

# CASE STUDY

## Toronto Premium Outlets Toronto, Canada

**Storage Provided:** 272,254 CF (7710.23 m<sup>3</sup>)

**Area:** 114,102 SF (10600.05 m<sup>2</sup>)

**Models:** Recharger® V8HD

**Number of Units:** 2,782

**Installed:** August 2012

**Project Engineer:** The Odan/Detech Group, Inc.,  
Burlington, Ontario Canada

**Contractor:** Metric Group  
Brampton, Ontario Canada



Toronto Premium Outlets™ is the first Premium Outlet Center in Canada. The unenclosed Center sits on a 45-acre site approximately 20 minutes west of Toronto in Halton Hills. Four entrances invite shoppers into a single-level, village-style setting with outdoor pedestrian courtyards that provide sufficient coverage for all-weather shopping.

During the planning stages, engineers from The Odan/Detech Group Inc. collaborated with site owners Simon Property Group and Calloway REIT as well as architects from The Collaborative Inc. to develop the layout for the mall and surrounding parking lots and a stormwater management system that would primarily provide detention, but would also allow a portion of the runoff to infiltrate back into the ground after a rainwater event.

In order to best manage the runoff, project managers determined that a unique combination of underground plastic chambers and an open detention pond would provide the best stormwater solution, as it would allow the property owners to efficiently control stormwater while maximizing the amount of leasable space on the site.

"Integrating a pond and CULTEC's chambers on the same site was quite unusual, but it was an innovative way of getting the job done," said Mark Harris with The Odan/Detech Group, Inc.

Untreated stormwater initially enters the first section of the detention pond through the forebay, where the silt sediment settles out of the water to the bottom of the pond. The clean stormwater remains in the forebay until there is enough volume to flow over into a micro-pool. Finally, the water slowly drains at a headwall out of the micro-pool and into a natural outside creek. With just over 236,000 cubic feet of volume provided by the pond, this process helps to slow the flow of water as much as possible before it empties into the creek in order to avoid an overflow or erosion problem.

Given the space constraints of the shallow site and the additional storage requirement of 272,000 cubic feet, Odan/Detech Group engineers chose to install CULTEC's Recharger® V8HD chambers to detain water onsite. The Recharger® V8HD provides a balance of maximizing storage in a small footprint, and best satisfies the



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# Toronto Premium Outlets

## Toronto, Canada *(continued)*

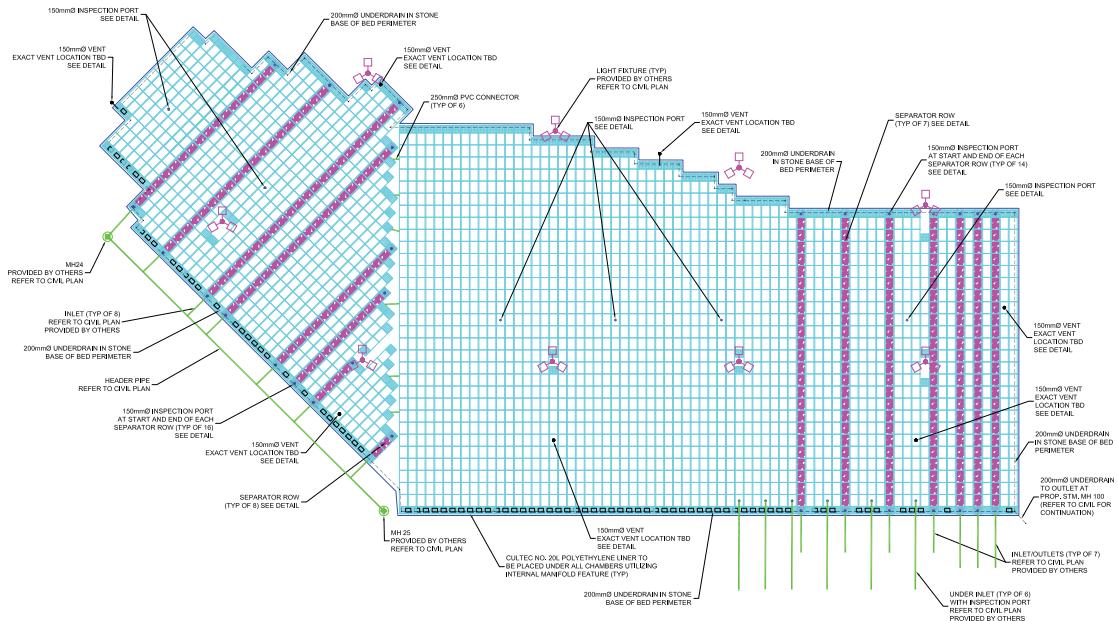
requirements of the Toronto Premium

and 60 inches wide and has a bare chamber capacity of 8.68 cubic feet per linear foot. The large bed consists of 2,782 chambers installed in 125 rows and provides a total of 272,254 cubic feet of storage. In addition, the V8HD model is able to withstand traffic loading with minimal cover – a major site requirement.

One major issue engineers faced during the project was determining how to remove sediment that enters the chambers and how the chambers themselves would be maintained. Ultimately, engineers decided to install a number of CULTEC Separator™ Rows as part of the stormwater chamber system to function as pre-treatment as well as infiltration.

Filter fabric was wrapped around the entire first row of chambers and a polyethylene liner was placed below them, creating a Separator Row. The Separator Row pre-treats runoff by capturing silts and fine particles in a row of chambers prior to runoff overflowing into the rest of the infiltration basin. To help maintain the stormwater system, debris can be easily vacuumed out using a water jet, which pushes water toward the catch basin and sump while removing waste. In addition, each Separator Row in this system features two access ports so regular inspection and maintenance may occur from either end.

A second design concern was the possibility of erosion. Releasing water too quickly would not only alter a water course, but could affect the natural wild and amphibious life that made its home along the creek. Creating a detention pond consisting of a forebay and micro-pool, and using CULTEC's chambers for additional storage volume helped to slow the progression of the water flow, thus minimizing any potential erosion or disturbance to the water course.



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