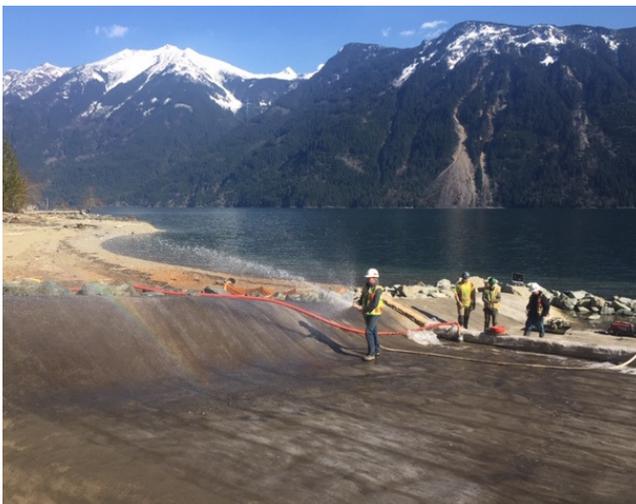


# TITAN TIMES

2020 YEAR IN REVIEW



# PROJECT HIGHLIGHTS



01

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## Concrete Canvas® Chosen for Remote Outfall Project in B.C.

This summer, 500 sq. m of 13mm bulk roll Concrete Canvas® (GCCM) was used to line an outfall at Harrison Lake, B.C. The installation was completed by Kingston Construction. The project was located in a remote area with no road access, therefore a barge was used to transport the CC bulk rolls and supplies to the site. This specific project hinged on the lake water levels, meaning the installation could only take place once lake water levels dropped to a predetermined point, adding to the installation challenges. Site prep work included clearing the existing outfall of all debris, compacting the substrate, and installing lock blocks around the perimeter of the outfall. An excavator was used to dispense the CC bulk rolls. Once the rolls were unrolled and laid, both ends were secured with an anchor trench. The strip joints were then sealed using Soudaseal sealant and secured using 20mm screws at 200mm intervals along the overlaps.

Finally, CC was hydrated utilizing the lake water. Once completely hydrated, rip rap was strategically placed on top of the CC to act as a ballast where it meets the lake. CC was the clear choice for this project due to the logistical simplicity given the limited site access, its ease of installation, rapid installation rate and performance longevity (120-year design life).



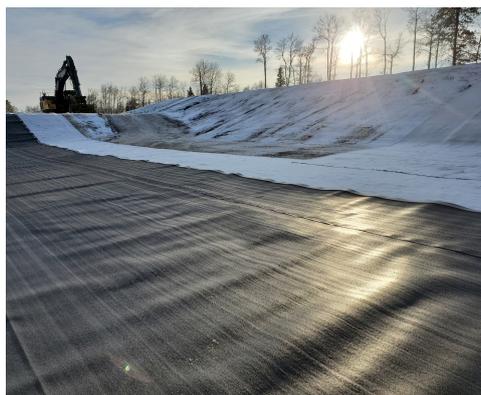
## Cold Weather Installs..... No Sweat!

Surprise winter weather didn't stop our crew from completing a multi-layer lining project in rural Saskatchewan. The installation included supply and installation of a conductive liner, Geosynthetic Clay Liner (GCL), geocomposite and geotextiles. Our team battled through the snow and came out on top, wrapping up the project on time!



Despite the cold and short daylight hours our crew rose to the challenge again to successfully complete another winter project in Rocky Mountain House, Alberta, where we supplied and installed a geosynthetic lining system that needed to be tied in to an existing cell. The lining system consisted of GCL, geocomposite and 60mil HDPE geomembrane.

Jobs well done!

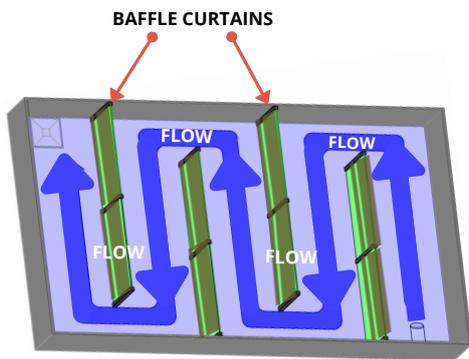


03

## Geomembrane Fabrication - Yes We Can!

Something that makes Titan unique is our ability to both supply and install product and also custom fabricate geomembrane panels for projects. This year we were happy to work on an underground water treatment facility upgrade project in Fort McMurray, Alberta. This involved putting a baffle curtain system in place to increase the wells water capacity and improve water treatment. The baffle curtain system works to direct the water through a winding route from the inlet, forcing it to take the longest path to the outlet. This increases the contact time of treatment chemicals with the water to improve the water treatment process.

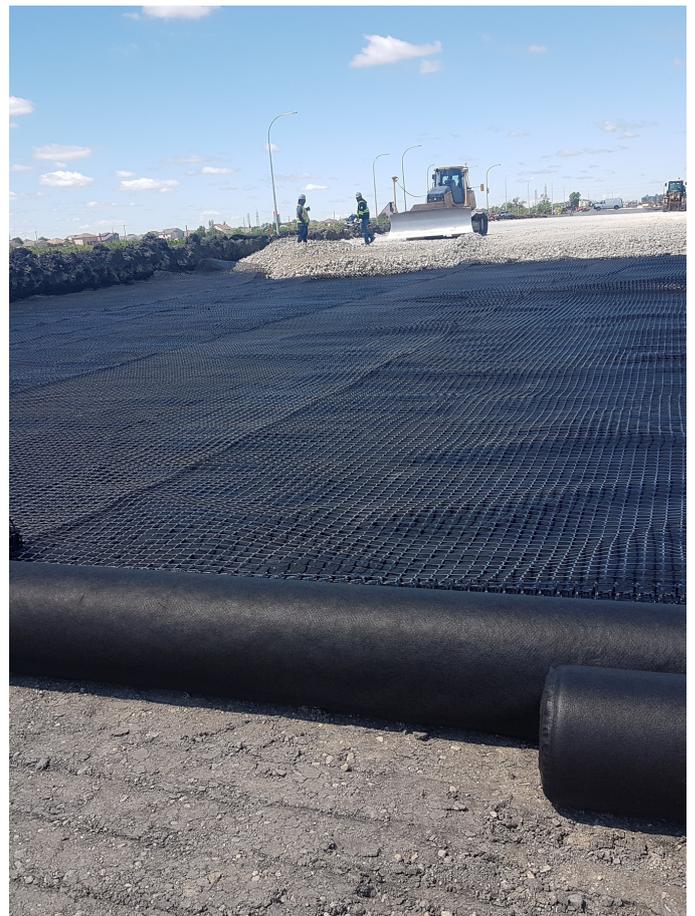
Titan fabricated, supplied and installed the geomembrane panels that formed the baffled curtain system for this project.



04

## Improving Roads in Winnipeg

We are pleased to have been part of the Fermor Avenue road reconstruction project, one of the City of Winnipeg's largest road improvement projects over the last 2 years. Titan supplied geotextile, geogrid, erosion control blanket and straw wattle which were used for over 2 kms of road work.



## Rural Drainage Solution

This Summer, Titan provided a nonwoven geotextile and geogrid solution to reinforce the ground under and over a 1500mm steel culvert that was being installed in a rural Saskatchewan roadway. The idea of this system was to prevent sagging or settling of the culvert. Concrete Canvas® was also used on both ends of the culvert, as an alternate to rip rap, for runoff erosion protection. At the same time it acts as a vegetation barrier keeping the outfall clear.



## Strengthening Agricultural Infrastructure

Sites that see heavy load traffic need soil reinforcement for long-term performance and farmyards are no exception! In Saskatchewan, our nonwoven geotextile and Titan Earth Grid™ was a choice system for base reinforcement of yards frequently trafficked by heavy farm equipment, and as an alternate to concrete slabs as a base for grain silos. In the yard base reinforcement application, the system allows for less aggregate providing upfront costs savings. In grain silo base application, the system allows for ground reinforcement of a much larger area for less money than pouring concrete slabs. It is also faster as there is no curing wait time allowing the grain silos to be set in place and used immediately.



07

## Extending Concrete Life

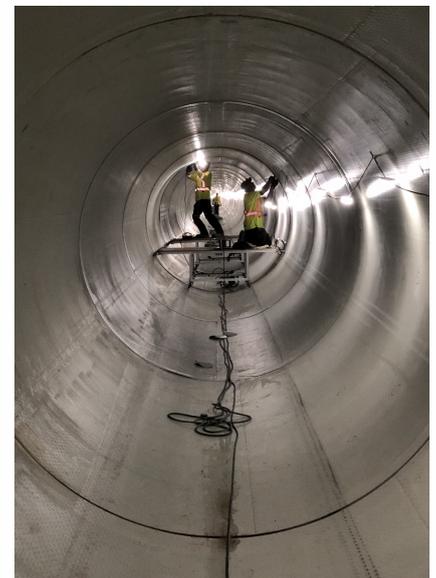
Landfill pumping stations collect leachate gases emitted by landfill waste. These gases are collected in concrete chambers which erode as a result of the corrosiveness of the leachate flowing through. Eventually these chambers need to be completely replaced which is very costly. The Waterloo Landfill was looking for a solution to prevent premature replacement of the concrete cells in their pumping station. Titan supplied and installed concrete protective liner in the walls, ceilings and floors of the pumping station cells. Not only will this lining solution extend the life of these concrete cells, but it is resistant to movement and cracking ensuring higher performance than alternate spray applied coatings, and it can be installed much more efficiently making it a more cost effective.



08

## Microtunnelling in Finland

This fall we had the pleasure of working with Ward & Burke Construction on the Turku Outfall microtunnelling project. The project, located in Turku, Finland, on the Aura River at the mouth of the Baltic Sea consisted of a 804m long, 2.98m diameter tunnel with triple curve built with 4m long lined concrete pipe sections. It was the first microtunnelling project of its kind in Finland. Titan repaired port holes and capped over 200 joints throughout the pipeline finishing 10 days ahead of schedule—a reflection of our crew's impressive preparedness and depth of experience!



## First Nations Community Drainage Solution

A First Nations Community in Manitoba needed a solution to divert water flow from adjacent wetlands. Compacted clay is the conventional solution for this, however, Titan recommended Geosynthetic Clay Liner (GCL) as an alternate solution. This was a far more cost effective solution since one truckload of GCL replaces 200 truckloads of clay. We supplied the product and provided value added installation site assistance to the contractor.



## Excelling in Ontario!

Coming out of the gates strong we showcased our expertise in geosynthetic installation at The Town of Hanover landfill expansion project. We supplied and installed 3 layers of product including; a 16oz nonwoven geotextile cushion layer followed by a 10oz nonwoven geotextile separation layer and 60mil HDPE geomembrane ovetop. Our crew completed this project 25% faster than expected living up to our well earned reputation for efficiency and quality workmanship.



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## 'Polishing' Off The Job!

This summer, we were pleased to have been selected for a 7,000m<sup>2</sup> multi-layer lining project at a remote mine site in Northern B.C. This involved supply and installation of, a drainage geocomposite, geotextile cushion, and a layer of white HDPE white geomembrane for a biochemical reactor polishing pond and adjacent ditch. We were chosen for this project due to our extensive lining installation experience and our ability to quickly adapt and overcome any installation challenge. The entire install took a total of 5 days to complete. We successfully worked with the client, project engineers, and our field/operations to solve general constructability issues and redesign a pipe penetration.



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## Record-Breaking BGM Installation!

Titan's installation production rate and quality shined again this fall when we were asked to assist with a mine tailings pond lining project in Northeastern Ontario. Our crews installed a record-breaking 9,347 m<sup>2</sup> of Coletanche Bituminous Geomembrane (BGM) in 1 day while adhering to stringent quality control and safety audits. We know our stuff and nothing slows us down to get the job done. Fantastic work by the entire team!



## Titan Geogrid Solution Used in New Zealand Landfill

Landfill capping is a containment practice in the waste management industry aimed at protecting the environment upon closure of a landfill cell. Though there are various methods of construction, landfill capping generally involves covering the landfill cell with a thick layer of clay, followed by a protective geomembrane liner, then a layer of soil overtop as a veneer cover. Occasionally, the soil veneer slides down the slopes and breaks apart because of its weight, but climactic conditions and slope steepness are also contributing factors. When this happens, it puts strain on the geomembrane liner increasing the risk of rupture.

These were real risk considerations in the design of a capping system for a landfill in Queenstown, New Zealand, which featured steep slopes (2.5:1) and was located in an area with high winds funneling through a gorge. Here, Titan TE-UXPET geogrid was used as a veneer reinforcement solution placed directly over the LLDPE geomembrane then covered with 500mm of scalping (a protective stone layer) and 150mm of topsoil mulch. It is working to increase the interface friction between the geomembrane and scalping, so tension is in one direction only—along the length of the geogrid. This is eliminating transfer of stresses across the width significantly reducing the strain on the liner.

"I am glad to see that clients are now recognizing the benefits of using polymeric geogrids for Veneer reinforcement in demanding landfill applications", says Sam Bhat, VP of Global Business Development and CTO of Geosynthetics for Titan. "We, at Titan, are poised to keep on offering our innovative geogrid solutions for various environmental applications".

Not only is Titan's TE-UXPET geogrid mitigating the risk of liner rupture and improving environmental safety for this New Zealand project, but from a design perspective, it also allows for construction of steeper landfill slopes resulting in increased landfill capacity.



# EVENTS

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## Launch of Titan Webinars

We propelled into the webinar world allowing us to connect with you while following COVID safety practices. We delivered a total of 5 webinars, including:

- Geosynthetic Innovations for Mining Infrastructure & Safety
- Geotextiles vs. Geogrids - Dispelling the Myths
- The Many Faces of Geogrid
- Concrete Canvas® 101 - Exploring the 5 W's
- Solving Modern Day Erosion Challenges

All recordings are available on our website [here](#).



## More to come...

More webinars will be delivered by our team and special guests in 2021! Our first webinar will be:

**January 27, 2021 - The Science Behind Walls and Slopes.**

**\*\*Additional details and registration available on our website in early January 2021.\*\***



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## Joint Videocasts

Thanks to the MSTA for having us on 'The Dig' videocast episodes focusing on mining innovations.

If you missed these, catch them here! (Click videos on left).



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## NEW Product Launch....Coming Soon!

Stay tuned for a new product launch in early 2021!



# FEEL GOOD MOMENTS

17

## Titan Tots!

Our Titan family is growing! Congrats to:

- Derek Bishop , CFO, on the birth of his 3rd child, Bowie.
- Eugene Almeria, Estimator, on becoming a grandpa for the 1st time to Alexis Faith
- Lucky Montierro , Operations Manager, on baby #3 coming in April.
- Danika Funk, Corporate Analyst, on baby #2 coming in March.
- Rebecca Spitzer , Sales Support Coordinator, on baby #1 coming in March.

# Congrats

## Making it official!

Congrats to Taylor Audet in Human Resources on her engagement!



Derek &amp; Family



Eugene - Alexis Faith



Lucky &amp; Family



Danika &amp; Family



Taylor &amp; Grant

18

## New Titans!

We welcomed new Titans to the **team!**

Janique Gosselin (Manitoba) - Accounts Payable Associate

Darcy Hume (Alberta) - Inside Sales

Danny Brick (Alberta) - Territory Representative

## Promotions!

Congrats to the following Titans on their promotions and new roles:

Chantal Hebert (Manitoba) - Inventory Accounting Analyst

Danika Funk (Manitoba) - Corporate Analyst

Darcy Maynard (Manitoba) - Construction Accounting Analyst

Christine Dupuis (Manitoba) - Inside Sales



# FEEL GOOD MOMENTS

19

## Giving Back!

It's the time of year for giving and spreading cheer!

Titan is proud to give back and help light up the 2020 holiday season by supporting 'Dinner for a Senior'. This initiative is providing Christmas dinner for many in our community who won't be able to be with family or friends this year. We are pleased to make a difference in a year that has been difficult around the world.



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## Jumping On the 'ODR' Bandwagon for COVID Wellness

Shout out to our Shop Manager, John Dark, and our Yard Coordinator, Jordan Hogan, at Head Office in Manitoba for setting up this awesome ODR (outdoor rink) on our pond as part of a COVID wellness initiative to help Titan staff and families keep active during closures of recreation facilities. The outdoor rink is being enjoyed by all during health breaks and on evenings and weekends, while following COVID safety rules.



# R & D Activities

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## University of Waterloo - NSERC Alliance (3yrs)

We are thrilled to announce that NSERC has awarded us a 3-year alliance research project with University of Waterloo titled **'Evaluation of geosynthetic reinforced pavements by field and laboratory testing, integrated with thermo-hydro-mechanical modeling.'** Titan has partnered with the Center for Pavement and Transportation Technology (CPATT) at the University of Waterloo (UW) in a novel project for the development of high-performance pavement geosynthetics. Titan's innovative Freeze-Thaw Super Grid™ will be used in the lab and field testing. In the Canadian context, climate factors such as temperature, frost and thaw actions and moisture are the primary cause of pavement deterioration, so the biggest challenge for Titan is how to optimize its products in design and application to effectively mitigate the climate impacts.

## Concordia University Montreal - NSERC (CRD)

This year Titan's R&D team continued to work for the Collaborative Research Development (CRD) NSERC program for the study of **'Novel Sustainable In-Situ and On-site Geotextile Filtration Method for Eco-Remediation of Lake Waters'**. Very encouraging results were obtained from both for Lake Caron and Lake Johanne studies. For the lake Caron In-Situ experiments were conducted. The results revealed a significant phosphorus removal as well excessive cyanobacteria/algae development in filtration area was restricted. Titan developed a new prototype woven geotextile with higher. Apparent Opening size of 700 microns to be a part of the hybrid filter configuration expected to allow maximum removal of the containments. The used geotextiles of 2019 have been sent to 3rd party laboratory for testing as an attempt to foster recycling and facilitate sustainability.

## University of Saskatchewan - Saskatoon, SK NSERC (CRD)

This research project titled **"Durability and performance of bituminous geomembranes,"** is progressing with the UFS. This two-year Collaborative Research Development (CRD) project will incorporate a detailed program of evaluation of the performance, and durability of several bituminous geomembrane (BGM) products under conditions of high vertical load, with significant point loading resulting from aggressive natural and recycled aggregates, including tire-derived aggregate (TDA) which is widely used in Western Canada. Ultimately, this will enable design engineers and others to consider and compare the relative merits (and disadvantages) of BGM's with those of polymeric geomembranes. Cold (and warm) weather durability is a key consideration for applications in Canada.

## McGill University - Montreal QC (Mltacs Accelerated Program)

The research Project entitled **'Investigation of Low-Ductility Geogrid Reinforcement for Ground-supported Concrete Structures'** continued this year with more lab experimentation to evaluate the performance of ConForce grid to resist Freeze - Thaw cycles. Temperature-controlled ASTM tensile tests was conducted on ConForce Grid to investigate material behavior under extreme temperatures ranging from +22 Degrees C to -26 Degrees C. The test results are very encouraging to provide new insights into the potential of using the ConForce grid in reinforced concrete applications in Northern Canada.



# R & D Activities

22

## Queen's University - Kingston, ON - NSERC (CRD)

Titan continued the NSERC collaborative research and development grant project with Queen's University for evaluating the performance of bituminous geomembrane. Physical and Hydraulic Performance of BGMs as Basal Liners revealed very useful results pertaining to leakage in BGM's. Research was also conducted to evaluate the mechanical and chemical degradation of BGM's at higher temperatures of 70 degrees C. Other investigated areas were the BGM seams performance and Interface shear Strength of BGM's with various types of Subgrades. Diffusion characteristics of BGM's were also studied this year to understand the penetration of various aromatic contaminants like Benzene, Toluene, Xylene into BGM layers.

NSERC also approved the continuation of Strategic Projects - Group (STPGP) entitled '**Geosynthetic liners for sustainable development of Arctic mineral resources.**' This research will be extremely useful for Canada's Northern Regions in the light of global warming.

## University of Ottawa - Ottawa, ON - NSERC-EGP

Titan's R&D team along with the University of Ottawa research team has been working for the Development of a Geosynthetic Mechanical Stabilization Technique for Road Subgrade in Warming Cold Regions. Titan has developed an innovative Freeze-Thaw SuperGrid for this application. Technical paper abstract titled '**Physical modeling of the geotechnical response to thaw-settlement and performance analysis of geosynthetic-reinforced pavements constructed on sensitive marine subgrade**', was submitted and accepted by GeoCalgary 2020.

## Underground Mine Applications Research

This year Titan successfully produced very high modulus polymeric Mine -Shield grids for roof control, long wall, and high wall screening for Underground Mines. They possess robust flame retardant and anti-static coating. These were tested for Flammability in the accredited 3rd Party testing laboratory in the US and fully passed the UL94 Flammability testing. These innovative products are intended to replace the conventional steel meshes and chain links being used in Underground Mines in Canada with huge benefits. Titan is also getting the Flammability Testing of the innovative Concrete Canvas (Geosynthetic Cementitious Composite Mat) done in 3rd party laboratory in Canada. This product can create a simple yet effective vent closure in remote, hard to-access areas in an underground mine.

## 2020 Technical Papers

### **On-site non-woven geotextile filtration method for remediation of lake water (Accepted for CSCE Conference, 2020)**

Authors: Pereira, Antonio C.1, Palakkeel Veetil, Dileep 1, Mulligan, Catherine N (Concordia University) and Bhat, Sam (Titan Environmental Containment)

### **Filtration for improving the surface water quality of a eutrophic lake (Submitted to Journal of Environmental Management, 2020)**

Authors: Dileep Palakkeel Veetil 1, Esteban Castillo Arriagada 1, Catherine N. Mulligan (Concordia University) and Sam Bhat (Titan Environmental Containment)

[READ HERE.](#)





THANK YOU FOR SPENDING 2020 WITH US.

*Seasons Greetings!*

We appreciate your valued business.

-The Team at Titan-