

# Maryland Intercounty Connector Project Ahead of the Curve in Meeting New Effluent Guidelines

*The final version of the Environmental Protection Agency's (EPA) new Effluent Guidelines is out and only recently posted to the Federal Register. These effluent limitation guidelines (ELGs) and new source performance standards (NSPS) are designed to control the discharge of pollutants from construction sites. Stormwater discharges from 10 acres of disturbed land and above will be required to meet a 280 NTU numeric limit on the allowable level of turbidity once the new limitations are fully implemented.*

*The Maryland State Highway Administration's Intercounty Connector (ICC) project is an example of a construction site that would fall under the new ruling. Over the past two years, the project has made use of Active Treatment Systems to control stormwater discharges. The stormwater control systems in place on this site already meet the new EPA guidelines. Not only do the turbidity readings perform better than the requirements stipulate, but the costs of the systems fall well below the EPA's reviewed summary of \$0.02/gallon for cost-effective erosion and sediment control and compliance.*



By Frank Kneib, MBA

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## Project Overview

According to its web site, the ICC project is a six-lane, 18-mile toll highway that cuts through parkland and residential communities linking Prince George's and Montgomery counties in central Maryland.

Within each of the major watersheds in the approximately 4,300 acres of the project, state-of-the-art stormwater controls and stormwater management methodologies are in place to ensure Best Management Practices (BMPs) and to prevent stormwater pollution. There are 21 special project sites, totaling 620 acres, designed to improve water quality, to protect brown trout and to safeguard other environmentally sensitive elements in the Upper Paint Branch watershed.

## Impaired Watershed Requirements

The Chesapeake Bay is a 303(d) listed impaired watershed for nutrients and sediment. The Maryland Department of the Environment (MDE) has set an NTU discharge limit of a 50 NTU monthly average and an 150 NTU daily maximum for this project. Due to these requirements and the fact that silt and clay materials are located along much of the project's path, it was expected that standard BMPs for erosion and sediment control (silt fence and sediment bags) would not meet these requirements.

After presenting to the Inter Agency Working Group (IAWG), a team from Rain for Rent along with the providers of StormKlear Water Treatment, laid out a solution to meet the specific stormwater treatment needs for this project. Recent data collections from the site in November of 2009 show that the systems in place not only meet the EPA standards but also satisfy those from MDE.

## How The System Works

Rain for Rent designed a 50 to 200 gallon per minute (gpm) system with a tube settler using a StormKlear chitosan injection as the first means of settling. Chitosan, an approved polymer made from crab shells, naturally neutralizes the negative surface charge of the dirt particles, causing them to settle. After the chitosan injection, the sediment flocculates, and the water is filtered through a sand media and bag system.

Because the ICC project is directed through a wetlands area, pollution prevention was a major concern, and the stormwater pollution prevention plan was scrutinized. Turbidity requirements averaging a 50 NTU discharge rating were imposed, while allowing for out of compliance events to occasionally spike to 150 NTU. Each step of the filtration process was critical to enabling the project to stay in compliance with the turbidity requirements of the MDE.



▲ *Rain for Rent Active Treatment System (ATS)*



▲ *ATS with baffle box, pump and filters*

▼ *Water samples before and after treatment*



ICC stormwater runoff was stored in ponds where turbid water is typically kept prior to treatment. Power Prime™ pumps moved the water from the ponds to the tube settler where the chitosan was injected. This process ensured that the water quality parameters were met and allowed for higher flow rates. Higher flow rates ensured that no off-specification water left the site, even during rain events.

The tube settler works in conjunction with pumps and other filtration equipment as a result of the following actions:

- The fluid stream is pumped from the pond using a 4-inch DV100 Power Prime™ pump. During the pumping operation, chitosan is introduced into the fluid stream which starts the treatment process in the water. The treated water enters the tube settler where it flows through a tortuous path designed to slow the fluid down and to allow more time for flocculation to occur, sending particulates down into a sump area where they can be removed easily.
- After the settling process, the cleaned water is pumped into a 36-3 Sand Media Filter. This filter removes remaining suspended solids from the fluid stream to an approximate level of 20 to 25 microns.
- The final step is to polish the water so that it meets the accepted turbidity level for the specific project. This is done using bags, and if needed, particulate filters to remove the remaining suspended solids down to as low as a ½ micron.

### **Water Monitoring**

After the filtration process, clean water is discharged into a channel which drains into the creek and is tested every 30 minutes to ensure that the turbidity levels stay below the required levels.

Over the past two years, contractors have been using these mobile systems which are able to move with the construction project. DOT projects move linearly, so mobility is necessary. The systems are set up to treat around 100 gallons per minute (gpm) on average. The systems average eight hours a day, three days a week run time for an average

weekly treatment between 140,000 and 150,000 gallons of sediment-laden stormwater runoff.

Typical sediment in a holding pond is between 400 and 800 NTUs in turbidity, and discharge averages around 30 to 35 NTUs. These systems have produced water down to as low as 4 NTUs, but the 30 to 40 NTU range is targeted on a cost-benefit rationale. This range is safely below the discharge permit level. Certain waters, like trout streams, require a lower NTU discharge level, a level that these systems can accommodate. Contractors can adjust the systems for better performance as needed.

### Meeting New EPA Effluent Regulations

The US EPA's new "Effluent Limitation Guidelines and Standards for the Construction and Development Point Source Category" requires better focus and accountability on standard erosion and sediment control BMPs, and it also requires sites of 10 or more acres to meet a numeric discharge requirement (280 NTUs). The treatment trailers being used today on the ICC project already produce results far better than this discharge requirement.

Once the new EPA Effluent requirements are fully implemented, they will reduce significantly the amount of sediment and other pollutants discharged



▲ View of construction on section C



▲ Settling pond prior to ATS

from construction sites. The guidelines state that the running total cost of treatment for a project like the ICC project is \$0.02/gallon. Recent data collected on the ICC site in November of 2009 shows an average cost (not including labor or fuel) of only \$0.0049/gallon. Each portable treatment trailer is capable of the following:

- Filtration trailer can discharge 200 gpm maximum gallons per minute.
- 120,000 maximum gallons per day can be discharged and filtered based on a 10-hour workday.
- 3,360,000 maximum gallons per cycle can be discharged and filtered based on above numbers.
- Average cost of filtration trailer with disposables is \$16,500/per cycle.

### Completing the Project


The project is due to be completed in 2010 with remaining sections being

completed in 2011 or early 2012. The mobile system created has been crucial for the multiple locations that require active treatment throughout the construction project. The ICC Maryland project is a model example of how the new EPA Effluent Guidelines are attainable.


The new EPA rules, once fully implemented, are projected to reduce the amount of sediment discharged from construction sites by up to 4 billion pounds each year at an annual cost of \$953 million. The benefits from reducing discharges of sediments include better protection for drinking water supplies, improvements in aquatic environments (eg: reduced streambed smothering) and less need for dredging of navigation channels and reservoirs. This rule obviously has many long term benefits; benefits already seen on the ICC project in Maryland.



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