terrafix®
geosynthetics inc.

issue number two

the clayliner
the newsletter dedicated to clay lining

Canada's leader of complete geosynthetic solutions

Winter 2009

GCL CASE STUDY
City of St. John's, Newfoundland

PROJECT ENGINEERS
Kendall Engineering

GENERAL CONTRACTOR
GCL Installer
Modern Paving Ltd.

GCL SUPPLIER
Arrow Construction Products Ltd.

CHALLENGE
Challenged with finding an economical alternative to an LLDPE geomembrane to close and cap an approximate area of 25 Ha (~ 250,000 sqm / ~ 2,500,000 sqft) of the municipal landfill. Existing bids to supply and install an LLDPE liner exceeded available budget.

SOLUTION
A Geosynthetic Clay Liner (GCL) provided an economical alternative to properly close and cap this municipal waste landfill. The main advantage by using a GCL is the fact that a local general contractor could deploy the GCL effectively without the need of outside help and/or specialty subcontractors.

PROJECT OVERVIEW
Modern Paving were able to deploy and cover areas as large of 20,000 sqm per day. Coordination was required to ensure over 100,000 sqm of material arrived on site prior to the start of deployment. The ease of installation provided Modern Paving the flexibility to either use one or two crews to deploy the GCL and/or concentrate on placing the cover soil layer over the GCL and/or others items on the landfill.

GCL vs. HPDE DEPLOYMENT FACTS

LLDPE Subcontractor	GCL Local General Contractor
Average Deployment Rate	Average Deployment Rate
3,000-6,000 sqm per day	10,000sqm – 20,000 sqm per day

Geotextiles
- Non-woven Geotextiles
- Woven Geotextiles
- High Strength Wovens
- Monofilament Wovens

Erosion Control
- Straw, Coconut and Excelsior Blankets
- Coir Mats and Logs
- Turf Reinforcement Mats
- Terraweb® Cellular Confinement System
- Gabion Baskets and Mats
- Armorflex® and A-Jacks®
- Fencing Products
- FLEXICRETE™
- Slopetame²
- Siltsacks® / Envirobags
- Silt Curtains

Geogrid Application
- Base Reinforcement
- RoadGrid
- Uniaxial / Biaxial
- T-Blocks
- TerraSlope
- TerraSteep
- TerraFort

Lining Systems
- Bentofix® Thermal Lock Geosynthetic Clay Liner
- HDPE Geomembranes
- LLDPE Geomembranes

Stormwater and Wastewater Systems
- GrassPave² and GravelPave² Permeable Pavement systems
- Weholite HDPE Pipe
- Corrugated HDPE Pipe
- Subdrain Pipe and Fittings
- Aqua-Swirl™- Oil and Grit Separator
- Aqua-Filter™
- Subsurface Retention/Detention system

And much, much more....

The Rock.

Overview of the site. Cape Spear, most easterly land point in Canada in the background.

Once the GCL was deployed, Seaguls departed the area!

Belly dumps were used to the cover soil over the GCL over a hard smooth subgrade.

Subgrade preparations were well done. Lay down of rolls were placed accordingly.

Placement of the cover soil.

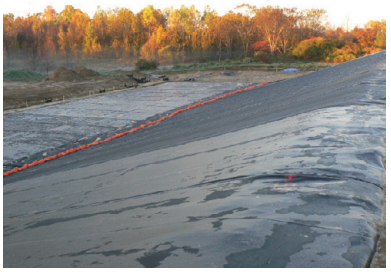
Over 100,000 sqm of GCL was sent to site prior to deployment.

One crew consisted of one operator and two labourers.

Storage of GCL on site.

What's new and exciting at terrafix geosynthetics

Queen's landfill liner test site



As an industrial partner, we are pleased to announce that the Research study into the "Long-Term Performance of Geosynthetic Liners" is in its third year at the GeoEngineering Centre at Queen's-RMC. Work is proceeding well with the various projects funded by the NSERC Strategic Grant, the Ontario Centres of Excellence (OCE) and MOE's "Best in Science" program. Updated information on this program including recent research papers have been published from this ongoing Research study and is available at www.geoeng.ca

This research project is a huge undertaking by the research team at the GeoEngineering Centre at Queen's-RMC which includes a fairly large field test site of 4,500 sqm. The site was carefully instrumented during construction and is providing valuable information over the last three years. An excellent example of information being supplied from the test field is further knowledge that Scrim-Reinforced GCLs such as our Bentofix NW Series (same product as this case study) are not shrinking. GCLs that are not Scrim-Reinforced are shrinking. This is just another study that is confirming that GCLs must be Scrim-Reinforcement. Scrim-Reinforcement is the presence of a woven fabric in the GCL, ie. scrim nonwoven = needlepunching of a woven with a nonwoven. As mentioned, some GCLs do not contain this all important woven presence.

Did you know?

What is Thermal Lock? Thermal Locking is a heat treating process where the fibres of the GCL are heated to permanently lock the needle-punched fibres into place. This procedure provides increased internal shear resistance and long term creep resistance. Did you know that this thermal locking procedure also provides a "low bulk void ratio"? Void ratio is defined as the volume of voids in a mixture divided by the volume of solids. A lower bulk void ratio will provide a lower permeability. Thermally treated GCLs swell to much lower bulk ratios and hence are less permeable than non-thermally treated GCLs at low confining stresses.

All Bentofix GCLs are thermally locked at our plant in Barrie, Ontario, to provide this all important factor during the manufacturing process.

Coast to Coast Assistance

ARROW CONSTRUCTION PRODUCTS LIMITED

From Coast to Coast our Local Distributors are pleased to provide you initial engineering assistance to on site start up assistance to deploy our Geosynthetic Clay Liner. Our Atlantic Canada distributor, Arrow Construction, has been providing engineering consultants and general contractors our Geosynthetic Clay Liner since 1992. Geosynthetic Clay Liners (GCLs) are utilized for many different sealing applications including municipal solid waste (MSW) landfill covers and liners, lagoons and canal liners. Depending on the application, you can count on Arrow Construction to have a proven historical case study.

At Terrafix, we provide powerful new technologies in geosynthetic products and services for construction and environmental applications. These new technologies can save you installation time and money.... and we can prove it!

Terrafix offers a turnkey approach to solving your environmental problems. From engineering to construction, our team of professionals are committed to providing the most advanced engineering solutions to today's environmental challenges.

We have technical experts available every day to answer your technical questions and to give you engineering solutions in which you can have confidence.

Because we carry the complete line of geosynthetic products you can count on us to have inventory available when you need it. And, many of our products can be custom cut and fabricated to fit the requirements of your project which will save you labour costs, installation time and minimize waste. Ask us about it!

Terrafix has been in business over 32 years. We have a track record of success and reliability. You can be certain that we will be here when you need us.

Call on Terrafix for all your geosynthetic product or service applications!

terrafix® geosynthetics inc.

178 Bethridge Road
Toronto, Ontario • M9W 1N3

Telephone (416) 674-0363
Fax (416) 674-1159

February 2009