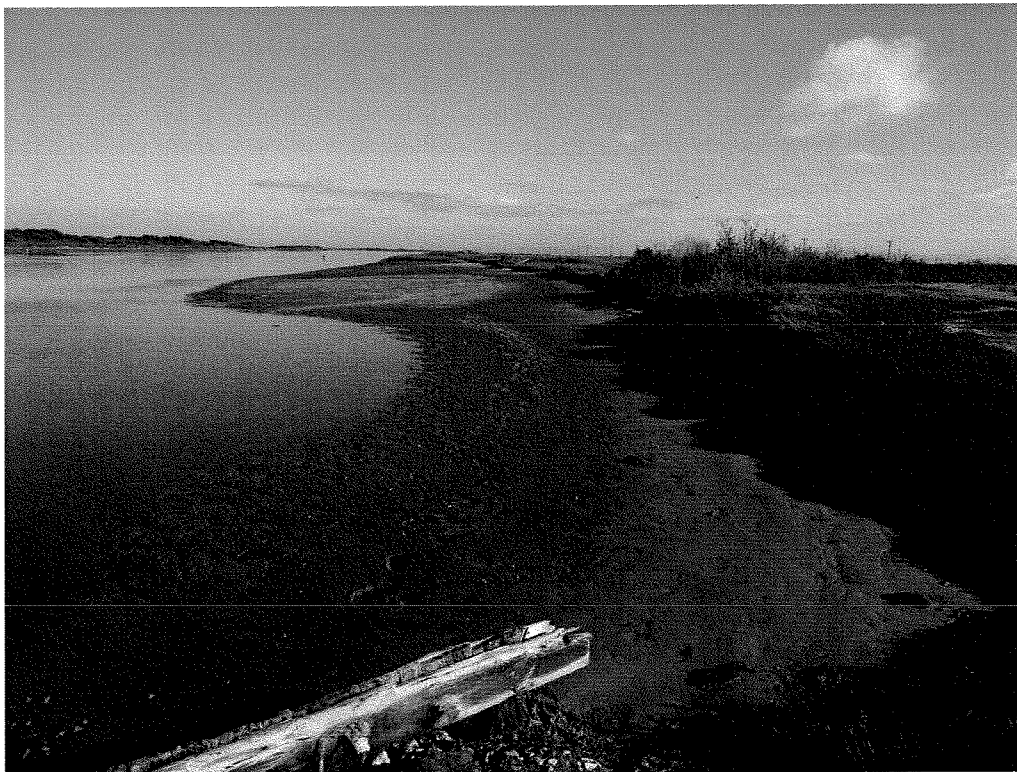
Our coastal engineering technical knowledge includes planning, site development, roadway/ rail/bridge design, schematic layouts, utilities, stormwater design, hydrology and hydraulics analysis, traffic control plans, pavement marking and signage, illumination, berth and wharf design, permitting, and environmental documents and approvals.

## Matagorda Boat Ramp

### Lower Colorado River Authority

The Lower Colorado River Authority (LCRA) proposed to construct a boat ramp near the mouth of Colorado River Channel in Matagorda County. This would allow full and free public use and access to the Colorado River channel, only a short distance from the Gulf of Mexico. The single-lane boat ramp, capable of launching a 30-foot long boat, is 20-ft wide and 75-ft in length with two courtesy docks on the sides of the ramp. A cofferdam was temporarily used to dewater a small area to construct the boat ramp. Located 210-ft outside of the navigational channel, there was no interference with navigation by the existence of the boat ramp structure. A bulkhead extended along the banks approximately 50 feet in length. The parking spaces adjacent to the docks comply with the Texas Accessibility Standards (TAS) and the Americans with Disabilities Act (ADA).

The project was authorized by the U.S. Army Corps of Engineers (USACE) Galveston District under Nationwide Permit No. 18, for the bank stabilization and Letter of Permission (LOP) 20204.



Location of Boat Ramp, looking north (upstream) on Colorado River Channel.

## Highlands Reservoir

### San Jacinto River Authority

FNI designed and managed the construction of upgrades to an intermediate sized, high hazard terminal reservoir dam that has a maximum hydraulic capacity of approximately 9,400 acre feet and an embankment length of 34,700 feet. Due to the age of the structure and erosion over the years, the inner slope of the structure was in a state of disrepair and, if left unattended, could compromise the integrity of the structure.

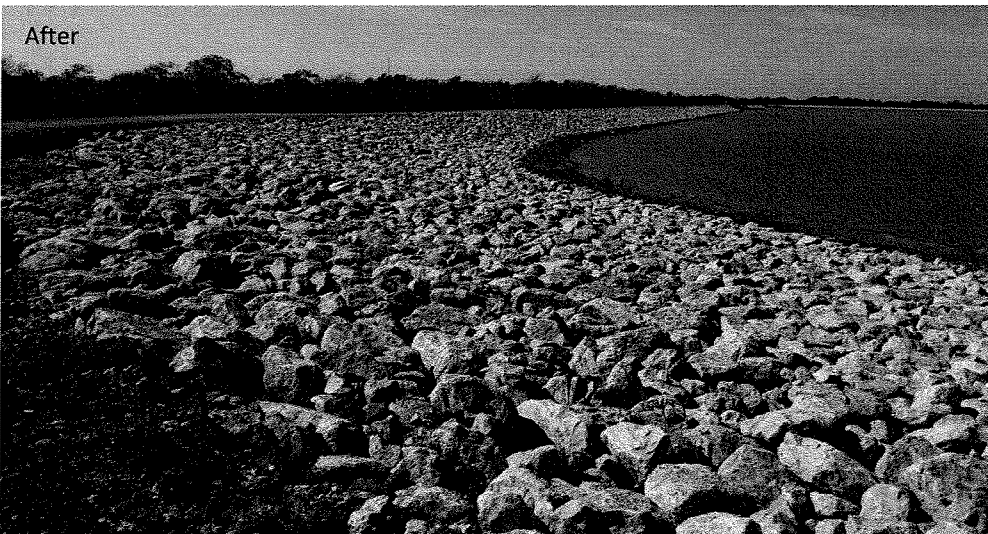
FNI performed engineering calculations for the wave energy and scour potential of the inner slope based on guidelines offered by the USACE, basing the calculations on the maximum reservoir depth, velocity of the wind and fetch of the reservoir. An engineered riprap system was designed to be placed on an altered slope geometry that extended approximately 15,000 LF. The engineered gradation was optimized using stone ranging from 8 inches to 2.5 feet in diameter supported by a bedding system of crushed aggregate. A detailed geotechnical analysis was performed on the embankments, which consisted of a finite element seepage analysis and sliding stability calculations for short-term and long-term rapid drawdown conditions. FNI also performed additional analysis on potential borrow soil sources local to the dam that could be used in slope rehabilitation and raising (approximately 8,000 LF of various portions of the embankment had to be raised between 2.5 and 5 feet in elevation). A new emergency spillway and two new low-flow structures (60 MGD) were designed.

FNI also performed all USACE permitting for this project, which was authorized under LOP 1.

Before



After





## Dan Gise

### Senior Environmental Scientist

Dan Gise is a Senior Environmental Scientist with 34 years of experience in the management and preparation of Environmental Impact Statements, Environmental Assessments, permitting, wetland delineations, environmental baseline surveys, endangered species surveys, habitat analyses and numerous other types of environmental studies and permitting activities. Mr. Gise is also experienced in interagency coordination, field surveys and aerial photo interpretation.

#### Relevant Project Experience

##### **Highlands Reservoir Dam Repair and Rehabilitation, San Jacinto River Authority**

Lead Environmental Scientist for the project which involved reconstruction of a reservoir embankment with access road on the crest. Work involved replacement of deficient riprap along the reservoir embankment with new, uniform riprap along the embankment and reconstruction of overflow structures. Mr. Gise conducted all agency coordination including the Pre-application meeting, led field surveys of wetlands and waters of the U.S., worked with the Project Engineer to reduce impacts to waters of the U.S., prepared permit application, and ensured that all questions from the USACE Regulator were addressed. A Letter of Permission (LOP) - 1 permit was issued for this project.

##### **Coastal Environmental Permitting Assessment, Undisclosed Energy Client, Brazoria County**

Project Manager for the construction of a marine loading terminal capable of accommodating between four and eight product tankers per month. Mr. Gise was responsible for directing agency interactions in regard to environmental issues and determining the federal, state and local projects that would impinge on the development of this project and researching the level of permitting required and potential issues that could impact schedule or cost. Federal and state agency environmental permits that would be required for this project included those from the U.S. Army Corps of Engineers (USACE), National Marine Fisheries Service/National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, U.S. Coast Guard, Texas Commission on Environmental Quality, Texas General Land Office, Texas Historical Commission, Texas Parks and Wildlife Department, and Texas Department of Transportation (TxDOT).

##### **Environmental Evergreen Contract, TxDOT Corpus Christi District**

Project Manager for Environmental Evergreen Contract for District involving preparation of environmental documentation, field surveys, client coordination and agency interaction. Many project sites were located in coastal areas including marine environments, estuaries, salt marshes and tidally influenced water bodies and involved USACE Section 404 permits. Responsible for preparing scopes and estimates, managing project staff and subcontractors, and preparation of project deliverables.\*

##### **JFK Causeway Seagrass Survey, TxDOT Corpus Christi District**

Mr. Gise was responsible for conducting the pre-construction surveys to establish baseline seagrass populations and for conducting the construction and post construction seagrass surveys for TxDOT Corpus Christi District required by the Section 10 permit for improvements to JFK Causeway. Seagrass populations included *Halodule beaudettii* (formerly *H. wrightii*) and *Thalassia testudinum*.\*



#### Experience

34 years

#### Education

M.S., Biology, Stephen F. Austin State University (1979)

B.S., Forestry and Biology, Stephen F. Austin State University (1976)



**SH 35 at Cavasso and Creeks, Baseline Establishment and Construction Monitoring  
Aransas County**

Conducted pre-construction wetland assessment and post-construction wetland monitoring to assess impacts to stands of primarily *Spartina alterniflora* and *Scirpus robustus*, but including other coastal vegetation, resulting from the use of timber mats for construction vehicles in brackish and freshwater coastal marshes.\*

**Seagrass Survey and Study, East Matagorda Bay, Matagorda County**

Principal Investigator and Project Manager for this three-year study. Matagorda County had constructed a cut between East Matagorda Bay and the Gulf of Mexico and was required by the USFWS to monitor seagrass densities to determine the effects of the cut. Mr. Gise performed the seagrass survey, including development of the sampling plan, conducting the sampling and preparing the necessary annual reports.\*

**Wetland Delineation, South Padre Island Drive, TxDOT Corpus Christi District**

Conducted wetland delineation along South Padre Island Drive on Mustang/Padre Island in sensitive coastal wetland and barrier island environment. Prepared delineation report for submittal to USACE. Sites included wetlands and waters of the United States impacted by proposed roadway expansion.\*

**Field Investigation Reports, National Marine Fisheries Service, Various Counties,  
Upper Texas Coast**

Principal Investigator for this project. Duties involved the collection and analysis of biological data pertinent to the evaluation of impacts associated with various activities requiring U.S. Army Corps of Engineers Section 404 Permits and verification of permit compliance within coastal areas.\*

**District-Wide Section 404 Compliance Audit, TxDOT Dallas District**

Project Manager for this audit of 31 construction sites in five counties. The purpose of this project was to determine compliance of construction activities with NEPA, Section 404 permit and Section 401 water quality certification conditions for each site. Conditions varied from site to site and the project team tailored survey forms to include conditions specific to each site along with general permit conditions. Project involved review of all project files, coordination with contractors and site visits to assess permit compliance. This project was completed in one month.\*

**Categorical Exclusion and Permit Application for Third Ferry Landings, Galveston/Bolivar  
Ferry, TxDOT Houston District**

Mr. Gise prepared the Categorical Exclusion (NEPA document) for the addition of third ferry landings to and changes to the access roads within the Galveston/Bolivar Ferry in Galveston County, Texas. Also included in this project were the Section 404 and Section 10 permit applications to the U.S. Army Corps of Engineers for placement of fill into waters and navigable waters of the United States. Mr. Gise coordinated with the U. S. Army Corps of Engineers for all aspects of permitting.\*

\*Experience prior to FNI

## Cody Mikeska

### Environmental Scientist

Mr. Mikeska is an Environmental Scientist in FNI's Houston Office. He has experience in helping clients comply with environmental regulations, including: the Clean Water Act, National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, Coastal Zone Management Act, Oil Pollution Act, Natural Gas Act, National Pollutant Discharge Elimination System, and the procedures outlined under the Natural Resources Damage Assessment guidelines. He also has vast experience in consulting with various federal, state, and local agencies in regard to environmental permit acquisition and information gathering.

Prior to joining FNI, Mr. Mikeska was a Senior Environmental Scientist for Kellogg, Brown & Root (KBR) where he was responsible for project management, conducting wetland delineations, tree surveys, threatened and endangered species studies, technical report writing, and environmental permit acquisition for various clients.

#### Relevant Project Experience

##### **Coastal Environmental Permitting Assessment, Undisclosed Energy Client, Brazoria County**

This project involved researching and documenting all environmental permits required for the construction of a marine loading terminal capable of accommodating between four and eight product tankers per month. Mr. Mikeska was responsible for the majority of research and report preparation for this project. Federal and state agency environmental permits that would be required for this project included those from the U.S. Army Corps of Engineers (USACE), National Marine Fisheries Service/National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, U.S. Coast Guard, Texas Commission on Environmental Quality, Texas General Land Office, Texas Historical Commission, Texas Parks and Wildlife Department and Texas Department of Transportation (TxDOT).

##### **JFK Causeway Seagrass Survey, TxDOT Corpus Christi District**

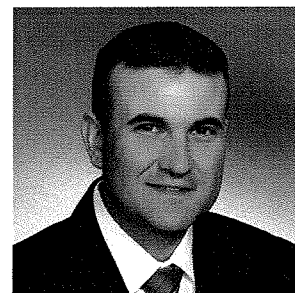
Mr. Mikeska conducted seagrass surveys for TxDOT Corpus Christi District required by the Section 10 permit for improvements to JFK Causeway. Project determined pre- and post-construction seagrass densities to assess the impacts of construction on neighboring seagrass populations.

##### **SH 35 at Cavasso Creek Pre- and Post-Construction Vegetation Surveys, TxDOT Corpus Christi District**

This project involved pre- and post-construction surveys of salt marsh vegetation for the SH 35 bridge replacement at Cavasso Creek in Aransas County, Texas over a three year period in response to impacts from bridge replacements in sensitive saltwater marsh environments. Responsibilities included project management, conducting the vegetation survey, report preparation for USACE submittal, and comparing the vegetative structure and composition between pre- and post-construction conditions.

##### **SH 35 at Salt Creek Mitigation Site Monitoring, TxDOT Corpus Christi District**

Mr. Mikeska was responsible for conducting the yearly audit survey for the SH 35 at Salt Creek mitigation site, which consisted of performing vegetative cover and composition sampling and compiling the data into the technical report. Mr. Mikeska was also responsible for project management tasks.



#### Experience

15 years

#### Education

B.S., Rangeland Ecology  
and Management, Texas  
A&M University

#### Precertifications

5 TxDOT Precertifications

**Galveston-Bolivar Ferry Maintenance Dredging Permit, TxDOT Houston District**

Mr. Mikeska was responsible for obtaining the 10-year maintenance dredging permit for the Galveston and Bolivar Ferry landing sites in Galveston County, Texas. This project consisted of compiling and submitting the maintenance dredging permit application to the USACE-Galveston District as well as being the permitting liaison between the TxDOT-Houston District staff and the USACE-Galveston District Regulatory Branch staff.

**On Call Services, Intercoastal Waterway, USACE Galveston District**

Mr. Mikeska coordinated and participated in aquatic and sediment sampling of various locations along the Intercoastal Waterway. Samples were then delivered to an independent laboratory for chemical analysis. The purpose of this sampling was to determine the extent of water and sediment contamination before the USACE began dredging activities within the Intercoastal Waterway.

**Seismic Operations at the USACE Wallisville Project, Seitel, Inc., Chambers County**

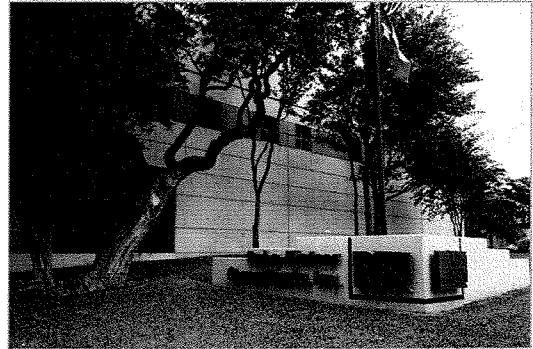
Mr. Mikeska's tasks included monitoring highland and wetland drilling vehicles on 14,000 acres of tidally influenced wetland habitat in order to prevent disturbance of wetland areas and endangered species habitat. Other tasks included managing multi-disciplined field crews and reporting vital field information to the USACE.

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## Raba Kistner Firm Profile

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Founded in 1968, Raba Kistner, Inc. (Raba Kistner) is recognized as one of the Southwest's largest consulting firms offering our engineering specialties. We provide program/project management services and self-perform:



- **Geotechnical Engineering (Raba Kistner Consultants, Inc.);**
- Environmental Consulting and Engineering (Raba Kistner Environmental, Inc.);
- Construction Materials Engineering, Testing, and Observation (Raba Kistner Consultants, Inc.);
- Facilities Engineering including Building Envelope Consulting and Roofing/Waterproofing (Raba Kistner Facilities, Inc.); and
- Pavement Consulting (Raba Kistner Consultants, Inc.).

All companies are wholly owned subsidiaries of Raba Kistner, Inc.

Our multi-disciplined team—made up of more than 400 employees—consists of civil, facilities, environmental, geotechnical, and materials engineers; roofing consultants and observers; building envelope consultants; architects; LEED APs; environmental geologists; scientists; archaeologists; technicians; and support personnel. More than 75% of our team holds licensure or certifications in their areas of expertise. Furthermore, Raba Kistner Consultant, Inc.'s Geotechnical and Construction Materials Testing staff and laboratories are among the largest in the State.

Headquartered in San Antonio, Raba Kistner has offices in Austin, Brownsville, Dallas, El Paso, Houston, McAllen, New Braunfels, Texas, Salt Lake City, Utah, and México. Raba Kistner's resources, manpower, and organizational structure allow for all corporate employees to serve as seamless service providers for every project.

Raba Kistner's engineering staff and independent laboratories are among the largest and most thoroughly equipped. We serve in leadership roles and are accredited by and/or affiliated with:

- American Association for Laboratory Accreditation (A2LA)
- American Association of State Highway and Transportation Officials (AASHTO)
- American Society for Testing of Materials (ASTM E 329)
- Association of Soil and Foundation Engineers (ASFE)
- National Institute for Standards and Technology (NIST)
- Texas Council of Engineering Laboratories (TCLE)
- US Army Corps of Engineers (USACE)

### History

Raba Kistner, an employee-owned professional corporation, was founded by Bunny J. Raba, Carl F. Raba, and Ronald G. Tolson in San Antonio, Texas in 1968 as Raba & Tolson Consulting Engineers, Inc., practicing solely in Geotechnical Engineering. In 1973, Tolson left and the firm was renamed Raba and Associates Consulting Engineers, Inc. Richard W. Kistner joined the firm in 1974 and led the expansion into the practice of Construction Materials Engineering. The firm continued to grow and was renamed Raba Kistner Consultants, Inc. in 1978 to reflect the addition of a new principal and the expansion of our services into major non-engineering areas including Geosciences and Environmental Sciences. Raba Kistner began practicing Facilities Engineering, including Building Envelope Consulting and Roofing/Waterproofing, in 1999. In January 2012, the company restructured to create Raba Kistner, Inc. as a holding company and four operating companies: Raba Kistner Consultants, Inc.; Raba Kistner Environmental, Inc.; Raba Kistner Facilities, Inc.; and Raba Kistner Infrastructure, Inc.

Raba Kistner, Inc. USCOE Experience

Project Name	Location	
TACTICAL EQUIPMENT SHOP (FY04)	San Antonio	TX
Kinetic Energy Missile Complex	WSMR	NM
WSMR Family Housing	WSMR	NM
Temporary Unit of Action Modular	Fort Bliss	TX
UEPH Barracks BCT-1	San Antonio	TX
Deployment Storage BCT 1	Ft Bliss	TX
Headquarters BCT 1	Ft Bliss	TX
Dining Facilities BCT 1	Ft Bliss	TX
Tank Trail BCT 1	Fort Bliss	TX
Temp Ramp Loop 375	Ft. Bliss	TX
BCT 2 Barracks 1 & 3	Fort Bliss	TX
EMVAF	El Paso	TX
AAFES Shopette	Fort Bliss	TX
BCT - 3	Fort Bliss	TX
CAB Headquarters	Ft. Bliss	TX
Fabens Storage Yard	El Paso	TX
AMERICAS BASIN	San Antonio	TX
PERSHING DAM	San Antonio	TX
HOLLOWMAN AFB NM FLIGHT CONTROL TW	San Antonio	TX
CONDUIT CATHODIC PROTECTION OBSERV	San Antonio	TX
PROPOSED WATERLINE HWY 54/MCGREGOR	San Antonio	TX
BLUFF CHANNEL PHASE I	San Antonio	TX
BLUFF CHANNEL PHASE II	San Antonio	TX
POST HOUSING	San Antonio	TX
HOLLOMON AFB SANTA TERESA	San Antonio	TX
INS Deportation/EOIR Building	FORT BLISS	TX
ASBESTOS SAMPLING AMERICAS BASIN	San Antonio	TX
AMERICAS BASIN SITE INVESTIGATION	San Antonio	TX
Las Cruces Flood Control	FORT BLISS	TX
Chem-Lab	WSMR	NM
BUILDING 501 AND 502 USMR	San Antonio	TX
WHITE SANDS ELEMENTARY SCHOOL	San Antonio	TX
Ft. Sam Houston ECS Facility	FT WORTH	TX
Dormitory Lackland -	Fort Worth	TX
US Army Corps - Lackland AFB	San Antonio	TX
Mobile Offices - BAMC	San Antonio	TX

SOIL CORROSIVITY STUDY	San Antonio	TX
BROOKS BLDGS 150 & 175W CONT ADMIN	San Antonio	TX
BROOKS BLGDS 150 & 175W CHARRETTE	San Antonio	TX
Testing Services	San Antonio	TX
BC Fuel Project Operations	San Antonio	TX
RAFB West Control Tower	San Antonio	TX
IDQ US Army Corps of Engineers	San Antonio	TX
Testing Services (COE)	LAUGHLIN AFB	TX
Testing Services (US COE)	San Antonio	TX
Medina Annex (Coring)	San Antonio	TX
LEAD ANALYSIS	San Antonio	TX
Lackland AFB Bldg 9210	San Antonio	TX
ARMY FAMILY HOUSING REVITALAZATION	San Antonio	TX
CONTRACT DRILLING SERVICES	San Antonio	TX
CONTRACT DRILLING	San Antonio	TX
RESISTIVITY SURVEY BROOKS AFB	San Antonio	TX
Brooke Army Medical Center/Phase 3	FORT WORTH	TX
BROOKE ARMY MEDICAL CENTER/PHASE 3	San Antonio	TX
HONDO ARMY AIRFIELD HONDO TEXAS	San Antonio	TX
SEWER LINE REPLACEMENT PROJECT	San Antonio	TX
MARSHALL ROAD REALIGNMENT	El Paso	TX
Ysleta Garage Project	El Paso	TX
White Sands Missile Range School	El Paso	TX



**MARTIN VILA, PE, F. ASCE**  
**SENIOR VICE PRESIDENT**



**AREAS OF EXPERTISE**

Geotechnical Engineering  
Construction Materials Engineering and  
Testing

**REGISTRATIONS**

Professional Engineer:  
Texas No. 78764  
California No. C-050529  
New Mexico No. 13379

**EDUCATION**

M.S. Civil Engineering  
The University of Texas at El Paso  
1990

B.S. Civil Engineering  
The University of Texas at El Paso  
1987

**PROFESSIONAL HISTORY**

Senior Vice President  
Principal-in-Charge  
Houston Region  
Raba Kistner, Inc.  
August, 2012-Present

Senior Vice President  
Vice President  
Regional Manager  
Rio Grande Valley, Mexico, Gulf Coast  
Raba Kistner Consultants, Inc.  
1994-2012

Resident Engineer  
California Dept. of Transportation  
(CALTRANS) District 1  
1990-1994

Martin Vila, Senior Vice President and Shareholder of Raba Kistner Consultants, Inc., is Principal-in-Charge of the Houston Regional office serving the architectural, engineering and construction industries. Mr. Vila was promoted to Vice President in April 2001 and was made a Shareholder in June, 2004. He supports clients on infrastructure, transportation, educational, commercial, industrial and residential projects.

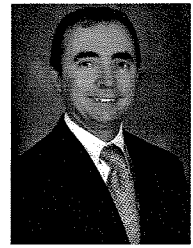
Vila previously was responsible for managing Raba Kistner's engineering and construction services on projects throughout South Texas, the Coastal Bend Region and Mexico. Services under his direction included geotechnical engineering, construction materials engineering and testing services and environmental investigations.

Operations in the Republic of Mexico were provided in conjunction with Raba Ingenieros, S. de R.L. de C.V., a wholly owned subsidiary of Raba Kistner, Inc., serving multinational, publicly traded companies throughout the country. His broad diversity of projects included maquilas, office warehouse distribution parks, retail and hospitality facilities.

After completing his formal education in Civil Engineering, Mr. Vila joined the California Department of Transportation (CALTRANS), and served as Resident Engineer within the Construction Department. He was responsible for contract administration and the implementation of engineering and construction services on highway, drainage and bridge projects, including seismic retrofits for existing bridges.

Martin Vila has served as an officer in a number of civic and professional organizations, including ASCE, TSPE (former President of the Rio Grande Valley Chapter), and AIA.

**JOHN BROWN, P.E.**  
**GEOTECHNICAL ENGINEERING MANAGER**



**AREAS OF EXPERTISE**

Geotechnical Engineering Project Management

**REGISTRATIONS**

Professional Engineer:

Texas No. 96185

Louisiana No. 0033879

**EDUCATION**

B.S., Civil Engineering  
University of Houston, 1991

B.S., Geology  
Sul Ross State University, 1983

**PROFESSIONAL HISTORY**

Geotechnical Engineering Manager  
Raba Kistner Consultants, Inc.  
September 2012

Project Manager  
Tolunay-Wong Engineers, Inc.  
1999-August 2012

Field Engineer  
Emcon, Inc.  
1998-1999

Geotechnical Field Engineer  
Engineering Consulting Services, Ltd.  
1997-1998

Project Engineer  
HMA Environmental, Inc.  
1993-1994

As a Geotechnical Engineering Manager, Mr. Brown is responsible for scope development, contracting, financial management and implementation for the majority of geotechnical engineering projects performed out of the Houston Office. He exemplifies the firm's high standards of consulting service and client care. Particularly well qualified in the region's complex surface and subsurface construction issues, his knowledge and experience offer a valuable contribution to Houston's expanding needs.

Since 1994, Mr. Brown has performed and managed numerous geotechnical investigations for commercial, industrial, transportation (road and railway), utility pipeline, public works, educational, retail and residential clients. His primary focus has been to build long-term client relationships by meeting or exceeding project deadlines, emphasizing communication throughout all phases of geotechnical investigations, and being willing to work with clients as their needs change throughout the life of a project.

Mr. Brown's project experience includes site reconnaissance and design phase geotechnical investigations, geologic inventory reports for bridge and roadway replacements, building distress investigations, and geotechnical construction inspection services. Design experience includes shallow footings, iterative mat foundation design, drilled footings (straight-sided and belled), deep foundations (driven and cast-in-place), tank ring-wall foundations, dispersive soils, highly expansive soils, residual soils and partially weathered rock, design of railway sections, raised earthen levees, large cut slopes, sheet-piling, bulkheads, rigid and flexible buried piping, open-cut excavations, trenchless technologies, and pavement design. Geotechnical testing experience includes pile driving inspection, auger cast-in-place pile inspection, static pile load-testing (axial and lateral), and extensive laboratory testing, logging, and classification of soil and rock formations.

## PROJECT EXPERIENCE

**Health and Kinesiology Center (PEAP Building), Texas A&M University.** Supervised geotechnical field investigation and laboratory testing, and performed engineering analyses for a new three story metal framed building with associated parking areas and a detention pond. Laboratory testing included swell tests to assess swell potential of highly expansive desiccated clays. Wrote the geotechnical report and performed a pier installation inspection during construction to determine optimum pier depths across the site. Total budget was approximately \$12,600.

**ALS Development and Reliability Center, Claremore, Oklahoma.** Performed a geotechnical study for a proposed research center located within an existing Baker Hughes facility. The facility had a 110-foot tall tower in the center of it, with three 30 ton bridge cranes in the top of the tower. The tower had a basement which housed three 25' wide x 30' long x 15' deep pits that were full of fluids, and seven test wells. Estimated maximum foundation load was between 400 and 500 kips at some of the columns in the tower portion of the structure. New driveways and a parking lot were also constructed for this project.

**Slope Failure at TPC Group Facility, Port Neches, Texas.** A large slope failure had occurred along an about 300 feet of river bank at the TPC Group's petrochemical port on the Neches River. Performed a geotechnical investigation to 1) determine the cause of the slope movement and, 2) offer slope stabilization methods and subsequent costs to implement these methods. Installed inclinometers above slide and inside slide area to monitor movement, and to help model failure surface at depth. Assigned laboratory testing including consolidated undrained (CU) triaxial compression with pore pressure measurements. Performed slope stability analyses to recreate soil/groundwater conditions at the time of failure, and to determine remedial actions for slope stabilization.

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*"Very responsive to an emergency call on short notice."*

*Project Manager, Rail Division*



## **About SAM, Inc.**

*Founded in 1994, SAM, Inc. is a leader in providing complete geospatial solutions.*

SAM, Inc.'s 'complete geospatial' approach gives us the tools and skills to develop efficient and customized solutions for projects of any scale. This gives our clients the benefit of a single point of contact for a comprehensive set of surveying and mapping products. The size of our available workforce means we are able to use these tools effectively to accomplish even large-scale projects on accelerated schedules.

From rail to roadway, aviation to electric, civic to federal, the impressive SAM, Inc. project portfolio demonstrates our proven track record of surveying, geospatial, SUE and utility coordination services for a wide variety of clients. Additionally, we offer a range of construction services through our wholly owned subsidiary SAM-CS, Inc.

*Above all, client satisfaction is our priority—we only consider a job complete when our client is successfully using the product. To us, there is no measure that matters as much as yours.*

## **Professional Land Surveying**

*Using the latest in surveying and mapping technology, our highly experienced staff of professional land surveyors, survey technicians and field crews provide top quality land surveying services.*

SAM, Inc. provides surveying services for a wide range of projects of all sizes, and for diverse markets such as electric transmission, oil and gas, transportation, telecommunications, aviation, and governmental clients. By organizing in market specific teams our clients benefit from experienced staff familiar with the unique aspects of their projects.

Using the latest technologies in the field and office, our 90+ survey field crews mobilize with the best data collection and communication tools. Trimble robotic total stations and dual-frequency GPS survey equipment meet the needs for the most demanding surveying projects. Trimble tablet PC's with integrated laptop, data collection, navigation systems and digital cameras provide real-time data exchange between field and office operations, increasing speed and productivity in data collection and management.



Survey technicians use fully integrated CAD workstations in the office, equipped with fast dual-monitor workstations and loaded with the latest versions of AutoCAD LDD, MicroStation v8, BlueSky AlignDB, PLS-CADD, GEOPAK, CAiCE, SMDS, Cyclone and Cloudworx applications for survey computation. Using current version software helps ensure quality and accuracy, and adds value for every project. In addition, we own and operate a Leica ScanStation C10 High-Definition Laser Scanner and our technicians are very experienced with capturing and processing scan point cloud data.

### *Land Surveying Solutions*

- Boundary Surveys
- Topographic Surveys
- Design Surveys
- Route Surveys
- Right-of-Way Mapping
- GPS Surveys
- Photogrammetric Ground Control
- HDS Laser Scanning
- Land Development Services
- Land Title Surveys
- Construction Staking
- As-Built Surveys



## Hydrographic Surveys

*Our surveys don't stop at the water's edge. Hydrographic and geophysical technologies provide you with detailed knowledge of what lies beneath the surface.*

Our hydrographic survey team brings state-of-the-art technology to your project, utilizing single- and multi-beam echo sounders, side-scan sonars, magnetometers, sub-bottom profilers, RTK GPS receivers, motion sensors, gyroscopes, sound velocity meters, and water level gauges. We specialize in shallow-water hydrographic surveys for energy, water, environment and transportation projects in near-shore and inland waters.

Hydrographic survey applications include:

- Pipeline and cable routing studies
- Reservoir volumes
- Environmental restoration
- Bridge routing, construction and inspection
- Well pads
- Water intakes and outfalls
- Habitat mapping
- Docks and bulkheads
- Hazard surveys
- Wastewater ponds
- Debris surveys
- Marinas
- Wind farms
- Shoreline protection
- Navigation channels
- Cooling ponds
- Pipeline depth of cover
- Artificial reefs
- Sediment sources

How deep or steep, rough or smooth is the underwater terrain? What physical and environmental constraints lie beneath the water's surface? How much sediment fills your reservoir or channel, covers your pipe, or is available for your restoration project? What navigation hazards and debris did the latest storm leave in its wake? SAM, Inc. hydrographic surveys will acquire data of the highest quality to answer all of your hydrographic needs.

### *Reliable Data Integration*

All hydrographic survey work is performed under the direction of an experienced hydrographer with established quality assurance/quality control processes and all final products are delivered in the client's required formats.

## Resumes

### Robert Gearhart

#### *Hydrographic Survey Manager*

Robert Gearhart is a senior project manager with 28 years of experience in hydrographic and marine-geophysical surveys for a variety of applications including petroleum exploration and production, pipelines, environmental restoration, ecological studies, debris assessments, and marine archeology. He has worked in rivers, lakes, transition zones, bays, and offshore waters with a wide variety of hydrographic and geophysical instruments.

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#### Project Experience

**Halfmoon Reef Oyster Mitigation, The Nature Conservancy, Matagorda Bay, Texas** A bathymetric survey was conducted in support of a project to restore the ecosystem of a relic oyster reef to a functional condition. Seafloor elevations from this survey were used to estimate the volume of rock required for design and construction of substrate for mitigation reefs.

**Bolivar Ferry Terminal Expansion, Texas Department of Transportation, Galveston County, Texas** Mr. Gearhart was project manager, lead hydrographer and principal archaeologist for a marine geophysical survey to map construction constraints including pipelines, obstructions and historic sites potentially affected by dredging of a new slip at the Bolivar Ferry Terminal. Proximity to large steel structures, limited the usefulness of magnetometer data for mapping buried features, so archaeological clearance of the proposed slip required a study of historic shoreline changes and 1,691 hydraulic probes placed on a 10x10-foot grid to at least 4 feet below the maximum-known historic seafloor elevation.

**San Luis Pass Inlet Management Study (CEPRA Project 1384), Texas General Land Office, Brazoria and Galveston Counties, Texas** Mr. Gearhart performed a hydrographic survey as part of environmental support provided to the Texas General Land Office for their proposed San Luis Pass Inlet Management Study. The purpose of the study was to develop a sediment catchment area for recycling littoral sediments for beach restoration of adjacent shorelines.

**Goose Island State Park Shoreline Protection, Texas General Land Office, Aransas County, Texas** Mr. Gearhart was lead hydrographer on a project to develop and evaluate shoreline protection and marsh-restoration alternatives for Goose Island State Park. He was responsible for a bathymetric survey to estimate sediment availability for creation of a 22-acre emergent marsh north of Goose Island. Side-scan sonar and magnetometer data was acquired to map constraints such as sea grass, oysters, and pipelines.

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<b>Education:</b>	Bachelor of Arts, Anthropology, Iowa State University, 1981
	Master of Arts, Anthropology, University of Missouri, 1987
	Multibeam Sonar Training Course 26, NOAA/THSOA, 2001
	Edgetech 4600 Swath Bathymetry System, Edgetech, 2012
<b>Software:</b>	Windows, Lynux, Microsoft Office, Microstation, GeoPak, Descarte, Blue Marble, HydroPro, Hypack, Chesapeake Sonar Wiz, Geometrics MagLog, Edgetech Discover, RADAN, Rockware Visual Seismic, Surfer, TideLog, Didson, TrackLink, MSX Odessa, and CODA
<b>Certifications:</b>	Basic Ground Penetrating Radar, Red Cross First Aid/CPR, DAN O2 Administration, SSI Master Diver, SSI Advanced Open Water, SSI Stress and Rescue Diver, SSI Nitrox Diver, PADI Open Water, NAUI Scuba (1981)
<b>Memberships:</b>	The Hydrographic Society of America



## **Scott Hiller**

### *Lead Geophysicist*

Scott Hiller has 8 years of experience providing geophysical and hydrographic survey services. He has worked offshore and onshore providing unique solutions and refining tried and true methods of hydrographic and geophysical survey. Scott provides marine and land geophysical services (magnetics, chemical sensing, sub-bottom profiling, GPR) as well as hydrographic services (single and multibeam bathymetry, high resolution imaging sonars, object detection, seabed classification) and offshore positioning. He also provides project planning, scheduling, estimates and budgets, as well as overseeing data processing and other technical responsibilities for these projects.

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## **Project Experience**

**Hydrographic and Geophysical Surveys, Bay Marchand, Louisiana** Project Manager and Lead Geophysicist for hydrographic and geophysical survey of Bay Marchand, Louisiana for Chevron. The survey provided high resolution multibeam seafloor modeling (0.25 ft bin size), sidescan sonar imaging, sub-bottom profiling, and magnetic survey techniques to locate subsea assets such as pipelines, tie-ins, service stations, wells, risers and power cables. The survey encompassed a 5NM x 5NM area just offshore of Fourchon, LA and provided a complete bathymetric and geophysical model of the seabed and shallow subsurface.

**Halfmoon Reef Oyster Mitigation, The Nature Conservancy, Matagorda Bay, Texas** A bathymetric survey was conducted in support of a project to restore the ecosystem of a relic oyster reef to a functional condition. Seafloor elevations from this survey were used to estimate the volume of rock required for design and construction of substrate for mitigation reefs.

**Sabine Pass Hydrographic Surveys and Rheological Study, Port Arthur, Texas** Project Manager and Lead Geophysicist for repeat hydrographic/geophysical surveys of the Sabine Neches Water Way from the Sea-Buoys to Port Neches for Shell Trading US Company. The survey provided high resolution multibeam, geologic sampling and shallow single channel seismic data for 46 miles of the Sabine Neches Water Way. The survey was repeated every 2 months to determine the temporal and spatial variations of fluid mud movement through the channel. The survey also provided a “nautical bottom” solution to depth measurements by determining the elevation at which certain densities present themselves in the sediment.

**Hurricane Ike Post Storm Surveys for Williams Gas Pipelines Transco, Gulf of Mexico** Project Manager and Lead Geophysicist for asset integrity and seafloor condition surveys for Williams Gas Pipelines Transco following Hurricane Ike. The survey provided high resolution multibeam bathymetry, sidescan sonar, magnetometer and subbottom profiler data acquisition to determine the location and condition of all Williams Gas Pipelines Transco assets affected by Hurricane Ike in the Gulf of Mexico. Geologic cores and multibeam seafloor modeling provided a snapshot of the current geologic condition in the seabed immediately surrounding these assets. Data collection required 6 months offshore and an additional 4 months in data processing/analysis.

**Hurricane Post Storm Surveys for USACE Galveston District, Texas Coast** Hydrographic Surveyor for the post-storm inspection surveys for all TX waterways affected by Hurricanes Ike, Gustav, Dolly, Eduard, and Alex. Provided data collection, in-field project management, data processing and analysis for Sabine Pass, Intracoastal Water Way, Corpus Christi Ship Channel, Port of Brownsville and Port Harlingen for multiple storm events over the last 5 years. Daily data transfers and channel condition reports were given directly to the USACE from various survey vessels employed to provide post storm conditions.

**Corpus Christi Ship Channel Surveys, Corpus Christi, Texas** Various responsibilities including acquisition, data processing, management and data analysis over many hydrographic and geophysical surveys performed in the Corpus Christi Ship Channel. High resolutions multibeam, single beam cross sections, sidescan sonar, magnetometer and sub-bottom profiler data have all been collected and used to define conditions in the ship channel for various clients including: The Port of Corpus Christi, Shell, BP, DOF Subsea, Kiewit, and the USACE.

**Brownsville Ship Channel Surveys, Brownsville, Texas** Various responsibilities including acquisition, data processing, management and data analysis over many hydrographic and geophysical surveys performed in the Brownsville Ship Channel. High resolutions multibeam, single beam cross sections, sidescan sonar, magnetometer and sub-bottom profiler data have all been collected and used to define conditions in the ship channel for various clients including: Port of Brownsville, Keppel Amfels, DOF Subsea, and the USACE.

**Lake Travis Multibeam and Subbottom Surveys, Lake Travis, Texas** Hydrographer\Geophysicist High resolution multibeam and sidescan surveys performed in 3 targeted areas (total ~0.5sqNM). Follow-up control, subbottom and geological surveys were conducted to help with analysis of the lakebed for the installation of a water intake structure.

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<b>Education:</b>	B.S., Geophysics, Magna cum Laude, St. Louis University, St. Louis, Missouri  Two year Graduate Program in Geological/Geophysical Oceanography at Texas A&M, College Station, TX
<b>Honors/Certifications:</b>	Kenneth Brill Geosciences Award, St. Louis University; Texas A&M Graduate Research Assistantship; NOAA Shallow Water Multibeam Certification; HYPACK Certified Hydrographer; Chesapeake Technology Sonar Wiz Certification; OYO GSR Certification
<b>Research &amp; Development:</b>	Invented and developed proprietary method for detection of subsea cables using electromagnetics; developed a survey grade fluorometric sensor with BP following the MC252 Oil Release in 2011
<b>Works of Authorship:</b>	"Importance of Acoustical Impedance in Multibeam Survey," Reson User Conference 2009; "Recent Advances in Subsea Cable Detection," Subsea IRM 2012 and APSG Fall Meeting 2012; "Deep Thoughts on the C3D," Whitepaper on commercial use of interferometry for colocation of bathymetry and sidescan data, "Use of Commercial Grade Fluorometer for the Detection of Submerged Oil Mats," BP internal report, 2012.

## Sample Projects

### Nueces River Delta Shoreline Protection Engineering Design

Location: Nueces Bay, Corpus Christi, TX  
Type of Services Provided: Hydrographic Survey  
Size: 500 feet wide along 4.7 miles of shoreline  
Client Name: Texas General Land Office c/o Atkins North America  
Cost: \$13,790  
Description:

The Nueces Delta Shoreline Erosion Control Project is an effort to stabilize, protect and improve the Nueces Delta shoreline. Initial efforts will include the determination of the best means for preventing wave erosion and sustaining accretion of the delta shoreline through sediment trapping. The erosion control project is funded by the Coastal Bend Bays & Estuaries Program (CBBEP) and by the Texas General Land Office (GLO) through a Coastal Erosion Planning and Response Act Program (CEPRA) grant to the CBBEP. Initial field investigations were funded directly by the Texas GLO through a contract with Atkins North America in order to provide data on soil strength, sediment characteristics, and topography in preparation for a detailed geotechnical survey. Hydrographic survey was conducted by Surveying And Mapping, Inc. (SAM, Inc.) under a GLO subcontract with Atkins.

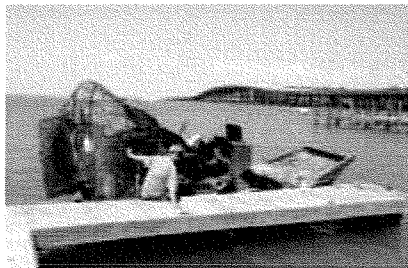


Figure 1



Figure 2



Figure 3



Figure 4

Bathymetric cross sections were surveyed by SAM, Inc. along 4.7 miles of Nueces Delta shoreline in the upper portion of Nueces Bay in depths ranging from 1 to 3 feet. The survey was conducted from an airboat (Figures 1-3) using an Odom CVM single-beam echo sounder equipped with a 3-degree, 200-kHz transducer. Geographic positions and water levels were provided by a Trimble R8 GPS receiver (Figure 4) operated in Fixed RTK mode. RTK base station corrections were provided by a cell-based Virtual Reference Station network. Fifty cross sections were surveyed in a direction perpendicular to the shore (Figure 5). Cross sections were each 500 feet long and were spaced 500 feet apart. Two additional lines were surveyed parallel to the shoreline at intervals of 100 and 300 feet from the bank.

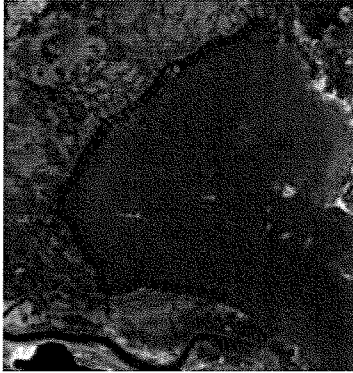


Figure 5

Water depths were converted to elevations referenced to the 1988 North American Vertical Datum (NAVD88). At the request of Atkins, bathymetric data was merged with LiDAR elevations acquired by the Bureau of Economic Geology in 2005, in order to extend profiles 100 feet onto land (Figure 6-7). The LiDAR shoreline position was updated to account for recent erosion based on 2011 aerial photography. The combined bathymetric and LiDAR dataset, in excess of 1 million points, was then seamlessly contoured at a 0.25-foot interval using ArcGIS (Figure 8, for example).

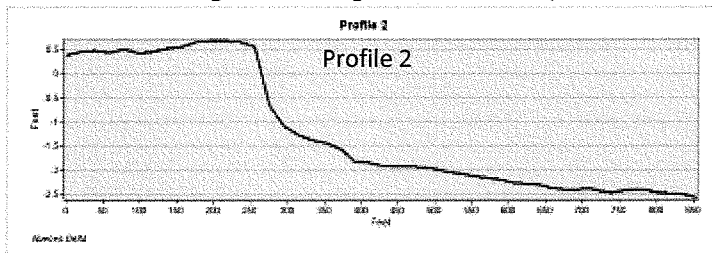


Figure 7

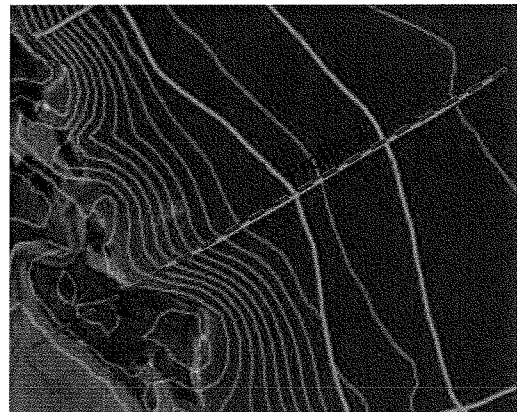


Figure 6

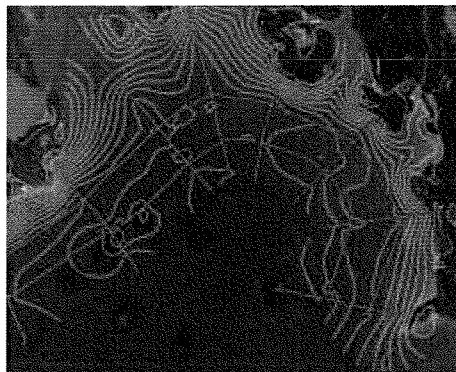


Figure 8

**San Luis Pass Inlet Management Study, Brazoria and Galveston Counties,  
Texas (CEPRA Project 1384)**

**Fee:** \$25,094

**Period of Performance:** August to September, 2011

**Project Sponsor:** Texas General Land Office c/o Atkins North America, Inc.

**Contact:** Newby, Ray [Ray.Newby@GLO.STATE.TX.US](mailto:Ray.Newby@GLO.STATE.TX.US) (512) 475-3624

**Key Staff:** Robert Gearhart, SAM, Inc.

Mr. Gearhart performed a hydrographic survey as part of environmental support provided by Atkins to the Texas General Land Office for their proposed San Luis Pass Inlet Management Study. The purpose of their study was to develop a sediment catchment area for recycling littoral sediments for ecosystem restoration, including beach restoration of adjacent shorelines. The hydrographic survey was to determine whether submerged archaeological sites might be affected by development of the proposed catchment area. The catchment area would consist of a dredged channel 525 feet wide and 11,775 feet long. The channel would encompass 44 acres beginning 470 feet southeast of the San Luis Pass Bridge and extending generally northward into West Galveston Bay. The initial survey was conducted on August 11, 2011, from a shallow-draft, 20-foot boat. Survey transects were spaced 66 feet apart and covered all navigable areas. An extensive sandbar crossing the central third of the area was surveyed using a 20-foot airboat on September 9, 2011. Survey equipment included an EG&G Geometrics Inc. G-882 magnetometer; a Marine Magnetics Explorer magnetometer; a CODA Technologies Ltd. DA75 side-scan sonar data acquisition system with an EdgeTech 4200 towfish (500 kHz); and a Hemisphere VS110 differentially corrected Global Positioning System. One magnetic anomaly, consistent with verified shipwreck anomalies, was hydraulically probed in December 2011 to a depth of 17 feet below sea level with negative results.