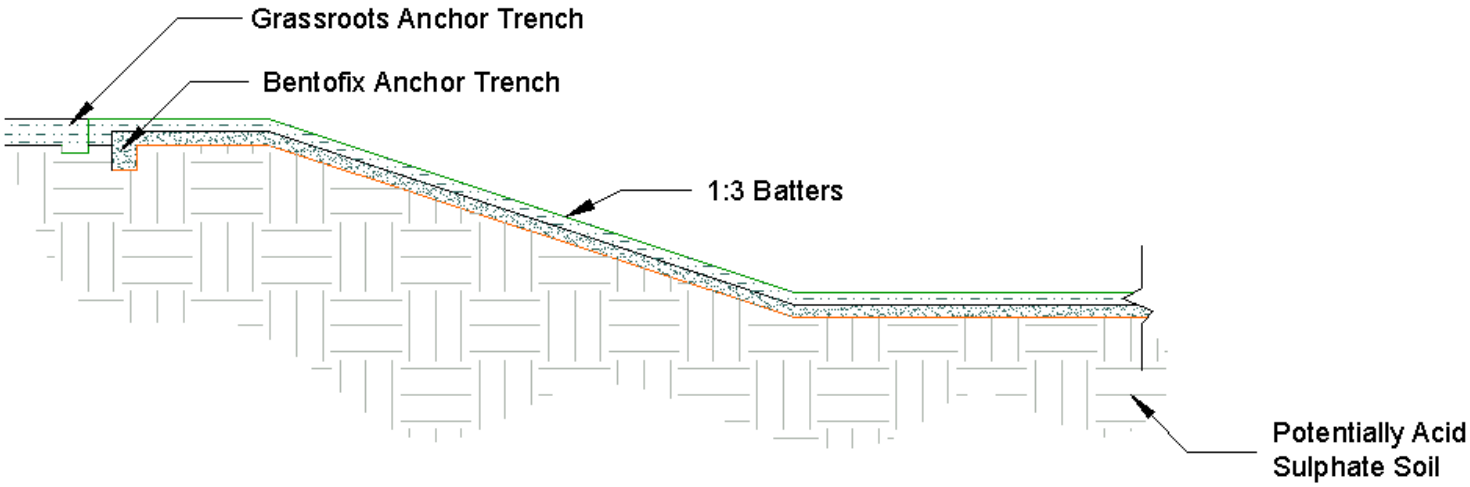
MINING
CASE STUDY

GEOFABRICS
Smarter Infrastructure

Collinsville Mine

Stream Diversion Channel Liner and Erosion Control

Proposed Lining System and Erosion Control



CHANNEL BED DETAILS

Channel Liner:-

The Bentofix X1000 liner suggested for use in the stream diversion channel. Bentofix is a Geosynthetic Clay Liner and provides a low permeability barrier to prevent infiltration of water and oxygen diffusion into the potentially acid sulphate soils below the channel. The Bentofix X1000 liner is constructed using a bentonite clay core surrounded with non-woven and woven geotextiles. This material requires a 300mm layer of protective material between this layer and the ground surface level.

Compacted Gravel/Road base Layer:-

The layer acts as a confining and erosion protection layer. It prevents excessive swelling in the Bentofix and also protects it from erosion due to the stiff and durable nature of compacted road base material.

Erosion Protection:-

The expected flows in the channel could possibly be as high as 3m/s, indicating the need for erosion controls measures. Grassroots, a turf reinforcement product has been suggested for use in this situation.

To promote vegetation growth on the Grassroots protective layer a 25mm cover of seeded soil or hydro mulch should be applied onto the Grassroots.

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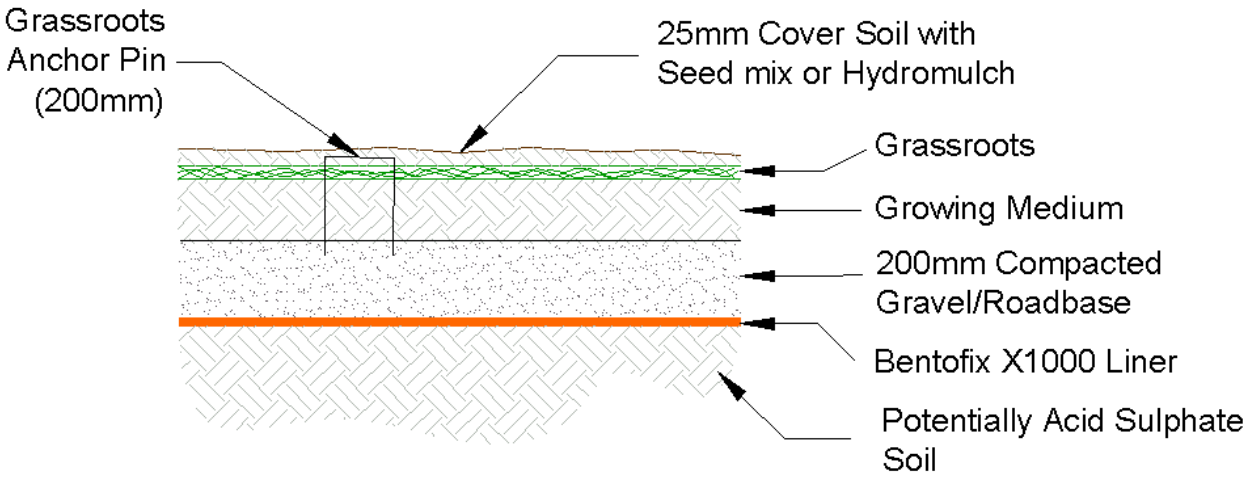
Channel Layout

The channel layout including the low permeability Bentofix X1000 GCL, a ~200mm

gravel/road base drainage and protection layer, a compacted soil layer for liner cover, the Grassroots erosion control mat and the thin top soil vegetation layer as recommended is displayed below.



TYPICAL INSTALLATION

(NTS)

Potentially Acid Sulphate Soil:-
This sub base layer as indicated in the supplied information has the potential to cause the creation and seepage of sulphuric acid with the inflow of excess water, indicating the need to restrict the flow of water into this medium.

Bentofix X1000 GCL:-
This low permeability liner is used to prevent the seepage of water into the sub soil.

Compacted Road base/Gravel:-
This layer, used for confining and protection of the Bentofix layer should have the specification that it should be a free draining, high quality granular material containing predominantly 5-50mm diameter particles, at a minimum depth of 200mm.

Growing Medium:-
If required, this layer increases the liner cover layer to a minimum of 300mm and also acts as a root base for vegetation growing on the Grassroots erosion control.

Grassroots:-
This is an erosion protection layer, capable of withstanding flow velocities up to 5m/s once a sturdy grass root base is established

Cover soil:-
This small layer is required to encourage vegetation to grow quickly.

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Bentofix Installation

- Prior to the installation of the Bentofix liner, the subgrade should be prepared. This involves the construction of the desired slope geometry, compaction, removal of potentially damaging materials and final smoothing of the slope.
- To install Bentofix, a steel bar is inserted through the core of the roll and suspended from a loading frame.
- Bentofix can then be dispensed in a controlled manner in the desired location.
- Panel are kept stable on steep slopes in an anchor trench (see page 6).
- The next roll can then be installed in a similar fashion, overlapping to the clearly marked line on the previous roll, no physical jointing or welding is necessary.
- Once the Bentofix has been installed, a minimum cover soil of 300mm is required before the liner is hydrated.
- A detailed installation guide is available from Geofabrics .

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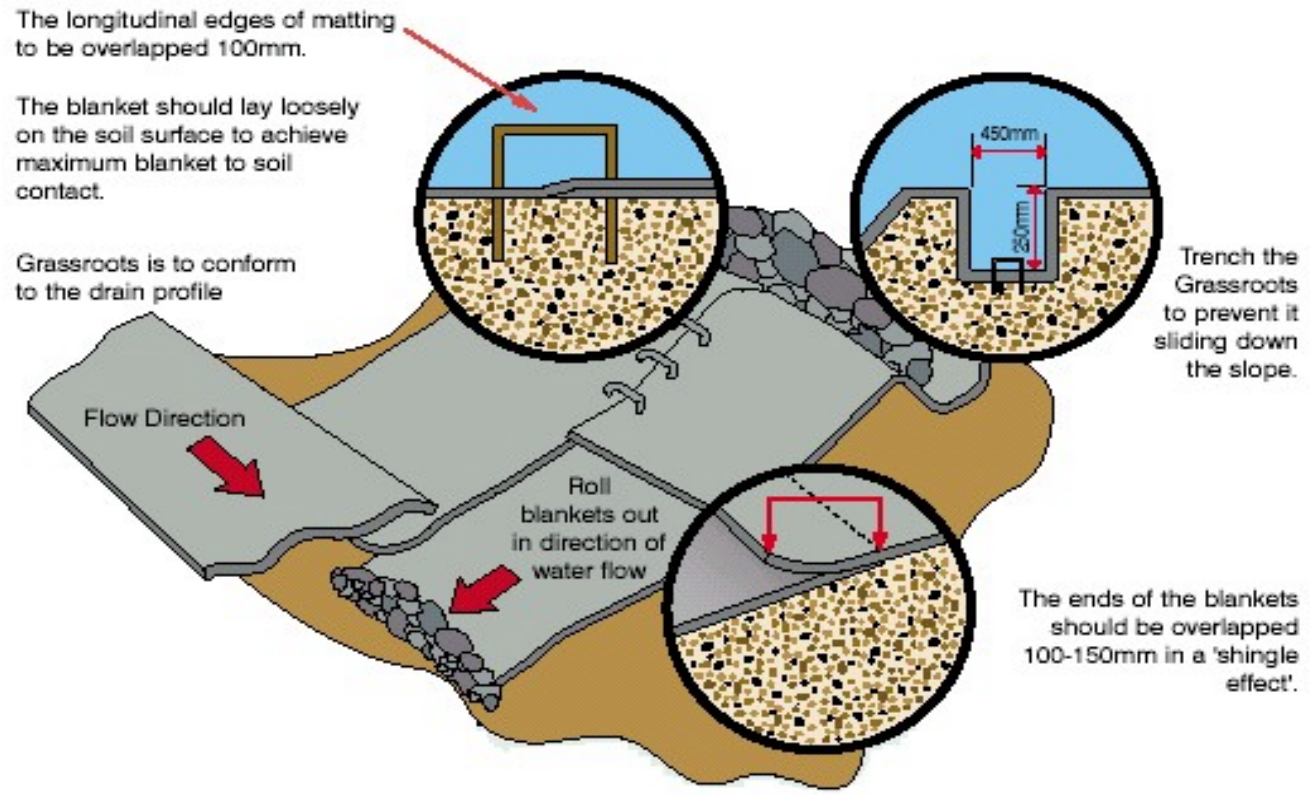
Grassroots Installation



Typical guidelines for installation of Grassroots

- Installation of Grassroots is a straight forward process, involving:
- Shaping and compacting the subgrade to the required profile. Enrich the soil if existing subgrade material is poor.
- To install Grassroots, unroll the product either down the slope or along the channel.
- Locate with steel pins as required (typically 1 pin every metre max, both directions)
- Trench the Grassroots at the top of the embankment
- Burial and trenching of appropriate edges is required to ensure no uplift of the edges.
- If required, cover with small layer of top soil and seed or hydro mulch

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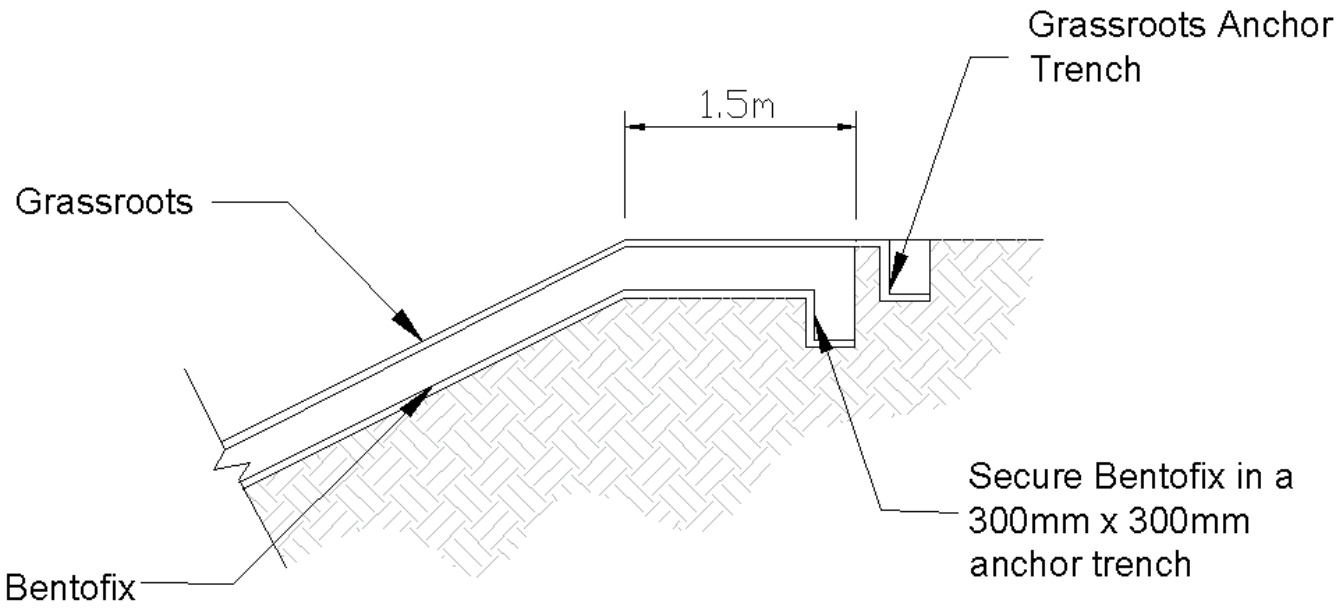
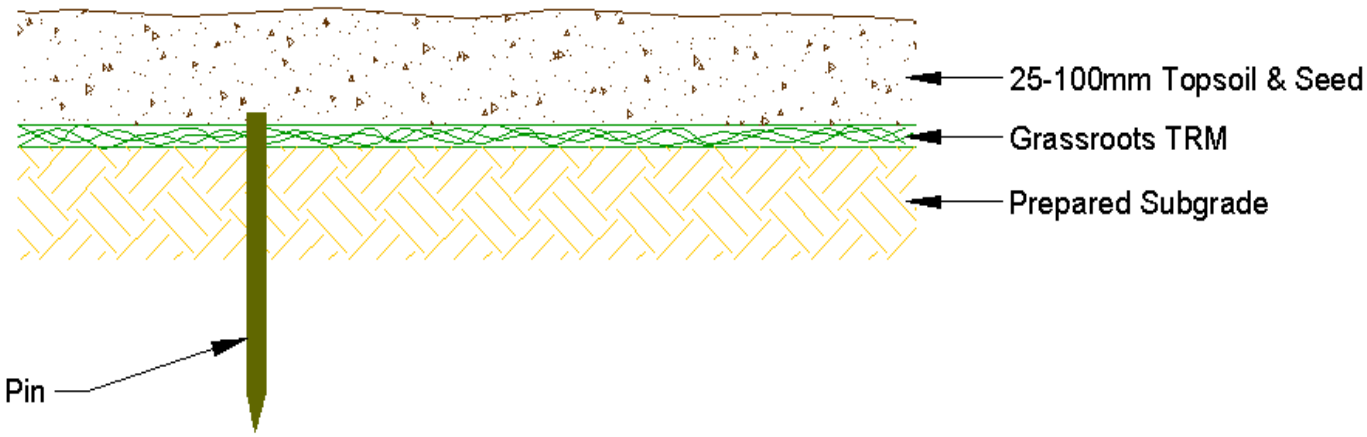
Anchor Trench Details

Fixing the geosynthetics into place involves installing anchor trenches at the top of the slope to prevent the material sliding down the batters. The suggested details are displayed in the diagrams below. This method is sufficient for the Bentofix liner as it also has a 300mm cover of compacted material, but to increase the stability of the slope under high water flow conditions the Grassroots should be pinned with anchor pins at regular intervals.



TYPICAL ANCHOR TRENCH



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