

Geotextile revetments

G-15.2

Geotextile or sand bag revetments provide an alternative to traditional seawalls and rock revetments and may be more appropriate in some circumstances. Geotextile sand bags can be used to increase the stability of eroding foreshores in much the same way as other prefabricated armour units. Geotextile sand bags have been used successfully to create buried revetments, seawalls and groynes in other Australian states. They are suitable for most shoreline erosion applications where a rock revetment might also be considered.

Thorough planning and specialist advice are essential. Managing problems after construction is more expensive than dealing with them in the planning stage. All revetment works must meet legislative requirements and may require approval from a number of agencies. An assessment of the proposed activity will determine the level of environmental harm.

Use these guidelines in conjunction with the information provided in Chapter 15 when planning works and engaging consultants and contractors to ensure the proposed works use the most effective methods and minimise the risk of causing damage to coastal values.

When to use a geotextile revetment

Geotextile revetments can be suitable for most shoreline erosion situations where a rock revetment would normally be used. They provide a softer finish and will often become covered in sand in sandy environments.

Visually they work best with sandy environments. They have been used to provide soft step accessways in some sandy coastline situations in other Australian states.

Geotextile revetments require a similar degree of back preparation to rock revetments and the large footprint means they should not be used in sensitive coastal environments where there will be an unacceptable loss of natural or cultural values.

Approvals

Approval and permits will be required. All works on Crown Land which includes all land below the high tide mark will require approval from Crown Land Services. A planning permit from the local council will also be required. Other approvals and permits may be required seek advice from DPIPWE.

Environmental and cultural considerations

Rock revetments require disturbance of the shoreline and as such have the potential to impact on vegetation communities, wildlife habitat, Aboriginal and maritime heritage values, threatened species and marine life and habitats. In most cases an Environmental Management Plan will be required to address these issues.

It is important to identify all natural values that may be affected. Seek advice from specialists. Vegetation and fauna assessments may be required.

It is important to identify all cultural values that may be affected. Contact Heritage Tasmania and Aboriginal Heritage Tasmania, a desktop search will determine if an assessment and permit are required.

Disclaimer

Any representation, statement, opinion or advice, expressed or implied in this publication is made in good faith, but on the basis that the Department of Primary Industries, Parks, Water and Environment its agents and employees are not liable (whether by reason of negligence, lack of care, or otherwise) to any person or for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation or advice referred to herein.

Revetment design

Revetments must be designed by an experienced engineer in consultation with a coastal geomorphologist. Revetments can cause erosion problems, be ineffective or impact on visual amenity and recreational spaces if poorly designed or sited.

Consider the attractiveness of the structure and foreshore access in design.

Design must consider a thorough analysis of the site and the coastal processes in the context of the expected life and maintenance regime of the structure. Geotextile manufacturers will provide generic designs.

Ensure engineering considers the following coastal processes in design:

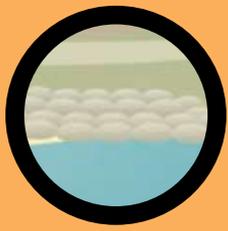
- Types of wave action, i.e. swells or wind driven waves
- Current and future water levels (taking into account sea level rise, storm surges and king tides)
- Direction and speeds of currents
- Water flows (runoff) from the land

Climate change and sea level rise predictions based on Intergovernmental Panel on Climate Change (IPCC) predictions must be incorporated into the design. Consider not just elevated water levels but inundation, and increased wave energy and storminess.

Materials

The geotextile materials are provided by the manufacturer.

Sand is required to fill the bags and water is pumped into the filling frame to create a slurry for filling the bags. Sand should generally be sourced off-site.



G-15.2

Geotextile revetments

Costs to consider

Geotextile product	Labour
Sediment (sand) fill	Engineering
Geotextile filter cloth	Assessments
Crushed stone	Supervision
Truck and transport	Excavator

Adapted from *Best management practices for foreshore stabilisation. Approaches and decision-support framework*, Swan River Trust 2009

Installation

Minimise impacts on coastal values during installation.

Schedule works to avoid significant wildlife events such as shorebird and penguin breeding times, fish spawning times.

Schedule works when tides, currents and waves will be most favourable for minimising disturbance and spread of sediments and disturbed materials.

Ensure all works staff and contractors are briefed on minimising environmental impacts and provide adequate supervision to ensure best practice environmental standards are being implemented.

Minimise the amount of excavation of the shoreline and the impacts on adjacent coastal vegetation. Do not dump excavated material onto coastal vegetation.

Rehabilitate disturbed areas as soon as possible.

Monitoring

Follow-up surveys and ongoing monitoring are essential to detect any adverse impacts from the construction works and any unwanted changes to coastal processes as a result of the structure.

Use established photopoints to monitor any build-up or loss of sand and establishment and growth of coastal vegetation.

Monitoring of rehabilitation works is also required.

Example of geotextile sand bag information sheet that is provided by the manufacturer. Revetments must be designed by an engineer in consultation with a coastal geomorphologist.

Maintenance

All revetments should be inspected regularly to ensure they are working as intended.

Geotextile sand bags can be subject to vandalism but repairs are possible and manufacturers often provide repair kits.

Information on the lifespan of the geotextile material is available from the manufacturer but does not refer to the lifespan of the overall structure as this will be dependent on the quality of the installation and design.

Inspections should identify any movement of the sand bags, any damaged bags and/or any scouring or erosion of the shoreline behind the structure.

Inspections are necessary after extreme storm events and very high tides to determine if waves are overtopping the structure.

Ongoing inspections are necessary to ensure the structure is not posing a hazard to the public.

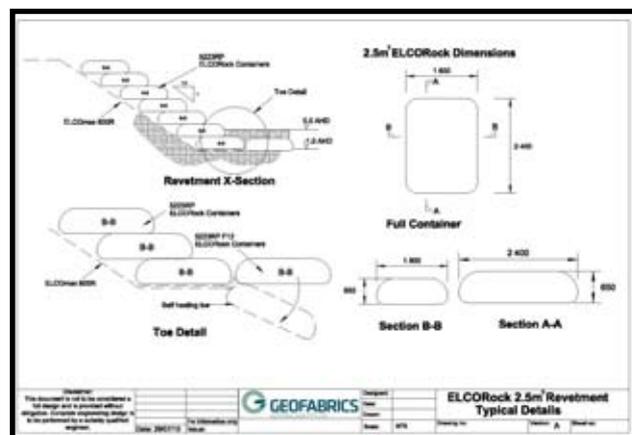
More Information

Tasmanian coastal works manual: Chapter 15, Page & Thorp 2010

Best management practices for foreshore stabilisation. Approaches and decision-support framework, Swan River Trust 2009. Western Australia

Coastal engineering manual, United States Army Corps of Engineers 2002 (Part V Chapter 3 Shore Protection Works)

<http://chl.ercd.usace.army.mil/cem>



Disclaimer
Any representation, statement, opinion or advice, expressed or implied in this publication is made in good faith, but on the basis that the Department of Primary Industries, Parks, Water and Environment its agents and employees are not liable (whether by reason of negligence, lack of care, or otherwise) to any person or for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation or advice referred to herein.