



Septage Lagoon Dewatering Solutions Case Study:

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Ontario Based Septage Hauler Chooses Geotube® Units for Onsite Sludge Management

The Challenge

Provincial standards in Ontario, related to Nutrient Management have placed pressures on those in the septage industry to seek alternative methods for the management of hauled septage. For years land application of septage has been practiced, however it is expected that this will not be a viable method of disposal in the foreseeable future.

Septage haulers across the province are evaluating technologies which are both economical and will produce a material which will meet the biosolids land application criteria set forth by the Ontario Ministry of the Environment (MOE).

Howard Campbell and Sons, located in Lyn, Ontario utilize two facultative storage lagoons for the management of hauled septage. While Campbell and Sons are permitted to land apply the waste from the lagoons, the lagoon cells were filling with sludge and needed to be dewatered. In addition, Earl Campbell, co-owner of Campbell and Sons was interested in perusing a more environmentally responsible method for the disposal of hauled septage.

The Solution

Geotube® dewatering containers are constructed of a special woven polypropylene material which is extremely efficient at retaining solids and producing a clear effluent. Geotube® units sit upon a constructed lay down area which is designed to direct the filtrate to wherever the application demands, in this instance back to the lagoon. As sludge is pumped to the Geotube® units it is chemically conditioned with a polymer to allow the Geotube® to dewater at its maximum efficiency. Once pumping is completed the Geotube® units are left to dewater until such time that the odorless, retained solids are



As un-stabilized septage is pumped into the Geotube® unit clear filtrate immediately begins to flow from the bag at the Howard Campbell and Sons Geotube® Facility in Lyn, Ontario

land applied.

The Construction

Campbell and Sons undertook the construction of the dewatering cell with consultation provided by Bishop Water Technologies and their engineering firm. The cell was designed to accommodate a total of 4 60' circumference x 100' long Geotube® units. The area was constructed at the perimeter of the lagoon, by creating a level sub-grade then laying down an impermeable geo-membrane so to not allow filtrate from the tube to escape to the environment. Crushed stone was laid on top of the membrane to provide drainage and promote dewatering from the bottom of the Geotube® unit. The design of the dewatering cell allows the filtrate from the Geotube units to flow back to the lagoon using gravity.

In March of 2009 representatives of Ashland Hercules Water Technologies bench tested samples from the lagoon cell in order to determine the polymer best suited to chemically condition the sludge prior to dewatering. It was determined that DrewFloc Polymer 2478 was the optimum polymer to condition the sludge.

Ashland Hercules provided the required polymer to condition approximately one years worth of hauled septage. Bishop Water Technologies supplied the polymer injection system and mixing chamber.

The Performance

In October of 2009 Campbell and Sons began pumping into one, 60 ft. circumference x 100' long Geotube® unit. Representatives of Bishop Water Technologies and Ashland Hercules Water Technologies visited the site

to assist in the setup of equipment and provide training to staff.

Sludge is pumped from the lagoon using a tractor PTO. Pumping rates vary from 530–740 gpm. The sludge is pumped from the lagoon and injected inline with a predetermined polymer solution. The polymerized sludge travels through a mixing chamber constructed of PVC. Turbulence created inside the mixing chamber is necessary to flocculate the sludge. The sludge is then pumped directly into the Geotube® unit. Pressure immediately begins to build in the Geotube® unit, and clear filtrate begins to pour from the bag as the solids are retained inside.

The utilization of the Geotube® dewatering technology provides additional onsite storage capacity. Since implementing the Geotube® units Campbell and Sons has not land applied any hauled septage. It allows a cleaner filtrate to be returned to the lagoon, effectively creating a much easier to manage lagoon system. The dewatered solids inside the Geotube® are odorless and can reach up to 40% solids, the material which is being land applied resembles a black earth more than raw septage.

Campbell and Sons now has control over disposal of solids. They can land apply the dewatered solids at a point when it makes the most sense for them.

In September of 2010 solids were collected from the Geotube® unit at Campbell and Sons, and sent to Caduceon Laboratories for analysis. Analysis of heavy metals and e-coli content show the retained solids to easily meet Ontario's criteria for the land application of biosolid material.

Geotube® units are not only an ideal technology for managing septage stored in lagoon cells, but also for dewatering septage from a tanker truck, as is done at the award winning Geotube® facility in Eganville, Ontario.

Every lagoon cleanout is unique, with each presenting a different set of challenges. Lowering transportation costs, maximizing onsite storage, reducing odor, retention of valuable solids, quick mobilization and meeting stringent environmental protocols are just a few. The Geotube® dewatering technology is the only dewatering technology that provides a solution to all these challenges and does so with simplicity and affordability.

Geotube® Retained Solids Analysis

Parameter	Unit	Dewatered Lagoon Sludge	Ontario Biosolids Limit
Arsenic	mg/kg	5	170
Cadmium	mg/kg	3.2	34
Chromium	mg/kg	2.9	340
Cobalt	mg/kg	<1	2800
Copper	mg/kg	726	1700
Lead	mg/kg	56	1100
Molybdenum	mg/kg	10	94
Nickel	mg/kg	22	420
Mercury	mg/kg	0.936	11
Selenium	mg/kg	8	34
Zinc	mg/kg	1390	4200
E coli	Cfu/g	<10,000	2,000,000
Total Solids	% by w	23.6	-



Sludge is injected with a polymer and transferred through the PVC mixing system prior to being dewatered.



Lay down area constructed using a geo-membrane liner covered in crushed stone.

How Geotube® Dewatering Technology Works

Dewatering with Geotube® technology is a three-step process.

In the *confinement* stage, the Geotube® container is filled with dredged waste materials. The Geotube® containers unique fabric confines the fine grains of the material.

In the *dewatering* phase, excess water simply drains from the Geotube® container. The decanted water is often of a quality that can be reused or returned for processing or native waterways without additional treatment.

In the final phase, *consolidation*, the solids continue to densify due to desiccation as residual water vapor escapes through the fabric. Volume reduction can be as high as 90 percent.



Step 1: Filling



Step 2: Dewatering



Step 3: Consolidation

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