

# Structural Soil

## EROSION CONTROL TECHNIQUE

Revegetation	✓	Temperate Climates	✓	Short-Term	
Non Vegetation		Wet Tropics	✓	Long-Term	✓
Weed Control		Semi-Arid Zones		Permanent	✓

**Symbol** (not applicable)



**Photo 1 – Stage 1: placement of aggregate**



**Photo 2 – Stage 1: fill voids with soil, then seed (non-traffic period)**



**Photo 3 – Stage 1: Establishment of grassed surface (vehicular traffic allowed)**



**Photo 4 – Close-up of established surface**

### Key Principles

1. Structural soils can be incorporated with ground covers (grasses) to produce surfaces suitable for heavy pedestrian and occasional vehicular traffic. The long, non-traffic, establishment time generally makes them unsuitable for construction sites; however, when sufficient establishment time exists, it can be used to stabilise long-term car parks.
2. The key to long-term performance is to avoid compaction of the soil fill, thus the percentage soil fill should not exceed the void volume of the loosely placed aggregate. Void volume can be determined by placing a sample of aggregate in a volumetric (measuring) jar, filling with water to the top of the aggregate, then separately measuring the retained water.
3. It is very important to prevent sediment deposits on the vegetated surface that can compact and damage the vegetation, thus good sediment control measures are required around the treated area.

## Design Information

Typically ..... to .....mm aggregate.

### Aggregate must be near uniform in size (uniform grading) with no fines.

Depth of aggregate is ideally the depth of the root system of the ground cover, but practically a depth of ..... to .....mm should be sufficient.

Ensure that the treated area suitably drains (i.e. good sub-surface drainage) such that waterlogging does not occur that may adversely affect vegetation growth.

Vegetation establishment phase requires **no** traffic movement over a period of around ..to ... months depending on plant growth rate.

## Description

A manufactured aggregate-soil mixture that produces a soil profile resistant to compaction caused by light traffic movement.

Traffic-induced damage to the grass is minimised by preventing compaction of the soil located within the aggregate layer. This in-turn minimised damage to the plant's root system. Soil compaction is prevented by allowing the weight of vehicles to be spread through the soil profile by direct aggregate to aggregate contact.

## Purpose

Stabilisation of vegetated swales, which are occasionally subjected to regular traffic.

Porous pavements that can be used for occasional overflow parking, such as vehicular parking on grassed parks.

Long-term, temporary car parking on construction sites where there is sufficient planning time to allow a 3-months non-traffic vegetation establishment period.

## Limitations

Required a long, non-traffic establishment period of around ..... months. Any vehicular traffic movement during the vegetation establishment period can result in root damage as the aggregate shifts.

## Advantages

Porous surface that can capture and treat many of the pollutants associated with motor vehicles and car parks.

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Well-vegetated structural soils (as shown in Photo 3) can generally withstand infrequent, construction traffic, such as loaded trucks, without damage to the surface or to the vegetation.

Aggregate continues to provide effective erosion control properties even during periods of drought when grass die-back occurs.

## Disadvantages

Long establishment period of ..... months.

Grass within the treated area is most susceptible to die-back (browning) during periods of drought compared to traditional grassed surfaces.

Surface can be subject to grass fires.

## Common Problems

Sediment deposits on the treated surface can result in soil compaction and failure of the plant cover.

## Special Requirements

It is essential for the aggregate to have a near uniform in size with little or no fines. This maximises the potential void volume, thus maximising the volume of soil infill without allowing soil compaction.

Requires good perimeter control of.

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## Location

Grassed surface that may experience regular heavy pedestrian traffic or occasional vehicular traffic.

## Site Inspection

Check for sediment deposits on the treated surface that may compact and damage the vegetation cover.

## Performance Indicators

Check for healthy, continuous vegetation cover.

## Construction

1. Refer to approved plans for location, extent, and application details. If there are questions or problems with the location, extent, or method of application contact the engineer or responsible on-site officer for assistance.
2. Prior to placement of the aggregate, determine the expected void spacing of the loose aggregate, if not already specified on the plans.
3. Spread enough aggregate to completely cover the surface of the soil at the density or thickness specified in the approved plans. If the application density is not supplied, then apply at a thickness of at least 150mm.
4. Ensure the soil pH is within the specified range.
5. Apply sufficient topsoil to completely fill, but not exceed, the void space within the aggregate. Where conditions allow, the soil and aggregate can be pre-mixed before placement.
6. Using a hand or machine broadcast method, apply one-half the specified quantity of seed while moving back and forth across the area using a uniform pattern. Then apply the remaining half the same way, but moving at right angles to the first pass. Cover broadcast seed by raking or chain dragging, then firm the surface with a roller to provide good seed contact.
7. Even out (level) any disturbances in the aggregate that have occurred during the topsoil and seeding process such that the final design levels and surface profile are achieved.
8. Mulch the seeded area as specified in the approved plan.
9. Make all necessary adjustments to ensure run-on stormwater flow is allowed to pass freely across the treated area following its natural drainage path.
10. Where required, establish appropriate sediment controls up-slope of the treated area to prevent sediment deposition on the surface.

## Maintenance

1. Inspect all treated surfaces fortnightly and after runoff-producing rainfall.
2. Check for rill erosion, or dislodgment of the aggregate.
3. If wash-outs occur, repair the slope and reinstall surface cover.
4. If the treatment is not effective in containing the soil erosion it should be replaced, or an alternative erosion control procedure adopted.

### Maintenance of grass

1. Watering the vegetation periodically is essential, especially in the first 7 days after establishment. Use low-pressure sprays because high-pressure jets can wash away the seed and mulch cover.
2. Watering should start immediately after planting. Watering should comply with specifications provided with the approved plan. Generally watering should vary according to weather and site conditions. A typical watering schedule may consist of the following:
  - 25 mm every second day for the first three waterings;
  - 10 mm twice a week for the next three weeks; and
  - 25 mm once weekly for a further two weeks.
3. Monitor site revegetation, particularly after rainfall, and appropriate maintenance and/or amendment to ensure that the revegetation is controlling erosion and stabilising soil slopes as required.
4. Areas must be re-seeded and mulched if the vegetation fails to establish or is damaged by runoff or construction activities.
5. If the temporary vegetation cover or erosion control measure (e.g. mulch cover) should fail for any reason before establishment of the permanent vegetation cover, then it must be replaced with an appropriate type of cover sufficient to control soil erosion.
6. If the permanent vegetation should fail to establish or to adequately restrain erosion for any reason during the construction or maintenance period, the area should be reseeded.