



Modular Geo-Void Systems

Total Water Management

Roof Gardens

Water management for Roof Gardens,
Landscaping and Paving

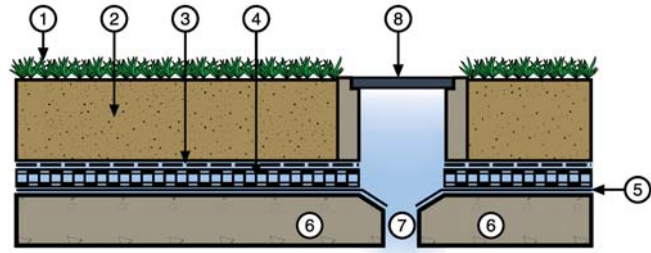


ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

Roof Garden Drainage Systems

Technical Information

- 1 • Turf.
- 2 • Permeable Soil Mix.
- 3 • Geotex.
- 4 • AquaDrain System.
- 5 • Waterproof Welded Sheet Membrane Tuflex.
- 6 • Reinforced Concrete Slab.
- 7 • Water Outlet.
- 8 • Solid Lid on Inspection Pit.
- 9 • Sand Layer



Minimum Soil Depth Over a Concrete Slab

Roof garden soil depth can vary depending on the specific design purpose. The concrete slab must have sufficient load bearing strength to support the soil depth required. Factors such as permeable soil, vegetation, species selection, size and root system behaviour must be considered.

Installation

Step 1.

Waterproof roof area with Tuflex welded sheet membrane.

Step 3.

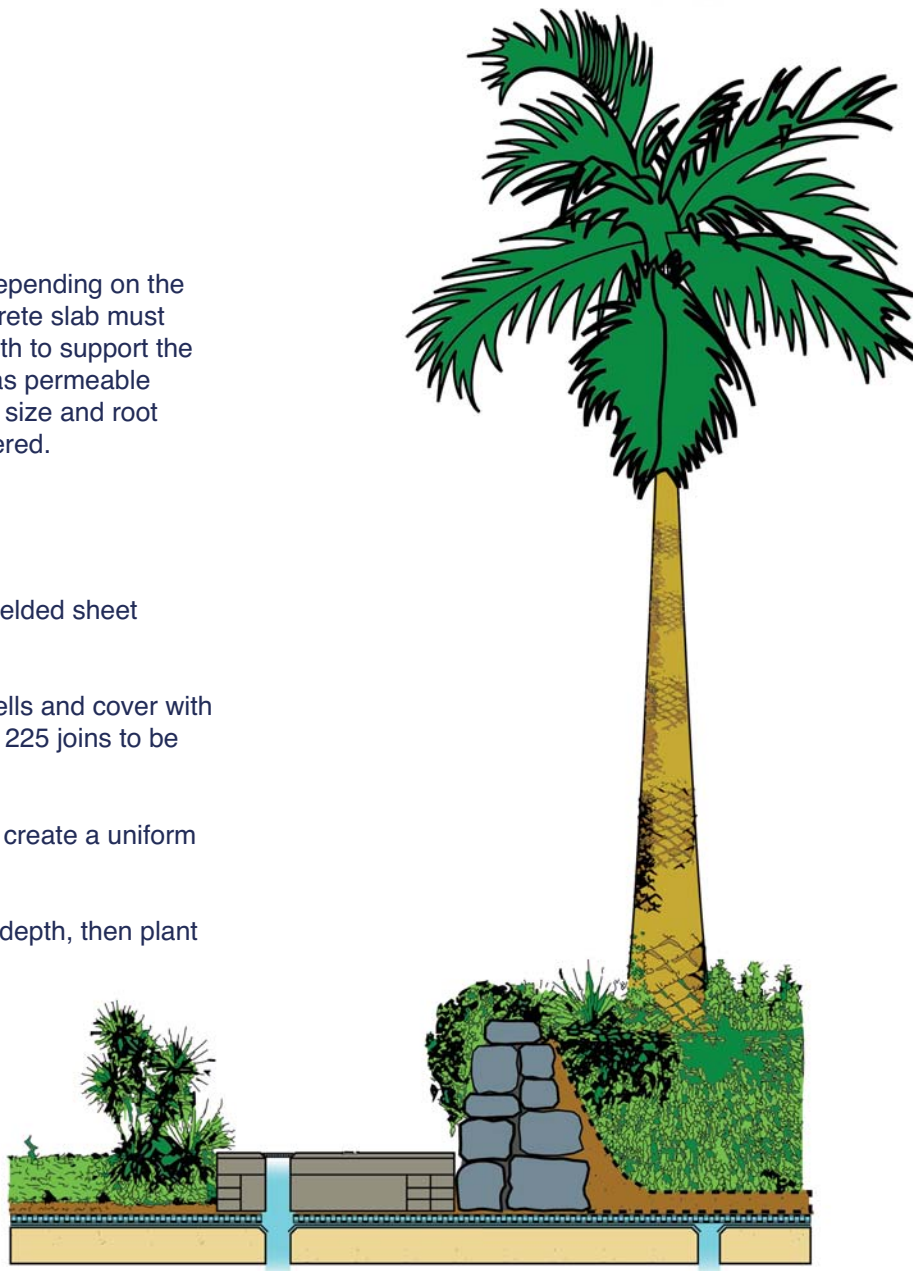
Lay Geo-tex 225 geotextile over cells and cover with minimum 50mm of sand. (Geo-tex 225 joins to be minimum 300mm overlap)

Step 2.

Cover roof area with AquaDrain to create a uniform drainage blanket.

Step 4.

Lay permeable soil mix to desired depth, then plant and mulch as required.



Specification

E.S.S. AquaDrain System

Flow Rate

Compressive Strength

AquaDrain 25 25 x 500 x 500mm

120 L/min

(2000 kN/m²)

AquaDrain 50 52 x 500 x 500mm

180 L/min

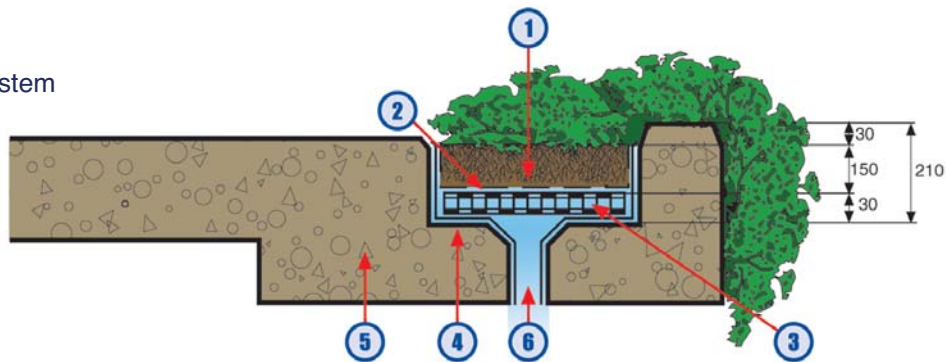
(1250 kN/m²)



Planter Box Drainage Systems

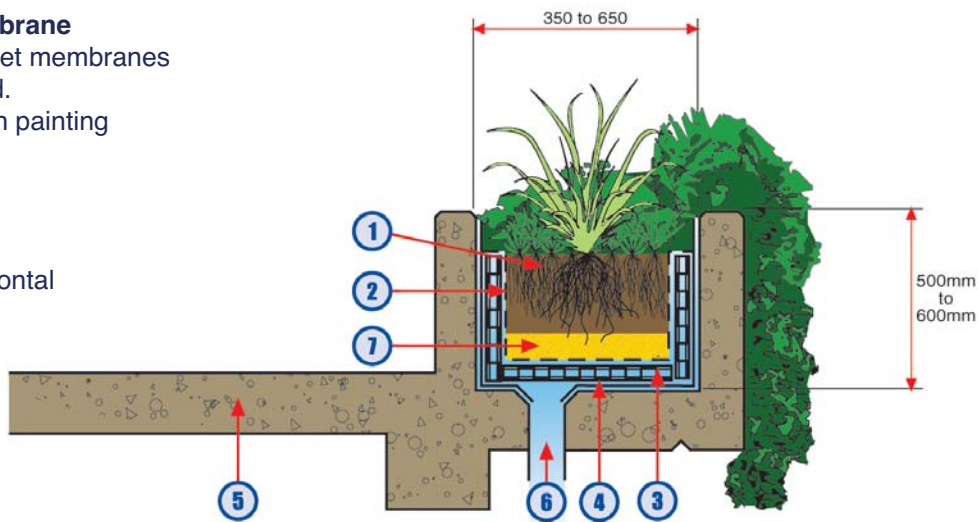
Typical Flower Box Detail

Detail 1
Horizontal Drainage System



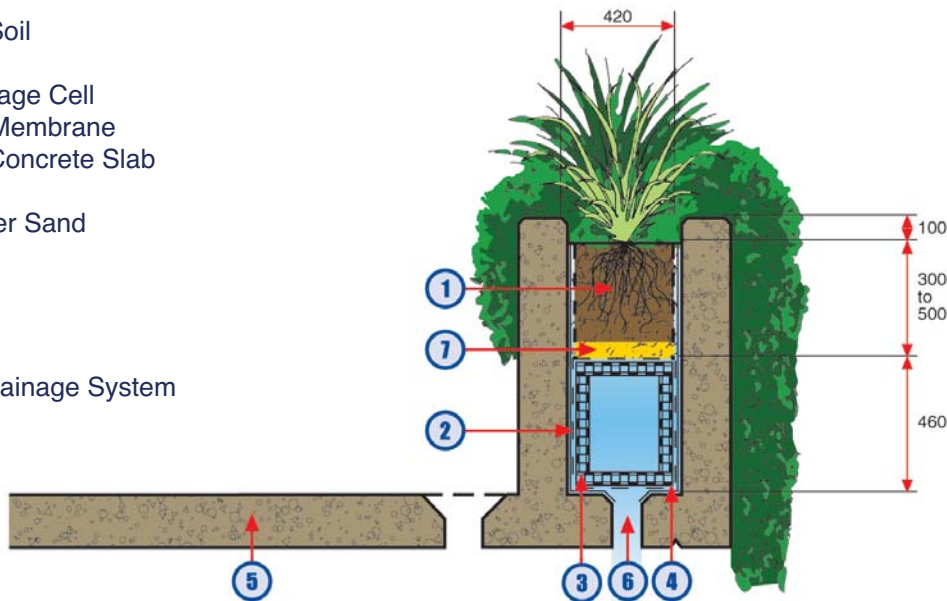
Waterproof membrane
Only selected sheet membranes are recommended.
Avoid use of brush painting waterproofing.

Detail 2
Vertical and Horizontal Drainage System



- 1 Permeable Soil
- 2 Geotextile
- 3 E.S.S. Drainage Cell
- 4 Waterproof Membrane
- 5 Reinforced Concrete Slab
- 6 Water Outlet
- 7 Washed River Sand

Detail 3
Modular Tank Drainage System



Specifications

Crush Strength

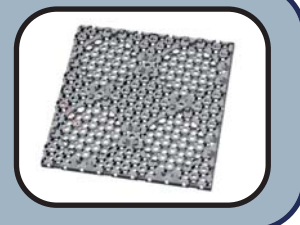
200 Tonnes/m²
125 Tonnes/m²

Flow Rate

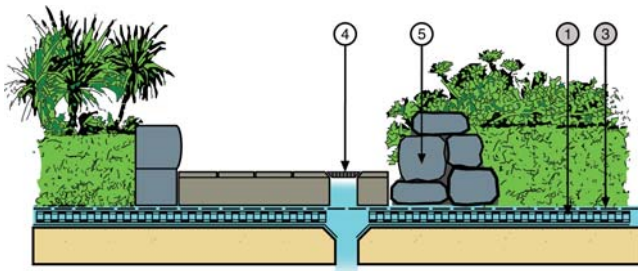
120 L/min
180 L/min

E.S.S. Drainage Cell

25 x 500 x 500mm
52 x 500 x 500mm



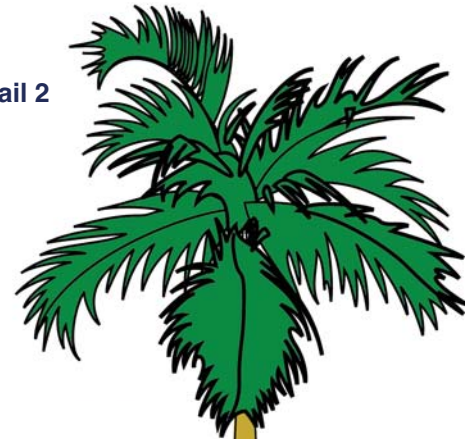
Roof Garden Designs



Detail 1

- ① AquaDrain Cell 25 or 50
- ② 200mm Clean Coarse Sand
- ③ 225gr. Geotextile
- ④ Water Outlet
- ⑤ Rock Retaining Wall Over AquaDrain Cell
- ⑥ 300gr. Geotextile

Detail 2



Water Management in Roof Gardens

During heavy rainfall periods, roof gardens must be able to infiltrate water quickly, hence the horizontal water draining capacity is extremely important.

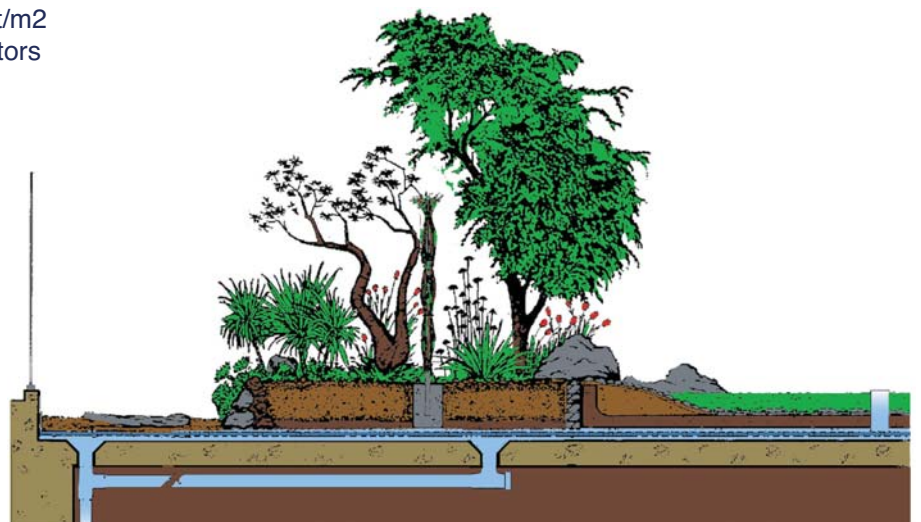
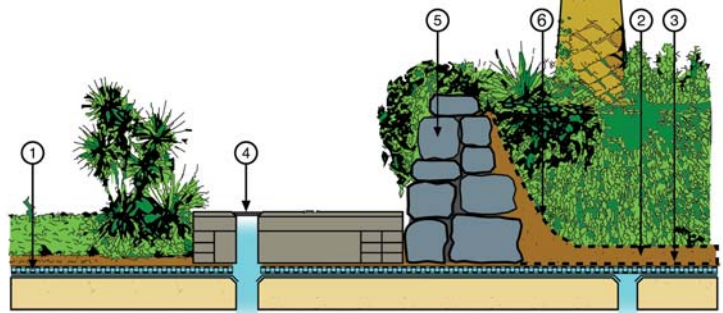
Furthermore, in certain dry periods the ESS Drainage Cell layer can be used as a water reservoir for the plants, providing we use water stored in the soil above the cell, (70 l/m²) while the cell has only air, aerating underneath the soil layer.

Light Weight System

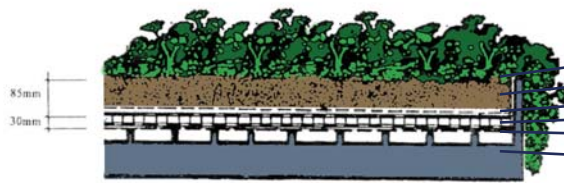
These cells are extremely light approximately 3.5 kg/m². Compared with gravel and foam lava as draining material the low weight is an obvious advantage. In fact, one cubic metre of gravel weighs 1800 kg and one cubic metre of foam lava weighs 1300 kg!

ESS AquaDrain Cells have high compressive strength up to 200 t/m² well above the normal safety factors required in landscaping.

Gardens and ponds can be efficiently built over ESS AquaDrain Cells



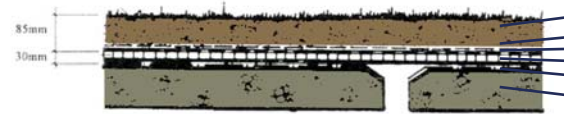
Typical Rooftop Garden



Total depth 115mm

Lightweight garden on metal roof

- 20% recycled compost
- Soil 80% double washed coarse river sand
- Hydrophilic geotextile
- AquaDrain 25 Cell**
- Waterproof membrane
- Metal roof awning
- Garden total weight approx. 56kg/m³



Total depth 115mm

Lightweight garden on minimum soil depth

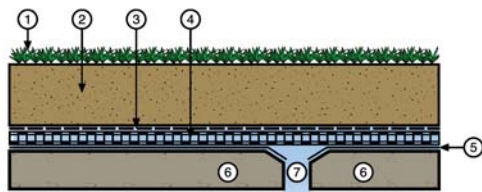
- 20% recycled compost
- Soil 80% double washed coarse river sand
- Hydrophilic geotextile
- AquaDrain 25 Cell**
- Waterproof membrane
- Reinforced concrete slab to engineering detail
- Garden total weight approx. 146kg/m³



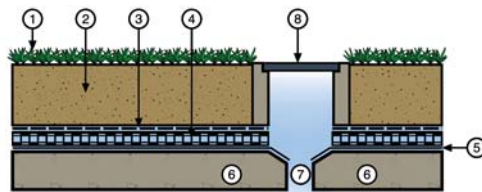
Total depth 130mm

Garden on minimum soil depth

- Suggested lightweight soil mix
- Hydrophilic geotextile
- AquaDrain 25 Cell**
- Waterproof membrane
- Reinforced concrete slab to engineering detail
- Garden total weight approx. 149kg/m³



Sand filling for turf over slab

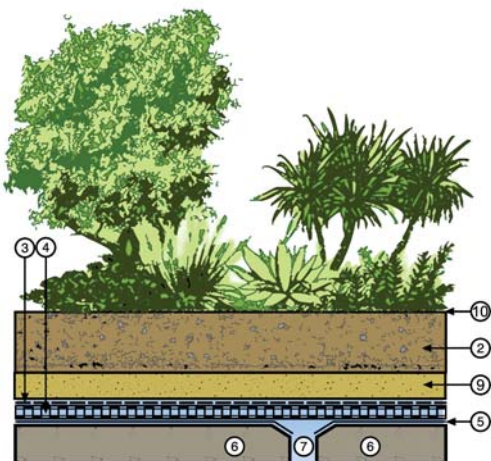


Minimum soil filling for turf over slab and outlet inspection pit.

ROOF GARDEN SOIL PROFILE

Minimum Soil Depth Over a Concrete Slab

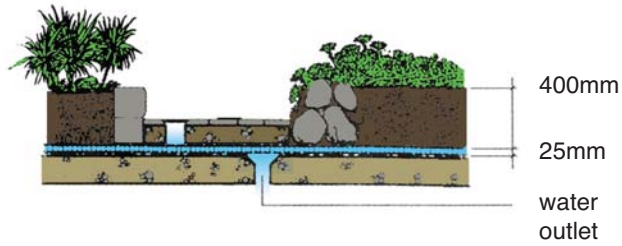
Roof garden soil depth can vary depending on the specific design purpose. The concrete slab must have sufficient load bearing strength to support the soil depth required. Factors such as vegetation, species selection, size and root system behaviour must be considered.



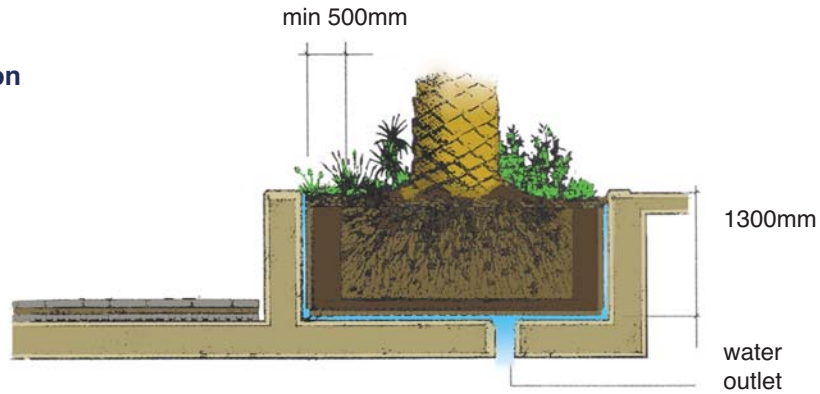
Typical filling for planting area on concrete slab.

- 1 Turf
- 2 Permeable Soil Mix
- 3 Geotex 225
- 4 AquaDrain 25 Cell
- 5 Waterproof Membrane
- 6 Reinforced Concrete Slab
- 7 Water Outlet
- 8 Solid Lid
- 9 Clean Sand
- 10 Mulch

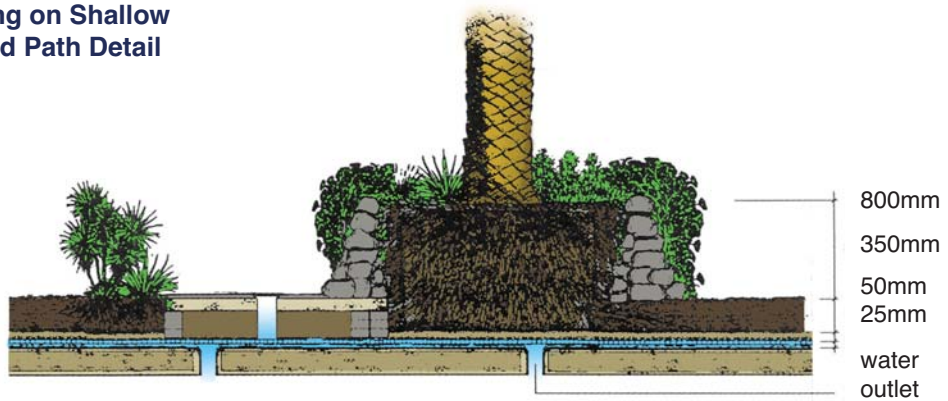
Typical Rooftop Garden



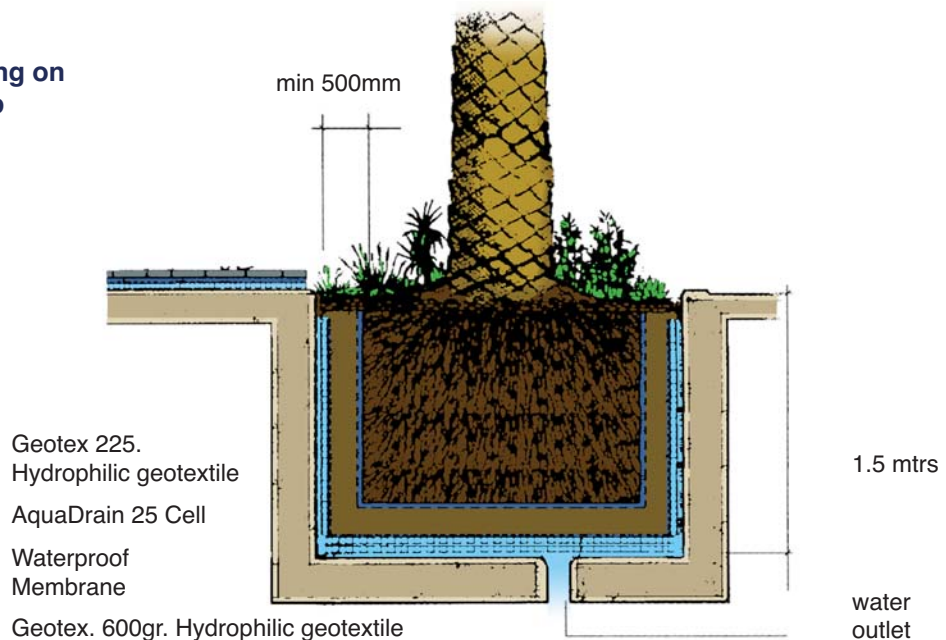
Mature Planting on Concrete Slab



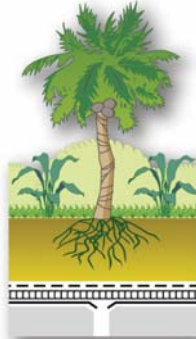
Mature Planting on Shallow Soil Profile and Path Detail



Mature Planting on Concrete Slab



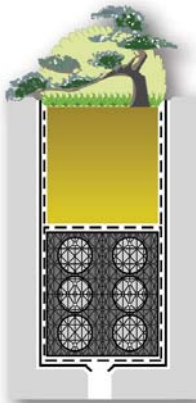
Podium Landscaping & Roof Gardens



Void Filler and Drainage Drainage Under Concrete Slab



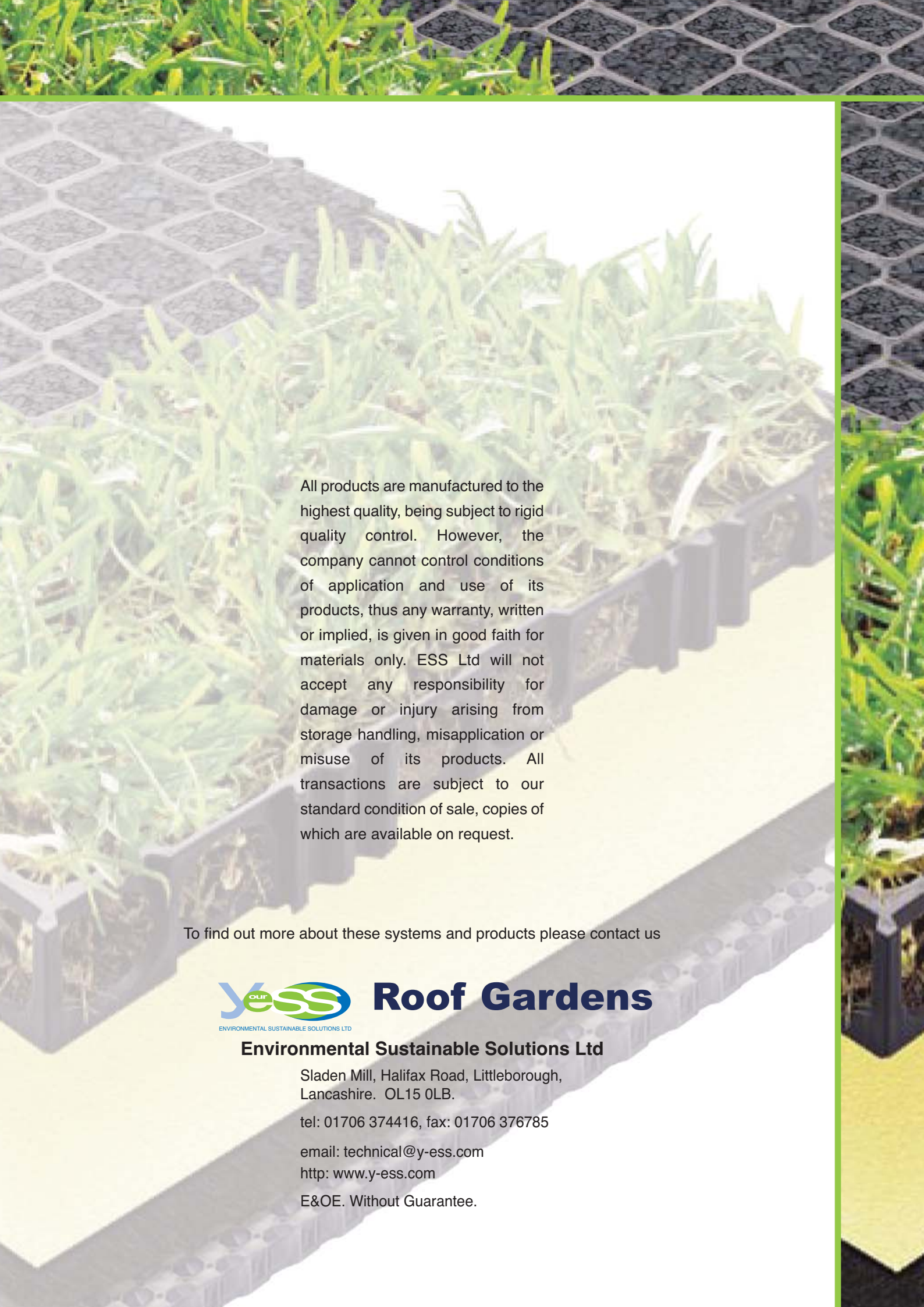
Lightweight Void Fill & Drainage



Installing tank modules into planter box

Benefits

- **Efficient Drainage**
Efficiently removes only excess water.
- **Ideal Growing Conditions**
An approximate minimum of 70L/m² of perched water is retained, ensuring ideal moisture conditions are maintained.
- **Stores Water**
E.S.S. Drainage Cell features unique cups for water storage.
- **Strong Structure**
E.S.S. Drainage Cell can support heavy loads up to 200 t/m².
- **Quick & Simple Installation**
E.S.S. Drainage Cells are quickly clipped together.



All products are manufactured to the highest quality, being subject to rigid quality control. However, the company cannot control conditions of application and use of its products, thus any warranty, written or implied, is given in good faith for materials only. ESS Ltd will not accept any responsibility for damage or injury arising from storage handling, misapplication or misuse of its products. All transactions are subject to our standard condition of sale, copies of which are available on request.

To find out more about these systems and products please contact us



Roof Gardens

Environmental Sustainable Solutions Ltd

Sladen Mill, Halifax Road, Littleborough,
Lancashire. OL15 0LB.

tel: 01706 374416, fax: 01706 376785

email: technical@y-ess.com

<http://www.y-ess.com>

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