

Urban Greening Factor for England – Development and Technical Analysis

Green Infrastructure Framework - Principles and Standards for England

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A list of the GI Framework Advisory Group members is provided in [Appendix 1](#).

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Executive Summary

There is a clear and urgent need to make our urban environments greener, healthier and more attractive places to live. The 25 Year Environment Plan placed particular emphasis on the importance of greening our towns and cities with an aim to improve existing green infrastructure, encouraging more investment in the environment and supporting more sustainable forms of development. This aim is at the heart of Natural England's Green Infrastructure Framework that provides the principles, standards and planning tools to create more biodiverse and resilient urban districts and neighbourhoods as the impact of climate change becomes increasingly evident.

Our planning system already recognises the importance of urban greening as an essential component of sustainable development. Planning policy provides guidance at a national and local level to improve the provision of green infrastructure and better target investment where it is needed the most. To strengthen this approach, Urban Greening Factors are increasingly being used as a planning tool to improve green infrastructure delivery through the process of development and regeneration. They were first developed in Northern Europe in the late 1990s. First by Berlin to combat the growing densification of urban neighbourhoods and then through the experimental and creative planning of Malmö's Western Harbour in Sweden. Urban Greening Factors have since been adopted by cities in Europe, Asia, North America and Australia. They are increasingly being used in the UK by Local Planning Authorities in the revision of their local plans and have become a prominent policy tool for urban greening across Greater London through the adopted London Plan.

This report on Developing a Model Urban Greening Factor for England introduces the Urban Greening Factor (UGF) and provides an analysis of current applications of the UGF in the UK and abroad.

There are two main components of the UGF:

- (a) a target factor score that sets a minimum proportion or percentage of greening for a particular site, area or land use; and,
- (b) a schedule of surface cover types and associated factor weightings that are used to calculate the score.

The UGF score is calculated by multiplying the area of each surface cover type by its factors; each figure is then added together and divided by the total area within the development site boundary that is commonly referred to the red-line boundary. This is shown in the formula below:

Urban Greening	Sum of each Surface Area type (m²)
Factor Score =	(Surface Area A x Factor A + Surface Area B x Factor B + Surface Area C x Factor C, etc.)

Total site area (m²)

The resulting score is then compared with the target UGF score for the development site set by the planning policy and the score indicates whether the urban greening proposals achieve, exceed, or fails to meet the defined target.

Proposals for a Model UGF Standard for England include both target scores for specific land uses and a set of weighted surface cover types. These have been developed from detailed research on international UGF applications through their initial development in Europe to current UK planning policy and practice.

This report sets out the concise sets of proposed UGF Target Scores and UGF Surface Cover Types for the Model UGF for England, and the rationale behind them. The Target Scores for Surface Cover Types comprise a familiar suite of green infrastructure elements including - vegetation and tree planting; green roofs and walls; sustainable drainage systems and water features; and paved surfaces.

The report concludes with a schedule of UGF policies that are currently used in UK planning practice.

1.0 Introduction

- 1.1 Natural England has developed an Urban Greening Factor for England, as one of a suite of five Headline Green Infrastructure Standards within the [Green Infrastructure Framework – Principles and Standards for England](#). The Urban Greening Factor (UGF) is a planning tool to improve the provision of Green Infrastructure (GI) particularly in urban areas. It is voluntary and can be used to increase urban greening and contribute to Biodiversity Net Gain. This report provides an analysis of the current application of UGFs in the UK and abroad, and was prepared to inform the development of the Urban Greening Factor for England. It is accompanied by a [User Guide for the Urban Greening Factor for England](#) (Neal, 2023) that explains its purpose, calculation, and application in the local planning process; and a set of [Urban Greening Factor Case Studies](#) (Neal, 2023) that describe current practice.
- 1.2 This paper is informed by detailed research and analysis of UGF tools undertaken during the development phase of the Green Infrastructure Standards Framework (see [Appendix 2](#)).
- 1.3 There are two main components of the UGF: (a) a target factor score that sets a minimum proportion or percentage of greening for a particular site, area or land use; and, (b) a schedule of surface cover types and associated factor weightings that are used to calculate the score. Proposals for a Model UGF Standard for England include both target scores for specific land uses and a set of weighted surface cover types. These have been developed from detailed research on international UGF applications through their initial development in the early 1990s in Europe to current UK planning policy and practice.
- 1.4 Urban Greening Factors or Green Space Factors were first established as a planning and development tool in Berlin and then Malmö during the mid to late 1990s. They have since been adopted by cities in Asia, Europe, the United States, Canada, and most recently in Melbourne, Australia. Southampton was the first location in the UK to use a Green Space Factor for the city centre in 2015. The Urban Greening Factor is now a prominent green infrastructure policy tool in the adopted London Plan (March 2021) and is increasingly being included by London Boroughs in the revision of local plans. The term Urban Greening is adopted to emphasise the tool's role in providing site-based GI through the development process. This provides the means to increase urban greening to improve climate resilience and meet other environmental objectives in addition to the provision of public parks and public open space networks that are commonly delivered through other associated planning policies.
- 1.5 The locations where the UGF is being developed or has been adopted is increasing and currently includes the following local planning authorities in the UK:
 - A. City of London - Urban Greening Factor

- B. Greater London Authority - Urban Greening Factor
- C. London Borough of Hackney - Urban Greening Factor
- D. London Borough of Hounslow - Urban Greening Factor
- E. London Borough of Islington - Urban Greening Factor
- F. London Borough of Sutton - Green Space Factor
- G. London Borough of Waltham Forest - Urban Greening Factor
- H. Portsmouth City Council - Urban Greening Factor
- I. Southampton City Council - Green Space Factor
- J. Swansea Council - Green Space Factor Tool

1.6 The UGF has also been applied by a small number of development corporations through their statutory role in local planning including the London Legacy Development Corporation (LLDC) and the Old Oak and Park Royal Development Corporation (OPDC). Greater Manchester has also recently committed to developing a Green Factor through its Joint Development Plan Document (August 2021) for the nine local authorities across the city region. Each application sets out the level of on-site green infrastructure that new developments are expected to provide as a minimum. Section 6.0 (page 48) of this paper provides a schedule of current UGF policies for all these locations.

Table 1 – Comparison of UK Urban Greening Target Scores

No	UGF Target Scores for Major Developments	Target Score - Minimum	City of London	Greater London Authority	London Borough of Hackney	London Borough of Hounslow	London Borough of Islington	London Borough of Sutton	London Borough of Waltham Forest	Portsmouth City Council	Southampton City Council	Swansea Council
1	An improvement in overall green infrastructure	+								Y	Y	
2	Previous developed sites to increase from baseline	+ 0.2						Y				
3	Developments that are predominately industrial	0.2				Y						
4	Developments to meet target score as a minimum	0.3	Y									
5	Developments that are predominately commercial	0.3		Y	Y	Y	Y		Y			Y
6	Developments that are predominately residential	0.4		Y	Y	Y	Y		Y			Y
7	Greenfield sites to achieve a score of at least	0.5						Y				

Source - Analysis of Current Green Space and Green Infrastructure Planning Policy (See [section 6.0 page 47](#), for further information) Key: The letter 'Y' denotes that the local authority has a minimum UGF Target Score of that value for that type of green infrastructure improvement or development indicated. A blank cell indicates that no minimum target score was assigned by that local authority to that type of green infrastructure improvement or development.

2.0 Comparison of UGF Target Scores

- 2.1 An analysis of ten planning authorities that use a UGF planning tool illustrates a mix of approaches to setting target scores for different land uses. Southampton and Portsmouth simply require an improvement or increase. The London Borough of Sutton expects a +0.2 (or 20%) increase in urban greening on previously developed sites and also sets a more ambitious urban greening target of 0.5 (or 50%) for greenfield sites. The Greater London Authority (GLA) sets two targets, 0.3 (or 30%) for predominately commercial development and 0.4 (or 40%) for predominately residential development.
- 2.2 Most applications set specific UGF target scores for Major Developments, rather than for all development applications, and focus on industrial, commercial and residential land uses. The majority of applications cluster UGF target scores around 0.3 for predominantly Commercial and 0.4 for predominantly residential developments - this is illustrated in Table 1.
- 2.3 The clustering of commercial and residential scores has been driven in part by early analytical research of international models and UK practice undertaken in the development of [UGF for the Greater London Authority](#) (Grant, 2017), the [City of London](#) (Grant, 2018) and [Swansea Council](#) (2019). The clustering is also a reflection of the influence the London Plan has had on London Boroughs through the hierarchy of regional and local planning. The GLA set UGF target scores through the London Plan (Policy G5) that are now reflected in local plans of London Boroughs choosing to develop their own scores. Preliminary research for a Greater Manchester Green Factor (2019) that may be included in the regional spatial strategy for the Combined Authority suggests the UGF planning policy tool may be similar to London and recommends the same target scores, although the research recognises the scores may be tailored in time to the local circumstances and the varying nature of the city region.
- 2.4 Analysis of international UGF models indicate a more sophisticated approach to setting target scores for a wider variety of land uses and, in some locations, this includes a banding of scores for particular uses - this is illustrated in Table 2. UGF target scores can be adapted to respond to different urban greening needs in different locations. Washington DC for example sets a target of 0.1 (10%) for dense city centre locations and industrial land uses whilst Helsinki sets its highest target of 0.8 (80%) for some suburban residential districts.
- 2.5 Berlin has a target score for commercial land uses, central districts and technical infrastructure of 0.3 (30%) but rises to 0.6 (60%) for residential areas and public facilities including nursery schools. The most recent international application is the City of Melbourne which launched its [Green Factor Tool](#) in 2020. The application is currently voluntary and sets a target score of 0.55 for most developments and

particularly commercial and residential uses. The target is reduced to 0.25 for industrial uses, recognising the greater difficulty in achieving urban greening within these sites.

2.6 It should be noted that several international models, including Berlin, Paris, Washington DC and Seattle allocate their UGF through the use of landscape plans or land use zoning plans. This allows a more fine-grained application of UGF scores that reflect the needs of particular contexts and green infrastructure requirements. Such techniques provide the ability to set more specific and targeted scores for particular locations.

Table 2 – Comparison of International Urban Greening Scores

No	Urban Greening Target Scores	Berlin / Biotope Area Factor	Helsinki / Green Factor Method	Malmö / Green Space Factor	Melbourne / Green Factor Tool	Paris / Biotope Coefficient	Seattle / Green Space Factor	Washington DC / Green Area
1	Residential Uses	0.6	0.5 - 0.8	0.6	0.55	0.6	0.5 - 0.6	0.2 - 0.4
2	Commercial Uses	0.3	0.3-0.6	0.5	0.55	0.4	0.3	0.2-0.3
3	Central Districts & Key Areas	0.3					0.3	0.1 - 0.3
4	Public Facilities	0.6						
5	Schools	0.3		0.6				
6	Nursery Schools	0.6		0.6				

No	Urban Greening Target Scores	Berlin / Biotope Area Factor	Helsinki / Green Factor Method	Malmö / Green Space Factor	Melbourne / Green Factor Tool	Paris / Biotope Coefficient	Seattle / Green Space Factor	Washington DC / Green Area
7	Technical Infrastructure	0.3	0.4 - 0.7					
8	Mixed Development			0.6			0.3	0.2 - 0.3
9	Industrial		0.2 - 0.5		0.25	0.4	0.3	0.1 - 0.3
10	Installations of collective interest (public facilities)					0.6		

Source - Analysis of international Urban Greening Factor Scores (see Paper 2.3 summary in [Appendix 2](#)). A blank cell indicates that no Urban Greening Target score was assigned to that development type by that municipality.

3.0 Proposed UGF Target Scores for England

3.1 Developing a preliminary UGF score for England takes account of current planning practice and plan-making processes across Local Authority and Combined Authorities. This includes the preparation of Local Plans, Neighbourhood Plans, Area Action Plans and Spatial Development Strategies. Planning practice also provides flexibility to incorporate or adopt UGF policies through Supplementary Planning Documents, Strategies and Design Guides or Codes including Greenspace Strategies, Green Infrastructure Strategies, Local Nature Recovery Strategies as well as taking account of policies for Biodiversity Net Gain.

- 3.2 The UGF score is calculated by multiplying the area of each surface cover type by its factors; each figure is then added together and divided by the total area within the development site boundary that is commonly referred to the red-line boundary. This is shown in the equation below.

$$\text{Urban Greening Factor Score} = \frac{\text{Sum of each Surface Area type (m}^2\text{)}}{\text{Total site area (m}^2\text{)}}$$

(Surface Area A x Factor A + Surface Area B x Factor B + Surface Area C x Factor C, etc.)

- 3.3 The resulting score is then compared with the target UGF score for the development site set by the planning policy and the score indicates whether the urban greening proposals achieve, exceed, or fails to meet the defined target.
- 3.4 The Green Infrastructure Framework will initially be voluntary rather than mandatory. To reflect this status UGF should be considered as a discretionary planning tool by local planning authorities and applied by organisations and individuals involved in the process of planning and development. This is expected to include planning officers, planning consultants, applicants, developers, architects, landscape architects, urban designers, engineers, SuDS specialists, tree officers, ecologists and landscape managers.
- 3.5 To encourage the uptake of a model UGF as part of this framework, target scores should strike a balance between being overly ambitious or too cautious and the process of application should be simple, logical, and straightforward at the outset. In time local planning authorities may choose to adapt and modify the proposed national model UGF target score to meet their own planning policy context and green infrastructure needs.

Core UGF Target Scores:

- 0.3 for predominately commercial development
- 0.4 for predominately residential development

- 3.6 The proposed UGF target score reflects current UK practice and takes account of international models that illustrate a more targeted and complex set of scores for specific land uses and development types. At the outset it proposes two Core target scores. In the future additional target scores aligned to different land uses including industrial and greenfield development could be considered. The rationale for the Core target UGF scores emphasises the importance of urban greening for predominately residential development with a target score of 0.4 which is required to provide a variety of amenity, recreational and ecosystem service benefits. A lower target score of 0.3 for commercial development recognises the challenge of

generally more urbanised and higher density locations with less space for urban greening.

- 3.7 Additional target scores for other land uses that have particular green infrastructure needs or constraints could be considered. For example, a target score of 0.2 for industrial development would include general industrial uses (Land use Class B2) and storage and distribution uses (Land use Class B8), as these commonly have difficulty in accommodating significant urban greening measures with the size of buildings, hard standing, vehicular and servicing requirements ([Town and Country Planning \(Use Classes\) Order, 1987, as amended](#)).
- 3.8 A target score of 0.5 for greenfield development and garden communities could be considered to reflect the need to both protect the environmental qualities and natural capital assets of greenfield sites as well as securing significant provision of green infrastructure that should be a particular hallmark of garden communities. Higher target scores can also be proposed for land uses that benefit from a strong association with green infrastructure such as new education and healthcare facilities. Here extensive evidence recognises the importance and therapeutic value of a strong green setting for these uses. As most of these development types are publicly funded, higher UGF target scores could be used to deliver more extensive urban greening for public benefit.

4.0 Comparison of UGF Surface Cover Weightings

- 4.1 Surface cover types provide the second component of the UGF that incorporate various urban greening measures proposed for a development site. Each are assigned different weightings reflecting environmental, social and biodiversity value and are used to calculate the greening factor to achieve or exceed the target UGF score. Surface cover types include the retention and protection of existing vegetation and trees, new areas of planting, hedgerows, trees and other landscape features including green roofs, green walls and sustainable drainage systems.

Surface Cover Types and Weightings used in the UK

- 4.2 An analysis of surface cover types and weightings used in the six most established applications of UGF in the UK includes 30 different criteria including paved surfaces, sustainable drainage systems, various forms of vegetation, tree planting, green roofs and green walls. A few surface cover types, such as sealed surfaces and areas of wetland and open water, have the same weightings across

all applications. Some choose to combine weightings, for example the City of London combines partially sealed and semi-open paving surfaces, whereas Sutton and Southampton have different weightings for each paving type. The full set of surface cover types used in six prominent examples is shown in Table 3.

Table 3 – Comparison of UK Urban Greening, Surface Cover Weightings

No	UGF Surface Cover Types	City of London Urban Greening Factor	Greater London Authority Urban Greening Factor	London Borough of Sutton Green Space Factor	Portsmouth City Council Urban Greening Factor	Southampton City Council Green Space Factor	Swansea Council Green Space Factor
1	Sealed paving surfaces	0.0	0.0	0.0	0.0	0.0	0.0
2	Partially sealed paving surfaces	0.1	0.1	0.2	0.2	0.2	0.1
3	Semi-open paving surfaces	0.1	0.1	0.4	0.4	0.4	0.1
4	Vegetation unconnected to sub-soil - Shallow ¹			0.4			
5	Vegetation unconnected to sub-soil - Deep ²			0.6			
6	Vegetation connected to sub-soil			1.0			
7	Wetland / open water surfaces for 6+ months	1.0	1.0	1.0	1.0	1.0	1.0
8	Biodiverse rain gardens / native vegetated SuDS						0.8
9	Rainwater infiltration / vegetated SuDS	0.7	0.7				0.7

No	UGF Surface Cover Types	City of London Urban Greening Factor	Greater London Authority Urban Greening Factor	London Borough of Sutton Green Space Factor	Portsmouth City Council Urban Greening Factor	Southampton City Council Green Space Factor	Swansea Council Green Space Factor
10	Green walls - connected to the ground ³	0.7	0.6	0.6	0.6	0.6	0.6
11	Green walls - unconnected to the ground ³	0.7	0.6	0.6	0.6		0.7
12	Green roofs - extensive with shallow soil ⁴	0.3	0.3	0.7	0.6	0.6	0.3
13	Green roofs - semi-intensive	0.8	0.7	0.7			0.8
14	Green roofs - intensive with deep soil ⁵	0.9	0.8	0.7	0.7	0.7	0.9
15	Preservation of existing trees		1.0				
16	Preservation of other existing vegetation		1.0				
17	Planting of semi-natural vegetation	1.0	1.0				1.0
18	Planting of woodland with contact to sub-soil				1.0	1.0	
19	Planting of new trees ⁶	0.7	0.6	0.4	0.7	0.6	0.6

No	UGF Surface Cover Types	City of London Urban Greening Factor	Greater London Authority Urban Greening Factor	London Borough of Sutton Green Space Factor	Portsmouth City Council Urban Greening Factor	Southampton City Council Green Space Factor	Swansea Council Green Space Factor
20	Planting of shrubs and bushes		0.6	0.3	0.6	0.6	
21	Planting of native hedges						0.7
22	Planting of hedges	0.6	0.6	0.3			0.6
23	Planting of native hedges ⁷						0.7
24	Planting of groundcover and perennial planting ⁷	0.5	0.5				0.5
25	Planting of species rich lawns ⁷						0.5
26	Planting of short mown amenity grassland	0.4	0.4		0.4	0.4	0.4
27	Planting of wildflower / perennial meadows	0.7	0.7		0.5	0.5	0.7
28	Food growing and allotment provision		0.6				0.5
29	Water features (unplanted and chlorinated)	0.2	0.2				0.2

No	UGF Surface Cover Types	City of London Urban Greening Factor	Greater London Authority Urban Greening Factor	London Borough of Sutton Green Space Factor	Portsmouth City Council Urban Greening Factor	Southampton City Council Green Space Factor	Swansea Council Green Space Factor
30	Tree pits and use of structural soil systems	0.9	0.8				0.8

Note: This table is a synthesis of UGF cover types from different applications. A comprehensive description of each UGF model was provided in UGF Paper 2.1. Review of Urban Greening Factor Applications (See [Appendix 2](#)). (A blank cell indicates that no weighting was assigned to that UGF surface cover type by that local authority).

References:

- 1 - Stated depth of shallow soils vary but generally <80cm (for Sutton this is <60cm)
- 2 - Stated depth of deep soils vary but generally >80cm (for Sutton this is >60cm)
- 3 - Swansea provides a higher weighting to Biodiverse green walls
- 4 - Extensive green roofs have shallow soils (<100mm) & monoculture planting (e.g., sedum matting)
- 5 - Intensive green roofs have deeper soils (>150mm) in some locations
- 6 - Factors for tree planting vary on canopy size and planting specification and range from 0.3 - 0.7
- 7 - Swansea includes higher factors for the use of native plant species

4.3 Each UGF application that was assessed offers a menu of similar greening elements although the total number of surface cover types varies - Sutton, Portsmouth and Southampton have 12, City of London has 16, Greater London Authority has around 19, and Swansea has 21 different cover types. Only the Greater London Authority includes a weighting for the protection of existing trees and vegetation, whilst Swansea includes increased weightings where native species or species-rich seed mixes are used.

4.4 In general, there is clear similarity in the selection of surface cover types and their weightings across the applications reviewed. The lowest weightings are assigned to various paving surfaces (0.0 - 0.4), amenity and unplanted water features (0.2), short mown amenity lawns and grassland (0.4) and ground cover and shrub planting (0.3 - 0.6). This reflects surface cover types that have limited functionality,

low permeability, or little biodiversity value. The highest weightings are given to the preservation of existing vegetation and trees (1.0), areas of wetland and open water (1.0), planting of woodland in contact with sub-soil (1.0), the planting of semi-natural vegetation (1.0) and the planting of wildflowers and perennial meadows (0.5 - 0.7). Weightings for the planting of new trees varies depending on the specification and planting techniques (0.4 - 0.7). The weightings for green roofs (0.3 - 0.9) also vary depending on the depth of substrate and whether they are categorised as extensive, with limited biodiversity value, or intensive, providing greater vegetation cover and social benefit.

Surface Cover Weightings used in International Applications

- 4.5 An analysis of the cover types used in six established international UGF applications indicates a very similar number of criteria as those used in UK models. These include paved surfaces, sustainable drainage systems, various types of vegetation, tree planting, green roofs and green walls. Some applications use a relatively simple set of surface cover types whilst others have a more sophisticated set of surface covers including three for different forms of green roof and two for different types of green wall. The full set of surface cover types used in the six international examples is shown in Table 4.

Table 4 - Comparison of International Urban Greening Surface Cover Weightings

No	UGF Surface Cover Types	Berlin, Germany Biotope Area Factor	Helsinki, Finland Green Factor Method	Malmö, Sweden Green Space Factor	Paris, France Biotope Coefficient	Seattle, United States Green Space Factor	Washington DC, United States Green Area Ratio
1	Sealed paving surfaces	0.0		0.0	0.0		
2	Partially sealed paving surfaces	0.3	1.0	0.2	0.3	0.2	0.4

No	UGF Surface Cover Types	Berlin, Germany Biotope Area Factor	Helsinki, Finland Green Factor Method	Malmö, Sweden Green Space Factor	Paris, France Biotope Coefficient	Seattle, United States Green Space Factor	Washington DC, United States Green Area Ratio
3	Semi-open paving surfaces	0.5	1.3	0.4	0.5	0.5	0.5
4	Vegetation unconnected to sub-soil - Shallow ¹	0.5		0.7	0.5	0.1	0.3
5	Vegetation unconnected to sub-soil - Deep ²	0.7		0.9	0.7	0.6	0.6
6	Vegetation connected to sub-soil	1.0		1.0	1.0		
7	Wetland / open water surfaces for 6+ months		2.6	1.0		0.7	
8	Rainwater infiltration / vegetated SuDS ³	0.2	2.5	0.2	0.2	1.0	0.4
9	Rainwater harvesting		1.4	0.2			
10	Green walls - connected to the ground	0.5	1.1	0.7	0.5	0.7	0.6
11	Green walls - unconnected to the ground	0.7	1.1	0.7	0.5	0.7	0.6

No	UGF Surface Cover Types	Berlin, Germany Biotope Area Factor	Helsinki, Finland Green Factor Method	Malmö, Sweden Green Space Factor	Paris, France Biotope Coefficient	Seattle, United States Green Space Factor	Washington DC, United States Green Area Ratio
12	Green roofs - extensive with shallow soil ⁴	0.5	1.3	0.4	0.7	0.4	0.6
13	Green roofs - semi-intensive ⁵	0.7			0.7		
14	Green roofs - intensive with deep soil ⁶	0.8	1.8	0.6	0.7	0.7	0.8
15	Preservation of existing trees		3.4			0.8	0.8
16	Preservation of other existing vegetation ⁷		2.1				
17	Planting of new trees ⁸		2.7	Pts		0.4	0.6
18	Planting of shrubs and bushes		1.7	Pts		0.3	0.3
19	Planting of hedges			1.0			
20	Planting of groundcover and perennial planting		1.6	0.4		0.1	0.2

No	UGF Surface Cover Types	Berlin, Germany Biotope Area Factor	Helsinki, Finland Green Factor Method	Malmö, Sweden Green Space Factor	Paris, France Biotope Coefficient	Seattle, United States Green Space Factor	Washington DC, United States Green Area Ratio
21	Planting of short mown amenity grassland		1.1				
22	Planting of wildflower / perennial meadows		1.8				
23	Planting of native or drought tolerant species ⁹		1.0			0.1	0.1
24	Food growing and allotment provision ⁹		2.2			0.1	0.1
25	Planting / landscape visible by general public ⁹					0.1	
26	Water features (utilising at least 50% recycled water)						0.2
27	Tree pits and use of structural soil systems					0.2	0.4
28	Planting irrigated by harvested rainwater ^{9/10}					0.2	0.1

No	UGF Surface Cover Types	Berlin, Germany Biotope Area Factor	Helsinki, Finland Green Factor Method	Malmö, Sweden Green Space Factor	Paris, France Biotope Coefficient	Seattle, United States Green Space Factor	Washington DC, United States Green Area Ratio
29	Area of renewable energy generation						0.5

Note this table is a synthesis of UGF cover types from different applications, a comprehensive description of each UGF model was provided in Paper 2.1. Review of Urban Greening Factor Applications – see [Appendix 2](#)). A blank cell indicates that no weighting was assigned to that UGF surface cover type by that municipality.

References:

Pts - Malmo awards additional Green Points providing additional bonus points for added ecological elements.

- 1 - Stated depth of shallow soils vary but generally <800mm (<600mm in Seattle)
- 2 - Stated depth of deep soils vary but generally >800mm (>600mm in Seattle)
- 3 - Helsinki has six separate weightings for Stormwater Solutions
- 4 - Extensive green roofs have shallow soils (<100mm), Berlin states substrate depth to be <200mm
- 5 - Semi-intensive green roofs have mixed depth soils (100-150mm), Berlin states substrate depth to be >120mm
- 6 - Intensive green roofs have deeper soils (>150mm), Berlin states substrate depth to be <150mm
- 7 - Helsinki has five separate weightings for the preservation of different vegetation types including bare rock
- 8 - Factors for tree planting vary on canopy size and specification and range from 0.4 - 0.6 (2.7 for Helsinki)
- 9 - Seattle and Washington DC include certain sustainable greening elements as bonus features
- 10 - Use of harvested rainwater for at least 50% of irrigation requirements

- 4.6 Berlin and Malmö were early pioneers of UGF and, alongside Paris, use the most concise set of around a dozen surface cover types. Applications for Helsinki and those in the United States are more complex and include additional features attributed to sustainable design. For example, there are more detailed specifications for sustainable drainage systems, more complex planting options, the harvesting and reuse of rainwater for irrigation and the generation of renewable energy. This reflects a general trend that shows more recent applications have become more sophisticated in surface water management and reuse and an increased focus on biodiversity by increased weightings in favour of native species.
- 4.7 There is less continuity in the weighting given for specific surface cover types across most international applications. Helsinki introduced its UGF as part of a Climate Proof City programme and uses a wider range of weightings from 1.0 to 3.4. Along with Malmö, Helsinki also has a system of bonus points for additional and more fine-grained interventions such as the provision of bird boxes, fruit trees and scented plants.
- 4.8 There is a general weighting preference across international applications away from sealed surfaces, traditional horticultural planting and amenity lawns and towards sustainable drainage, more intensive green roofs and retaining vegetated cover at ground level and connected to sub-soils. The highest weightings are given to the protection of existing trees and the provision of natural areas of open water and wetlands. Helsinki has five different weightings for the protection of onsite features including preserved, trees, shrubs, meadows and bare rock that is a particular characteristic of the city. For some the approach to tree planting is also more complex with Seattle, for example, having five different specifications and weightings for this surface cover element

5.0 Proposed UGF Surface Cover Weightings for England

- 5.1 Drawing on the technical analysis of UK and international examples, structured interviews with five leading UK applications and an analysis of current UGF planning policies listed in Section 6.0, a set of 22 different surface cover types is proposed for the Model UGF for England. This includes the most common components used in urban greening and is structured around four key headings:
- Vegetation and Tree Planting
 - Green Roofs and Walls
 - Sustainable Drainage Systems and Water Features
 - Paved Surfaces

5.2 A weighting factor from 0.0 to 1.0 is assigned to each cover type reflecting its environmental, social value in urban greening, the delivery of ecosystem services and the benefit to biodiversity and habitat creation. This is presented in Table 5 which includes a brief general description, more detailed guidance for each cover type is provided in Table 7. A separate UGF User Guide describes the principles and the process of applying urban greening factors through the planning system and development process.

Table 5 - Proposed UGF Surface Cover Weightings for England

No	UGF Surface Cover Type	Factor	General Description
Vegetation and Tree Planting			
1	Semi-natural vegetation and wetlands retained on site (Including existing / mature trees)	1.0	Protection and enhancement of existing vegetation within the development site including mature trees and habitats.
2	Semi-natural vegetation established on site	1.0	New areas of vegetation and species-rich habitats within the development site that are connected to sub-soils at ground level.
3	Standard / semi-mature trees (Planted in connected tree pits)	0.9	Tree planting established within engineered and interconnected systems with structural soils to maintain tree health at maturity.
4	Native hedgerow planting (Using mixed native species)	0.8	Dense linear planting of mixed native hedgerow species, at least 800mm wide and planted two or more plants wide.
5	Standard / semi-mature trees (planted in individual tree pits)	0.7	Tree planting established within separate designed tree pits with structural soils to maintain tree health at maturity

No	UGF Surface Cover Type	Factor	General Description
Vegetation and Tree Planting			
6	Food growing, orchards and allotments	0.7	Areas and facilities provided for local allotment and community-based food growing including formal orchards with fruit trees.
7	Flower rich perennial and herbaceous planting	0.7	New areas of mixed native and ornamental herbaceous and perennial plant species to support seasonal cycles of pollinating insects.
8	Single species or mixed hedge planting (Including linear planting of mature shrubs)	0.6	Dense linear planting of native or ornamental shrub and hedgerow species, closely spaced with one or more plants wide.
9	Amenity shrub and ground cover planting	0.5	Areas of formal and informal non-native shrub and ground cover planting connected to sub-soils at ground level or in planters.
10	Amenity grasslands including formal lawns	0.4	Areas of short-mown grass and lawn used for active sports or informal recreation that is regularly cut and generally species-poor.
Green Roofs and Walls			
11	Intensive green roof (Meets Green Roof Organisation / GRO Code)	0.8	High maintenance accessible green roof with planting and a depth of growing substrate with a minimum settled depth of 150mm.

No	UGF Surface Cover Type	Factor	General Description
Green Roofs and Walls			
12	Extensive biodiverse green roof (Meets the GRO Code, may include Biosolar)	0.7	Green roof with species-rich planting, with limited access, may include photovoltaics, the depth of growing substrate is 100 - 150mm.
13	Extensive green roof (Meets GRO Code)	0.5	Low maintenance green roof, limited species mix in planting and with no access, the depth of growing substrate is 80 - 150mm.
14	Extensive sedum only green roof (Does not meet the GRO Code)	0.3	Low maintenance sedum green roof, no access, combined depth of growing substrate, including sedum blanket, is less than 80mm.
15	Green facades and modular living walls (Rooted in soil or with irrigation)	0.5	Vegetated walls with climbing plants rooted in soil supported by cables or modular planted systems with growing substrate and irrigation.
SuDS and Water Features			
16	Wetlands and semi-natural open water	1.0	Areas of semi-natural wetland habitat with open water for at least six months per year contributing to surface water management.
17	Rain gardens and vegetated attenuation basins	0.7	Bio-retention drainage features including vegetated rain gardens and attenuation basins that also provide biodiversity benefit.

No	UGF Surface Cover Type	Factor	General Description
SuDS and Water Features			
18	Open swales and unplanted detention basins	0.5	Sustainable drainage systems to convey and temporarily hold surface water in detention basins with minimal vegetation cover.
19	Water features (unplanted and chlorinated)	0.2	Ornamental and generally chemically treated water features providing amenity value but with minimal biodiversity and habitat benefit.
Paved Surfaces			
20	Open aggregate and granular paving	0.2	Porous paving using gravels, sands and small stones as well as recycled materials that allow water to infiltrate across the entire surface.
21	Partially sealed and semi-permeable paving	0.1	Semi-permeable paving using precast units and filtration strips that allow water to drain through defined joints and voids in the surface.
22	Sealed paving (including concrete and asphalt)	0.0	Impervious paving constructed of concrete, asphalt or sealed paving units that do not allow water to percolate through the surface.

Analysis of UGF Surface Covers and Ecosystem Services

5.3 A key objective for UGF is to increase the multi-functionality of green infrastructure in urban areas and the different weighting of surface covers takes this into account. The process of assigning weightings has been benchmarked by comparing the proposed surface covers and weightings with similar habitat types included in the [Environmental Benefits from Nature](#) (EBN) Tool (Natural England, 2021). This assigns a numerical value (1-10) for a suite of ecosystem services

across individual habitat types; higher values are given to those habitats that offer a greater degree of functionality for a particular ecosystem service. This analysis is presented in Table 6 which demonstrates that UGF surface cover types with higher weightings correlate relatively closely with habitat types that offer greater ecosystem service value.

Table 6 - Comparison of UGF Surface Cover Weightings and EBN Scores for Ecosystem Services

No	UGF Surface Cover Type	UGF Factor	EBN Habitat Type (v0.3.3 May 2021)	Food Production	Wood Production	Water Supply	Flood Regulation	Erosion Protection	Water Quality Regulation	Carbon Storage	Air Quality Regulation	Cooling and Shading	Noise Reduction	Pollination	Pest Control	Recreation	Aesthetic Value	Education	Interaction with Nature	Sense of Place
Vegetation and Tree Planting				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Semi-Natural vegetation and wetlands retained on site (including existing/mature trees)	1.0	Broadleaved, mixed and yew semi-natural woodland	1	6	3	9	10	10	10	7	10	8	7	8	10	10	10	10	10
			Tall herb and fern	1	0	8	5	8	5	4	1	2	1	8	10	8	10	6	8	4
2	Semi-natural vegetation established on site	1.0	Wood pasture and parkland with scattered trees	5	2	7	6	8	6	5	3	6	4	9	8	10	10	10	10	10
			Dense scrub	1	2	4	6	8	5	6	7	6	6	9	10	8	8	6	8	6
			Semi-natural grassland	6	0	9	4	8	5	4	1	2	1	9	8	10	10	10	10	10

No	UGF Surface Cover Type	UGF Factor	EBN Habitat Type (v0.3.3 May 2021)	Food Production	Wood Production	Water Supply	Flood Regulation	Erosion Protection	Water Quality Regulation	Carbon Storage	Air Quality Regulation	Cooling and Shading	Noise Reduction	Pollination	Pest Control	Recreation	Aesthetic Value	Education	Interaction with Nature	Sense of Place
Vegetation and Tree Planting				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
3	Standard/semi-mature trees (planted in connected tree pits)	0.9	N/A																	
4	Native hedgerow planting (using mixed native species)	0.8	Hedgerow with trees	1	2	4	7	9	5	7	8	7	7	10	10	8	10	10	10	10
5	Standard/semi mature trees (planted in individual tree pits)	0.7	Tree	0	1	1	6	6	2	7	6	8	4	7	8	8	10	8	8	10
6	Food growing, orchards and allotments	0.7	Traditional orchards	7	1	7	8	8	5	5	4	8	4	9	8	8	10	8	7	10
			Allotments, city farm, community garden	9	0	7	2	1	1	3	2	2	2	2	8	4	10	5	6	4
7	Flower rich perennial and herbaceous planting	0.7	Ephemeral/ short perennial	1	0	5	3	4	3	2	1	2	1	8	10	10	8	6	8	4

No	UGF Surface Cover Type	UGF Factor	EBN Habitat Type (v0.3.3 May 2021)	Food Production	Wood Production	Water Supply	Flood Regulation	Erosion Protection	Water Quality Regulation	Carbon Storage	Air Quality Regulation	Cooling and Shading	Noise Reduction	Pollination	Pest Control	Recreation	Aesthetic Value	Education	Interaction with Nature	Sense of Place
Vegetation and Tree Planting				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
8	Mixed hedge planting (including linear planting of mature shrubs)	0.6	Hedgerows	1	1	4	6	8	5	5	7	6	6	9	10	8	10	10	10	10
9	Amenity scrub and ground cover planting	0.5	Introduced Shrub	0	1	4	5	6	4	4	4	6	6	6	6	8	8	2	4	4
			Flower bed	0	0	7	2	2	1	2	1	2	1	6	6	8	10	2	6	4
10	Amenity grasslands and formal lawns	0.4	Amenity Grassland	0	0	7	3	4	2	3	1	2	1	2	2	10	5	2	2	2
Green Roofs and Walls				A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
11	Intensive Green Roof	0.8	Intensive green roof	0	0	0	3	1	1	2	1	6	1	6	4	6	5	4	2	6
12	Extensive biodiverse green roof (inc bio-solar)	0.7	Brown roof or extensive green roof	0	0	0	1	1	1	1	1	2	1	7	8	6	4	4	4	6
13	Extensive Green Roof	0.5	N/A																	
14	Extensive sedum only green roof	0.3	N/A																	
15	Climbing plants rooted in soil or modular system with irrigation	0.5	Green Wall	0	0	0	1	1	1	1	4	6	2	6	4	0	6	4	2	6

No	UGF Surface Cover Type	UGF Factor	EBN Habitat Type (v0.3.3 May 2021)	Food Production	Wood Production	Water Supply	Flood Regulation	Erosion Protection	Water Quality Regulation	Carbon Storage	Air Quality Regulation	Cooling and Shading	Noise Reduction	Pollination	Pest Control	Recreation	Aesthetic Value	Education	Interaction with Nature	Sense of Place
	Water Features and SuDS			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
16	Wetland or semi-natural open water	1.0	Fern, marsh, and swamp	1	0	10	4	8	7	6	1	4	1	4	3	6	10	10	10	10
			Freshwater	0	0	10	1	0	1	1	0	4	0	1	2	10	10	10	10	10
17	Rain gardens and vegetated SuDS	0.7	Rain garden	0	0	10	15	2	7	2	1	4	1	6	6	6	10	6	8	6
			SuDS, retention pool	0	0	10	10	4	6	3	1	3	1	3	3	10	6	4	4	4
18	Open swales and unplanted dentation basins	0.5	SuDS detention basin	0	0	10	10	0	1	4	0	4	0	3	3	10	8	4	4	4
			Bioswale	0	0	5	5	2	2	2	1	4	1	5	4	8	8	4	4	4
19	Water feature (unplanted and chlorinated)	0.2	N/A																	

No	UGF Surface Cover Type	UGF Factor	EBN Habitat Type (v0.3.3 May 2021)	Food Production	Wood Production	Water Supply	Flood Regulation	Erosion Protection	Water Quality Regulation	Carbon Storage	Air Quality Regulation	Cooling and Shading	Noise Reduction	Pollination	Pest Control	Recreation	Aesthetic Value	Education	Interaction with Nature	Sense of Place
	Paved Surfaces			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
20	Open aggregate and granular paving	0.2	Footpath / cycle path – green	0	0	5	2	3	1	2	1	2	1	4	4	10	6	2	4	6
21	Partially sealed and permeable paving	0.1	Artificial unvegetated, unsealed surface	0	0	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0
22	Sealed paving (including concrete and asphalt)	0.0	Sealed surface and building	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source – Natural England (2021) [Environmental Benefits from Nature Tool - Beta Test Version \(JP038\)](#). A blank cell indicates that the UGF Surface Cover type did not match to an Environmental Benefits from Nature Habitat type.

Detailed guidance and measurement of UGF Surface Cover Types

5.4 Table 7 provides a more detailed schedule of guidance for each surface cover type that can be used by local planning authorities and development teams to plan, design, and review the quality and content of urban greening proposals. The descriptions include reference to relevant guidance and standards that should be used to inform the design and specification of each surface cover and ensure the correct weighting is applied. The method of measurement is also given which will be used in calculating the UGF score.

Table 7 - Guidance on the specification and measurement of UGF Surface Cover Types for England

No	UGF Surface Cover Type	Factor
Vegetation and Tree Planting		
1	Semi-natural vegetation and wetlands retained on site (including existing / mature trees)	1.0
1.1	<p>Guidance - The protection and enhancement of existing vegetation, trees and habitats provide a variety of environmental, social, and economic benefits. This will protect soils, maintain permeability, reduce flood risk, and preserve biodiversity within a development site. Priority should be given to retaining, protecting and enhancing good quality native and semi-natural habitats including woodland and wetlands that offer particular ecology and hydrology benefits. Specific attention should be paid to prevailing national and local planning policies for nature conservation and in particular the National Planning Policy Framework (2021) and the protection of designated and priority habitats and species listed in the Natural Environment and Rural Communities Act (2006) - Schedule 41 (Natural England, 2010). Proposals should also take account of BS 8683:2021 Process for designing and implementing Biodiversity Net Gain (BSI 2021), and BS 5837:2012 - Trees in relation to design, demolition, and construction (BSI, 2012). Where available this should make reference to a tree constraints plan (to BS 5837:2012) for the development site that should include an assessment of the future growth potential of trees and their canopies.</p>	

No	UGF Surface Cover Type	Factor
Vegetation and Tree Planting		
1.2	<p>Measurement - In Square Metres (m²) of semi-natural vegetation and habitats retained at ground level. Existing woodlands, clusters of trees and individual retained trees should be measured as the current total spread of the existing canopy where the trees are within the development boundary. This can be measured using either the existing tree constraints plan or other site survey plan. Trees and their associated canopies that are outside the site boundary should not be included in the calculation.</p>	
2	Semi-natural vegetation established on site	1.0
2.1	<p>Guidance - New areas of semi-natural vegetation that offer ecological value and biodiversity benefit including woodland, species-rich habitats and wildflower grasslands that are not frequently cut. Planting should be connected to sub-soils at ground level to improve permeability and surface water management. Proposals should take account of BS 8683:2021 Process for designing and implementing Biodiversity Net Gain (BSI, 2021a). Particular attention should be given to the management of existing and imported soils following the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, (DEFRA, 2009); BS 8601:2013 Specification for subsoil (BSI, 2013); and BS3882:2015 Specification for topsoil (BSI, 2015). Planting techniques should take account of BS 4428:1989 Code of practice for general landscape operations (BSI, 1989). Future landscape maintenance should take account of BS 7370-Part 4:1993 Grounds Maintenance - Recommendations for maintenance of soft landscape (BSI, 1993).</p>	
2.2	<p>Measurement - In Square Metres (m²) at ground level including areas under existing individual tree canopies but excluding areas under existing woodlands. New areas of general tree planting should be measured as standard / semi-mature trees (category 5).</p>	

No	UGF Surface Cover Type	Factor
Vegetation and Tree Planting		
3	Standard / semi-mature trees (planted in connected tree pits)	0.9
3.1	<p>Guidance - Trees make a substantial contribution to the amenity and environmental performance of urban areas. Tree planting proposals should first take account of Trees, Planning and Development, A Guide for Delivery (TDAG, 2021). The planting of standard to semi-mature trees should following Trees in Hard Landscapes Guide (TDAG, 2014) and BS 8545:2014 – Trees (BSI, 2014). This surface cover type takes account of tree planting within connected engineered crated or raft systems using structural growing media to minimise the risk of compaction. The minimum soil volume should be equivalent to at least two thirds of the projected canopy area of the mature tree and specified to meet future rooting, nutrient, oxygenation, and irrigation needs.</p>	
3.2	<p>Measurement - In Square Metres (m²) of the area of spread of the tree canopy at maturity as stated by Tree Species Selection for Green Infrastructure (TDAG, 2019) or published by nursery supplier.</p>	
4	Native hedgerow planting (using mixed native species)	0.8
4.1	<p>Guidance - Native hedgerows provide valuable habitat, cover and ecological connectivity for biodiversity and deliver a variety of ecosystem services including improved microclimate and reduced air pollution. Mixed species planting, rather than single species, is better for wildlife and this is further enhanced by integrating occasional native tree species within the alignment of the hedge. Native hedgerows should be a minimum of 800mm wide and design proposals should take account of guidance and resources provided by Hedgelink¹, the coalition of organisations interested in hedgerows. Attention should be given to both implementation and future management, following BS 4428:1989 Code of practice for general landscape operations (BSI, 1989) and BS 7370-Part 4:1993 Grounds Maintenance - Recommendations for maintenance of soft landscape (BSI, 1993).</p>	

¹ Hedgelink UK: <https://hedgelink.org.uk/hedgerows>

No	UGF Surface Cover Type	Factor
Vegetation and Tree Planting		
4.2	Measurement - In Square Metres (m ²) including areas under existing or proposed tree canopies.	
5	Standard / semi-mature trees (planted in individual tree pits)	0.7
5.1	<p>Guidance - Tree planting proposals should first take account of Trees, Planning and Development, A Guide for Delivery (TDAG, 2021). The planting of standard to semi-mature trees should follow Trees in Hard Landscapes Guide (TDAG, 2014), Highway Tree Management: operations note 51 (Forestry Commission, 2019) and BS 8545:2014 - Trees (BSI, 2014). This surface cover type takes account of tree planting within individual designed tree pits using structural growing media to minimise the risk of compaction. Where possible the minimum soil volume should be equivalent to at least two thirds of the projected canopy area of the mature tree and specified to meet the future rooting, nutrient, oxygenation, and irrigation requirements. When this is not possible the tree should be planted in the expectation it can exploit the adjacent free-soil environment where this will not impact utilities or built structures.</p>	
5.2	<p>Measurement - In Square Metres (m²) of the spread of the tree canopy at maturity as stated by Tree Species Selection for Green Infrastructure (TDAG, 2019) or published by nursery supplier.</p>	
6	Food growing, orchards and allotments	0.7
6.1	<p>Guidance - Allotments and areas for community food growing provide a variety of public health, sustainability and ecosystem service benefits. Provision should take account of Local Government Association Growing in the Community good practice guidance (LGA, 2009) and supplementary documents (LGA, 2010) and current guidance from the People's Trust for Endangered Species guidance on Traditional Orchards (PTES, 2014), the Orchard Project, the National Association of Allotments and Leisure Gardeners and the Social Farms and Gardens organisation.</p>	

No	UGF Surface Cover Type	Factor
Vegetation and Tree Planting		
6.2	Measurement - In Square Metres (m ²) excluding areas existing or proposed non-orchard tree canopies.	
7	Flower rich perennial and herbaceous planting	0.7
7.1	Guidance - The provision of flower-rich areas of ornamental herbaceous and perennial planting enhances visual amenity, provide distinctive seasonal highlight and are particularly beneficial for pollinating insects. New areas of planting should prioritise mixed semi-natural and ornamental perennial plant species and draw on good practice including Plantlife publications, research in designed ecology (University of Sheffield, no date) and pollinator demonstration projects (Buglife) ² . Planting should take account of the particular substrate, establishment and management needs of pollinator-rich and species-rich planting; BS 4428:1989 Code of practice for general landscape operations (BSI 1989); and BS 7370-Part 4:1993 Grounds Maintenance - Recommendations for maintenance of soft landscape (BSI, 1993).	
7.2	Measurement - In Square Metres (m ²) including areas under existing or proposed tree canopies.	
8	Single species or mixed hedge planting (including linear planting of mature shrubs)	0.6
8.1	Guidance - Hedges are used to define boundaries and deliver a variety of ecosystem services including improved microclimate and reduced air pollution. Mixed species planting rather than single species is better for wildlife and design proposals should take account of guidance and resources provided by Hedgelinek ¹ , the coalition of organisations interested in hedgerows. Attention should be given to both implementation and future management, following BS 4428:1989 Code of practice for general landscape operations (BSI 1989) and	

² Buglife Pollinator Projects. <https://www.buglife.org.uk/our-work/pollinator-projects/>

No	UGF Surface Cover Type	Factor
Vegetation and Tree Planting		
	BS 7370-Part 4:1993 Grounds Maintenance - Recommendations for maintenance of soft landscape. (BSI 1993).	
8.2	Measurement - In Square Metres (m ²) including areas under existing or proposed tree canopies.	
9	Amenity shrub and ground cover planting	0.5
9.1	Guidance - Areas of substantially ornamental shrub and ground cover planting provides amenity and seasonal highlight. The depth of growing medium, including the use of raised planters, should be sufficient to ensure the long-term health of the planting areas. Species selection, planting techniques and maintenance should follow horticultural good practice, BS 4428:1989 Code of practice for general landscape operations Error! Bookmark not defined. (BSI, 1989) and BS 7370-Part 4:1993 Grounds Maintenance - Recommendations for maintenance of soft landscape (BSI, 1993).	
9.2	Measurement - In Square Metres (m ²) including areas under existing or proposed tree canopies.	
10	Amenity grasslands including formal lawns	0.4
10.1	Guidance - Areas of short mown grassland and formal lawns provide a variety of public health benefits associated with organised sport, children's play and informal recreation. Species selection, establishment techniques and maintenance should reflect the anticipated intensity of use. The depth and placement of growing medium should prevent compaction and be sufficient to ensure the long-term health of the grassland sward. Planting techniques should follow horticultural good practice, BS 4428:1989 Code of practice for general landscape operations (BSI, 1989) and BS 7370-Part 3:1991 Grounds maintenance - Recommendations for maintenance of amenity and functional turf Error! Bookmark not defined. (BSI, 1991).	

No	UGF Surface Cover Type	Factor
10.2	Measurement - in Square Metres (m ²) including areas under existing or proposed tree canopies.	
Green Roofs and Walls		
11	Intensive green roof (meets Green Roof Organisation / GRO Code)	0.8
11.1	Guidance - An Intensive and high maintenance Green Roof with regular access for people and constructed with a deep growing substrate at least 150mm in depth supporting a broad range of vegetation including lawns, shrubs, hedges and tree planting providing recreation and amenity space. These roofs may also combine qualities of a blue roof for temporary water attenuation. Design and management should meet the GRO Green Roof Code (GRO, 2021, para 2.2.4) for Intensive Green Roofs and where appropriate blue roof technical guidance (GRO, 2021, para 2.2.5 and NFRC, 2017).	
11.2	Measurement - In Square Metres (m ²) of areas of intensive green roof with a minimum settled depth of substrate of 150mm or more.	
12	Extensive biodiverse green roof (meets the GRO Code, may include Biosolar)	0.7
12.1	Guidance - An Extensive and relatively low maintenance Green Roof constructed with a growing substrate between 100mm and 150mm in depth supporting a variety of low growing and medium height plants including wild and meadow flowering species to support pollinating insects. Additional natural features and habitats should be incorporated to encourage insect populations and bird life to establish biodiverse roofs or biosolar roofs that incorporate photovoltaic (PV) panels. These may provide limited access for people and the design and management should meet the GRO Green Roof Code (GRO, 2021, para 2.2.2 and 2.2.3) for Extensive Wild and Meadow Flower Roofs or Biodiverse Roofs.	

No	UGF Surface Cover Type	Factor
12.2	Measurement - In Square Metres (m ²) of areas of semi-intensive green roof with defined depth of substrate between 100mm to 150mm including areas of roof below photovoltaic panels.	
Green Roofs and Walls		
13	Extensive green roof (meets GRO Code)	0.5
13.1	Guidance - An Extensive and low maintenance Green Roof constructed with a shallow growing substrate between 80mm to 150mm in depth supporting a limited variety of hardy and drought tolerant succulent or wildflower plant species. These generally do not provide access for people, the design and management should meet the GRO Green Roof Code (GRO, 2021, para 2.2.1) for Extensive Green Roofs.	
13.2	Measurement - In Square Metres (m ²) of areas of extensive green roof with defined depth of substrate between 80mm to 150mm.	
14	Extensive sedum only green roof (does not meet the GRO Code)	0.3
14.1	Guidance - An Extensive and very low maintenance Green Roof that commonly use pre-grown planted blankets of drought tolerant sedum plant species. They are constructed with a shallow growing substrate of up to 80mm and this depth may include a 20mm thick sedum blanket. They are not accessible, and their design and management does not meet the GRO Green Roof Code (GRO, 2021).	
14.2	Measurement - In Square Metres (m ²) of areas of extensive sedum only green roof with defined depth of substrate up to 80mm, including the sedum blanket.	
15	Green facades and modular living walls (rooted in soil or with irrigation)	0.5

No	UGF Surface Cover Type	Factor
15.1	<p>Guidance - Green walls include green façades with climbing plants rooted in soil supported by cables or modular living wall structures incorporating a growing substrate, planting, and irrigation system. Maintenance requirements vary and living walls require regular monitoring to ensure there is adequate water and nutrient supply to support plant growth. Design and management should take account of the National Building Specification's guide to facade greening part 1 (NBS, 2015a), part 2 (NBS, 2015b) and part 3 (NBS, 2015c) and current fire safety regulations for green walls that place limits their height.</p>	
Green Roofs and Walls		
15.2	<p>Measurement - In Square Metres (m²) of the vertical plane of the green wall to the height of the planting supports or modular system.</p>	
SuDS and Water Features		
16	Wetlands and semi-natural open water	1.0
16.1	<p>Guidance - Ponds and wetland habitats that provide areas of open water for at least six months a year that support attenuation and the natural treatment of surface water runoff. Design, establishment and long-term management should take account detailed guidance in the SuDS Manual Chapter 23 (CIRIA, 2015) and the recommendations to update Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS) and in particular Standard 6: Biodiversity (Defra, 2021). Maintenance should also take account of BS 7370-Part 5:1998 Grounds Maintenance - Recommendations for the maintenance of water areas (BSI, 1998).</p>	
16.2	<p>Measurement - In Square Metres (m²) of wetland habitats including areas of open water.</p>	
17	Rain gardens and vegetated attenuation basins	0.7
17.1	<p>Guidance - Sustainable Drainage Systems (SuDS) collect, store, convey and naturally filter surface water runoff. Bio-retention features that capture and retain water and are deliberately vegetated to increase habitat and biodiversity value include rain gardens (shallow planted depressions) and planted swales (shallow vegetated channels). Design,</p>	

No	UGF Surface Cover Type	Factor
	<p>establishment and long-term management should take account of detailed guidance in the SuDS Manual Chapter 17 - Wet swales and Chapter 18 - Bio-retention systems (CIRIA, 2015). Proposals should also take account of the recommendations to update Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS) and in particular Standard 6: Biodiversity (Defra, 2021).</p>	
17.2	<p>Measurement - In Square Metres (m²) of vegetated surface water drainage and attenuation features.</p>	
SuDS and Water Features		
18	<p>Open swales and unplanted detention basins</p>	0.5
18.1	<p>Guidance - Sustainable Drainage Systems (SuDS) collect, store, convey and natural filter surface water runoff. Open swales and detention basins (larger landscape depressions that are generally dry but fill temporarily) are used to convey surface water during periods of heavy rainfall. They have minimal vegetation cover and provide limited habitat and biodiversity value. Design, establishment and long-term management should take account of detailed guidance in the SuDS Manual Chapter 17 - Dry swales and Chapter 22 - Detention basins (CIRIA, 2015).</p>	
18.2	<p>Measurement - In Square Metres (m²) of open surface water drainage and detention features.</p>	
19	<p>Water features (unplanted and chlorinated)</p>	0.2
19.1	<p>Guidance - Water features that are designed and engineered to provide amenity value and visual interest but do not form part of a Sustainable Drainage System (SuDS). Water supply is generally provided by mains or borehole within a closed system that is generally chemically treated to maintain water quality.</p>	
19.2	<p>Measurement - In Square Metres (m²) of the open surface water area and enclosing structure.</p>	
Paved Surfaces		

No	UGF Surface Cover Type	Factor
20	Open aggregate and granular paving	0.2
20.1	Guidance - Porous paving, footpath and road surfaces that contribute to Sustainable Drainage Systems (SuDS) that intercept surface water runoff allowing it to infiltrate across the entire surface and percolate on through the base and sub-base layers. Materials include reinforced grass systems, bound and unbound gravels, aggregates, recycled materials and other porous paving materials.	
Paved Surfaces		
20.2	Measurement - In Square Metres (m ²) of the porous surface material including areas under existing or proposed tree canopies.	
21	Partially sealed and permeable paving	0.1
21.1	Guidance - Semi-permeable paving that contribute to Sustainable Drainage Systems (SuDS) by intercepting surface water runoff and allowing it to percolate through defined joints and voids and drain at defined locations using filter drains that can capture sediment. Design and construction of filtration features should take account of detailed guidance in the SuDS Manual Chapter 16 - Filter drains and Chapter 20 - Pervious pavements (CIRIA, 2015). Design and construction of unit paving should also take account of BS 7533-101:2021 - Pavements. Guidance (BSI 2021b) and Guidance on the permeable surfacing of front gardens published by Communities and Local Government and Environment Agency (DCLG, 2008).	
21.2	Measurement - In Square Metres (m ²) of the semi-permeable surface material including areas under existing or proposed tree canopies.	
22	Sealed paving (including concrete and asphalt)	0.0
22.1	Guidance - Sealed and impervious areas of paving constructed of concrete, asphalt or sealed paving units that do not allow water to percolate through the surface. These surfaces significantly reduce the permeability of sites, have no role in Sustainable Drainage Systems (SuDS) and can increase flood risk during periods of heavy rainfall. Permitted development rights for householders (MHCLG, 2019) requires all areas of hard surfacing in front gardens exceeding 5 Square Metres	

No	UGF Surface Cover Type	Factor
	(m ²) to be made of permeable or porous material under Class F of the Town and Country Planning (General Permitted Development) (England) Order 2015 .	
22.2	Measurement - In Square Metres (m ²) of the impervious surface material.	

6.0 Comparison of UGF Policies used in UK Planning Practice as per Planning Practice Guidance

6.1 Below lists a schedule of UGF policies that have been adopted in local plans or referenced in associated local planning guidance as per [Planning Practice Guidance](#). The list is in alphabetical order rather than chronologically structured and concludes with an emerging Green Factor policy for Greater Manchester and policies for two Development Corporations (LLDC and OPDC) in London.

- A. City of London - Urban Greening Factor
- B. Greater London Authority - Urban Greening Factor
- C. London Borough of Hackney - Urban Greening Factor
- D. London Borough of Hounslow - Urban Greening Factor
- E. London Borough of Islington - Urban Greening Factor
- F. London Borough of Sutton - Green Space Factor
- G. London Borough of Waltham Forest - Urban Greening Factor
- H. Portsmouth City Council - Urban Greening Factor
- I. Southampton City Council - Green Space Factor
- J. Swansea Council - Green Space Factor Tool
- K. Greater Manchester - Green Factor
- L. London Legacy Development Corporation - Urban Greening Factor
- M. Old Oak and Park Royal Development Corporation - Green Space Factor

A. City of London Urban Greening Factor

Source: [City of London Local Plan, City Plan 2036 Shaping the future City](#)

A.1 - p157 paragraph 6.6.4

The City Corporation seeks further urban greening to make the Square Mile more attractive to workers, residents and visitors. This would contribute to the

Mayor of London's ambition to make over 50 per cent of London green by 2050 and support London's designation in 2019 as the world's first National Park City.

A.2 - p160 paragraph 6.6.4 Policy OS2: City Greening

1. The provision of urban greening should be integral to the design and layout of buildings and the public realm.

- All development proposals will be required to demonstrate the highest feasible levels of greening consistent with good design and the local context;
- The installation of biodiverse extensive or intensive green roofs, terraces and green walls will be sought, where appropriate, and new development should not compromise these elements on existing buildings located nearby; and
- The loss of green walls and roofs, in whole or in part, will only be permitted in exceptional circumstances.

2. Major development proposals will be required to:

- Include an Urban Greening Factor (UGF) calculation demonstrating how the development will meet the City's target UGF score of 0.3 as a minimum; and
- Submit an operation and maintenance plan to demonstrate that the green features will remain successful throughout the life of the building.

A.3 - Page 161 paragraph 6.6.11

Urban greening provides a wide range of benefits for air quality, noise, urban heat island effect, rainwater run-off, biodiversity enhancement, recreation, and health and wellbeing of the City's communities. This will increase in importance as weather patterns continue to change with rising average temperatures, summer droughts and more intense rainfall events periodically through the year. The inclusion of blue infrastructure such as rain gardens and rainwater harvesting can help to minimise water use.

B. Greater London Authority Urban Greening Factor

Source: [GLA \(2021\) The London Plan, The Spatial Development Strategy for Greater London, March 2021, Greater London Authority](#)

B.1 - Page 114 paragraph 3.3.13

Maximising urban greening and creating green open spaces provides attractive places for Londoners to relax and play and helps make the city

more resilient to the effects of climate change. Landscaping and urban greening should be designed to ecologically enhance and, where possible, physically connect, existing parks and open spaces.

B.2 - Page 322 Policy G5 Urban Greening

Boroughs should develop an Urban Greening Factor (UGF) to identify the appropriate amount of urban greening required in new developments. The UGF should be based on the factors set out in Table 8.2 in the London Plan but tailored to local circumstances. In the interim, the Mayor recommends a target score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development (excluding B2 and B8³ uses)

B.3 - Page 322 paragraph 8.5.1

The inclusion of urban greening measures in new development will result in an increase in green cover, and should be integral to planning the layout and design of new buildings and developments. This should be considered from the beginning of the design process.

B.4 - Page 322 paragraph 8.5.2

Urban greening covers a wide range of options including, but not limited to, street trees, green roofs, green walls, and rain gardens. It can help to meet other policy requirements and provide a range of benefits including amenity space, enhanced biodiversity, addressing the urban heat island effect, sustainable drainage and amenity – the latter being especially important in the most densely developed parts of the city where traditional green space is limited. The management and ongoing maintenance of green infrastructure should be considered and secured through the planning system where appropriate.

B.5 - Page 323 paragraph 8.5.4

The UGF is currently only applied to major applications but may eventually be applied to applications below this threshold as boroughs develop their own models. London is a diverse city so it is appropriate that each borough

³ The Town and Country Planning (Use Classes) Order (1987), as amended. Available at: [The Town and Country Planning \(Use Classes\) Order 1987 \(legislation.gov.uk\)](#) ([as amended](#))

develops its own approach in response to its local circumstances. However, the challenges of climate change, poor air quality and deficiencies in green space need to be tackled now, so while each borough develops its own bespoke approach the Mayor has recommended the standards set out above. Further guidance will be developed to support implementation of the Urban Greening Factor.

B.6 - Page 323 paragraph 8.5.5

Residential development places greater demands on existing green infrastructure and, as such, a higher standard is justified. Commercial development includes a range of uses and a variety of development typologies where the approach to urban greening will vary. Whilst the target score of 0.3 does not apply to B2 and B8 uses³, these uses will still be expected to set out what measures they have taken to achieve urban greening on-site and quantify what their UGF score is.

B.7 - Page 324

Table 8.2 - Urban Greening Factors

C. London Borough of Hackney Urban Greening Factor

Source: [LB Hackney \(2020\) Hackney A Place for Everyone Hackney Local Plan 2033 Strategic Planning Adopted July 2020](#)

C.1 - Page 156 paragraph 11.6

Living roofs and vertical forests are important features of urban greening, providing various benefits including improvements in the visual appearance of buildings, increased biodiversity, mitigation and adaptation to climate change, and reduction in air and noise pollution. Green roofs can work well alongside and even enhance the performance of renewable energy technologies, particularly solar photovoltaic systems, for example by regulating temperature.

C.2 - Page 159 Policy LP48: New Open Space

- A. All development proposals for 10 or more residential units must maximise on-site provision of open space and where feasible provide: (i) 14 sqm per person of communal open space; and (ii) An Urban Greening Factor score of at least 0.4.
- B. All major mixed-use or commercial development must maximise on-site provision of open space and where feasible provide: (i) 4 sqm of communal open space per employee; and (ii) An Urban Greening Factor score of at least 0.3.

C.3 - Page 160 paragraph 11.13

In addition to providing communal open space, applicants are required to incorporate urban greening measures in the layout and design of a scheme to achieve an Urban Green Factor score of at least 0.4 for major residential schemes and at least 0.3 for major mixed-use or commercial schemes in line with the London Plan. This will help to increase green cover across each development and contribute towards the aims of Policy LP49 Green chains and Green Corridors.

D. London Borough of Hounslow Urban Greening Factor

Source: [London Borough of Hounslow West of Borough Local Plan Review, Volume 3 Pre-Submission Regulation 19 Consultation, July 2019](#)

D.1 - Page 62 Policy WoB4: Green Belt, Metropolitan Open Land and Open Space

i) Improve the overall green coverage and ecology of the area by including urban greening from the beginning of the design process with an urban greening factor target score of 0.2 for predominantly industrial development, 0.3 for mixed employment and commercial development and 0.4 for predominately residential development. Measures can include planting street trees, creating living roofs and walls and providing habitats for wildlife which increase biodiversity.

D.2 - Page 64 paragraph 4.53

Developers will be expected to consider green infrastructure and open space provision early in the design process, in terms of its spatial layout, functionality, quality of design and microclimate and long-term management arrangements. They will need to demonstrate how their scheme compares to the London Plan Urban Greening Factor and the accompanying Green Points system. This approach aims to secure a minimum amount of green cover in every building lot, and to minimise the degree of sealed or paved surfaces in development. In order to optimise green infrastructure provision, developers should score their proposed green infrastructure against the Urban Greening Factor and Green Points System criteria. Developments should seek to achieve the targets set out in the most up-to date mayoral policy or guidance, which at the time of this Local Plan's publication are a score 0.2 for predominantly industrial development, 0.3 for mixed employment and commercial development and 0.4 for predominately residential development.

D.3 - Policy WoB4 Key Performance Indicators

4.4 - Increase Urban Greening of developments in line with GLA Urban Greening Factor. Performance of approved major developments against London Plan Urban Greening Factor (UGF) targets scores (0.4 for predominantly residential schemes, 0.3 for predominantly commercial).

Source: [London Borough of Hounslow Great West Corridor Local Plan Review, Volume 4 Pre-Submission Regulation 19 Consultation, July](#)

D.4

The Hounslow Great West Corridor Local Plan Review, Volume 4 includes the same Urban Greening policies as those in Volume 3 for the West of Borough

E. London Borough of Islington Urban Greening Factor

Source: [Islington Local Plan Strategic and development management policies - Regulation 18 draft, November 2018](#)

E.1 - Page 142 Policy G1: Green Infrastructure

E - Major developments are required to conduct an Urban Greening Factor assessment in accordance with the methodology in the London Plan. Schemes should achieve an Urban Greening Factor score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development.

E.2 - Page 143 paragraph 5.5

The London Plan includes an interim London wide Urban Greening Factor model to assist boroughs and developers in determining the appropriate provision of urban greening for new developments. Islington Council will use the London wide model in the determination of planning applications but may in time develop a local model through further supplementary guidance. The Council will expect developers to design urban greening into developments from the earliest possible stage and take every opportunity to incorporate urban greening interventions into their development.

F. London Borough of Sutton Green Space Factor

Source: [London Borough of Sutton \(2018\) Sutton Local Plan 2016-2031, February 2018.](#)

F.1 - Page 114 Policy 33: Climate Change Adaptation

Proposed developments should minimise vulnerability of people and property and be fully adapted and resilient to the future impacts of climate change by:

Minimising overheating and contribution to the urban heat island effect by permeating the development with blue and green spaces and by incorporating a range of natural cooling measures as part of the design and layout, including passive design measures (e.g., building orientation), shading, planting and soft landscaping, trees, ponds, SuDS measures and other surface water features. All major developments should:

- comply with the Mayor's cooling hierarchy as set out in London Plan Policy 5.9.
- incorporate and manage green roofs or green walls where feasible.
- for previously developed sites - aim to achieve an increase in overall green space coverage of at least 10% compared to baseline conditions prior to development.
- for previously developed sites - aim to achieve an improved Green Space Factor (GSF) score of at least +0.2 compared to the baseline GSF score prior to redevelopment.
- greenfield sites - aim to achieve a GSF score of at least 0.5.

F.2 - Page 116 paragraph 33.20

The council's 'Green Space Guidelines for Sutton' recommend that all residential and major non-residential developments on previously developed sites should aim to achieve at least a 10% increase in green coverage, particularly in built-up areas deficient in open space and therefore at greatest risk of overheating during summer heatwaves. The guidelines also include details of the council's 'Green Space Factor' scoring system which should be used by developers for calculating the extent to which different types of green infrastructure have been incorporated as part of the design and layout. If onsite delivery of green space is not feasible, the council will negotiate Section 106 agreements to deliver appropriate mitigation measures elsewhere.

F.3 - Page 117 paragraph 33.20

Information to be provided in support of planning applications

Sustainability statements submitted with major planning applications (which may form part of the design and access statement) or landscaping schemes as appropriate should provide details of any proposed green infrastructure together with a proposed aftercare, management and monitoring arrangements), tree planting measures and how the proposed development will meet the council's minimum green coverage and Green Space Factor standards in Policy 33(b).

G. London Borough of Waltham Forest Urban Greening Factor

Source: [Waltham Forest Local Plan \(LP1\) 2020 –2035, Regulation 19, October 2020](#)

G.1 - Page 177 Policy 79 - Green Infrastructure and the Natural Environment

B - In the event that development proposals are allowed in exceptional circumstances in Green Belt or MOL within the meaning of national policy and the London Plan, they should:

Vi - New development must be designed to maximise opportunities for urban greening through appropriate landscaping schemes and planting of trees.

D - New high quality and usable open spaces and/or landscape infrastructure must be provided in major new developments. Where new development cannot contribute to usable open space provision or landscaping on-site, or provision is deemed insufficient to the scale and nature of the development, financial contributions will be sought for the ongoing maintenance of public open space;

G.2 - Page 179 paragraph 17.2

The projected growth in population and housing demand increases the importance of improving the provision of accessible open spaces, especially in areas of deficiency. Accordingly, all developments that create five or more units will need to submit an ecology report which will use the Mayor's Urban Greening Factor (UGF) to demonstrate that the development aims to exceed the Mayor of London's minimum UGF score of four. Full justification will be required where open space or landscape infrastructure cannot be provided on-site.

G.3 - Page 187 paragraph 17.23

The Draft London Plan (Policy G5) promotes the importance of sustainable urban greening as a fundamental element of site and building design proposals. This may include the incorporation of living roofs and walls or spaces for species to nest, roost or hibernate. This is especially important in order to protect species or mitigate against any unavoidable loss, such as at brownfield sites. As well as providing a valuable habitat, landscaping serves to reduce the urban heat island effect created by climate change. In accordance with the Climate Change Strategy, climate change tolerant species and/or native species are preferable in landscaping

schemes. For developments of 10 units and above, developers will be encouraged to exceed the Urban Greening Factor targets scores set out in Policy G6 of the Draft London Plan. As the Local Plan progresses, updated UGF targets specific to the borough may be developed into a Supplementary Planning Document which provide further details on the soft landscaping approach that the Council is promoting in new development. (policies 79 - 80)

Source: [Shaping the Borough, Waltham Forest Local Plan 2020 - 2035 \[LpI\] Submission, September 2021, Schedule of proposed changes to the published plan.](#)

G.4 - Amendment to Policy 79 B

Vi - New development must be designed to maximise opportunities for urban greening (as defined within London Plan 2021 Policy G5) through appropriate landscaping schemes and planting of trees.

H. Portsmouth City Council Urban Greening Factor

Source: [Portsmouth Local Plan 2038, 'Regulation 18' Consultation Document Draft for consultation September 2021](#)

H.1 - Page 153 paragraph 528

The proposed GI network also identifies areas that present opportunities to deliver additional greening, given their current lack of green coverage and/ or proposals for more significant redevelopment during the plan period. To help quantify this, an Urban Greening Factor (UGF) tool has been developed to accompany planning applications submitted within the UGF areas (as identified on Figure 21). The UGF tool allows for a simple assessment process comparing green infrastructure coverage on a proposed development site, pre and post development. Betterment in GI provision through on-site net gains is required, though there is flexibility for how this is achieved*. A completed assessment will need to accompany all development proposed within these areas.

*Further explanation of the UGF tool can be found in Green Infrastructure background paper (Portsmouth City Council, 2021)

H.2 - Page 155 Policy G2: Green Infrastructure

All proposals should demonstrate how green infrastructure has been integral in the design of development, and opportunities for net gains and/or enhancements have been explored. Planning permission will be granted where:

Development within the identified 'Urban Greening Factor' (UGF) areas demonstrates an increase in green infrastructure, via the UGF tool.

H.3 - Page 156 Policy Monitoring

Quantifiable net gain in green infrastructure in the city - square metres of additional green infrastructure incorporated into new development each year, measured from the urban greening factor.

H.4 - Page 255 paragraph 7.4.10 Draft Strategic Policy S4: Cosham

Redevelopment also presents an opportunity to bring about significant environmental and social benefits through Green Infrastructure enhancements. Cosham District Centre has been identified as an area to implement the 'Urban Greening Factor' tool, and Northern Road as a 'green corridor', with the aim of delivering net gains in green infrastructure through new development and public realm enhancements. See Policy G2: Green Infrastructure on page 155.

Source: [Green Infrastructure Background Paper, July 2021](#)

H.5 - Page 51 paragraph A.13

It is considered that the requirement of some degree of improvement above a minimum is the best approach for a UGF policy to take at present. By asking for an improvement in overall green infrastructure it is felt that a policy can begin to bring about cumulative gains in the natural environment in the city over time as development comes forward. However, by keeping the degree of improvement flexible initially (above a conservative minimum figure), the chances of conflict with other requirements on a development that might bring about viability concerns, will be kept as low as possible.

H.6 - Page 52 paragraph A.15

Regarding the spatial extent of the policy, the compulsory requirement to demonstrate net gains in green infrastructure via the UGF would only be applied to select areas of the city initially, though the policy will be drafted to encourage its use around the rest of Portsmouth. The UGF focus areas selected are those that are considered in particular need of greening due to their strategic role in delivering new development. One such area first identified for the UGF to be applied was the city centre area where the Council expects significant new development to come forward in the future. It is an area of extensive hard surfacing, and significant new greening could contribute to a variety of objectives such as improvements in air quality, climate resilience, and economic investment generated by an improved public realm.

H.7 - Page 53 Paragraph A.16

It is considered that more focussed greening measures could also be beneficial in certain other locations of the city in order to meet sustainability objectives where the Council intends to encourage greater levels of housing growth and other forms of development going forwards. The UGF policy approach has therefore been expanded to focus on a number of other strategic sites allocated in the Local Plan that do not benefit from significant greenery at present, as well as key district centres across the city. The full proposed spatial extent of the policy area is displayed in Figure 5.1:

I. Southampton City Council Green Space Factor

Source: [Southampton City Council \(2015\) Planning Southampton City Centre, City Centre Action Plan, adopted 18 March 2015.](#)

I.1 - Page 53 Policy AP 12 Green Infrastructure and Open Space

6 - Require all developments (and especially the key sites set out in chapter 5) to assess the potential of the site for appropriate green infrastructure improvements by using the Council's Green Space Factor, and to improve the score for the site.

I.2 - Page 55 paragraph 4.117

Suitable qualitative improvements are to be measured using the Council's Green Space Factor (GSF). The Core Strategy requires green infrastructure (GI) to be protected for biodiversity and recreation purposes; however, it is readily apparent that different areas of the city have different levels of GI. Describing how and to what extent areas differ can be challenging and is often a subjective process. The GSF enables an objective assessment of the quality and functionality of GI to produce a score for any site or area in the city centre. The Council will advise on the GI required in a particular area or plot and provide examples of GI interventions that can deliver such benefits.

J. Swansea Council Green Space Factor Tool

Source: [Natural Resources Wales and Swansea Council \(2021\) Swansea Central Area: Regenerating Our City for Wellbeing and Wildlife, February 2021](#)

J.1 - Page 6

Green infrastructure will be planned and designed to be multi-functional and will involve a partnership approach, using innovative solutions, including Supplementary Planning Guidance for green infrastructure and a Green Space

Factor tool (GSF tool). Swansea Council is committed to using the GSF tool, designed for the Swansea Central Area, as a measure for the quantity and functionality of green space in its developments.

J.2 - Page 8 paragraph 1.5

The implementation of the strategy is supported by the use of the Swansea Green Space Factor (GSF) tool, designed to increase the quantity and functionality of GI schemes (Appendix 3 of the source document above).

J.3 - Page 19

Ensure the Green Space Factor tool (GSF tool) is used on Council led developments.

J.4 - Page 45 paragraph 5.6

Swansea Council will apply the Green Space Factor Tool (GSF tool) in consideration of all development in the Swansea Central Area (see Appendix 3 of the source document above). This is a simple method for measuring the extent and likely effectiveness (in providing various ecosystem services) for various interventions included in project proposals. The Council will use this tool to assess the quantity and quality of GI and may choose to set minimum targets in the central area where redevelopment is proposed.

J.5 - Page 46 paragraph 5.7

The GSF tool is considered the effective measure for assessing how much permeable greenspace is needed across a development. Natural Resources Wales and Swansea Council see the GSF tool as best practice for planning the enhancement of GI in the central area, delivering the green artery as set out in the Swansea Central Area Regeneration Framework and meeting obligations under Schedule 3 to the Flood and Water Management Act 2010. Natural Resources Wales and Swansea Council expect and encourages developers to use the tool as part of the design and application process.

J.6 - Page 73 paragraph A3.2.1

The Swansea Green Space Factor (GSF) tool is aimed primarily at new developments and refurbishments. It can be used to establish a baseline for retrofit projects and used to measure the associated improvements. Minimum target scores will be an expectation and will be as follows:

- 0.3 for predominantly commercial developments, and
- 0.4 for predominantly residential developments.

K. Greater Manchester Green Factor

Source: [Greater Manchester's Plan For Homes, Jobs and the Environment, Greater Manchester Spatial Framework, Revised Draft - January 2019](#)

K.1 - Page 146 Policy GM-G 9 - Standards for a Greener Greater Manchester

Greater Manchester will develop standards in relation to:

A Greater Manchester "Green Factor", which sets out the level of on-site green infrastructure that new developments are expected to provide so as to meet their occupants' needs and contribute to the extent and interconnectedness of the wider network. The Green Factor will provide a baseline expectation based on the proportion of the site that is covered by different types of green infrastructure features.

Source: [GMCA \(2019\) Guidance For Greater Manchester - Embedding Green Infrastructure Principles Final, October 2019, Version 7](#)

K.2 - Page 2

This document is written in the format of guidance to Greater Manchester's Local Authorities (LAs). It is part of a commission undertaken by WSP for the Greater Manchester Combined Authority (GMCA) to provide guidance on the implementation of Natural England's national principles for green infrastructure standards across the Greater Manchester area, as set out in the narrative supporting policy GM-G 9 of the Greater Manchester Spatial Framework (GMSF).

K.3 - Page 26 Table 2

Decreasing surface water flood risk

Recommended tools - Green Factor for identifying the relative permeability of different land surfaces within a development site (scored from 0 to 1), and comparing to a numeric standard to be set by individual LAs and/or the GMCA

K.4 – Page 31 A Greater Manchester 'Green Factor'

There is currently no specific standard for reducing surface water flooding in Greater Manchester. However, the GMCA intends to develop one similar to that recently adopted in London. Policy G5 of the draft London Plan requires boroughs to develop an Urban Greening Factor to identify the appropriate amount of permeable surface cover required in new developments. On a scale of 0 (no permeability) to 1 (full permeability), a target score of 0.4 is recommended for developments that are predominately residential, and 0.3 for predominately commercial, though the scores may be tailored to local circumstances. The Greater

Manchester 'Green Factor' is expected to be similar to the London one, though it is likely that recommended scores will differ for rural and urban areas given the nature of the city region. Whilst LAs will be required to impose the Green Factor on new developments, following the approach of London, it is likely that target scores set by the GMCA will be variable at LA level so as to be appropriate to local circumstances.

Once developed by the GMCA, this will set out the level of on-site green infrastructure that new developments are expected to provide, so as to meet their occupants' needs, increase ecosystem service delivery, and contribute to the extent and interconnectedness of the wider network. The Green Factor will provide a baseline expectation based on the proportion of the site that is covered by different types of green infrastructure features (each with their own 'factor' or 'score'). Similar to the 'Urban Greening Factor' adopted in the London Local Plan, the Green Factor will be based on a set of regional factors, but tailored to local circumstances.

Source: [Places For Everyone, Joint Development Plan Document – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan Publication Stage, August 2021](#)

K.5 – Page 162 Policy JP-G 8 – Standards for Greener Places

We will develop standards in relation to - A "Green Factor", which sets out the level of on-site green infrastructure that new developments are expected to provide so as to meet their occupants' needs and contribute to the extent and interconnectedness of the wider network. The Green Factor will provide a baseline expectation based on the proportion of the site that is covered by different types of green infrastructure features.

L. London Legacy Development Corporation Urban Greening Factor

Source: [LLDC \(2020\) Local Plan 2020 to 2036, London Legacy Development Corporation, Adopted 21 July 2020](#)

L.1 – Page 97 paragraph 6.15

Applications for major development schemes will be expected to provide the appropriate, high-quality and well maintained urban greening, as a fundamental element of site and building design meeting the Urban Greening Factor target score as set in the Draft New London Plan Policy G5 Urban Greening.

L.2 Page 152 Strategic Policy SP.5: A sustainable and healthy place to live and work

The Legacy Corporation will work with its partners to achieve a sustainable future for those who live and work in its area and contribute to a sustainable future for east London and London as a whole, by:

11 - Urban greening through planting in the public realm and private spaces and green and brown roofs

L.3 Page 166 Policy S.9: Overheating and urban greening

Outside the existing parks and open spaces within the Legacy Corporation area, opportunities to introduce planting of trees in private and public spaces, including streets, along with those for including green roofs, green walls and other planting opportunities, should be taken to maximise the contribution that urban greening can make in creating a liveable environment and maximising local biodiversity and encouraging local food growing.

Planning applications for major development schemes should set out within the Design and

Access Statement the measures included to avoid overheating (including overheating analysis against a mid-range climate scenario for the 2030s) and excessive heat generation and, where appropriate, to maximise urban greening.

L.4 Page 273 Local Plan Key Performance Indicators

9 - Protect Biodiversity and Habitat - Number of applications approved for development schemes meeting the Urban Greening Factor target.

M. Old Oak and Park Royal Development Corporation Green Space Factor

Source: [OPDC \(2017\) LOCAL PLAN Revised Draft for Regulation 19 Consultation, 29 June 2017](#)

M.1 - Page 163 Policy EU2: Urban Greening and Biodiversity

OPDC will seek to ensure that development in the OPDC area secures an overall increase in green cover and a net gain in biodiversity by supporting development proposals where they:

d) demonstrate that major development proposals have optimised urban greening in their schemes with reference to the Green Space Factor and Green points system score;

M.2 - Page 165 paragraph 6.31

To measure the quantity and quality of green space, applicants should demonstrate how their scheme compares to the Green Space Factor and the accompanying Green Points system. This approach aims to secure a minimum amount of green cover in every building lot, and to minimise the degree of sealed or paved surfaces in development. This tool has been tested and adopted by a number of UK local authorities including the London Borough of Sutton and the City of Southampton. In order to optimise green infrastructure provision, developers should, as part of their Green Infrastructure and Open Space Strategy and Management Plan (GIOSMPs) score their proposed green infrastructure against the Green Space Factor and Green Points System criteria.

References

British Standards Institution (BSI) (1989) BS 4428:1989 Code of practice for general landscape operations (excluding hard surfaces). London BSI. Available at: <https://shop.bsigroup.com/products/code-of-practice-for-general-landscape-operations-excluding-hard-surfaces> (Accessed 18th January 2023).

British Standards Institution (BSI) (1991- 1998) BS 7370 Parts 1-5. Grounds Maintenance (including water areas). London BSI. Available at: <https://shop.bsigroup.com/search?query=BS7370&type=products> (Accessed 18th January 2023).

British Standards Institution (BSI) (2012) BS 5837:2012 Trees in relation to design, demolition and construction. Recommendations, London BSI. Available at: <https://shop.bsigroup.com/products/trees-in-relation-to-design-demolition-and-construction-recommendations> (Accessed 18th January 2023).

British Standards Institution (BSI) (2013) BS 8601:2013 Specification for subsoil and requirements for use, London BSI. Available at: <https://shop.bsigroup.com/products/specification-for-subsoil-and-requirements-for-use> (Accessed 18th January 2023).

British Standards Institution (BSI) (2014) BS 8545:2014 Trees: from nursery to independence in the landscape. Recommendations, London BSI. Available at: <https://shop.bsigroup.com/products/trees-from-nursery-to-independence-in-the-landscape-recommendations> (Accessed 18th January 2023).

British Standards Institution (BSI) (2015) BS3882:2015 Specification for topsoil, London BSI. Available at: <https://shop.bsigroup.com/products/specification-for-topsoil> (Accessed 18th January 2023).

British Standards Institution (BSI) (2021a) BS 8683:2021 Process for designing and implementing Biodiversity Net Gain. Specification, London BSI. Available at: <https://shop.bsigroup.com/products/process-for-designing-and-implementing-biodiversity-net-gain-specification> (Accessed 18th January 2023).

British Standards Institution (BSI) (2021b) BS 7533-101:2021 Pavements constructed with clay, concrete or natural stone paving units - Code of practice for the structural design of pavements using modular paving units, London BSI. <https://shop.bsigroup.com/products/pavements-constructed-with-clay-concrete-or-natural-stone-paving-units-code-of-practice-for-the-structural-design-of-pavements-using-modular-paving-units> (Accessed 18th January 2023).

CIRIA (2015) The SuDS Manual (C753). Available at: <https://www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS> (Accessed 18th January 2023).

City and County of Swansea (2019) Swansea Central Area, Regenerating Our City for Wellbeing and Wildlife, Consultation Draft August 2019 - now superseded by the adopted document, dated February 2021. Available at: www.swansea.gov.uk/article/9580/Swansea-Central-Area-Regenerating-our-City-for-Wellbeing-and-Wildlife (Accessed 18th January 2023).

City of London (2021) City of London Local Plan, City Plan 2036 Shaping the future City. Available at: www.cityoflondon.gov.uk/assets/Services-Environment/cityplan-2036-march-2021.pdf (Accessed 18th January 2023).

City of Melbourne (2021) Green Factor Tool. Available at: www.melbourne.vic.gov.au/community/greening-the-city/green-infrastructure/Pages/green-factor-tool.aspx (Accessed 18th January 2023).

Department for Communities and Local Government (DCLG) (2008) Guidance on the permeable surfacing of front gardens, Communities and Local Government and Environment Agency, September 2008. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7728/pavingfrontgardens.pdf (Accessed 18th January 2023).

Department for Environment, Food and Rural Affairs (DEFRA) (2009) Construction code of practice for the sustainable use of soils on construction sites. Available at: [Construction Code of Practice for the Sustainable Use of Soils on Construction Sites](http://publishing.service.gov.uk) (publishing.service.gov.uk) (Accessed 18th January 2023).

Department for Environment, Food and Rural Affairs (DEFRA) (2021) Recommendations to Update Non-Statutory Technical Standards for Sustainable Drainage Systems (SuDS), Final Report, February 2021. Available at: http://randd.defra.gov.uk/Document.aspx?Document=15129_WT15122RecommendationstoUpdateNonStatutoryTech%27calStandardsforSust%27bleDrainageSystems.pdf (Accessed 18th January 2023).

Department for Levelling Up, Housing and Communities (DLUHC) - formerly Ministry of Housing, Communities and Local Government (MHCLG) (2021) National Planning Policy Framework, 20 July 2021. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf (Accessed 18th January 2023).

Forestry Commission (2019) Highway tree management: operations note 51. Available at: [Highway tree management: operations note 51 - GOV.UK \(www.gov.uk\)](http://www.gov.uk) (Accessed 18th January 2023).

Grant, G. (2017) Urban Greening Factor for London Research Report, Ecology Consultancy / Greater London Authority. Available at: www.london.gov.uk/sites/default/files/urban_greening_factor_for_london_final_report.pdf (Accessed 18th January 2023).

Grant, G. (2018) Urban Greening Factor Study, Green Infrastructure Consultancy / City of London, July 2018. Available at: www.cityoflondon.gov.uk/assets/Services-Environment/planning-draft-local-plan-evidence-urban-greening-factor-study-2018.pdf (Accessed 18th January 2023).

Greater London Authority (GLA) (2021) The London Plan, The Spatial Development Strategy for Greater London. March 2021, Greater London Authority. Available at: www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf (Accessed 18th January 2023).

Greater Manchester Combined Authority (GMCA) (2019) Guidance For Greater Manchester - Embedding Green Infrastructure Principles Final, October 2019, Version 7. Available at: [07.01.02 Guidance for Greater Manchester - Embedding Green Infrastructure Principles.pdf \(greatermanchester-ca.gov.uk\)](http://07.01.02_Guidance_for_Greater_Manchester_-_Embedding_Green_Infrastructure_Principles.pdf(greatermanchester-ca.gov.uk)) (Accessed 18th January 2023).

Greater Manchester (2019) Greater Manchester's Plan For Homes, Jobs and the Environment, Greater Manchester Spatial Framework, Revised Draft - January 2019. Available at: www.greatermanchester-ca.gov.uk/media/1710/gm_plan_for_homes_jobs_and_the_environment_1101-web.pdf (Accessed 18th January 2023).

Greater Manchester (2021) Places For Everyone, Joint Development Plan Document – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan Publication Stage, August 2021. Available at: www.greatermanchester-ca.gov.uk/media/4838/places-for-everyone.pdf (Accessed 18th January 2023).

Green Roof Organisation (GRO) (2021) The Green Roof Code, Green Roof Code of Best Practice incorporating Blue Roofs and Biosolar Applications, Anniversary Edition 2021. Available at: www.bauder.co.uk/getmedia/aa24968f-19b6-4195-b48f-b52d073957f2/GRO_GreenRoofCode.pdf (Accessed 18th January 2023).

Local Government Association (LGA) (2009) Growing in the Community, second edition, Local Government Association. Available at: www.local.gov.uk/sites/default/files/documents/growing-community-second--8f5.pdf (Accessed 18th January 2023).

Local Government Association (LGA) (2010) A Place to Grow, a supplementary documents to Growing in the Community, Local Government Association. Available at: www.local.gov.uk/sites/default/files/documents/place-grow-supplementary--736.pdf (Accessed 18th January 2023).

London Borough of Islington (2018) Islington Local Plan Strategic and development management policies - Regulation 18 draft, November 2018. Available at: [Islington strategic development management policies](http://Islington_strategic_development_management_policies) (Accessed 18th January 2023).

London Borough of Hackney (2020) Hackney Local Plan 2033, Strategic Planning Adopted July 2020. Available at: [Local plan 2033 \(LP33\) | Hackney Council](#) (Accessed 18th January 2023).

London Borough of Hounslow (2019) West of Borough Local Plan Review, Volume 3 Pre-Submission Regulation 19 Consultation, July 2019. Available at: [https://lbhounslow.sharepoint.com/sites/InternetLinks/pp/Shared Documents/Planning and Building/Planning Policy/Local Plan/Local Plan Reviews/3. Local Plan Reviews Examination Library/3. Core Documents/Core02 LBH LPR Volume 3 - West of Borough Plan \(Regulation 19 Version\).pdf?ga=1](https://lbhounslow.sharepoint.com/sites/InternetLinks/pp/Shared Documents/Planning and Building/Planning Policy/Local Plan/Local Plan Reviews/3. Local Plan Reviews Examination Library/3. Core Documents/Core02 LBH LPR Volume 3 - West of Borough Plan (Regulation 19 Version).pdf?ga=1) (Accessed 18th January 2023).

London Borough of Hounslow (2021) London Borough of Hounslow Great West Corridor Local Plan Review, Volume 4 Pre-Submission Regulation 19 Consultation. Available at: [Local Plan Review Great West Corridor \(Volume 4\) - Amendments Consultation - London Borough of Hounslow - Citizen Space](#) (Accessed 18th January 2023).

London Borough of Sutton (2018) Sutton Local Plan 2016-2031, February 2018. Available at: [The Local Plan - Sutton Council](#) (Accessed 18th January 2023).

London Borough of Waltham Forest (2020) Waltham Forest Local Plan (LP1) 2020 –2035, Regulation 19, October 2020. Available at: [Proposed Submission Local Plan \(LP1\) - Shaping the Borough \(walthamforest.gov.uk\)](#) (Accessed 18th January 2023).

London Borough of Waltham Forest (2021) Shaping the Borough, Waltham Forest Local Plan 2020 - 2035 [LP1] Submission, Schedule of proposed changes to the published plan. Available at: [KD2 LP1 SCHEDULE OF PROPOSED CHANGES COMBINED DOCUMENT.pdf \(walthamforest.gov.uk\)](#) (Accessed 18th January 2023).

London Legacy Development Corporation (LLDC) (2020) Local Plan 2020 to 2036. London Legacy Development Corporation, Adopted 21 July 2020. Available at: www.queenelizabetholympicpark.co.uk/-/media/lldc/local-plan/adoption-local-plan-2020/final-version-local-plan-may-2021/local-plan_web-version-14-january-2021.ashx?la=en (Accessed 18th January 2023).

Ministry of Housing, Communities and Local Government (MHCLG) (2019) Permitted development rights for householders, Technical Guidance, September 2019. www.planninggeek.co.uk/wp-content/uploads/2020/07/190910 Permitted-development-rights-for-householders-Technical-Guidance.pdf (Accessed 18th January 2023).

National Building Specification (NBS) (2015a) The NBS guide to façade greening (Part One), Definitions, benefits and detriments. David Fuller, National Building Specification. Available at: www.thenbs.com/knowledge/the-nbs-guide-to-facade-greening-part-one (Accessed 18th January 2023).

National Building Specification (NBS) (2015b) The NBS guide to façade greening (Part Two), Systems. David Fuller, National Building Specification. Available at:

www.thenbs.com/knowledge/the-nbs-guide-to-facade-greening-part-two (Accessed 18th January 2023).

National Building Specification (NBS) (2015c) The NBS guide to façade greening (Part Three), Thermal benefits. David Fuller, National Building Specification. Available at: www.thenbs.com/knowledge/the-nbs-guide-to-facade-greening-part-three (Accessed 18th January 2023).

National Federation of Roofing Contractors (NFRC) (2017) NFRC Technical Guidance Note for the construction and design of Blue Roofs. Roofs and podiums with controlled temporary water attenuation. National Federation of Roofing Contractors Ltd. Available at: www.nfrc.co.uk/docs/default-source/form-protected-documents/sustainability/blue-roofs-spreadslowres.pdf?sfvrsn=2 (Accessed 18th January 2023).

Natural England (2010) Natural Environment and Rural Communities (NERC) Act, Schedule 41. Available at: <http://publications.naturalengland.org.uk/publication/4958719460769792>
<http://publications.naturalengland.org.uk/file/6518755878240256> (Accessed 18th January 2023).

Natural England (2021) Environmental Benefits from Nature Tool - Beta Test Version (JP038). Available at: <http://publications.naturalengland.org.uk/publication/6414097026646016> (Accessed 18th January 2023).

Natural Resources Wales and Swansea Council (2021) Swansea Central Area; Regenerating Our City for Wellbeing and Wildlife, February 2021. Available at: [Swansea Central Area: Regenerating our City for Wellbeing and Wildlife - Swansea](#) (Accessed 18th January 2023).

Neal, P. (unpublished, 2019) Final Report: GI Standards Framework Interim Report. Natural England.

Neal, P. (unpublished, 2020) A Review of UGF Applications. Natural England.

Neal, P. (unpublished, 2020) An Assessment of UGF and Ecosystem Services. Natural England.

Neal, P. (unpublished, 2020) An Analysis of UGF Metrics, Net Gain and Scale of Application. Natural England.

Neal, P. (unpublished, 2020) A Review of the use of UGF to meet Local Needs and Inform Targets. Natural England.

Neal, P. (2023) Urban Greening Factor for England – Case Studies. Natural England. Available at: [Home \(naturalengland.org.uk\)](http://Home.naturalengland.org.uk) (Accessed 18th January 2023).

Neal, P. (2023) Urban Greening Factor for England – Development and Technical Analysis. NERR132. Natural England. Available at: [Home \(naturalengland.org.uk\)](https://www.naturalengland.org.uk) (Accessed 18th January 2023).

Neal, P. (2023) Urban Greening Factor for England – User Guide. Natural England. Available at: [Home \(naturalengland.org.uk\)](https://www.naturalengland.org.uk) (Accessed 18th January 2023).

Neal, P. (2023) Urban Greening Factor for England – Summary Report. NERR131. Natural England. Available at: [Home \(naturalengland.org.uk\)](https://www.naturalengland.org.uk) (Accessed 18th January 2023).

Old Oak and Park Royal Development Corporation (OPDC) (2017) LOCAL PLAN Revised Draft for Regulation 19 Consultation, 29 June 2017. Available at: [opdc_local_plan_revised_draft_for_regulation_19_consultation_0.pdf \(london.gov.uk\)](https://www.london.gov.uk/asset-library/asset/15707) (Accessed 18th January 2023).

Portsmouth City Council (2021) Portsmouth Local Plan 2038, 'Regulation 18' Consultation Document Draft for consultation September 2021. Available at: [Portsmouth Local Plan 2038](https://www.portsmouth.gov.uk/asset-library/asset/2734) (Accessed 18th January 2023).

Portsmouth City Council (2021) Green Infrastructure Background Paper, July 2021. Available at: [Green-Infrastructure-background-paper-Sep21_compressed.pdf \(portsmouth.gov.uk\)](https://www.portsmouth.gov.uk/asset-library/asset/2734) (Accessed 18th January 2023).

People's Trust for Endangered Species (PTES) (2014) Traditional Orchards, a guide to wildlife and management, People's Trust for Endangered Species and Natural England. Available at: <https://ptes.org/wp-content/uploads/2014/06/Guide-to-wildlife-and-management-England.pdf> (Accessed 18th January 2023).

Southampton City Council (2015) Planning Southampton City Centre, City Centre Action Plan, adopted 18 March 2015. Available at: www.southampton.gov.uk/media/3bidvj1w/ccap-18-march-2015_tcm63-371356.pdf (Accessed 18th January 2023).

The Town and Country Planning (Use Classes) Order (1987), as amended. Available at: [The Town and Country Planning \(Use Classes\) Order 1987 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukSI/1987/1142/made) ([as amended](https://www.legislation.gov.uk/ukSI/1987/1142/made)) - puts uses of land and buildings into various categories known as 'Use Classes' (Accessed 18th January 2023).

The Town and Country Planning (Development Management Procedure) (England) Order (2015) No. 595, Part 1 Article 2. [www.legislation.gov.uk/uksi/2015/595/article/2/made](https://www.legislation.gov.uk/ukSI/2015/595/article/2/made) (Accessed 18th January 2023).

Trees and Design Action Group (TDAG) (2014) Trees in Hard Landscapes - A Guide for Delivery. Trees and Design Action Group, September 2014. Available at: www.tdag.org.uk/uploads/4/2/8/0/4280686/tdag_tihl.pdf (Accessed 18th January 2023).

Trees and Design Action Group (TDAG) (2019) Tree Species Selection for Green Infrastructure: A Guide for Specifiers. Trees and Design Action Group, Issue 1.3 2019 (or later). Available at:
www.tdag.org.uk/uploads/4/2/8/0/4280686/tdag_treespeciesguidev1.3.pdf (Accessed 18th January 2023).

Trees and Design Action Group (TDAG) (2021) Trees, Planning and Development, A Guide for Delivery, Issue 1.1 2021 (or later). Available at:
www.tdag.org.uk/uploads/4/2/8/0/4280686/tdag_tpd2021.s1v1.pdf (Accessed 18th January 2023).

University of Sheffield (no date) Designed Ecology. Available at:
www.sheffield.ac.uk/landscape/research/ecology. Research available on the website (Accessed 18th January 2023).

Appendix 1 – Green Infrastructure Framework Advisory Group Members

Organisations in the Green Infrastructure Framework Advisory Group:

1. Activity Alliance
2. AECOM
3. Berkeley Homes
4. Birmingham City Council
5. Birmingham City University
6. Brillianto
7. Buckinghamshire County Council
8. Building Research Establishment
9. Building with Nature
10. Cambridge City Council
11. Canal and River Trust
12. Chartered Institute of Ecology and Environmental Management (CIEEM)
13. Chartered Institute of Water and Environmental Management (CIWEM)
14. Chilterns AONB Unit
15. Construction Industry Research and Information Association (CIRIA)
16. Core Cities Group
17. Cornwall Council
18. Country Land and Business Association
19. Cycling UK
20. Department for Environment, Food and Rural Affairs
21. Ecosystems Knowledge Network
22. Eden Project
23. Environment Agency
24. Essex County Council
25. Field Studies Council
26. Fields In Trust
27. Forestry Commission
28. Friends of the Earth
29. Future Parks
30. Gloucestershire Wildlife Trust
31. Greater Manchester Combined Authorities
32. Groundwork
33. Historic England
34. Home Builders Federation
35. Homes England
36. Keep Britain Tidy
37. Land Trust
38. Landscape Institute
39. Lendlease

40. Local Government Association
41. Lockhart Garratt
42. Mind
43. Mott MacDonald
44. National Federation of Parks and Greenspaces
45. National Grid
46. National Infrastructure Commission
47. Natural England
48. Nene Park Trust
49. Nottingham City Council
50. Office for Health Improvement and Disparities, Department of Health and Social Care
51. Open Spaces Society
52. Ordnance Survey
53. Parks Alliance
54. Peel Land and Property Group Management Limited
55. Royal Society of Protection of Birds
56. Sport England
57. Sustrans
58. The Association of Directors of Environment, Economy, Planning and Transport
59. The Department for Health and Social Care
60. The Ramblers
61. The Rivers Trust
62. The Wildlife Trusts
63. Town and Country Planning Association
64. UK Green Building Council
65. University of Birmingham
66. University of Manchester
67. University of Northumbria
68. University of Oxford
69. University of the West of England
70. Urban Nature Ltd
71. Urban&Civic
72. Wildfowl and Wetlands Trust
73. Wildlife and Countryside Link
74. WSP Global Inc

Appendix 2 – Stages of Urban Greening Factor Research

1. The development of the UGF described in this report was commissioned and led by Natural England on behalf of Defra, and was undertaken between September 2021 and March 2022.
2. It builds on research undertaken during earlier stages of the development of the GI Framework between 2019 and 2020, and contributes to a set of eight papers on UGF applications, as set out below.

Stage 1 (2018-19)

This work was contracted to LDA Design, and led by Frazer Osment. Peter Neal was the lead author of the paper below:

Neal, P. (unpublished, 2019) Final Report: GI Standards Framework Interim Report.

Stage 2 (2020)

This work was contracted to the University of Manchester. Dr Ian Mell led the delivery of the contract. Peter Neal was the lead author of the briefing papers (unpublished, 2020) below:

2.1 - A Review of UGF Applications

This paper introduces the concept and describes the chronological development of Urban Greening Factors using a structured review of the academic and grey literature. It provides a description of both international practice and UK applications and includes a summary of existing policies, guidance and the process of application and implementation. It assesses the extent of the evidence base that has been used to develop specific Urban Greening Factors and provides a review of surveys, assessments and evaluations that gauge the effectiveness of the planning tool.

2.2 - An Assessment of UGF and Ecosystem Services

This paper provides a review of the approach and effectiveness of Urban Greening Factors in delivering ecosystem services (ESS). It uses a familiar evaluative framework of supporting, regulating, provisioning and cultural service headings. Particular attention is given to factors that prioritise the water-holding capacity of

vegetated surface covers and soils that have commonly been used as a proxy for delivering wider ESS benefits.

2.3 - An Analysis of UGF Metrics, Net Gain and Scale of Application

This paper provides an analysis of the metrics commonly used in Urban Greening Factors that incorporate specific socio-cultural, economic and ecological parameters. It assesses the role that Urban Greening Factors can play in spatial planning and their potential use in analysing the nature of green infrastructure provision, demonstrating net gain and their ability to work alongside other net gain metrics including the Biodiversity Metric and Eco-metric.

2.4 - A Review of the use of UGF to meet Local Needs and Inform Targets

This paper considers the flexibility of Urban Greening Factors in meeting particular local needs and how inclusive and collaborative approaches including stakeholder consultation and public engagement can inform their development. This may help to prioritise the delivery of specific ESS alongside other cultural, recreational and placemaking objectives and describes how the use of Urban Greening Factors can inform national and local targets for ESS and green infrastructure provision.

Stage 3 (2021-22)

This work was contracted to Peter Neal, who was the lead author of the papers below.

Technical Papers (Published 2023)

- 3.1 - Urban Greening Factor for England - Case Studies
- 3.2 - Urban Greening Factor for England - Development and Technical Analysis
- 3.3 - Urban Greening Factor for England - User Guide
- 3.4 - Urban Greening Factor for England - Summary Report

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