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Update to Clients

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Environmental Investigation and Permitting at a Waterfront Club

By Marwan M. Sadat, Ph.D., P.E., BCEE, CEO of SAI

At SAI we are often presented with very challenging permitting issues that require innovative approaches.

An interesting case involved a private gun club in Bucks County, Pennsylvania, that retained SAI to prepare a National Pollutant Discharge Elimination System (NPDES) permit. Prior to and separate from this action, the club had adopted rules that required all members to use non-toxic shot which is considered by the United States Environmental Protection Agency as non-polluting, in order to avoid lead contamination at the shooting range and in the Delaware River (which comprises the eastern border of the property). The club had also constructed a 35-foot Kevlar shield to keep errant shot contained and away from the water. We should note that the stormwater from the property does not directly impact the Delaware River.

Nevertheless, the gun club was ordered by the 5th District Court of Philadelphia to submit the NPDES permit application as a result of a legal challenge to the club by the Delaware Riverkeeper. The individual permit

Continued on Page 2

Cape May Lower Township Landfill Closure Study

Like many landfills in southern New Jersey, the Lower Township landfill on Fulling Mill Road in Cape May began as a gravel mine in the 1950's. After the mining operations ended in the early 1970's, the owners decided to accept municipal waste. Landfilling operations continued until the early 1980's. Throughout the landfill's operation, the New Jersey Department of Environmental Protection (NJDEP) cited the owners with violations. Although the site eventually stopped receiving waste, it was never properly closed. Eventually, the site was obtained by Cape May County in 1985 to be used for runway right-of-ways associated with the Cape May County airport, located directly across Fulling Mill Road.

Above, an aerial photograph of the site taken from Google Earth. The adjacent golf area is clearly visible to the right, and the end of a runway can be seen at the bottom of the photo.

Groundwater monitoring wells were originally installed in the 1980's to determine if the landfilling operations had impacted the local aquifers. Replacement monitoring wells and additional monitoring wells were installed in early to mid-2000 and in 2010 and 2011, some of which were used to evaluate possible impacts to a municipal well field located north of the site. Elevated concentrations of organic compounds, some metals, and ammonia were historically measured.

The Cape May County Department of Public Works began the process to close the landfill by retaining SAI to conduct a preliminary conceptual landfill closure investigation in 2013. SAI began its investigation by conducting a Preliminary Assessment and a ground-penetrating radar survey. Based on the findings from these investigations, SAI implemented test pit and soil boring programs to characterize the waste materials and to document the subsurface groundwater hydrogeology. The data collected by these efforts were used to develop a conceptual site model for the project and initiated a groundwater investigation.

SAI used the data collected in the synoptic groundwater study to develop groundwater contour maps using Surfer, a full-function 3D modeling program, to delineate the potentiometric surfaces for both the upper and lower aquifers, from which groundwater flow directions and hydraulic gradients were inferred. Groundwater flows north-

Continued on Page 2

INSIDE

Philly Gun Club

Continued from Page 1

application was to address the potential impacts associated with the shooting range activity.

SAI's challenge was to demonstrate that the gun club activities did not cause a measurable impact on the river.

To prepare the permit application to the Pennsylvania Department of Environmental Protection (PA DEP), SAI analyzed the potential of any shots reaching the river. SAI utilized a stochastic model, also known as Monte Carlo, to stimulate the reaction time of the shooters and simultaneously the spatial track of the bismuth shots. Monte Carlo models are widely used to mimic events in the real world. For example, in the design of dams it is important to predict flood events of 500 years or more because of the potential of a catastrophic failure of the structure. However, stream flow records are usually limited to 50 to 100 years. Using the Monte Carlo method, a synthetic flow model was developed at Harvard University to generate stream flows for a period of 500 years, which conforms statistically to the original data. This technique is extremely powerful and is also being used now in the design of wastewater treatment plants where the strength and quantity of the waste is simu-

Continued on Page 3

Clean Dredge Material Used for ILR Landfill Cap Maintenance

The $3 billion bridge being constructed to replace the Tappan Zee Bridge has been underway for over a year. One of the project efforts involved removing sediment in areas where new bridge foundations are being built. Sampling of this sediment revealed slight contamination in some areas, while other spots were clean enough to meet NJ Cleanup Standards for Residential Direct Contact.

The project's dredge contractor was required to dispose of this material on upland sites where it can be put to beneficial use. Consequently, the contractor contacted SAI to inquire if we had clients that might

Above and top right, views of clean dredge material used for landfill cap maintenance.

be able to utilize the clean dredge material. Fortunately, one of SAI's clients, Industrial Land Reclaiming, Inc. (ILR) of Edison, NJ needed clean soil to repair depressions on the side slopes of their closed landfill. ILR accepted 37,000 cubic yards of the Tappan Zee dredged material that met the most stringent soil cleanup standards.

The material was placed and covered with six inches of topsoil to help reestablish the vegetative cover.

SAI has a long history of working with both contaminated and clean dredge materials. SAI was the engineer that developed the first New Jersey upland beneficial use of contaminated dredge in 1995 to address a statewide crisis concerning the disposal of this material.

Cape May Landfill Closure

Continued from Page 1

west in the upper aquifer and northeast in the lower, which is consistent with previous findings.

Groundwater sampling results showed very limited exceedances of some metals (also naturally occurring) and low concentrations of ammonia-N.

SAI also implemented a landfill study to monitor the presence of methane gas. This information is critical to both landfill closure requirements and redevelopment concerns. SAI measured the landfill gas composition as a percentage of methane, carbon dioxide, volatile organic compounds, hydrogen sulfide, and oxygen.

SAI presented our findings to the Cape May Board of Chosen Freeholders on February 11, 2015. SAI will be proposing a second phase of investigation work that will result in a closure design and development of an operations and maintenance program including the establishment of a Classification Exception Area for the groundwater impacts.

EDITOR: LISA THOMPSON

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 Assists with Hurricane Sandy Environmental Reviews

In the wake of the substantial damage sustained by New Jersey from Hurricane Sandy in 2012, the United States Department of Housing and Urban Development provided over $2 billion to the State to aid in recovery efforts. The New Jersey Department of Community Affairs (NJDCA) was tasked with managing the funding, and the NJDEP is conducting and overseeing environmental reviews of properties being evaluated for these funds.

Currently, thousands of homeowner applications are being processed by NJDCA/NJDEP. SAI is subcontracting to CDM Smith (one of six teams chosen for this effort) to develop Tier 2 Site-Specific Reviews on properties in Monmouth, Ocean, Atlantic, and Cape May Counties. SAI's work is focused on residential homes and multi-unit residential buildings in the Reconstruction, Rehabilitation, Elevation and Mitigation Program/Landlord Rental Repair Program.

Performing an environmental review on these properties is a two-step process. The first step is to collect all of the digital data that is available for each site. These data are then used to generate a series of figures in GIS that map the locations of the various field assessment layers (which can include floodplains, wetlands, coastal zone, sensitive habitat, and a host of other features).

Once the maps are completed, SAI staff visit each site to complete an Environmental Questionnaire (EQ). The EQ is completed in the field and uploaded automatically to the project database. The field work includes photographing the site and items or issues noted during the visit, surveying for aboveground storage tanks, and reviewing the previously prepared GIS maps for any discrepancies.

SAI also uses this opportunity to help determine if further studies or analyses are required, such as for cultural resources, endangered species, wetlands, known contaminated sites, etc. A written report of the findings of the site visit is entered into the project database for review by CDM Smith.

Left and above, SAI Project Engineer Jon Marino photographs properties damaged by Hurricane Sandy.

To date, SAI has completed approximately 100 of these environmental reviews in Atlantic, Cape May, Hudson, Middlesex, Monmouth, and Ocean Counties.

SAI is proud to have provided this crucial service to speed the recovery efforts of private landowners who were severely impacted by Hurricane Sandy.

Philly Gun Club

Continued from Page 2

lated using the Monte Carlo method. The model we used simulated the probability distribution of the reaction time of the shooters and to compute the spatial trajectory of the bismuth shots. This allowed SAI to estimate the likelihood of bismuth shots overshooting the Kevlar shield and falling into the Delaware.

This project was interesting because it required SAI to research reaction time for shooters and, hence, to develop a paradigm of the impact to the river. The application to PA DEP included the results

Update on Delaware River Tubing (DRT)

In a previous newsletter, we discussed our efforts to assist DRT with the acquisition of US Army Corps of Engineers and NJDEP Land Use permits for the installation of specially designed stairs at two locations along the Delaware River in Kingwood Township, NJ.

This effort has been completed. The installed stairs, which are situated partially below the water line, allow DRT customers to exit the river in a safe and orderly fashion at the end of their tube ride. SAI surveyed the proposed stair locations and prepared the plans for inclusion into the applications that were submitted to the regulatory agencies.

SAI is currently assisting DRT in securing local zoning approvals for their new location along Route 12 in Kingwood Township. SAI will be preparing an Environmental Impact Assessment and providing expert testimony during the public hearings.

For additional information about stories in the newsletter, or to learn more about SAI's services and experience, please contact Joe Wiley at 609-826-9600 or at jwiley@sadat.com.

Philly Gun Club

Continued from Page 3

of the modeling, documentation of the reaction time, and the probability of the impact, if any, on the river.

We at SAI cheered when PA DEP advised the client that our application clearly demonstrated no impact on the Delaware River and, therefore, there was no reason for the agency to issue a permit.

Congratulations!

Randy Kertes completes first triathlon

Vice President of Science & Land Use Randy S. Kertes completed the TRI New Jersey State Olympic Triathlon in West Windsor on July 20, 2014. The competition comprised a one-mile swim, a 25.5 mile bike ride, and a 6.2 mile run. Randy completed the race, his first, in 3 hours, 11 minutes. Way to go Randy!

Kudos for Dr. Sadat

SAI is proud to announce that Dr. Sadat has been certified by the American Academy of Environmental Engineers and Scientists (AAES) as a Board Certified Environmental Engineer.

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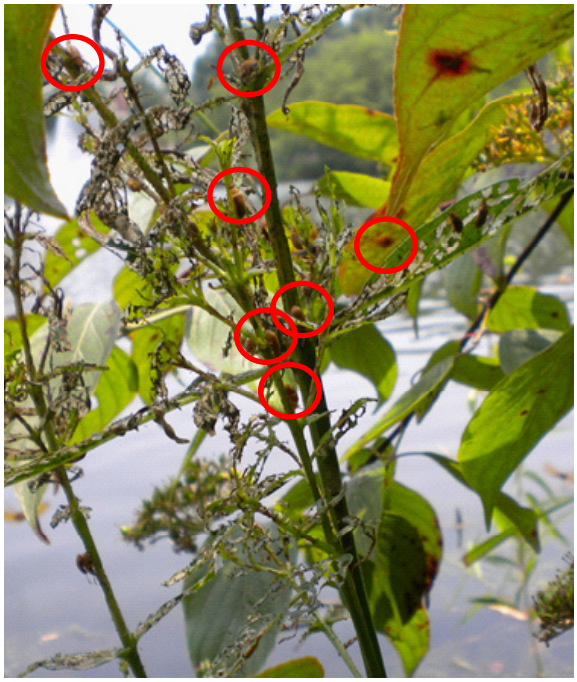
Innovative Approach to Controlling Purple Loosestrife

Randy S. Kertes, PG, CPG coauthored a poster presentation with Dr. Kathleen Browne and Dr. Laura Hyatt, both of Rider University, entitled "Holistic Loosestrife Management, Rider University Restored Riparian Buffer" at the 2013 Watershed Congress Along the Schuykill River in Pottstown, PA.

Centennial Lake at Rider University. Purple loosestrife is growing along the edge in the foreground.

Rider University is using leaf-eating beetles (Galerucelle spp.) to control purple loosestrife along the shorelines of Centennial Lake on the Lawrenceville, NJ campus. After Rider restored the riparian buffer in 2000, the invasive plant began to dominate sections of the shoreline. The New Jersey Department of Agriculture provided the leaf-eating beetles; Rider studied their progress from 2002 through 2011.

The results of this study showed dramatic reduction of purple loosestrife. Loosestrife is still present along the riparian buffer but is holistically managed by the leaf-eating beetles.



Some of the leaf-eating beetles that are helping to control invasive plants. Notice the leaves that are riddled with holes.