

Southampton City Council Green Space Factor Guidance Notes

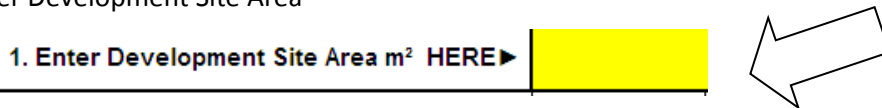
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Vegetation (green infrastructure) within the city provides many important benefits (ecosystem services) which make the city an attractive and resilient place to live. Key benefits include, surface water and air quality management, evaporative cooling and biodiversity. The Green Space Factor (GSF) is a tool which allocates a score to different types of surfaces based on infiltration potential, which is used as a proxy for ecosystems services provided by the different surfaces, e.g. cooling, air quality, biodiversity. There is a back-ground paper available on how this was developed.

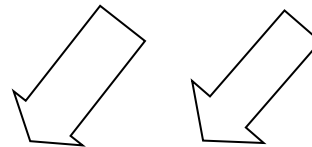
The GSF is scored from 0 to 1, where impermeable surfaces are scored as 0 and surfaces with the highest green space factor are scored 1. There are detailed definitions of the different surface types on the tool tab, and p.5 of this guidance. The Green Space factor tool is a simple excel spreadsheet. Enter values in the yellow areas and the scores will be calculated for you.

- 1) Enter Development Site Area



- 2) There is a column for the existing development site in which you can insert the areas in m² of the current surface types.

- 3) The right hand side column can then be used to insert the proposed surface areas



Surface Type (see tab for detailed descriptions)	Factor	2. Current Surface Area m ²	3. Proposed Surface Area m ²
Primary (Ground Level) Layers			
Building surface area with no green roof	0.0	0.00	0.00
Extensive greenroofs	0.6	0.00	0.00
Intensive greenroofs	0.7	0.00	0.00
Non-permeable surfaces	0.0	0.00	0.00
Permeable paving	0.2	0.00	0.00
Semi-permeable surfaces e.g. sand and gravel	0.4	0.00	0.00
Grassland (short, amenity)	0.4	0.00	0.00
Grassland (long, rough)	0.5	0.00	0.00
Shrubs	0.6	0.00	0.00
Trees on shallow soil/ tree pits	0.6	0.00	0.00
Woodland/ Trees on deeper soil	1.0	0.00	0.00
Open Water	1.0	0.00	0.00
Development Area Total		0.00	0.00

Green walls can be added as an additional layer to boost the proposed score.

Secondary Layers			
Green walls with a height limit of 10 metres (area of)	0.6	0.00	0.00

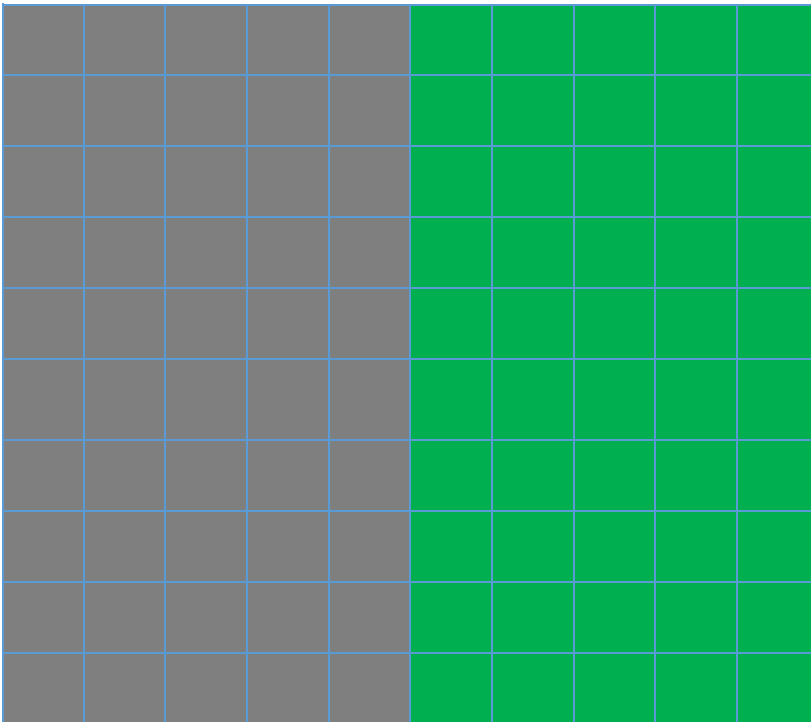
- Different scenarios can be used to see what provides the best GSF score.
- The aim is to increase the Green Space Factor as much as possible.
- **Note the Development Site Area (1) should be the same as the total of the current surface areas (2) and the total of the proposed surface areas (3). Warnings will come up if they are not the same.**

Simplified development example

Key

- Extensive green roof
- Non-permeable surface
- Permeable paving
- Woodland/ trees on deeper soil
- Tree in shallow soil/ tree pit

Current site layout:



Proposed surface layout



Completed tool based on simplified development example

1. Enter Development Site Area m² HERE ▶	100.00		
Surface Type (see tab for detailed descriptions)	Factor	2. Current Surface Area m²	3. Proposed Surface Area m²
Primary (Ground Level) Layers			
Building surface area with no green roof	0.0	0.00	0.00
Extensive greenroofs	0.6	0.00	36.00
Intensive greenroofs	0.7	0.00	0.00
Non-permeable surfaces	0.0	50.00	14.00
Permeable paving	0.2	0.00	16.00
Semi-permeable surfaces e.g. sand and gravel	0.4	0.00	0.00
Grassland (short, amenity)	0.4	0.00	0.00
Grassland (long, rough)	0.5	0.00	0.00
Shrubs	0.6	0.00	0.00
Trees on shallow soil/ tree pits	0.6	0.00	4.00
Woodland/ Trees on deeper soil	1.0	50.00	30.00
Open Water	1.0	0.00	0.00
Development Area Total		100.00	100.00
	Spare Capacity ▶		
Secondary Layers			
Green walls with a height limit of 10 metres (area of)	0.6	0.00	0.00
WARNINGS ▶	OK	OK	OK
	GI SCORE	0.50	0.57
	Result		Pass

Detailed definitions

Building surface area with no green roof	Building surface area with no green roof
Extensive green-roofs	<p>Extensive green roofs have minimal planting depths (as shallow as 2.0 cm) and sometimes only a mineral substrate. They are limited to flowers, grasses, mosses, and drought tolerant succulents such as Sedum, chosen for their ability to regenerate and maintain themselves over long periods of time, in addition to being able to withstand the harsh conditions of cold, heat, drought and wind. Native species are often preferred. Extensive green roofs require minimal maintenance, and are generally not accessible to the public. They do not necessarily require irrigation, and they have fewer other requirements, such as guardrails. Extensive green roofs are the least expensive form of roof greening to implement and maintain.</p> <p>Extensive green roofs, certainly initially, have a lower proportion of grasses and therefore don't have the same dense root mat as grassland. A green roof is unlikely to experience the same degree of compaction because there is much lower human access. In addition, the mineral substrates have a more open structure so even with some compaction there are still pores available to hold water. Vegetation management is generally less intense on green roofs so there is a higher level of humidity at root level plus the substrates are coarser and therefore less likely to become baked hard.</p>
Intensive green-roofs	<p>Intensive green roofs use a wide variety of plant species that may include trees and shrubs, require deeper substrate layers, are generally limited to flat roofs, require 'intense' maintenance, and are often park-like areas accessible to the general public. They are often built in high density areas where green space is limited. Intensive green roofs are more costly than extensive green roofs to build and maintain.</p>
Non-permeable surfaces	e.g. tarmac
Permeable paving	Stone paving with joints where water can infiltrate
Semi-permeable surfaces	e.g. sand and gravel
Grassland (short, amenity)	Where the majority of vegetation is grasses, generally short mown, e.g. for amenity space, Grasslands, particularly amenity grasslands found in urban areas, have a higher degree of soil compaction than woodlands and scrub. This results in a loss of soil pores which further impedes water infiltration and reduces the amount of water that can be held. Short mown grasslands have lower water attenuation ability than longer grass because the lack of aerial vegetation means there is little protection for the soil and it consequently dries out very quickly. This results in a hard surface which water simply runs off.
Grassland (long, rough)	Rough grassland that is not being cut regularly. Predominantly grasses but may contain other plants. Natural and amenity grasslands can be found on deep soils, however this likely to be of little use for surface water management as the water's path into the soil is blocked by a dense root mat occurring within the top 5-10cm of soil.
Shrubs	Vegetation where soil depth is more than 60cm and there is no direct contact with deeper soil e.g. roof of underground parking
Trees on shallow soil/ tree pits	Individual landscaping trees in built up spaces e.g. car parks, highway. Area taken as area of canopy.
Woodland/ Trees on deeper soil	Vegetation where plants have direct contact with deeper soil. Trees and shrubs, have a more open network of surface roots plus bigger, deeper roots which channel water into the soil. Water can therefore percolate into the ground more easily and run down the stem and roots; in this case deep soil is useful because it can hold more water than shallow soil.
Open Water	Areas of open water including ponds and ditches/swales covered by water for at least 6 months

Extensive Green Roofs:



Meadow on Roof of Commercial Building, Germany



Traditional Scandinavian turf roof



Affordable Housing, Gold Lane, London



Sedum roof on garages, Germany

Intensive Green Roofs:



Canary Wharf, London



Carlton House, Royal Leamington Spa



Moorgate Business Centre, Rotherham



Roof of Coast Plaza Hotel, Vancouver

Using the Green Space Factor can also assist in achieving other mandatory requirements, e.g. BREEAM.

BREEAM Credits

Green infrastructure water attenuation can be component of a Sustainable Drainage System (SuDS) which can achieve 1 credit under BREEAM **Pol 03**.

A green roof in combination with a storage tank can be part of a rainwater harvesting system which helps to gain credits in BREEAM **Wat 01/ Wat 04** by reducing the use of mains water.

There are potential credits for both ecological enhancement and change of ecological value of the site by planting with native plant species as approved by a suitably qualified ecologist. BREEAM **LE 02-05**.

Green roofs will improve a building's thermal performance. This will help reduce the predicted Dwelling Emission Rate (DER) for the building which is the estimated carbon dioxide emissions per m² for energy use in heating, hot water and lighting. The lower DER the green roof causes may help to gain an extra credit under BREEAM **Ene 01**.

In a high density development it can be difficult to achieve **amenity space**. Roof terraces, i.e. intensive green roofs, whether private or communal gardens, can provide this.

Please contact Southampton City Council

Planning Ecologist—Lindsay.McCulloch@southampton.gov.uk 023 8083 2727 or

Sustainable Development Officer—Melanie.Robertson@southampton.gov.uk 023 8083 4262

if you would like further advice on using Southampton's Green Space Factor Tool.