



Vol. 32, No. 1

# Update to Clients

*Update*

**SAI Senior Staff Present SWANA Webinar on Issues with Landfill Caps**

SAI President Dr. Lahbib Chibani, P.E., and Vice President of Technical Services Dr. Amira Fahim, P.E., were chosen to conduct a webinar for the Solid Waste Association of North America (SWANA). The webinar, titled *The Effect of Landfill Caps on Stability and Flooding Potential*, was held on February 26.

SWANA invited SAI to hold this webinar because of the company's reputation for expertise in landfill environmental engineering. The webinar was developed based upon extensive analyses of different capping options for a landfill in the Meadowlands region of New Jersey. At this particular site, the property is bounded on the south by railroad lines that flood frequently and on the north by two 100-year-old water supply lines that were highly susceptible to additional stresses. SAI engineers had to consider the implications of the chosen cap design on these sensitive nearby structures. (For more information on this project, see Page 3.)

We enjoy these opportunities to share our expertise with such a broad audience. Dr. Chibani, Dr. Fahim and Dr. Zahid Aziz, Project Scientist at SAI, presented a paper on the same topic at the

**SAI and Glimcher Realty Trust -- A Long, Successful Partnership**



*A nighttime photograph of the entrance to The Outlet Collection, courtesy of Glimcher Realty Trust.*

SAI forged a solid working relationship with Glimcher Realty Trust early in our company history, and continues its work with Glimcher today. Glimcher, the owner and operator of The Outlet Collection -- Jersey Gardens (formerly the Jersey Gardens Mall) in Elizabeth, New Jersey, has relied on SAI's experience and expertise in many ways over the years.

SAI began working at this 165-acre former landfill site in the early 1990s, when it was purchased for redevelopment by the ORION Corporation, a Danish company that used the name OENJ for the project. SAI's work for OENJ included:

- securing environmental permits;
- environmental remediation;
- designing and providing construction oversight;
- performing Remedial Investigations and developing a NJDEP-approved Remedial Action Workplan/Landfill Closure Plan;

- developing a protocol to utilize recyclable materials for construction, and by doing so saving the client over \$10 million;
- designing a flexible vertical membrane cutoff wall with a separate leachate collection system to contain PCBs and oily waste;
- designing a pipe culvert that extends 5,800 feet into Newark Bay to replace an open tidal ditch that divided the property;
- designing a sub-slab landfill gas venting system that provides for a 50-to-1 air-to-gas dilution ratio;
- installing a gravity leachate system and force main throughout the site;
- designing a stormwater management system comprised of a series of detention basins, and obtaining the required Stream Encroachment permit; and
- helping design two wetland mitigation areas that provide habitat for the Least Tern, a state endangered species.

SAI's efforts for OENJ helped this project win the USEPA's Phoenix Award for Region II (the project was ranked second nationally).

In the mid-1990s, OENJ sold 100 acres of the site to Glimcher, who recognized the value of SAI's efforts and retained the firm through the completion of the mall and into the present. Under Glimcher's leadership, SAI continued to oversee the maintenance of the remediation and advise on continued redevelopment of the site.

In addition to the mall itself, the buildings that form the landfill cap include five hotels and three restaurants, comprising over 1.2 million square feet of retail space. SAI designed and oversaw the installation of the required environmental engineering and clo-

*Continued on Page 2*

**INSIDE**

SAI Helps to Blitz the Bay!.....see page 2  
Massive Landfill Closure Efforts in the Meadowlands.....see page 3



### Glimcher Realty Trust

*continued from Page 1*

sure controls during the construction of an Applebee's restaurant that was built as an extension of the mall's eastern wall.

SAI also provided compliance assistance during the major renovation of the mall to ensure that all environmental engineering controls installed at the site, such as the landfill cap (building slab, pavement, vegetated areas) and the subslab venting system, continue to operate as designed during and after the renovation project.

Post-closure, SAI provides monitoring and inspec-

International Conference on Solid Waste Technology and Management (ICSW) held in Philadelphia from March 30 to April 2 of this year.

### What Not To Do



The designers of this gas line (not SAI) clearly neglected to account for thermal stressors during the design phase. This gas line, which should be straight, shows the buckling and warping that these stressors can cause.



*A close-up of the goose exclosures designed and maintained by SAI to encourage growth of wetland plants in the mitigation area.*

tion services for Glimcher for the groundwater and leachate systems, the wetlands mitigation area, and other required inspections. SAI also provides ongoing inspection, testing and reporting for Glimcher and the commercial users of other properties for the subslab gas venting systems.

In October 2012, Hurricane Sandy severely impacted the mitigation wetlands. As a result, in April 2013, SAI oversaw the removal of approximately 800 cubic yards of debris from the adjacent upland area and the planting of over 2,500 wetland plants in the low marsh wetlands. The wetlands inlet structure, which was designed to handle unusual storms, survived intact.

SAI staff has presented different aspects of this wet-



*An aerial photograph of the entire redeveloped area, courtesy of Glimcher Realty Trust. The mall can be seen at the top of the photo, and the hotels at the bottom.*

lands restoration project at two conferences this spring. One dealt with SAI's findings on the adaptations that have benefitted these tidally-influenced wetlands, and the other focused on promoting wetland restoration sites on highly impacted brownfields.

It is estimated that the mall project created thousands of full-time jobs for the Elizabeth Urban Enterprise zone. SAI is proud to have been a part of the creation of prime real estate where none previously existed.

From the Editor -

*If you would like to receive a full-color electronic version of our newsletter in Adobe PDF format via email, or if you want additional information about SAI and its services, please send an email to: lthompson@sadat.com.*

*Thanks — we look forward to hearing from you.*



## SAI Helps Insurer and Regulators Complete a Complex & Challenging Project

In early 2014, SAI successfully completed seven landfill remediation/closure projects totaling over 700 acres. Redevelopment options for these areas are now being considered.

SAI was retained in 2008 to help complete the landfill remediation project in the Meadowlands. When the original developer declared bankruptcy before the work was finished, the Surety (American Home Assurance, a subsidiary of the American Insurance Group) retained WCD Consultants of Pennington, NJ, to advise them on completing the project. WCD recommended SAI to be the technical consultant for the landfill closure design due to its recognized expertise in the field.

The New Jersey Meadowlands Commission (NJMC), which owns the properties, partnered with the NJDEP to oversee the closures. Both organizations, along with AHA, worked closely with SAI to confirm the approach to be taken to complete the project.

After helping identify the remaining work, SAI provided design and construction oversight at three of the sites, and partial assistance with design and/or construction oversight at the remaining four sites.



An image from Google Earth showing the landfills for Rutherford East and West.

### The Process

Initial challenges included reconstructing the complex permitting history for the sites, identifying performance requirements for the various remedial measures, and analyzing the design documents. A surveyor documented the extent of the visibly completed work. SAI developed methods to test underground remedial measures, including leachate collection systems and vertical hydraulic barriers, in areas where they had been constructed.

SAI performed engineering design services that consisted of evaluating the existing leachate system and the post-closure leachate levels, evaluating and designing the various containment systems, and designing remedial measures to maximize the performance of these systems. SAI then evaluated and designed the different engineering controls needed to complete the closure at the different landfills. This included grading, stability analyses of the landfill and adjacent structures, and design of leachate, stormwater and gas management systems, and capping systems.

### Critical Design Issues

Most of the landfills presented unique and critical design issues. Four of the most intriguing are described below.

#### Rutherford West

When SAI joined the project team, a vertical hydraulic barrier (VHB) at the Rutherford West Landfill had failed. Excessive movement in the southwest portion of the landfill had pushed a 940-foot section of the VHB out, between one and four feet in some places, towards neighboring Berry's Creek.

SAI performed a hydraulic evaluation of the VHB to identify the failed portion of the system. This evaluation included pump tests, continual monitoring of the groundwater's physical parameters (including water temperature inside and outside the VHB), and tidal surface water measurements. Seasonal water temperature variations were used to help identify the location of the compromised portion of the VHB.

Where the VHB was compromised, sections of sheet pile had been driven inboard to act as a hydraulic bar-

## SAI Blitzes the Bay!



Pictured, left to right: John Zingis, Lisa Thompson, Melissa Lindsay and Emery Coppola, Jr.

On Friday, April 25, SAI employees assisted with NJDEP's annual Blitz the Bay, a day to clean up the wetlands that surround Barnegat Bay. Our staff visited the Tunes Brook Drive section of the Bay near Kettle Creek, and pulled approximately 15 bags of trash out of the marshes in that area. Each bag weighed about 35 to 40 pounds, and close to 90% of the waste were "floatables", such as water and soda bottles.

SAI is proud to do its part to help maintain Barnegat Bay, one of New Jersey's most valuable natural resources.

*Continued on Page 4*

## Welcome!

### Erik Lujkantschenko

Mr. Lujkantschenko joined SAI as a Project Scientist. He is working on construction inspection/oversight of landfill closure projects, soil investigation and preparation of daily field reports. He received a B.S. in Environmental Science from Rutgers University in 2013.

## Presented

Dr. Marwan Sadat, P.E., Dr. Emery Coppola, P.G., and Dr. Zahid Aziz presented papers at the Solid Waste Association of North America's (SWANA) Landfill Symposium in March 2014 in Monterey, California.

Dr. Sadat and Dr. Coppola's presentation is entitled, *Estimating the Impacts of Leachate-Impacted Groundwater on a Tidal River*, and Dr. Aziz presented, *Isotopic Evaluation of Natural Attenuation of Contaminants in Aquifer Beneath a Landfill*.

rier. SAI's engineers were able to utilize 20-foot-long sections of vinyl sheet piles that had been stored at the site to construct a new, functioning VHB. SAI determined the depth for anchoring the VHB sheet piles to provide a stable containment that will not shift in the future.

### Rutherford East

The previous developer intended to build a golf course at Rutherford East. Engineering controls (including a VHB, leachate and gas collection systems, and the first lift of a clay cap) had been partially installed. SAI evaluated these controls, then amended the approved Landfill Closure plan and graded the site to accommodate a solar farm. This site received processed dredge material (PDM) as a low permeability barrier in the cap, so SAI evaluated the integrity of the PDM by performing Standard Penetration Test borings to collect Shelby Tube Samples.

### Avon

The Avon Landfill is bounded on the south by NJ Transit train lines that flood frequently, and on the north by two 100-year-old water supply lines that provide water to Jersey City and are highly susceptible to additional stresses. This made the cap design particu-



*A view of the railroad tracks adjacent to the Avon Landfill.*

larly sensitive. SAI considered several options, including different configurations of conventional caps with a covered or exposed geomembrane barrier layer. Our engineers had to consider carefully how the cap would impact the landfill's water infiltration rate, settlement, leachate levels (and the resulting effect on the structural integrity of adjacent utilities). SAI also performed global and veneer slope stability analyses, and examined the impacts of the 25-year storm. SAI settled upon capping the landfill with processed dredge material and soil cover to minimize impacts on the adjacent pipelines and flood-prone railroad.

### Kingsland

The installed leachate system at the Kingsland Landfill was not performing to expectations due to a collapsed pipe. SAI discovered this issue while conducting a video inspection. SAI designed a replacement pipe for the collapsed portion of the leachate system, rendering it intact and functional once again. SAI also designed stormwater downchutes to address settlement of some installed stormwater pipelines.



*Leachate from the Kingsland Landfill.*

### What the Future Holds

The NJMC is currently evaluating potential end uses of the sites, some of which could become prime real estate for commercial and warehouse development.