

# CASE STUDY | Mine Haul Road Application



## Swamp Grid™ 40

### ▼ WHAT:

Mine haul road construction project – Northern Ontario, Canada.

### ▼ APPLICATION:

This application involves the construction of mine haul roads built on compacted clay with blast rock/granite. These haul roads extend into a mine pit providing passage for rock dump trucks weighing several hundred tonnes.

### ▼ CHALLENGE:

The compacted clay with blast rock/granite base course meant that the roads would be unreinforced at the interface of the sub-base and the subgrade, giving rise to lateral movement of particles. This would cause upward movement of the subgrade fines by pumping action resulting in sub-base failure. Repetitive heavy dump truck traffic also meant that heavy dynamic loads would be concentrated over the weak subgrade resulting in higher differential settlement.

### ▼ CONVENTIONAL SOLUTION:

The conventional solution for this challenge would consist of using 1.0m of compacted crushed rock backfill (aggregate base) over the compacted clay subgrade.

### ▼ TITAN SOLUTION:

Considering the characteristics of the subgrade soil in this scenario, both reinforcement and separation functions were important for optimal road performance. To ensure this, Titan proposed a solution which consisted of our Swamp Grid™ 40 installed at the bottom of the aggregate base layer.

Swamp Grid™ 40 is a biaxial geogrid bonded to a 200gsm continuous filament nonwoven geotextile by a precision heat bonding process. The geogrid acts as reinforcement, whereas the geotextile works as a soil separator and filter to prevent contamination of the aggregate base by fines from the subgrade. This allows for better drainage of the sub-base which helps maintain stability of the soil structure.

In addition to its effective soil reinforcement, drainage, and filtration functions; Swamp Grid™ 40 allows for thinner aggregate base and makes it easier to place and compact aggregate base. Furthermore, it minimizes the loss of aggregate into the soft subgrade during construction and prevents penetration of individual aggregate particles into the soft subgrade under repeated traffic loads.

This solution provided our client with significant cost savings by allowing them to use far less aggregate base (0.7 m thick vs. 1.0 m) while helping to reduce impact on environment.

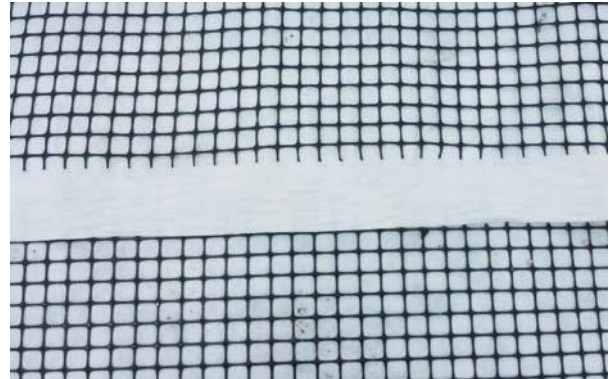
*Continued on page 2.*





## PRODUCT DESCRIPTION:

Swamp Grid™ 40 is a bi-axial polypropylene (PP) geogrid bonded to a continuous filament nonwoven geotextile separator by a precision heat bonding. It is manufactured using a punching and drawing process whereby the polypropylene sheet is stretched in two directions, machine (longitudinal) and cross-machine (transverse). The result is a monolithic and isotropic geogrid with thick and wide ribs, thick integral nodes, and uniform square apertures. The ribs have a high degree of molecular orientation continuing in part through the mass of the integral node. Swamp Grid™ 40 geometry allows for strong mechanical interlock with soil particles and features high tensile stiffness at low strains to resist construction damage, environmental exposure.



This geogrid product is ideal for combined soil stabilization/reinforcement applications. The geogrid enhances the structural performance of pavement by increasing the Layer Coefficient Ratio (LCR), while the nonwoven geotextile effectively keeps expensive imported material from being contaminated by the migration of fines from the saturated base soils.

It is engineered to be mechanically and chemically stable in aggressive soil environments and formulated to resist UV degradation. It is also not susceptible to hydrolysis, environmental stress cracking and micro-organism attack.

## BENEFITS:

- Reduces granular base course thickness = \$\$\$ SAVINGS
- Prevents migration of rock into the clay.
- Provides higher compaction of aggregate base.
- Improves drainage.
- Controls differential settlement.
- Minimizes carbon footprint.

## PROJECT HIGHLIGHTS:

**Project:**

Mine Haul Road

**Location:**

Northern Ontario

**Installation:**

August 2016

**Product Solution/System:**

Swamp Grid™ 40 bi-axial composite geogrid

**Product Supplier:**

Titan Environmental Containment Ltd, Manitoba, Canada

*\*(Supplied the products and offered design service and technical guidance).*

Contact us for more information:

TITAN ENVIRONMENTAL CONTAINMENT

Toll free: 1-866-327-1957 / Email: [info@titanenviro.com](mailto:info@titanenviro.com) / Web: [www.titanenviro.com](http://www.titanenviro.com)

TRUST. QUALITY. VALUE