Stormwater Solutions
Uncovering the benefits of geosynthetic-based underground detention systems

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Flooding has been an ever-increasing topic on the nightly news over the last few years. The increasing frequency of intense storms along with the continued development and expansion of neighborhoods challenge the capacity of existing infrastructure. Roofs and pavement replace fields and forests, which increases stormwater runoff flowing to pipes and streams. In older urban cities, stormwater and sanitary pipe networks are combined and drain to wastewater treatment plants. Heavy rains often exceed the treatment capacity of these plants — resulting in combined sewer overflows (CSOs), a simple acronym for an unpleasant occurrence.

One need only attend a planning board meeting discussing a new development to recognize the increased scrutiny paid to stormwater management by all involved parties. A basic principle is that post-construction stormwater runoff cannot exceed pre-construction conditions and many times developers are encouraged to also improve drainage in adjacent flood-prone neighborhoods. Stormwater detention ponds are the standard solution. They are sized and located within the new development to store runoff during an historic storm event and release the collected stormwater at a low rate after the storm has passed. Where land is limited or valuable, stormwater ponds are installed below ground.

Along with being cost-effective, geosynthetic-based underground stormwater detention systems are easy to build.

As one example, a stormwater detention system offered by GeoStorage Corp combines locally available products, mainly stone and concrete, to store water in large chambers underground. The chambers are formed by geosynthetic reinforced stone retaining walls/abutments and capped with a concrete lid. The system is efficient because the stone retaining wall backfill has 40% porosity — the material used to create the large open chamber has an additional water storage capacity equal to 40% of its volume.

Designs for these geosynthetic-based systems follow Federal Highway (FHWA) Integrated Bridge guidelines, a national standard popularized in Ohio. The large chamber enables access for

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UNDERGROUND ANSWER A stormwater detention system offered by GeoStorage Corp utilizes products like stone and concrete to store water in large chambers underground. The chambers are formed by geosynthetic reinforced stone retaining walls/abutments and capped with a concrete lid.

...inspection and maintenance crews and allows them to monitor the infiltration bed directly on recharge applications where the goal is to replenish the water table. In addition, local availability of the system components results in the lowest carbon footprint in the marketplace.

Along with being cost-effective, geosynthetic-based underground stormwater detention systems are easy to build. A geotextile liner is placed around the perimeter of an excavation, and inlet and outlet pipes are extended through the liner and daylighted into the chamber. From that point on, the project is a stone placement operation – dumping, spreading and compacting stone lifts around the perimeter, as a small dedicated crew installs the geosynthetic (geogrid or geotextile) reinforcement and wire mesh face forms at the chamber walls. Precast reinforced concrete panels are then placed over the chamber and manholes are extended to the parking lot surface with concrete rings.

Stormwater management has become the most expensive component of the site development package and given the frequency of flood events and the aging stormwater infrastructure that is not likely to change. Efficient and reliable stormwater detention systems are needed to protect neighborhoods and preserve the environment while encouraging continued investment in the development of communities.


The Next Generation in Stormwater Management Technology

GeoStorage Underground Stormwater Systems offer substantial savings when compared to traditional stormwater systems, with benefits that improve overall performance and maximize design.

• Higher Storage Capacity
• Reduced Carbon Footprint
• Easier Maintenance

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www.propertiesmag.com | vol. LXIX, issue 6