

Eco-1 Topsoil

POINTS
AVAILABLE

1

AIM OF CREDIT

To encourage and recognise construction practices that conserve the ecological integrity of topsoil on site.

CREDIT CRITERIA

One point is awarded where:

- From the date of site purchase (see Compliance Requirements), to the completion of design/construction, no topsoil was removed from site;
- All topsoil affected by the construction works was separated and protected from degradation, erosion or mixing with fill or waste; and
- 95% of all topsoil on site (by volume) retains its productivity.

This credit is 'Not Applicable' and is excluded from the points available used to calculate the Land Use and Ecology Category Score where:

- No topsoil on site was affected by the construction/refurbishment works; or
- The topsoil on site is inherently non-productive.

COMPLIANCE REQUIREMENTS

Where indicated, the requirements of this credit are to be applied to the state of the site that existed at the date of site purchase. In cases where the site has been owned by the current owner for more than five years (from the project's Green Star registration date), they are to be applied to the state of the site that existed at least five (but not more than ten years) prior to the project's Green Star registration date.

Note that the following documentation, required in the General section of the Green Star submission forms part of the Compliance Requirements for this credit:

Where the site has been owned by the current owner for less than five years (from the project's Green Star registration date):

- Scaled site plans OR aerial photographs generated prior to site purchase (but not more than ten years prior to site purchase), marked up as necessary to be clearly showing:
 - Whether the site was a greenfield or brownfield site, and whether it contained any buildings;

Eco-1 Topsoil

POINTS
AVAILABLE

1

- The footprint area of any buildings that existed on the site;
- The land types that were present on site in accordance with Eco-4 Change of Ecological Value Calculator; and
- The areas that existed in a radius no less than 100 metres around the site.

AND

- Evidence of site purchase clearly indicating the site purchase date and any relevant site attributes.

Where the site has been owned by the current owner for more than five years (from the project's Green Star registration date):

- Scaled site plans OR aerial photographs generated at least five years (but not more than ten years) prior to the project's Green Star registration date, marked up as necessary to be clearly showing:
 - Whether the site was a greenfield or brownfield site, and whether it contained any buildings;
 - The footprint area of any buildings that existed on the site;
 - The land types that were present on site in accordance with Eco-4 Change of Ecological Value Calculator; and
 - The areas that existed in a radius no less than 100 metres around the site.

AND

- Evidence of the fact that the site has been owned by the current owner for more than five years (from the project's Green Star registration date).

Project teams must ensure that the information in the short report is consistent with the information submitted in the General section of the submission, and is referenced clearly.

In order to determine whether or not topsoil on site is inherently non-productive, a report from a suitably qualified professional (see Additional Guidance) is required.

Where topsoil is contaminated and taken off-site for treatment or disposal this credit cannot be achieved. To achieve this credit, topsoil must not be removed from site.

The 'site' is defined by the scope of Green Star assessment. If a development consists of several buildings, the site must be defined for each registered building.

Eco-1 Topsoil

POINTS
AVAILABLE

1

Inherently non-productive topsoil

To remain productive, topsoil must not be covered by permanent hard surfaces. Topsoil that is inherently non-productive may be affected by one or more of the following problems:

- Very poor capacity to store water;
- Excessive salinity, acidity, or alkalinity;
- Very low nutrient availability;
- Poor physical status of surface and subsoil horizons e.g. excessively hard, compact and/or impermeable.

DOCUMENTATION - DESIGN RATING

Submit all the evidence and ensure it readily confirms compliance.
☐ Short report

☐ Extract(s) from the contract

☐ Tender site plan of the project

Where the credit is claimed as 'Not Applicable' because no topsoil was affected by the construction/refurbishment works:

☐ Short report

☐ Tender site plan of the project

Where the credit is claimed as 'Not Applicable' because the topsoil on site is considered to be inherently non-productive:

☐ Short report

☐ Report by a suitably qualified professional

Short report that describes how the Credit Criteria have been met by:

- Quantifying the amount of topsoil on the site at time of purchase, or five years prior to the date of the project's Green Star registration; all assumptions must be justified;
- Describing the scope and extent of the construction works, and how they will affect existing topsoil;
- Where topsoil is present and affected, describing how the integrity of the site's topsoil will be protected throughout construction works;
- Describing, with calculations and references to drawings, the 'before' and 'after' conditions that account for all topsoil on the site, and clearly confirming that no more than 5% of the site's topsoil will be covered by hard surfaces as a consequence of the design, and that at least 95% of the site's topsoil will remain productive;
- Referencing the documentation submitted in the General section of the submission. Projects must ensure that the information in the short report is consistent with the information submitted in the General section and is referenced clearly;
- Where the credit is claimed as 'Not Applicable' because no topsoil was affected by the construction/refurbishment works, stating and summarising why this was the case; and
- Where the credit is claimed as 'Not Applicable' because the topsoil on site is considered to be inherently non-productive, summarising the reasoning behind this determination, and citing evidence from the suitably

Eco-1 Topsoil

POINTS
AVAILABLE

1

qualified professional.

Extract(s) from the contract stipulating the requirements of topsoil management that the contractor and sub-contractors must adhere to, ensuring that the Credit Criteria are met.

Tender site plan of the project, indicating:

- All surfaces in the development, with the hard surfaces clearly identified;
- The original and resulting location of topsoil, quantifying its volume; and
- Where topsoil is separated and stored on-site, the storage location(s).
- Where the credit is claimed as 'Not Applicable' because no topsoil was affected by the construction/refurbishment works, showing the landscaped areas, and the areas affected by the construction works.

Report by a suitably qualified professional

- Stating that the topsoil on site has been found to be inherently non-productive;
- Providing a description of the condition of the topsoil on site; and
- Justifying the determination that the topsoil on site is inherently non-productive.

DOCUMENTATION - AS BUILT RATING

Submit all the evidence and ensure it readily confirms compliance.

☐ Short report

☐ As-built site plan

☐ Confirmation from the contractor

Where the credit is claimed as 'Not Applicable' because no topsoil was affected by the construction/refurbishment works:

☐ Short report

☐ As-built site plan

Where the credit is claimed as 'Not Applicable' because the topsoil on site is considered to be inherently non-productive:

☐ Short report

☐ Report by a suitably qualified professional

Short report that describes how the Credit Criteria have been met by:

- Quantifying the amount of topsoil on the site at time of purchase; all assumptions must be justified;
- Describing the scope and extent of the construction works, and how they affected existing topsoil;
- Where topsoil is present and affected, describing how the integrity of the site's topsoil has been protected throughout construction works;
- Describing, with calculations and references to drawings, the 'before' and 'after' conditions that account for all topsoil on the site, and clearly confirming that no more than 5% of the site's topsoil has been covered by hard surfaces as a consequence of the design, and that at least 95% of the site's topsoil will remain productive;
- Referencing the documentation submitted in the General section of the submission. Projects must ensure that the information in the short report is consistent with the information submitted in the General section and is referenced clearly; and
- Where the credit is claimed as 'Not Applicable' because no topsoil was affected by the construction/refurbishment works, stating and summarising why this was the case.
- Where the credit is claimed as 'Not Applicable' because the topsoil on site is considered to be inherently non-productive, summarising the reasoning behind this determination, and citing evidence from the suitably

Eco-1 Topsoil

POINTS
AVAILABLE

1

qualified professional.

As-built site plan of the project, indicating:

- All surfaces in the development, with the hard surfaces clearly identified; and
- The original and resulting location of topsoil, quantifying its volume.
- Where the credit is claimed as 'Not Applicable' because no topsoil was affected by the construction/refurbishment works, showing the landscaped areas, and the areas affected by the construction works.

Confirmation from the contractor:

- Confirming that no topsoil was removed from the site;
- Quantifying the amount of topsoil covered by hard surfaces as a result of the project; and
- Describing how the Credit Criteria were met during or as a result of construction works.

Report by a suitably qualified professional:

- Stating that the topsoil on site has been found to be inherently non-productive;
- Providing a description of the condition of the topsoil on site; and
- Justifying the determination that the topsoil on site is inherently non-productive.

ADDITIONAL GUIDANCE

Externally Sourced Topsoil

The importation of topsoil to the site does not prevent the achievement of points under this credit, except where such importation compromises the productivity of the existing topsoil.

Projects that substitute topsoil from the site with topsoil imported from offsite, forfeit this credit.

Permanent Hard Surfaces

Permanent hard surfaces are defined as:

- Any permanent structure (e.g. building or car park); and
- Any impervious or semi-impervious surfaces (e.g. hardstands and unpaved car parks).

Stockpiling topsoil

In order to maximise the beneficial effects of the biological and biochemical properties of the site topsoil, it is required to stockpile the soil in layers of approximately 450-600mm for periods of less than 3-4 months. If longer periods are warranted or site constraints do not permit the nominated layering of 450-600mm then the mounding of the site topsoil should not exceed 1200mm high and preferably be for a period of less than 6 months. All site topsoil should be covered with a spun-bonded polypropylene material adequately anchored to the existing ground to prevent erosion of the topsoil by wind or water, as well as to limit contamination by invasive weed species.

Eco-1 Topsoil

POINTS
AVAILABLE

1

All stockpiled site topsoil should be placed at least 2000mm from the outer most projection of the foliage canopy (the tree's drip-line) of existing trees and other vegetation to be retained, in order to preserve the existing roots and soil conditions in an intact and non-compacted state for the duration of the project.

The stockpiled site topsoil should be temporary fenced and have a signage notice attached stating 'Site topsoil to be protected from vehicular entry, no other material to be stored within this fenced area', or similar.

Suitably qualified professional

For the purposes of this credit a suitably qualified professional is a person such as a professional soil technician or agronomist.

Topsoil

Topsoil is the zone of the soil in which most biological activity occurs. It is the upper layer of mineral soil below any fresh or semi-decomposed leaf litter, usually the top 5cm to 20cm though this can vary greatly from site to site. Relative to other soil layers, it has high concentrations of organic matter and microorganisms.

Table Eco1.1: Amounts of Organic Matter in Soils

(Source: Handreck and Black 2010).

Amounts of Organic Matter in Soils	
Topsoil Locations	% of Organic Matter in Soils
Wheat Belt - Cultivated soils	0.5 - 2.5%
Pastures - Long established	5.0 - 8.0%
Natural bushland soils - dry inland	<1.0%
Sclerophyll forests	2.0 - 4.0%
Alpine mountain ash	<25.0%
Tropical rainforest soils	<25.0%

Eco-1 Topsoil

POINTS
AVAILABLE

1

The organic matter content can be determined in accordance with AS 1289.4.1.1, or by any other laboratory procedure (such as a Leco furnace) that has been correlated with the methodology of AS 1289.4.1.1.

In soil classification systems, topsoil is known as the A Horizon. The A Horizon is a surface layer and is described in relation to the deeper soil horizons. When compared to deeper horizons, A Horizons may be darker in colour and contain more organic material. Alternatively they may be lighter in colour but contain less clay or sesquioxides.

The 'A' horizon layer can finish abruptly with a distinctive line or it can merge gradually into the next layer referred to as the 'B' horizon'; these lower layers under the site topsoil are referred to as the 'sub-soil'. The sub-soil may have many layers (horizons) and these horizons are different in colour, texture and structure.

The 'C' horizon is referred to as the 'parent material'. The 'parent material' provides information into the origins of the various soil compositions. The soil layers are formed from rocks and sediments (parent material) as a result of the 'weathering' by physical, chemical and biological processes.

Multiple Buildings Single Rating Guidance

Table Eco1.2: Multiple Buildings Single Rating guidance

Rating	Guidance
Design	No change from existing requirements.
As Built	No change from existing requirements.

BACKGROUND

Topsoil is a valuable and diminishing natural resource in Australia and globally. Jones (2002:1) states that “the most meaningful indicator for the health of the land, and the long-term wealth of a nation, is whether soil is being formed or lost”. The loss of topsoil adversely affects both agricultural production and environmental conservation. Topsoil conservation is important because soil formation is a very slow process. One centimetre of soil takes between 100 and 400 years to develop (Kassam et al., 1992).

In just over 200 years of European presence in Australia, more than 70% of land has become seriously degraded (Flannery, 1994). Despite our attempts to implement 'best practice' in soil management, the situation continues to deteriorate.

Eco-1 Topsoil

POINTS
AVAILABLE

1

At present, building waste within Australia makes up around 40% of all waste generated, and uncontaminated soil represents about a third of this waste (Reardon & Fewster, 2008). In 2004-2005, 110,000 tonnes of uncontaminated soil were disposed of to landfill in Sydney alone (DECC, 2007).

REFERENCES & FURTHER INFORMATION

- Australian Standard, Standards Australia, Homebush, NSW.
 - AS 1289 - 2000 Methods of testing soils for engineering purposes;
 - AS 1289.2.1.1 – 2005 Method 2.1.1 Soil moisture content tests—Determination of the moisture content of a soil—Oven drying method (standard method);
 - AS 1289.4.1.1 – 1997 Method 4.1.1: Soil chemical tests—Determination of the organic matter content of a soil—Normal method;
 - AS1726-1993 Geotechnical site investigations;
 - AS 3743 – 2003 Potting mixes;
 - AS 3798 – 1996 Guidelines on Earthworks for Commercial and Residential Developments;
 - AS 4419 -2003 Soils for Landscaping and Garden Use;
 - AS 4482.1 - 2005 Guide to the investigation and sampling of sites with potentially contaminated soil;
 - AS 4454 -1999 Composts, Soil Conditioners and Mulches.
- Baker, D.E., and Eldershaw, V.J. (1993) Interpreting soil analyses - for agricultural land use in Queensland. Dept. of Primary Industries, Project Report Series QO93014, Australia.
- Bell, L.C. (2004). Construction and Protection of New Soils in Diverse Biogeographic Zones – The Challenge for Successful Rehabilitation in the Australian Mining Industry. In Conserving Soil and Water for Society: Sharing Solutions, Paper No. 402. In Proceedings of the ISCO 2004 - 13th International Soil Conservation Organisation Conference – Brisbane, 4-9 July, 2004. Co - hosted by the Australian Society of Soil Science Inc. (ASSSI) and the Australasian Chapter of the International Erosion Control Association (IECA). Warragul, Vic: Picton, NSW. Australian Society of Soil Science Inc. International Erosion Control Association (Australasia).
- Cross, R. and Spencer, R., (2009), Sustainable Gardens, CSIRO Publishing, Collingwood, Victoria.

Eco-1 Topsoil

POINTS
AVAILABLE

1

- Department of Environment and Climate Change (DECC) NSW (2007), Report into the Construction and Demolition Waste Stream Audit 2000-2005: Sydney Metropolitan Area, DECC, Sydney, Australia.
- Flannery, T. (1994), The Future Eaters: An Ecological History of the Australasian Lands and People, Reed Books, Sydney, Australia.
- Handreck, K., (2001), 2nd ed., Gardening Down-Under A Guide to Healthier Soils and Plants, Landlinks Press, Collingwood, Victoria.
- Handreck, K.A., and Black, N.D.(2010), 4th ed. Growing media for ornamental plants and turf, New South Wales University Press Kensington, N.S.W.
- Isbell, R.F. (1996) The Australian Soil Classification CSIRO Publishing, Collingwood, Victoria.
- Isbell, R.F., McDonald, W.S. and Ashton, L.J. (1997). Concepts and Rationale of the Australian Soil Classification. ACLEP, CSIRO Land and Water, Canberra.
- Jones, C. (2002), Building New Topsoil, Stipa Native Grasses, 'Changing Landscapes' Forum, Armidale Australia, 03 May 2002.
- Kassam, A.H., van Velthuizen, H.T., Mitchell, A.J.B., Fischer, G.W. & Shah, M. (1992), 'Agro-Ecological Land Assessment for Agricultural Development Planning: A Case Study of Kenya', Food and Agricultural Organisation/International Institute for Applied Systems Analysis, Resource Database and Land Productivity, Technical Annex 2: Soil Erosion and Productivity, Rome, Italy.
- McDonald, RC, Isbell RF, Speight, JG, Walker J & Hopkins MS. (1990). Australian Soil and Land Survey Field Handbook (2nd edition). Inkata Press Melbourne.
- Rayment, G.E. and Higginson, F.R., (1992), 1st ed., Australian laboratory handbook of soil and water chemical methods, Melbourne Inkata Press.
- Reardon, C. & Fewster, E. (2008), 'Material Use: 5.3 – Waste Minimisation' in Commonwealth Government of Australia (2008), Your Home Technical Manual, Government Publishing, Canberra, Australia.

For additional information refer to the Management Credit Man-7 'Waste Management'.