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CASE FILES

Geopro® Learning Tool **April 15, 2002**

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Eastwood Towne Centre

Lansing, MI Winter/Spring 2002

Eastwood Towne Centre is destined to be Lansing's focal point for retail shopping and restaurant services. By the end of 2002, its 192 acres will host such mega stores as *Sam's Club*, *Wal-Mart*, an *NCG* 18 theater cinema and the *Eastwood Towne Centre* retail complex. Ancillary businesses, all desiring to pull on the retail traffic generated by **Eastwood Town Centre**, are sure to add to this northeast Lansing shopping destination location.

However, this expanse of impermeable material [90+% planned in pavement and roofing] can deliver a real impact on the local watershed in terms of storm water quantity and quality. To minimize quantitative concerns of the *Ingham County Drain Commission*, the developer, *Eastwood, LLC* [*Eastwood*], excavated two large detention basins along the project's eastern boundary. Prior to construction of storm drain systems, the site's runoff traveled to these basins. Restrictors in the basin outfalls reduced offsite flow volumes to approximate preconstruction levels.

Portion of 192 acre, mass-graded site

Both basins doubled as construction sediment collection traps and their sizes allowed nearly complete deposition of course-grained soils. Unfortunately, the entire, all-clay site was mass graded, resulting in runoffs being highly turbid with fine-grained soils. Even after lengthy impoundments within the basins, off-site discharges did not meet *Drain Commission* quality requirements.

The *Drain Commission* requested *Price and Company, Inc*. assistance in developing a plan to improve off-site discharge quality. The ensuing plan focused on two project phases: 1. Provide immediate management practices to reduce off-site environmental impacts and 2. Plan the additional management practices that would provide both environmental safety and logical, economic development continuation.

Increasing sediment basin size to enable suspended fine-grain soil settlement is expensive and ineffective as is *filtration* of turbid water.

Phase I: Immediate Practices

The method chosen to render acceptable storm water quality was flocculation, a chemical process using environmentally safe, site-specific, anionic polyacrylamide [PAM].

When properly matched to site soil lithologies and water chemistries, one or more polyacrylamides [PAM's] will cause rapid, relatively complete flocculation and/or chelation of suspended solids within a water column. Once formed, the floc will drop, via gravity, in a quiescent water body, allowing discharges of relatively clean surface waters.

Simple field bench tests were performed by *Price and Company, Inc*. to determine which polymer would provide optimal performance. The tests indicated that *Applied Polymer Systems, Inc.* [*APS*]

702b Floc Log® [partially hydrated form of the polymer] developed large floc within 20 seconds of being added to and mixed with the turbid site water. The resulting water achieved upwards of 98% clarity through this process. To develop the necessary on-site water treatment process, all site runoff was directed to the North Basin [site topography allowed this change without excessive cost]. The North-to-South Basin storm drain system [included in the Project Plans] was installed [approximately 900' of 42" concrete pipe], as was the South Basin to off-site outfall storm drain system section. Again, this work was included as part of the Project but had not been completed at this time.

A flow restrictor [8" diameter pipe] provided a volume release control at the North Basin outfall. Thirty six [36] ***702b Floc Logs***®, placed immediately down gradient from the restrictor, offered sufficient polymer to the turbid water released from the North Basin. As the polymer and water flowed to the South Basin, mixing occurred, developing the desired floc. Upon entering the South Basin, the floc dropped to the basin bottom within 6' to 7' of the outfall structure, leaving relatively clean water to discharge from the South Basin.

The entire site was now discharging storm runoff waters that met the quality standards of the *Ingham County Drain Commission*.

Water discharging into South Basin from North-to-South Basin pipe after ***Floc Log®*** treatment to improve quality [19 NTU reading]

Phase II: Intermediate Practices
Continued construction included the installation and use of an extensive storm drain system. This system emptied directly into the South Basin, bypassing the North-to-South Basin polymer treatment. However, ***702b Floc Logs***®, installed at locations dictated by a combination of anticipated flows, time of travel and accessibility, provided the same function and result as described in the **Phase I** discussion.

View of 60" pipe bottom through 4" of flowing water. Water entering South Basin from site storm drain system after ***Floc Log®*** treatment to improve quality.

As this storm drain system develops, with an increasing quantity of flow, as many as 150 to 200 ***Floc Logs***® will be used.

System Advantages Include:

1. Passive system requires no pumps or labor [other than to replace ***Flog Logs***®, when required],
2. Inexpensive – approximate cost of $0.00007 per gallon,
3. Reliable – continues to work without operation management,
4. Offers superior performance to all other known systems.

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