

# Taking Control of Turbidity

## Testing of a construction site clean water alternative

By Don Thieman, CPESC, LEED GA

On Dec. 1, 2009, the U.S. Environmental Protection Agency (EPA) created a ruling requiring site personnel to monitor discharged storm water for turbidity levels on certain sites. The idea of turbidity requirements encouraged industry professionals to look for ways to create the necessary processes that would establish a practical solution without making the requirements an excessive financial burden. Erosion and sediment control distributors nationwide looked for locations to test ideas and materials utilizing a unique mix of solutions to meet and exceed the EPA ruling requirements.

In the Midwest, ASP Enterprises and Quick Supply Co. were asked to work on a demonstration site with the Madison County, Ill., Soil and Water Conservation District, with the flexibility to demonstrate anything “new.” The outcome of this project was the ASP/Quick Supply turbidity reduction sediment basin (TRSB).

The TRSB is a combination of several erosion and sediment control products and exemplifies the value local, technically savvy distributors bring to the region they serve. The TRSB uses flocculants, ditch checks, impermeable liners, turf reinforcement mats, silt fence and a sediment basin skimmer, putting them all together to provide a clean water alternative to the more expensive filtering or external baffle box-type solutions.

### Flocculants

The difficulty with designing this type of system is that all soils react differently when settling. Some fine colloidal particles can take a year or more to settle fully. A flocculant is a solution that connects these small particles molecularly so that they settle more quickly and in larger flocs. A wide range of flocculants exists, and many soils require a specific type to settle out in the time frame needed on construction sites.

Flocculants, in particular, require knowledgeable and technically trained experts to evaluate onsite soils and come up with the most effective pairing. Some flocculants are universal but may not clarify storm water as quickly as another flocculant. Some may flocculate quickly but may not clarify completely or sufficiently.

### Treatment Process

The basic concept of the TRSB is to focus the storm water to be treated into a swale where the flocculant can then be applied. Ditch checks are used in the swale to slow the water down while applying the flocculant, mixing it and agitating it. Depending on the water volume, several of these ditch check applicators may be necessary. Once the flocculant has been applied to the storm water, it enters the basin.

The sediment basin is divided into sections by baffles. These baffles help

reduce the energy in the water while creating a serpentine flow direction that requires the water to travel a longer distance before being released. Notches typically are installed in the baffles to specifically direct the water. Wire-backed silt fence has been ASP/Quick Supply’s product of choice for the baffles. The use of biodegradable coir fabric as one of the baffles can improve the effectiveness of the basin as well because of the unique properties of flocculated sediments in suspension.

### Basin Configuration

While the configuration of the basin is important, there are some other options that should be examined. If the TRSB is to be in use for an extended period of time—say, six months or more—a reinforced vegetated swale for directing water into the basin using turf reinforcement mats may be considered. If, on the other hand, the construction cycle is short, an impermeable liner can protect the swale from erosion. Either way, it is important to avoid triggering additional erosion problems and turbidity by concentrating the flow in the swale.

The final part of the TRSB is the Faircloth Skimmer. This skimmer regulates the outflow of the basin so that it fills and creates the necessary pools of water to cause gravity settling of the flocculated material. The skimmer drains the basin more slowly, but from the surface of the basin—a key factor, as the cleanest water in a sediment basin is on the surface. By skimming water off the surface, additional settlement time is allowed for the remaining water in the water column.

Important factors for the skimmer are proper sizing and determining the correct diameter of the internal orifice. Determining these skimmer parameters is another value a local technical distributor can bring to create a cost-effective solution that performs as needed.



Initial results show that the TRSB system is successful in reducing turbidity to an acceptable level.

## Outcome

Initial results collected from the first full-scale ASP/Quick Supply TRSB suggest that with many soil types it is fully capable of reducing turbidity to an acceptable level. The company will continue to improve this process-driven solution to meet the changing needs of the site construction industry. **SWS**

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