COMPLY, CONTROL

Treating dewatering discharge with a portable sediment tank

By Jennifer Fenstermaker

More attention than ever is being paid to how storm water runoff is managed on construction sites. Suggest the idea of numeric effluent limits to anyone in the construction or engineering industries and they may reference the debate surrounding the revised Construction General Permit (CGP), which took effect in May 2014. The new CGP sends two resounding messages to the industry: Sediment is a pollutant, and inspections are a cost-effective means of ensuring compliance and can be expected to increase.

Issued under the Clean Water Act's National Pollutant Discharge Elimination System, the CGP serves as the model under which states regulate and enforce pollution prevention on construction sites. All CGPs nationwide require sites to manage storm water and sediment and have for some time. In fact, many of the best management practices (BMPs) used for storm water management have been around for decades. Yet, as regulations tighten, it is becoming apparent that those practices may not be enough to keep up with evolving requirements.

One area that was under careful review during the most recent revision of the CGP is sediment reduction during dewatering—the act of removing and discharging accumulated storm water from excavations, trenches, foundations and vaults, or from sediment traps or basins.

Initially, contractors were mandated to reduce the turbidity levels in dewatering discharge down to 280 nephelometric turbidity units (ntu). Industry response was loud and clear: We need BMPs that will meet this requirement before it is enforced. After careful review, the U.S. Environmental Protection Agency (EPA) agreed, and stayed the numeric limit for the time being, leaving in place the treatment requirement and affording individual states the freedom to set numeric limits if they chose. Many states did indeed set numeric limits, some more stringent than those originally suggested by the EPA.

Choices for Compliance

There are multiple choices that a contractor has to maintain compliance.

The science of accelerated sedimentation birthed the development of a portable sediment tank to meet environmental regulations in a way that was feasible to the construction industry.

Used to minimize the effect of soil erosion, control sediment and treat dewatering discharge, Aqualete Industries LLC's WTS2000 is a Department of Environmental Protection-approved portable system that applies the technology of accelerated sedimentation using

Hoses were attached to influent valves on the system and placed into the sediment pond.

Influent (left) and effluent (right)

enhanced directional hydrodynamics. It functions without the use of chemicals or replaceable filters and has a small carbon footprint. It was designed to be used by any worker on a site.

Water is pumped into the WTS2000 using any standard construction pump. Upon entering the system, the polluted water begins its treatment journey. During that journey, the water will make more than 100 right-hand turns, each time slamming into Aqualete's dual-angle inclined plate technology. During its journey, the polluted water also will encounter a hydrocarbon barrier that will separate and prevent the hydrocarbons from continuing on their way. The silt, sand, hydrocarbons, nutrients, phosphorous and other pollutants are trapped in the unit and stored until cleaning, while treated water is discharged via the effluent valves or hoses.

The WTS2000 has two separate independent sides for treatment and cleaning flexibility. It is constructed of marine-grade stainless steel and can be towed or trailer-mounted.

The System in Action

In August 2012, Rutgers University and the New Jersey Department of Agriculture State Soil Conservation Committee needed to pump out and cleanse a mixture of water and solids trapped in a surface detention pond. Rutgers University had installed the pond to capture runoff during the construction of its new business center on its Livingston Campus in Piscataway, N.J. The detention pond was full and needed to be dewatered. Because the water contained clay, other measures such as geotextile bags would clog and be ineffective in reducing sediment, turbidity and other pollutants from the discharged water—a requirement of the CGP. The soil on this site also had an exceedingly high colloidal element and appeared "stained" red.

Aqualete Industries crew arrived on site with the WTS2000, detached the unit from the pickup truck and leveled it. Hoses from a 3-in. diaphragm pump were attached to influent valves on the system and placed into the sediment pond. Two discharge hoses were attached to the back of the unit and routed into a single 4-in. discharge hose.

The influent water from the hose was split, flowing equally into both sides of the system. The water entering the WTS2000 was observed for flow and estimated turbidity reduction.

In addition to visual assessments of water quality, independent laboratory tests were run. Dr. George Guo of Rutgers University and his team arrived on site and set up all testing materials, including plastic buckets to determine water flow and sample jars placed at specific locations alongside the WTS2000, which were used to quantify reduction rates and evaluate the quality of the effluent water.

Once the water began to exit the system, approximately five complete evacuations of the chambers were completed. Water samples were taken by Guo and his team. The crew then took samples from the first, second and third chambers and the effluent of the entire system. This process was repeated for both the left and right sides of the unit. The samples were marked and logged and placed in a cooler at approximately 39°F.

Once the final sample was taken, the pump was turned off. The trays were observed for sediment collection and retention. The WTS2000 was drained back into the site pond. The lids were placed onto the unit and securely fastened. Used tools and equipment were returned to their proper places. In this instance, Aqualete Industries chose to clean the WTS2000 at its facility in Ocean, N.J., so that additional observations could be made. However, sediment also could have been returned directly to the site and the unit hosed out before being used at another location.

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The Numbers

Rutgers University School of Civil Engineering & Environmental Science conducted third-party testing that confirmed that the WTS2000 reduced:

- Total suspended solids (TSS) such as sediment and clay by 83%;
- Nitrogen by 77%;
- Phosphorus by 83%, and
- Turbidity by 64%.

This brought the final effluent water down to 270 ntu.

Onsite reductions in TSS, nitrates, phosphates and turbidity indicated that the WTS2000 is effective when used as a portable sediment tank. By treating collected runoff, the system prevents sediment and other pollutants from contaminating nearby waterways. The sediment collected within the unit may also be reclaimed for use on the site. The system minimizes the negative impacts on water quality that result from post-construction runoff from site work in both new development and redevelopment applications.

It is no longer acceptable to say that we cannot comply with regulations because we lack the tools needed. Portable sediment tanks that utilize the science of accelerated sedimentation are a solution to a problem that spans many industries. SWS

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