



ICB

Sustainable Roofing Solutions

EVAGREEN



www.icb.uk.com

INTRODUCING EVAGREEN

EVAGREEN from ICB (International Construction Bureau) Limited is the ultimate green roof system. Developed to meet every type of eco-friendly specification from extensive low maintenance installations to elaborate intensive planting.



WHY GO GREEN?

- The aesthetic appeal of a green roof – blending in with the surrounding landscape and improving the appearance of industrial or commercial buildings.
 - Long life expectancy of the roof. The green roof system literally protects the single ply membrane, and with a little maintenance will still look and perform like new even after decades.
 - An attractive, extended living space – not just an ordinary industrial or commercial roof – plants, trees, birds and small animals can make it their home too.
 - Reduction of thermal shock to the building, its roof and substrate. UV radiation largely absorbed by the green roof system.
 - Excellent insulant – therefore less energy consumed. A green roof will act as a highly effective way to insulate a building.
 - Better living environment for those in the building – access to a roof garden or sun terrace, proven investment in price of property.
 - Dust and nutrient filtration system for the atmosphere. Natural carbon dioxide absorption and removal system.
 - Improvement of micro-climate.
 - Noise reduction. The system acts as an ideal acoustic insulant – more effective than many man-made materials.
 - Better absorption and slow release of rain water will help to balance water tables in highly developed areas or areas prone to flooding.
- The momentum to specify ‘green’ is now growing in the UK with building owners looking to be environment friendly and architects keen to provide a ‘green’ design edge to industrial and commercial projects.
- ICB’s EvaGreen roof system is backed up by full technical and design resources even down to assistance with choice of planting if required. The system has been carefully developed to give a quality installation that the building owner can be proud of.

EXTENSIVE OR INTENSIVE?

Extensive: Sedum.

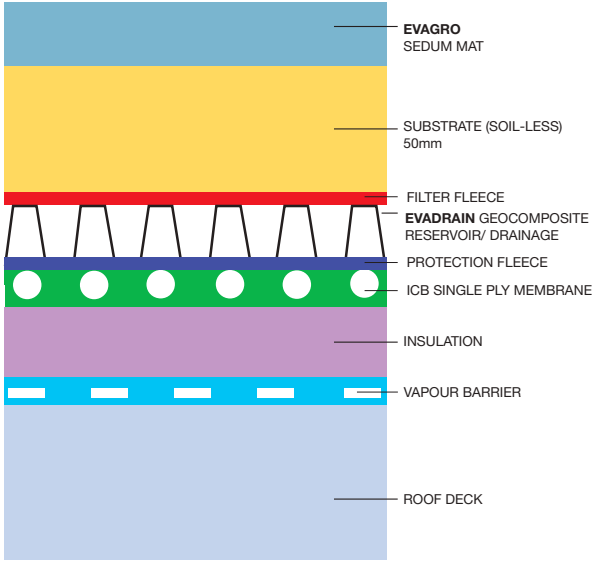
Extensive roofs are; lightweight, have a low maintenance requirement and don’t usually require additional irrigation. The exception would be a pitched sloping roof where the rainwater runoff would be greater and/or in exposed areas where wind forces would cause unusual drying out of the system.

Intensive: Plants, shrubs, planters, trees, and turf/grass.

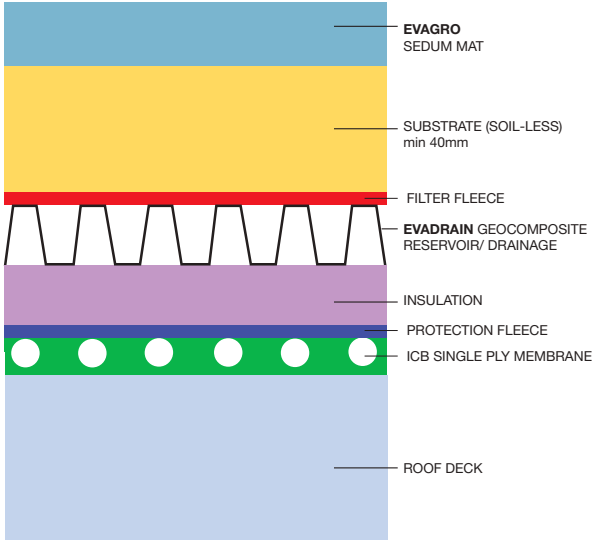
Intensive roofs should be treated in a similar fashion to any garden, they require the same maintenance/care. This type of installation is usually based on a thicker soil or substrate layer which will normally require the installation of additional irrigation. Plants should always be specially selected for the location and growing conditions. Care should also be taken to ensure the roof structure can support the additional loadings which should be calculated assuming the system is saturated.

DESIGN REQUIREMENTS

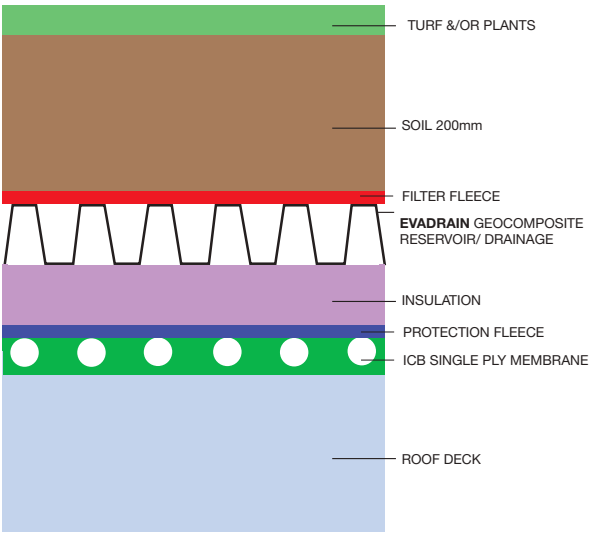
EXTENSIVE – WARM ROOF



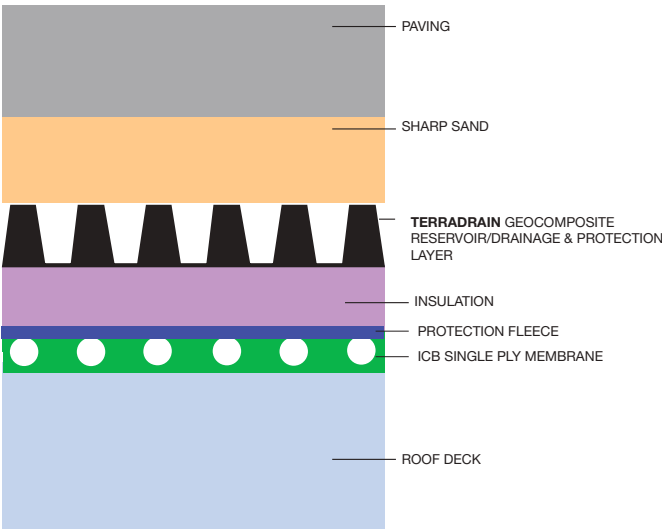
EXTENSIVE – INVERTED ROOF



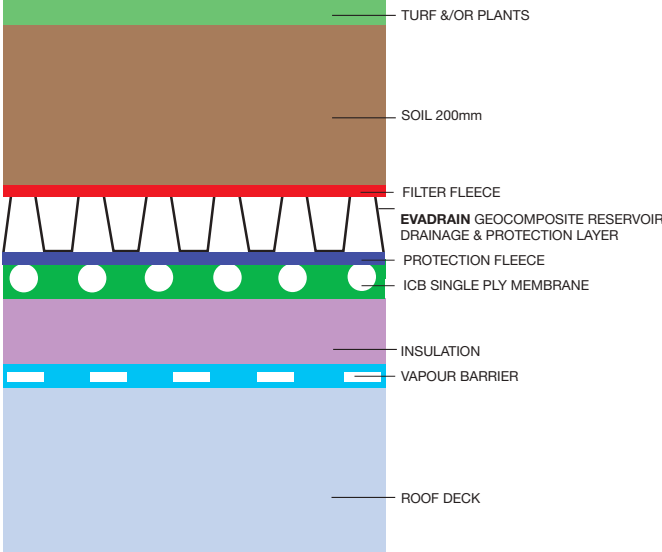
INTENSIVE – INVERTED ROOF



ROOF TERRACES



INTENSIVE – WARM ROOF



*(Not to scale)



DESIGN AND CONSTRUCTION

The prime objective in the design and construction of a green roof system is that the established planted roof will be aesthetically pleasing, environmentally beneficial and will not compromise the essential function of the roof; that is to prevent water entering the building. The following points should be taken into account:

- Position of the building
- Orientation of the roof
- Height of the roof above the ground
- Roof pitch
- Weight limitations of the building
- Preferred planting
- Sustainability of components
- Levels of maintenance
- Performance required of plant layer

Generally, the EvaGreen system is based on the following elements built up on the pre-installed membrane:

- Root resistant layer or root resistant waterproofing
- Protection layer
- Drainage/Reservoir layer
- Filter layer
- Substrate or soil layer
- Plant layer

TYPICAL WEIGHTS/LOADING

Extensive Green Roof

Sedum with rootzone (wet weight)	40kg/m ²
Substrate: (based on minimum 40mm)	38kg/m ²
Drainage/reservoir layer	1.38kg/m ²
Waterproofing	1.7kg/m ²
100mm thick insulation	6kg/m ² 87.08kg/m ²

TYPICAL WEIGHTS/LOADING

Intensive Green Roof

Turf	30kg/m ²
Soil 200mm depth (wet weight)	360kg/m ²
Drainage layer	1.38kg/m ²
Waterproofing	1.7kg/m ²
100mm thick insulation	6kg/m ² 399.08kg/m ²

INSTALLATION INFORMATION

EvaGro: Sedum Mat

Delivery: Palletised 11 – 15 rolls per pallet. For deliveries in the months May – Sept EvaGro can only be held in the rolled state for 48 hrs max. For deliveries during late September to end April rolled state can be extended to 96 hrs depending on temperature.

Plant composition:

Approx 30 species can be used. In general each roll will contain 8 – 10 species. For extensive type roof applications these species will be predominantly from the genus sedum.

Installation:

EvaGro must be unrolled carefully onto correctly installed drainage and substrate layer. The newly installed Evagro mat must then be irrigated to ensure

the drainage layer/substrate is to full capacity. This process may need to be repeated until Evagro is established – dependent on environmental conditions.

Lead Time:

Dependent on quantity. To ensure requirements can be met please advise as early as possible.

Root Resistant layer:

Loose laid with all joints taped and/or 500mm laps.

Protection & Filter Sheets:

Loose laid with 500mm laps

Drainage/Reservoir Layer:

Loose laid with overlap at edges and aeration/diffusion holes uppermost.

THE PRODUCTS

Acessory Products see page 8

EvaDrain

A 25mm Drainage/Reservoir board suitable for all types of green roof build up, from Extensive to Intensive & Brown.

Made of high impact RECYCLED Polystyrene the board allows multi-directional drainage with high water retention properties.



EVADRAIN TECHNICAL DATA:

To be used as a water retention and drainage layer on extensive, semi-intensive and intensive green roofs.	
A black, double-sided water, reservoir and multi-directional drainage board with precise 2 mm, diffusion openings in the centre of each of the crowns of the studs peaking at the top side of the board. The board is 25 mm in thick and is made of recycled high impact polystyrene. The product is CE marked.	
Size: 1910x955x25 mm (LxWxH) [EN ISO 9863-1:2005].	
Weight: 1.38 kg/m ² [EN ISO 9864:2005].	
Retention capacity (water): 4 litres/m ² .	
Retention capacity (crushed brick infill): 12.5 litres/m ² .	
Maximum load pressure (empty) at 10 % compression: 525 kN/m [EN ISO 802:1995]. Maximum load pressure (4-8 mm gravel infill) at 2 10 % compression: > 790 kN/m [EN ISO 802:1995].	
Water discharge capacity at i = 0.01 i.e. at roof slope 1%: 0.80 litres/(mxs) i = 0.02 i.e. at roof slope 2%: 1.40 litres/(mxs); i = 0.03 i.e at roof slope 3%: 1.85 litres/(mxs); nd i = 1 i.e. at roof slope 100%: 15.38 litres/(mxs) [EN ISO 12958:2010].	
Rate of drainage through 2 perforations under 5 mm permanent water pressure: 0.092 litres/m [EN ISO 11058:2010].	
Microbiological resistance test: Minimum 25 years as per conditions set in the standard [EN 12225:2000].	
The drainage performance and the attenuation of storm-water runoff reduction of EvaDrain 25 exceeds the requirements set forth in German Building Standard DIN 4095, EN 3252:2000 /A1:2005, and the German FLL Guidelines.	

EvaGro

Sedum mat with rootzone and specifically formulated substrate – for use above EvaDrain – is designed to add natural beauty to any roof environment. Sedum species are carefully selected for the purpose and require less maintenance than an intensive roof garden.



Terradrain D6

For use in hard landscaping. A geotextile filter thermally bonded on one side of a cusped HDPE core. Overall thickness is 6mm and is designed to ensure excess water is drained away from the soil or sand bedding layer for optimum moisture levels without swamping or ponding. Also provides protection for the waterproofing membrane. A 10mm version is available for increased drainage.

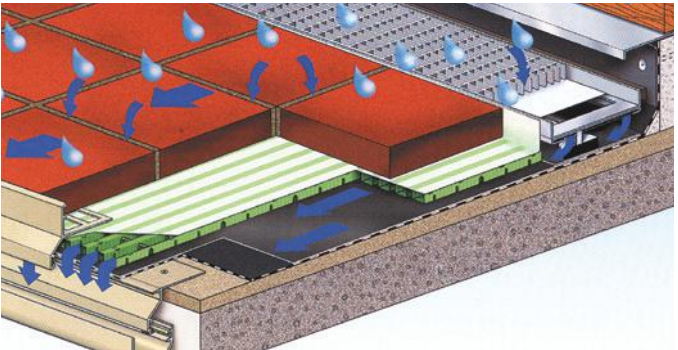


TERRADRAIN TECHNICAL DATA:

Composite		HG1.0	HG0.1	
In plane water flow at 100Pa	(l/m/sec)	0.95	0.30	BS 6906(7)(MOD)
at 240kPa		0.80	0.24	
at 500kPa with soft foam		0.65	0.19	
Flow reduction after 1,000,000 hours	(%)	<6		DTp C1514
Thickness at 2kPa	(mm)	5.5	BSEN 964-1:1995	
Tensile strength long/cross	(kN/m)	15/15	BSEN ISO 10319:1996	
Elongation long/cross	(%)	80/40	BSEN ISO 10319:1996	
CBR puncture resistance	(N)	2,500	BSEN ISO 12236:1996	
Life expectancy	(yrs)	120		
Working temperature	(oC)	-20 to 80		
Chemical resistance		Excellent resistance to all common chemicals.		
Bacteria/fungi		Does not support growth.		
Compatibility with waterproofing membranes		Fully compatible. All components compatible with potable water.		
Health, safety, environment		INERT. No known health hazard. No precautions necessary.		

ICB Drainage Channel

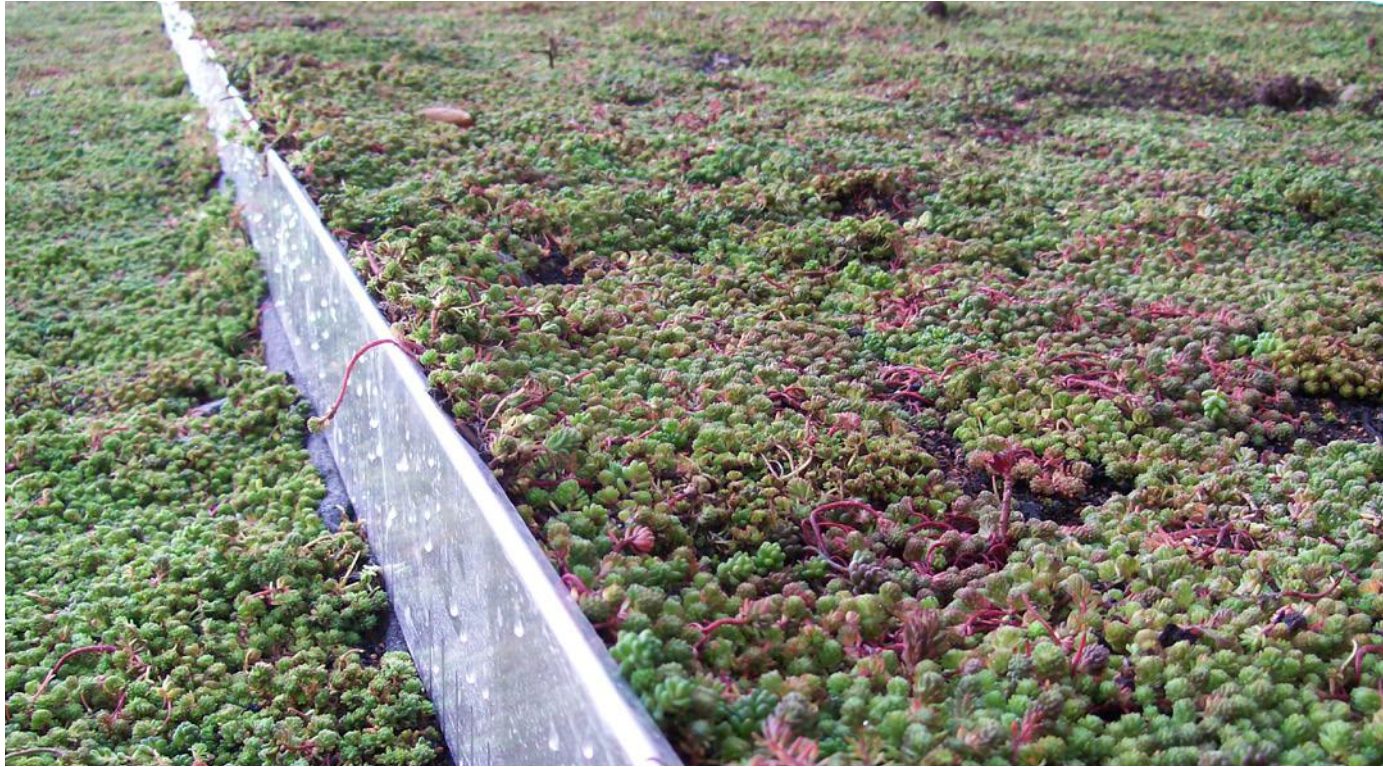
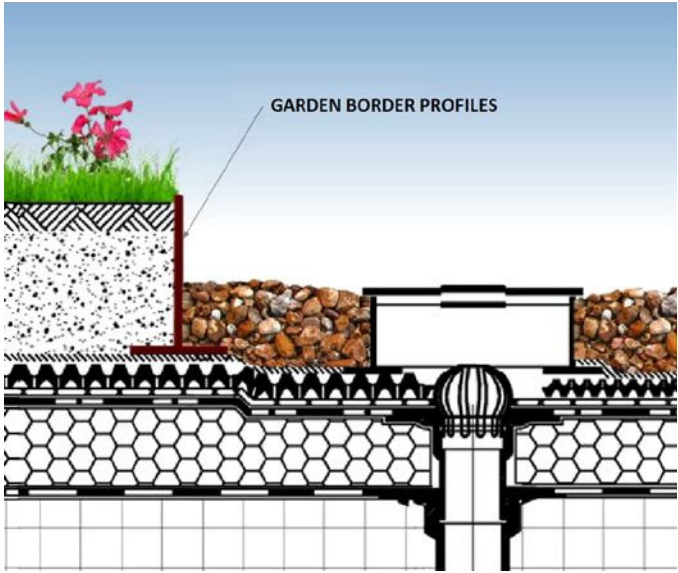
The ICB Drainage Channel system will ensure perfect drainage where flagstones, paving stones or promenade tiles are used by the removal of rainwater at perimeters and door thresholds.



GREEN ROOF ACCESSORY PRODUCTS

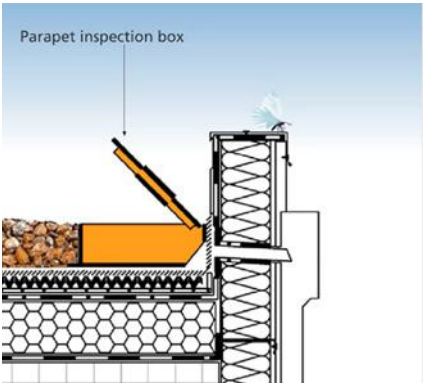
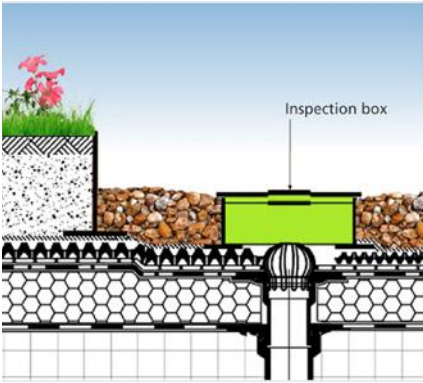
Garden Border Profiles

These profiles are used to separate various parts of the garden planting regime and to separate the plants from other items on the roof. They are also used to contain pebble borders. These pebble borders are essential around any items on the roof which fully penetrate the roof deck on which the garden is installed, for example; rainwater outlets and rooflights, as they serve as a fire break. Whilst we recommend using aluminium to form the profiles in order to avoid any danger of degradation through rusting and because of the recyclable nature of aluminium, the profile are also available in galvanised steel and can if desired be polyester powder coated to any RAL colour desired. The profiles are available in standard sizes or bespoke to your requirements.



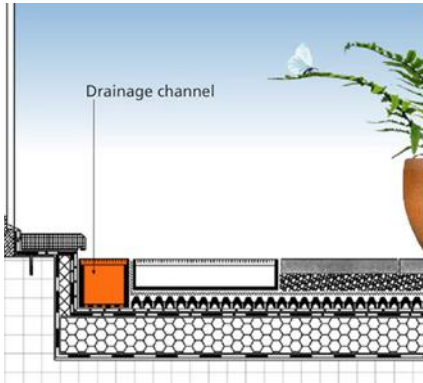
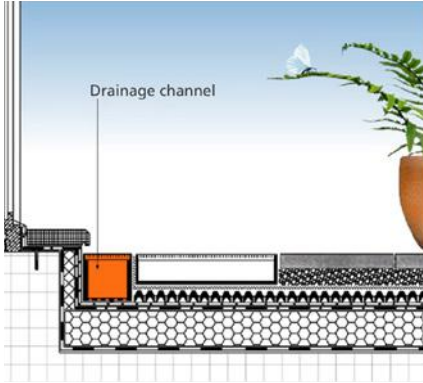
Inspection Boxes

Inspection boxes, available in toughened plastic or aluminium to standard or bespoke sizes, ease the inspection of rainwater outlets and help prevent these becoming clogged with debris from the roof garden.



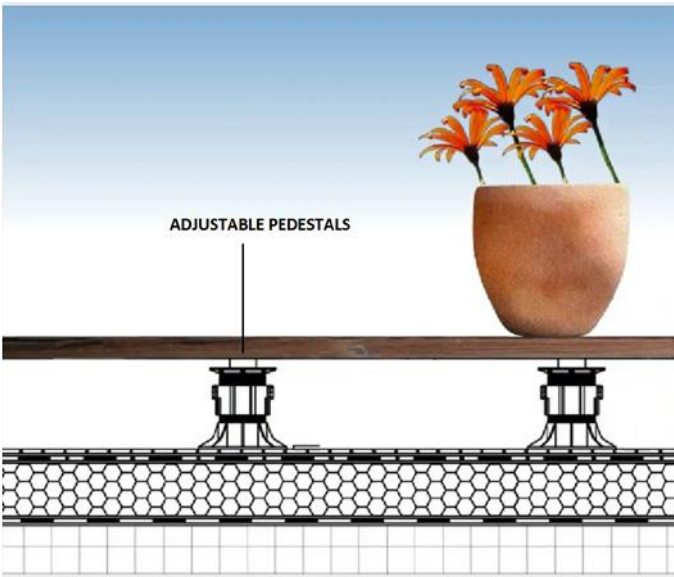
Drainage Channels

Primarily used around the perimeter of a flat roof where any potential danger exists of water ingress at the upstand into the building fabric or interior. These channels can also help alleviate the problem of low upstands on refurbishment projects. The channels are available in galvanised steel or aluminium in either a fixed height or adjustable version.



Paving & Decking Supports

Our paving & decking supports range from flat supports pads; which primarily protect the weatherproofing membrane and allow free flow of rainwater under the decking or paving, to height and angle adjustable versions to ensure a level finish.



TTV Guardrail

A unique Roof Edge Protection Guardrail which utilises the ballast provided by the green roof, thereby avoiding the need for fixings, thus maintaining the integrity of the roof waterproofing.



POST INSTALLATION MAINTENANCE REQUIREMENTS

To ensure that the plant material establishes immediately after installation some aftercare may be needed. This will be dependent upon season of installation and climatic factors. Generally, for autumn to spring installations, no procedures additional to those outlined below will be necessary. For summer installations a temporary irrigation system may be needed.

The following are general guidelines for maintenance related to extensive type Green Roof Systems. Levels of maintenance will be affected by system composition and these guidelines do not constitute any liability to ICB Ltd with regards the performance of the planted system.

Removal of any undesirable plant material. The term ‘weed’ is inaccurate, one man’s weed is another man’s establishment of increased biodiversity. Dependent upon material and site requirements removal may be by hand or by a point application of a herbicide. Procedure to be carried out at all maintenance intervals. Assessment of problem weeds and correct timing of the program is essential.

Checking for pest and diseases. The major problem that will be encountered is infestation by aphids. This can be dealt with using environmentally friendly measures. Aphid attack is most severe when the plants are under stress. Ensuring that the system has the correct nutrient and water retention capacities will minimise this problem. Procedure to be carried out at all maintenance intervals.

Application of slow release nutrient source. CORRECT nutrient status within the substrate is important. Previous fertiliser applied, season, location and nature and condition of plant material determine the levels of nutrients to be applied. Procedure to be carried out when deemed appropriate.

System correction. Extensive type Green Roofs are low maintenance because system design should be such that the desired plants are encouraged whilst undesirable elements are discouraged. Small localised areas (e.g. north side of any roof penetration) of the installed planted element may be found to not satisfy these criteria and undesirable plant material MAY colonise. This plant material should be removed and the substrate

conditions amended to ensure that the desirable plants flourish. Procedure to be carried out as part of inclusive 12 months maintenance.

Checking of gutters and drain ways for debris and its removal. Procedure to be carried out at all maintenance intervals.

Removal of flower heads after flowering. Dependent upon individual aesthetic requirements of the client. Late summer/early autumn procedure that can be included in any maintenance agreement.

Removal of leaf litter. The ideal position for EvaGro installation is in full sun. In certain situations adjacent trees could shed leaves onto the roof surface. Dependent upon quantity these may need to be removed. This could be done with a leaf blowing machine. Late summer/early autumn procedure that can be included in any maintenance agreement.

As a general guide, frequency of maintenance visits for a well designed system will be as follows: Year one: 2-3 visits Year two and subsequent years: 1-2 visits

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