Climate and Ecological Resilience

MAYOR OF LONDON

TRANSPORT
FOR LONDON
EVERY JOURNEY MATTERS

Dimension #5
Climate and Ecological Resilience

[CR]

Introduction

How can our developments respond to the environmental impacts of a changing climate? Guiding this Dimension is the dual focus of mitigating the effects of the climate and ecological emergency on London's green spaces and water systems, and making sure developments improve biodiversity and access to green spaces. Reducing the risk of flooding, keeping buildings and streets cool, and increased planting are therefore central to this Dimension.

We cover areas from biodiversity and urban greening to the impact of construction on ecological systems. This Dimension takes a long-term view of development and emphasises how spaces can be made resilient. While this Dimension largely addresses external spaces, it should be read in conjunction with Dimensions #6 (High Performance Buildings) and #4 (Health and Wellbeing), which deal more closely with the buildings themselves.

The indicators in this Dimension focus on the ways new development can benefit local microclimates by:

- Reducing the impacts of anticipated climate change on our public realm;
- Supporting increases in biodiversity and the amount of vegetation on our land;
- Making sure our choices – from planting to drainage and paving – will be resilient to climate change;
- Protecting resources as much as we can during the construction process; and
- Sustainably managing water to futureproof London against flooding and water shortages.

An important part of this Dimension is the way it frames the landscaping of a project as an active part of the city. By highlighting this planted and paved infrastructure as a part of development we will be raising awareness and understanding of the role nature has in creating healthy environments.

How to use this guidance

The TfL Sustainable Development Framework (SDF) is designed to be applied to any form of development, from small sites to large regeneration master plans and from housing projects to mixed-use and commercial schemes. The Framework's strength lies in its ability to highlight synergies that would ordinarily go unseen or opportunities that could otherwise be overlooked. It does this by providing the technical tools to measure and balance performance sustainably at every stage of delivery, and we recommend that the SDF be built into a development project as early as possible.

These technical guidance documents provide the detail that sits alongside the Sustainable Development Framework Handbook. Together, they create a freely available tool to be accessed and used by anyone building sustainably.

The technical documents are designed to help a project team calculate and manage individual indicators effectively, and include an explanation of how each indicator is calculated and how it can be used in parallel with the RIBA Stages of Work. The initial part of the guidance offers an overview of the particular Dimension, and is followed by detail on each indicator.

The initial part of this guidance is designed to be accessible to everyone involved in a development project. It offers an overview of the particular Dimension and detail on each indicator, setting out the essential elements you will want to know to understand how the indicator works, the ways in which it can add value to a project, and how it is calculated. The later sections are more technical with a step-by-step approach to implementing the SDF in practice.

As we consider the SDF to be a living document, we continue to test, balance and refine the Framework on our projects, and alongside best practice research and industry standards. Throughout a project's lifecycle therefore, performance data for relevant indicators in terms of targets, policy and process should be collected regularly, recorded and kept up-to-date.

The aim is to gain an understanding of the opportunities and constraints within a development site. By using the indicators to help identify a project's strengths and weaknesses, strategies, interventions and design tactics can be adjusted to deliver the best overall results. Adopting a holistic approach to the indicators will identify the cases where improving or reducing the performance of one indicator may affect the performance of another. By taking into account how indicators relate to each other, more can be made of the process to find efficiencies and balance, and to optimise projects.

Each indicator in the technical guidance document is presented in the same easy-to-follow format, under the following headings:

Introduction section

What is it?

A summary of what the indicator is and what it aims to achieve and measure, with some background information.

How does it add value?

A synopsis of the importance of the indicator and the benefits it brings to a project.

From the summary and synopsis, the reader should be able to understand the context of the indicator, and also describe why it is an important component of sustainable development.

Infographic overview

What type of project does the indicator apply to?

Each indicator is categorised according to whether it is to be used for residential, commercial and/or masterplan projects. There may also be a threshold of project size for applicability.

Who is responsible?

It is assumed that the development manager for the project is responsible overall, and this list outlines which professionals or consultants lead and/or support the delivery of the indicator.

RIBA stages

The RIBA Plan of Work organises the process of briefing, designing, constructing and operating building projects into stages from zero to seven. This illustration identifies when the indicator is relevant during a project's lifecycle, as well as the types of action that happen at each RIBA stage.

Connected UN Sustainable Development Goals

Identifies linkages between the SDF and the United Nations (UN) Sustainable Development Goals.

Connected SDF indicators

A useful list of other indicators that have a relationship with the indicator being described.

Methodology section

How is it calculated?

This section details the way in which each indicator can be calculated. It is often accompanied by an illustration, or a direct link to a relevant external methodology. This may be written in more technical language and is intended for the relevant project consultant to understand exactly what information is required by the indicator.

Scoring infographic

A summary of the metric type, its units, and the targets for Good and Leading Practice. Some indicators will have a pass/fail metric, in this instance a pass would be Leading Practice.

What is the process?

Following the eight RIBA Plan of Work stages, this part describes the key actions that need to take place, and who is best positioned to carry them out. This is accompanied by a summary of the documents and reports that support the work.

The SDF process assumes that a full planning application would be submitted at the end of RIBA Stage 2 and that tender would happen at the end of RIBA Stage 4.

Actions should be adjusted as needed for projects working to alternative programmes.

Additional information section

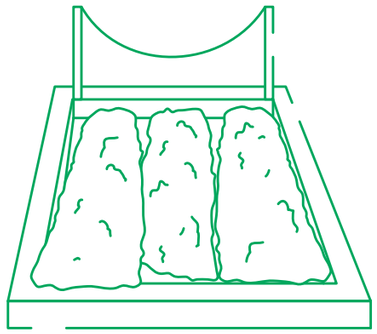
Relevant policy

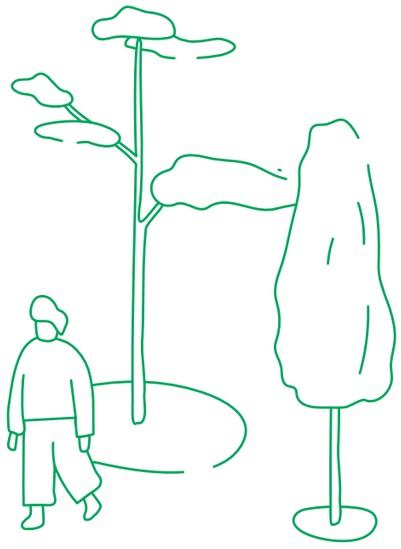
A summary of the key policies that relate to the indicator, and that have helped to shape it. This list is not exhaustive, but provides a useful background.

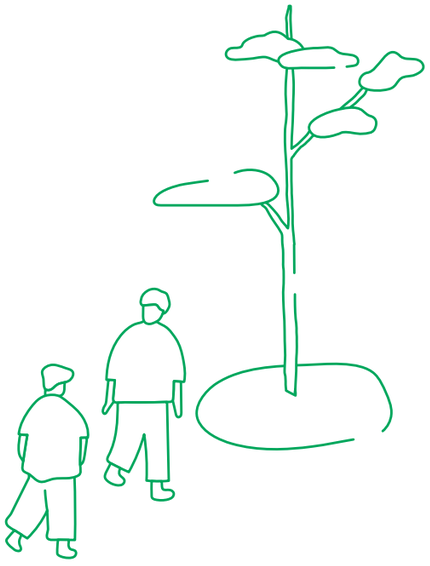
Further reading

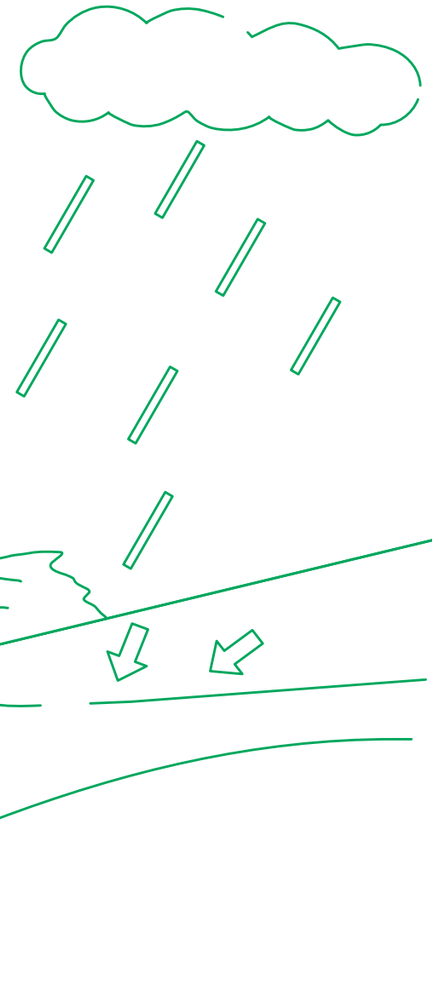
A list of additional sources of information on the indicator.

Indicators









ID no

Key Performance Indicator (KPI) name

CR1 Urban Greening – Residential
CR2 Urban Greening – Commercial

What is it?

Most growing cities have to strike a balance between regeneration and development and the need to protect green infrastructure, such as parks, gardens and waterways. This means there are few opportunities to create new green areas, and it is the development itself that needs to provide the urban greening, for example, with green roofs and walls, trees and rain gardens.

This indicator evaluates the quantity and quality of the vegetated surfaces within a development. Based on the Urban Greening Factor (UGF) set out in The London Plan (Policy G5: Urban greening), this indicator scores the different types of vegetative cover and surfaces according to their ability to provide specific benefits such as cooling, flood management and wildlife habitat.

To fully understand and improve the sustainability value and climate resilience of a development site, UGF should be considered early in the design process.

How does it add value?

The loss or lack of green infrastructure in cities not only intensifies the impacts of climate change, but speeds up biodiversity loss and magnifies social inequalities as property prices rise in 'greener', less densely developed areas. By introducing greening measures, such as green roofs, walls and planting in developments, residents and businesses can enjoy some of the benefits of nature-based solutions, even in areas with limited green spaces. By considering UGF early in the design process, new developments can help support:

- Biodiversity
- Minimise the urban heat island effect (areas hotter than their surroundings due to concentrations of buildings and surfaces that absorb and retain heat, resulting in higher daytime temperatures and reduced night-time cooling)
- Manage rainwater run-off
- Improve health and wellbeing
- Adapt to hotter summers and extreme downpours
- Add financial value to the site

What type of project does the indicator apply to?

CR1

- ☑ Residential
- ☐ Commercial
- ☑ Masterplan

CR2

- ☐ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Landscape Architect	●●●	leading
Development Manager	●●○	accountable
Ecologist	●○○	supporting
Architect	●○○	supporting
Engineer – Structural and Civil	●○○	supporting
Contractor	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design	Specify	Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
15 Life on Land

Connected SDF indicators

- ☑ Access to Nature
- ☑ Public Realm
- ☑ Outdoor Air Quality
- ☑ Healthy Streets

How is it calculated?

The indicator is calculated using the information provided in The London Plan Guidance – Urban Greening Factor, a document designed for use by landscape architects, ecologists and planners. The different types of urban greening in built developments are grouped into types of surface cover to indicate their relative value as a nature-based solution. Each type is allocated a score based on its potential for rainwater capture and infiltration. This is used as a proxy for naturalness and functionality. Factors range from one for semi-natural vegetation, through to 0.8 for a green roof, 0.4 for mown amenity grass and 0 for impermeable sealed surfaces.

The UGF score is calculated by:

- Assigning each surface cover type the relevant UGF factor
- Measuring the area of each surface cover type in square metres
- Multiplying the factor score by the area of each surface cover type
- Adding the scores together for each surface type
- Dividing the combined score by the total site area

Metric type

#

Numerical

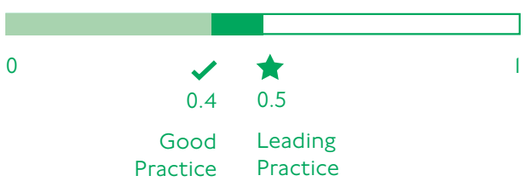
Units

m^2

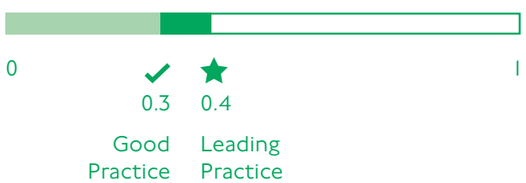
Ratio of urban greening

Range

CR1



CR2



Note: Can be higher than 1 in some circumstances but only if buildings occupy most of the red-line boundary and are clad in green walls

Surface cover types and factor scores

Surface cover type	Factor
Semi-natural vegetation (eg trees, woodland, species-rich grassland) maintained or established on site	1
Wetland or open water (semi-natural; not chlorinated) maintained or established on site	1
Intensive green roof or vegetation over structure. Substrate minimum settled depth of 150mm	0.8
Standard trees planted in connected tree pits with a minimum soil volume equivalent to at least two thirds of the projected canopy area of the mature tree	0.8
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code 2014	0.7
Flower-rich perennial planting	0.7
Rain gardens and other vegetated sustainable drainage elements	0.7
Hedges (line of mature shrubs one or two shrubs wide)	0.6
Standard trees planted in pits with soil volumes less than two thirds of the projected canopy area of the mature tree	0.6
Green wall – modular system or climbers rooted in soil	0.6
Groundcover planting	0.5
Amenity grassland (species-poor, regularly mown lawn)	0.4
Extensive green roof of sedum mat or other lightweight systems that do not meet GRO Code 2014	0.3
Water features (chlorinated) or unplanted detention basins	0.2
Permeable paving	0.1
Sealed surfaces (eg concrete, asphalt, waterproofing, stone)	0

How is it calculated? (continued)

Figure 3.2: Calculating the UGF score

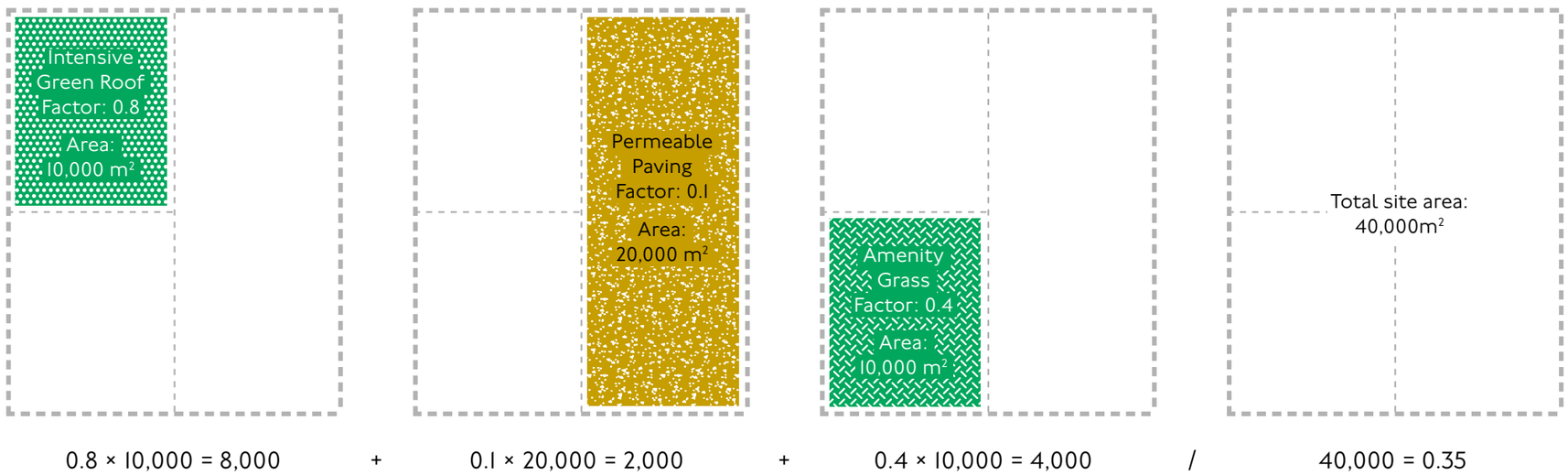
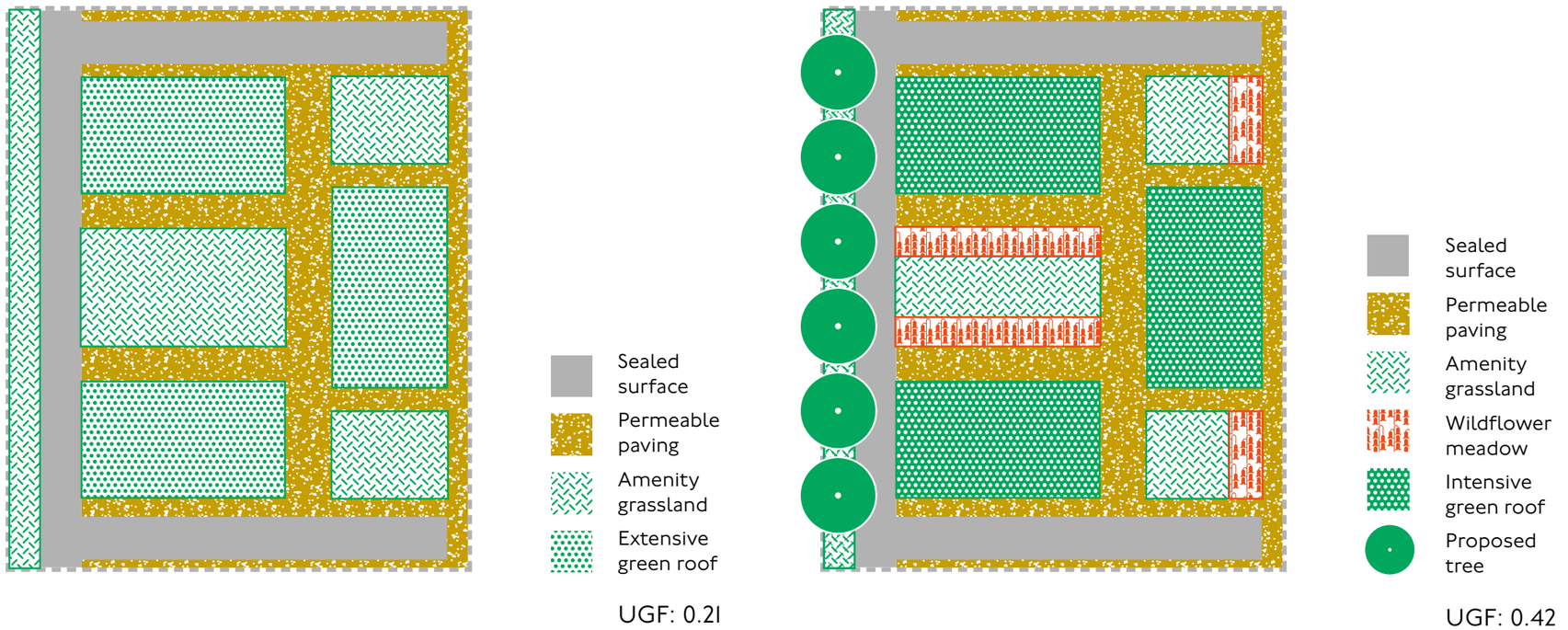


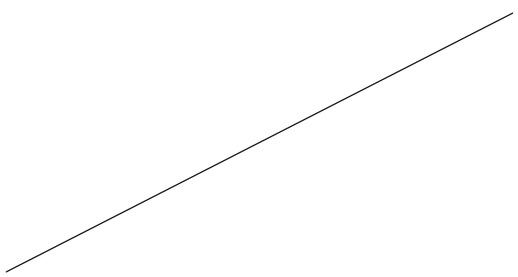
Figure 3.1: Plans showing how the quality of different green surface cover types can affect the UGF score



What is the process?

RIBA Stage 0: Optimise

Action



Documentation

RIBA Stage 1: Optimise

Action

Development manager

Set London Plan Urban Greening Factor (UGF) target scores as the brief is being developed

Landscape architect

Understand the policy framework, site context and existing landscape within and outside the red line boundary (all the land necessary to carry out the development) by completing a landscape assessment

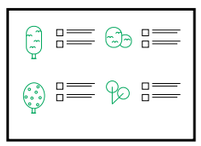
Ecologist (if required)

Understand the policy framework, site context and existing ecology within and outside the red line boundary by carrying out a preliminary ecological survey

Arboriculturalist (if required)

Establish the distribution and quality of trees on the site by carrying out a tree survey

Documentation



Project brief with targets

Landscape assessment

Preliminary ecological appraisal

Tree survey

RIBA Stage 2: Plan / Design

Action

Landscape architect

Develop the approach for maximising greening, including: retention of existing vegetation, creation of new landscapes, and opportunities for greening the built envelope

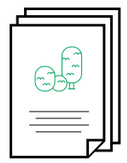
Ecologist and arboriculturalist (if required)

Advise landscape architect on the landscape design approach to make sure any ecological objectives or arboricultural requirements are fully considered

Architect

Make sure the approach developed by the landscape architect is compatible with the architectural design concept

Documentation



Landscape strategy (incorporating ecology and tree chapters as required)

What is the process? (continued)

RIBA Stage 3: Plan / Design

Action

Structural and civil engineer

Review design approach and advise on structural implications, material selection and potential constraints of any proposed green roofs and walls

Landscape architect

Prepare layout plans (including green roofs and sustainable drainage systems, SuDS, if appropriate) and calculate UGF to establish if the approach is likely to achieve the target score. Make sure any ecological objectives and tree protection requirements can be delivered alongside the proposals for meeting the UGF score

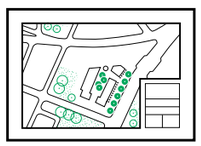
Ecologist and/or arboriculturalist

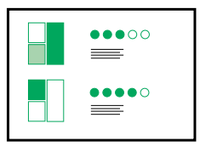
Support and advise the landscape architect as required

Architect

Make sure layout plans are compatible with the next version of architectural designs

Documentation





Landscape and ecology plan, including UGF calculation

RIBA Stage 4: Specify

Landscape architect

Prepare detailed specification of plants/landscapes/habitats retained, enhanced or created. Next, prepare detailed description of measures required to protect or manage existing features during the construction period, and the management and maintenance requirements during the establishment phase

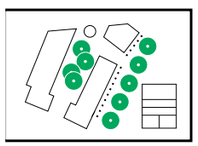
Ecologist and/or arboriculturalist

Support and advise the landscape architect as required

Development manager

Make sure the planting plans and management plans are included in the tender documents at the start of procurement

Documentation



Planting plans

Construction environment management plan (if required)

Landscape and ecology management plan

RIBA Stage 5: Specify

Contractor

Identify any potential constraints to the delivery of the scheme as specified. Deliver scheme

Landscape architect

Meet with contractors to advise on constraints to practical delivery and monitor the adherence to specifications

Action

What is the process? (continued)

Action

RIBA Stage 6: Monitor

Development manager
(with landscape architect as necessary)

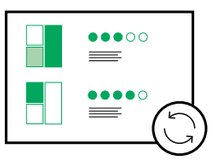
At the end of the defects period, assess the condition of all green areas contributing to the UGF score. If more than five per cent of any of the defined surface cover types has not been delivered or planting has failed, the UGF score should be amended by recalculating the area of actual surface cover delivered. Make sure the landscape and ecology management plan is updated (if necessary) and given to the property manager

RIBA Stage 7: Monitor

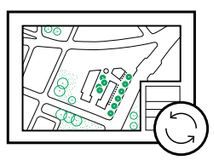
Property manager

Manage the site in line with measures set out in the landscape and ecology management plan. Five years after full completion, carry out an audit, and if more than five per cent of any of the defined surface cover types is no longer present or viable, amend the UGF score accordingly

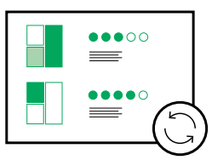
Documentation



Post-construction UGF score



Updated landscape and ecology management plan



Post-occupancy UGF score

Relevant policy

The London Plan, Policy G5, Urban greening

Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage.

The London Plan, Policy GG2, Making the best use of land

To create successful sustainable mixed-use places that make the best use of land, those involved in planning and development must:

(F) … protect and enhance London's open spaces, including the Green Belt, Metropolitan Open Land, designated nature conservation sites and local spaces, and promote the creation of new green infrastructure and urban greening, including aiming to secure net biodiversity gains where possible

National Planning Policy Framework, paragraph 154

New development should be planned for in ways that:

A) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.

Further reading

Urban Greening Factor, London Plan Supplementary Guidance

Urban Greening for Biodiversity Net Gain: A Design Guide

The GRO Green Roof Code

Planning for green infrastructure – the green space factor and learning from europe

ID no

CR 3

Key Performance Indicator (KPI) name

Minimising Flood Risk and Maximising Flood Resilience – Residential

What is it?

The Met Office has predicted that under future climate change projections, the UK may see an increase in flood risk from various sources including precipitation (rain, hail, snow), rivers, drains and rising ground water. While the best way to lower this risk is to build housing developments in areas that are unlikely to flood, land availability coupled with housing demand may make this impractical.

The purpose of this indicator is to reduce the risk of flooding for occupants and neighbours by considering the location, master-planning and design of new homes, and to demonstrate that a process has been followed to significantly reduce the risk and improve resilience.

For this indicator, we are following the criteria set out by BRE Home Quality Mark One (HQM) 3.1 for Flood Risk and 3.2 Managing Rainfall Impacts.

How does it add value?

By taking measures to protect residential developments, should a flood occur, the overall costs involved and the time needed to restore the property are reduced. Making sure the correct measures are in place, also increases the appeal and the value of the property, and helps to avoid the potential health effects of flooding, such as stress and anxiety. Reducing flood risk also protects the local environment against the release of harmful pollutants such as industrial and agricultural chemicals during a flood.

What type of project does the indicator apply to?

- ☑ Residential
- ☐ Commercial
- ☑ Masterplan

Who is responsible?

Civil Engineer	●●●	leading
Development Manager	●●○	accountable
Architect	●○○	supporting
Landscape Architect	●○○	supporting
Drainage Engineer	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design	Specify	Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
3 Good Health and Wellbeing

Connected SDF indicators

- ☑ Healthy Streets
- ☑ Public Realm
- ☑ Access to Nature
- ☑ Sustainable Drainage

How is it calculated?

This indicator follows the criteria set out by HQM 3.1 for Flood Risk. Please refer to Home Quality Mark ONE England (page 52 of 256).

Flood risk assessment (minimum requirement)

A site-specific flood risk assessment (FRA) must be carried out according to the current leading practice national planning guidance. All current and future sources of flooding should be considered.

Flood risk (up to 19 credits)
If low risk (19 credits)

Where a site-specific FRA confirms the development is situated in a flood zone with a low probability of flooding from all sources, all credits are awarded. The FRA must consider all current and future sources of flooding.

If medium or high risk (17 credits)

The prerequisite for this indicator is to provide home information in line with the HQM 11.2 Home Information section of the Home Quality Mark ONE England Manual.

Medium or high risk (17 credits)

If the residential property is considered medium or high risk, as stated in the manual, and is not in a functional flood plain (in accordance with current leading practice national planning guidance), the flood risk assessment must take all current and future sources of flooding into account.

To increase the resilience and resistance of the development to flooding, one of the following must be achieved:

1. The ground level of all habitable parts of the home and access to both the site and homes, are designed so they are at least 600mm above the design flood level of the site's flood zone.
2. The design of the building and the wider site reflects the recommendations made by a qualified professional in accordance with BS 85500:2015.

Metric type

Points

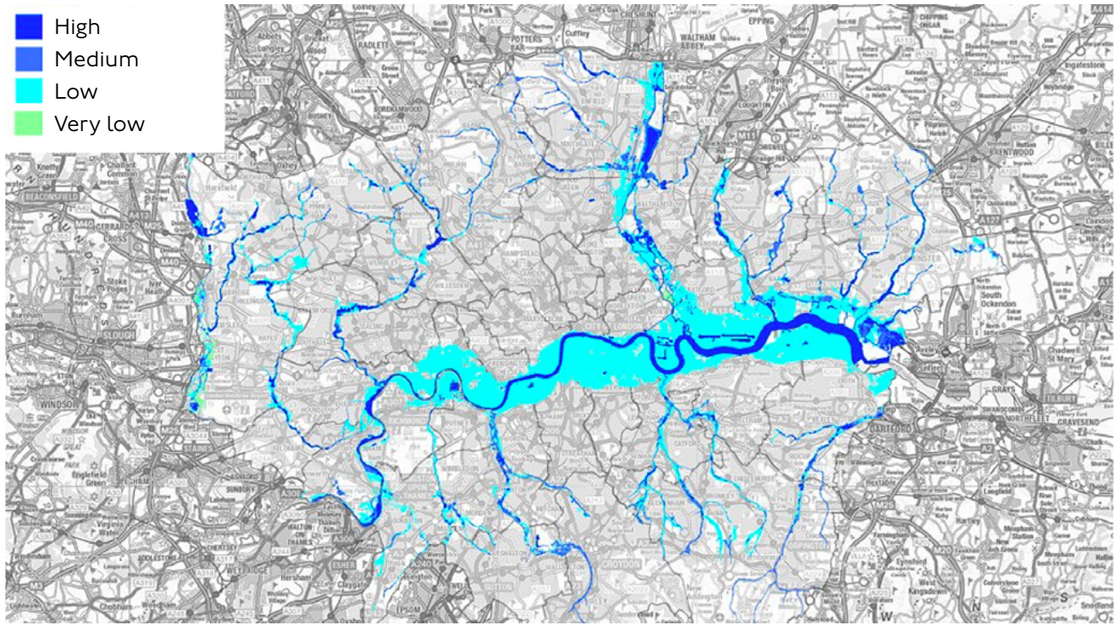
Units

Number of credits available under HQM 3.1 and 3.2

Range

1 | 17 + 8 Good Practice | 38 Leading Practice

How is it calculated? (continued)



Environment Agency
Flood Map

Managing Rainfall Impacts

In HQM there are two routes to assess 3.2 Managing Rainfall Impact; Foundation and Comprehensive. The Foundation route is only suitable for small and usually non-urban sites. Therefore, the expectation is that the Comprehensive route will be taken and an appropriately qualified professional will be appointed to carry out, demonstrate or confirm the sites' compliance with the following;

Peak-rate of run-off
(up to five credits):

Drainage measures are specified to ensure that peak rate of run-off from the site to the watercourse (natural or municipal) is not greater for the developed site than it was either pre-development (three credits) or an equivalent greenfield site (five credits)

Volume of run-off
(up to nine credits):

Drainage measures are to ensure that post developed run-off, for the 100-year six-hour storm even is no greater than if it was for the site than it was either pre-development (six credits) or an equivalent greenfield site (nine credits)

Water quality
(three credits):

Where three credits have been sought in the peak-rate or volume criteria and the water quality of receiving surface water or ground water have revived appropriate pollution prevent and treatment measures in accordance with C753 the SUDs Manual

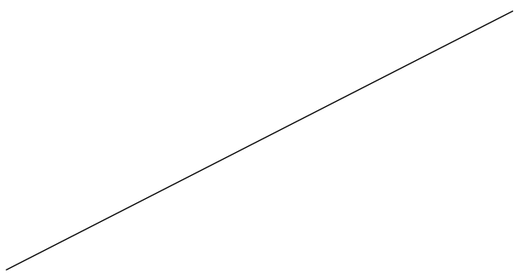
Designing for maintenance and operation
(two credits):

Where agreements have been put in place for the ownership, operation and maintenance of all SuDs for the design life of the development.

What is the process?

Action

RIBA Stage 0: Optimise



RIBA Stage 1: Optimise

Development manager

Establish the need for flood risk assessment in the tender documents

Civil engineer

Review the flood risk zone and relevant flood risk policies, and assess status and location of the site in relation to flood zones and the likelihood of flood risk

RIBA Stage 2: Plan / Design

Civil engineer

Develop the strategy for managing flood risk

Architect

Understand the implications for potential flood risk and the measures needed to mitigate any flood risk issues and prepare initial layouts that take flood risk issues into account

RIBA Stage 3: Plan / Design

Civil engineer

Consult Lead Local Flood Authority (LLFA)* and negotiate flood risk issues and develop a flood compliant scheme

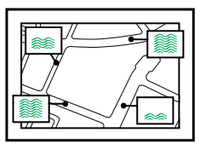
* in London, the authority is the relevant borough

Architect

Understand the implications of the outcome of the negotiations with the LLFA and update layouts as necessary

Action

Documentation



Flood risk assessment

Draft flood risk strategy

Flood risk strategy

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Civil engineer

Develop detailed plans and specifications in collaboration with the architect, and landscape architect as required

RIBA Stage 5: Deliver

Contractor

Deliver the scheme as per specifications provided

Civil engineer

Provide quality control function as required

RIBA Stage 6: Monitor

Development manager

Make sure the scheme is consistent with LLFA requirements as part of the post-occupancy evaluation

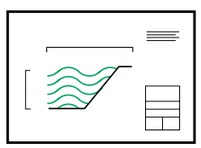
RIBA Stage 7: Monitor

Property manager

Make sure any flood management structures (if present) are maintained to a sufficient standard

Action

Documentation



Detailed drawings and specifications as part of the architectural plans

Documentation

Relevant policy

The London Plan, Policy SI 12, Flood risk management

Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water

National Planning Policy Framework, paragraph 167

When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment

Further reading

Home Quality Mark One, Technical Manual England, Section 3.1, Flood Risk

London Regional Flood Risk Appraisal

BS8533:2017 – Assessing and managing flood risk in development. Code of practice, Section 5

ID no

CR 4

Key Performance Indicator (KPI) name

Minimising Flood Risk and Maximising Flood Resilience – Commercial

What is it?

Even when a site is not in an area at risk of flooding from nearby watercourses, heavy rainstorms or flash floods can sometimes overwhelm local infrastructure. New developments are at risk from this type of flooding and the impact on surrounding neighbourhoods must be considered. With due consideration at the early stage of location, design and specification, this risk can be managed, including the potential future increase in rainwater from climate change.

This indicator aims to encourage projects to avoid, reduce, and delay the discharge of rainfall to public sewers and watercourses. By doing so, the risk and impact of localised flooding on- and off-site is minimised, along with watercourse pollution and other environmental damage.

For this indicator, we are following the criteria set out by BREEAM UK New Construction 2018 Pol 03, Flood and surface water management.

How does it add value?

By selecting the right site location and development design at the outset of the project, the potential for flooding on- and off-site is reduced along with significant clean-up costs. The impact of the development on the off-site water management infrastructure is also limited. Adopting flood risk measures helps to improve the resilience of local drainage and flood prevention systems, minimises the release of waterborne pollutants off-site and reduce the burden new development places on existing water infrastructure.

What type of project does the indicator apply to?

- ☐ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Drainage Engineer	●●●	leading
Development Manager	●●○	accountable
Architect	●○○	supporting
Landscape Architect	●○○	supporting
Contractor	●○○	supporting
Asset Manager	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design		Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
3 Good Health and Wellbeing

Connected SDF indicators

- ☑ Healthy Streets
- ☑ Public Realm
- ☑ Sustainable Drainage
- ☑ Urban Greening Factor

How is it calculated?

This indicator follows the criteria set out by BREEAM Pol 03, Flood and surface water management. Please refer to BREEAM UK NC 2018 Manual (page 336 of 392).

Appoint an appropriate consultant (prerequisite)

The consultant is appointed to carry out and demonstrate the development's compliance with all criteria.

Flood resilience (up to two credits)

Low flood risk (two credits)
A site-specific flood risk assessment (FRA) must confirm the development is in a flood zone that is defined as having a low annual probability of flooding.
The FRA must take all current and future sources of flooding into consideration. Refer to the BREEAM UK NC 2018 Manual for a list of potential sources of flooding which must be considered.

Medium or high flood risk (one credit)

A FRA must confirm the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. The FRA must take all current and future sources of flooding into consideration. Refer to the manual for a list of potential sources of flooding which must be considered.
The resilience and resistance of the development to flooding must also be increased by either:

- Designing the ground level of the building and access to the building and site so that they are 600mm above the design flood level of the site's flood zone
- Making sure that the final design of the building and the wider site reflect the recommendations made by an appropriate consultant is in line with the hierarchy approach outlined in Section 5 of BS 8533:2017

Surface water run-off (up to two credits) (prerequisite)

Surface water run-off design solutions must be bespoke and take into account the specific site requirements and natural or man-made environment of the site and its surrounding area. The priority levels detailed in the methodology section of BREEAM Pol 03 must be followed, with justification given by the appropriate consultant where water is allowed to leave the site.

Surface water run-off – rate (one credit)

The BREEAM UK NC 2018 Manual lists several criteria which must be met to achieve this credit. They include requirements for brownfield and greenfield sites relating to the peak rate of water run-off from the site to the watercourses, relevant maintenance agreements in place for all specified sustainable drainage systems (SuDS), and all calculations must include an allowance for climate change.

Surface water run-off – volume (one credit)

Flooding of property will not occur in the event of a local drainage system failure (caused either by extreme rainfall or a lack of maintenance) and:

Drainage design measures must be specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been before the assessed site's development. This must be for the 100-year six-hour event, including an allowance for climate change. Additional predicted volume of run-off for this event must also be prevented from leaving the site by using infiltration or other SuDS techniques.

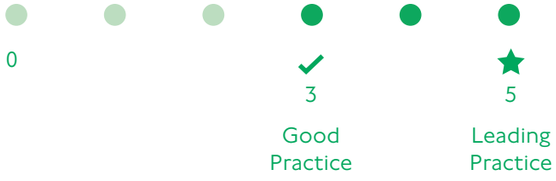
Metric type

Points

Units

Number of BREEAM POL 03 credits

Range



How is it calculated? (continued)

Or (only where the above criteria cannot be achieved):

An appropriate consultant must justify why the above criteria cannot be achieved and drainage design measures should then be specified so that the post-development peak rate of run-off is reduced to the limiting discharge. Limited discharge is explained in the manual.

There must be relevant maintenance agreements in place for all specified SuDS and all calculations must include an allowance for climate change.

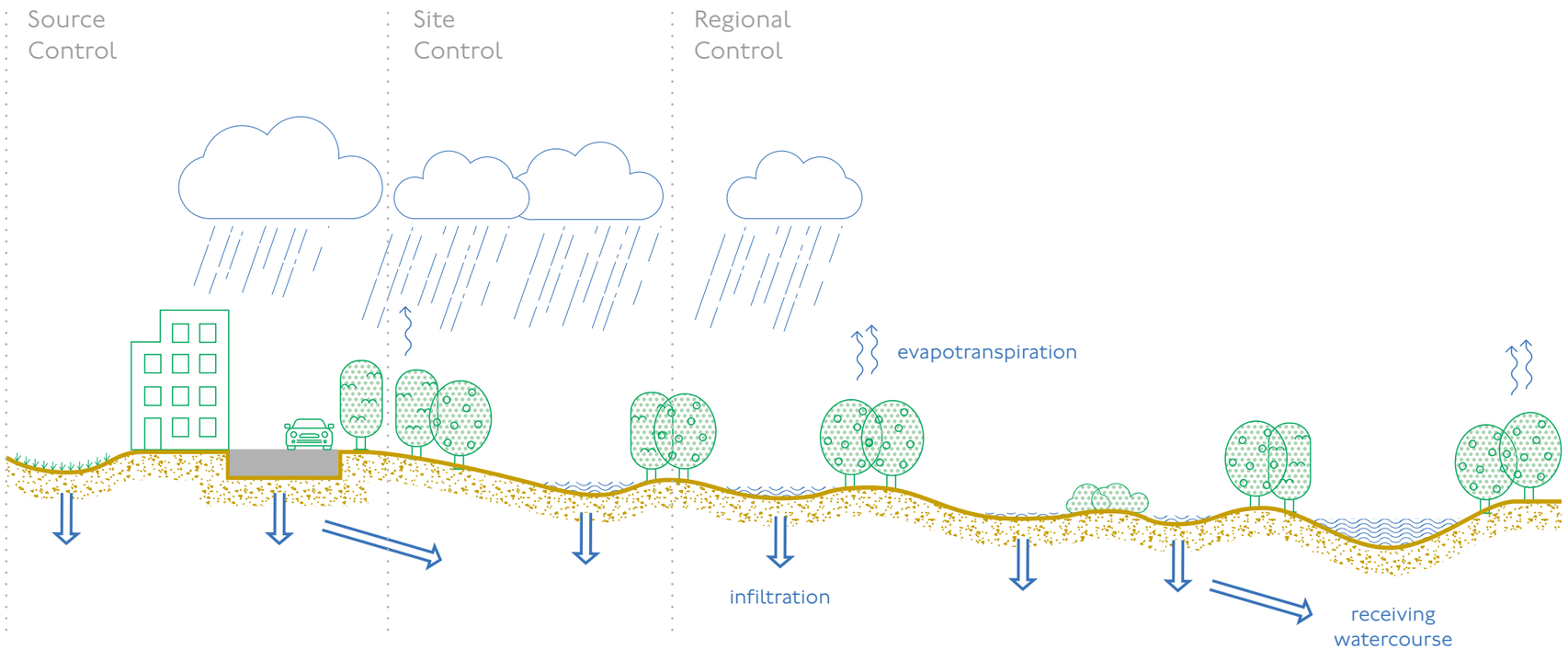
Minimising watercourse pollution (one credit)

The BREEAM UK NC 2018 Manual lists criteria which must be met to achieve the minimising watercourse pollution credit. They include:

- Making sure there is no discharge from the developed site for rainfall up to 5mm (confirmed by the appropriate consultant)
- Putting appropriate measures in place to avoid watercourse pollution depending on the level of risk of contamination
- Making sure all water pollution prevention systems are designed and installed in line with the recommendations of documents such as the SuDS Manual and other relevant industry best practice
- Providing a comprehensive and up-to-date drainage plan of the site for the building or site occupiers
- Confirming all relevant maintenance agreements for the ownership, long-term operation and maintenance of all specified SuDS are in place
- Making sure all external storage and delivery areas are designed and detailed in line with the current best practice planning guidance

Simple buildings – surface water run-off (up to two credits)

The manual explains how up to two credits can be awarded for surface water run-off for simple buildings. However, if all criteria for surface water run-off as listed above are met, two credits and an exemplary credit can be achieved. For details on the alternative criteria list which apply to simple buildings, refer to the BREEAM UK NC 2018 Manual.



What is the process?

Action

RIBA Stage 0

RIBA Stage I: Optimise

Development manager

Commission flood risk assessment in line with BREEAM requirements

Drainage engineer

Prepare flood risk assessment in line with BREEAM requirements for POL 03

RIBA Stage 2: Plan / Design

Architect

Prepare building sections and plans making sure that floor level is 0.3 metres higher than the obtained/estimated flood level and safe access/escape routes are available/present

Landscape architect

Work with architect to make sure safe access/egress routes are available/ present in the landscape design

Drainage engineer

Develop a sustainable drainage systems (SUDS) strategy for site in line with BREEAM guidance and Greater London Authority (GLA) drainage hierarchy

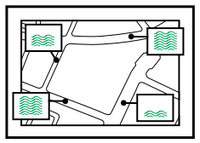
RIBA Stage 3: Plan / Design

Drainage engineer

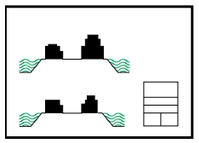
Develop the detail of SUDS strategy in order that all water pollution prevention systems have been designed in line with the recommendations of documents such as the SuDS Manual and other relevant industry best practice

Action

Documentation



Flood risk assessment



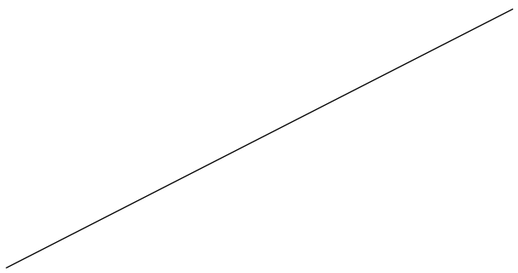
Sections and building/landscape plans showing floor level and estimated flood level including access and escape routes

Documentation

What is the process? (continued)

Action

RIBA Stage 4



RIBA Stage 5: Deliver

Contractor / drainage engineer

Ensure that all water pollution prevention systems have been installed in line with the recommendations of documents such as the SuDS Manual and other relevant industry best practice

RIBA Stage 6: Monitor

Contractor

Prepare and make available comprehensive and up-to-date drainage plan of the site for the building or site occupiers

Project manager / drainage engineer

Prepare maintenance agreements for the ownership, long-term operation and maintenance of all specified SuDS

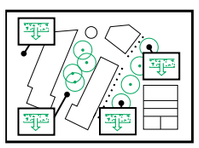
RIBA Stage 7: Monitor

Asset manager

Follow the maintenance agreements for all specified SuDS

Action

Documentation



Drainage plan of the site

Maintenance agreements for all specified SuDS

Documentation

Relevant Policy

BREEAM UK New Construction 2018: Pol 3, Flood and surface water management

In the UK around 0.5 million homes, offices, factories and warehouses are considered to be at a significant risk of flooding, ie they have a greater than one in 75 chance per year of being flooded. Apart from the initial effects of being flooded, i.e. access and use of the building, once flood water isremoved significant resources (man hours, time and cost) are usually required to clean, refit and re-open buildingsfor use. This has major impacts on business continuity that can be costly and time-consuming to manage. With due consideration at an early stage of the location, design and specification of the development (including the building, curtilage and wider site) the risk of flooding, and impact if it is flooded, can be managed

BS8533:2017 Section 5, Assessing and managing flood risk in development

The London Plan Policy SI 13, Sustainable drainage

Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)

2) rainwater infiltration to ground at or close to source

3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)

Construction Industry Research and Information Association (CIRIA) SUDS Manual (C753) 2015

Available here.

Further Reading

London Sustainable Drainage Action Plan, Greater London Authority (2016)

London Regional Flood Risk Assessment, 2018

Thames Catchment Flood Management Plan (CFMP), Environment Agency

Thames Estuary 2100 (TE2100): 2016 review

ID no

CR5

Key Performance Indicator (KPI) name

Sustainable Drainage

What is it?

London is fast outgrowing its drains and faces an increasing risk of surface water flooding and sewer overflows. To make the most effective use of the existing and planned drainage infrastructure, new developments should aim to manage rainwater as a valuable resource rather than a waste product and reduce all areas with impermeable surfaces. Ideally, drainage systems should mimic the ways that nature manages rainwater.

This indicator measures how well a development deals with rainfall by maximising the use of rainwater harvesting, promoting absorption and infiltration, and reducing discharge to the sewer network.

How does it add value?

By adopting more natural sustainable drainage systems or SuDS, the burden on the existing network is eased, the risk of flooding reduced, and polluted run-off water from roads and hard-surfaces partially cleaned before entering the conventional drainage system. Guidance set out in The London Plan's sustainable drainage hierarchy encourages water re-use and storage, and infiltration techniques based on natural porous surfaces. This approach helps to manage surface water run-off as close to its source as possible, and in new developments, reduces the risk of flooding, pooling of rainwater and sewer overflows. Developments that adhere to the hierarchy offer greener, more appealing environments and amenities for residents, and improve biodiversity.

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What type of project does the indicator apply to?

- ☑ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Landscape Architect	●●●	leading
Development Manager	●●○	accountable
Engineer – Civil	●○○	supporting
Architect	●○○	supporting
Drainage Engineer	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design	Specify	Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
15 Good Health and Wellbeing

Connected SDF indicators

- ☑ Healthy Streets
- ☑ Public Realm
- ☑ Water Efficiency
- ☑ Urban Greening Factor
- ☑ Soils Protection

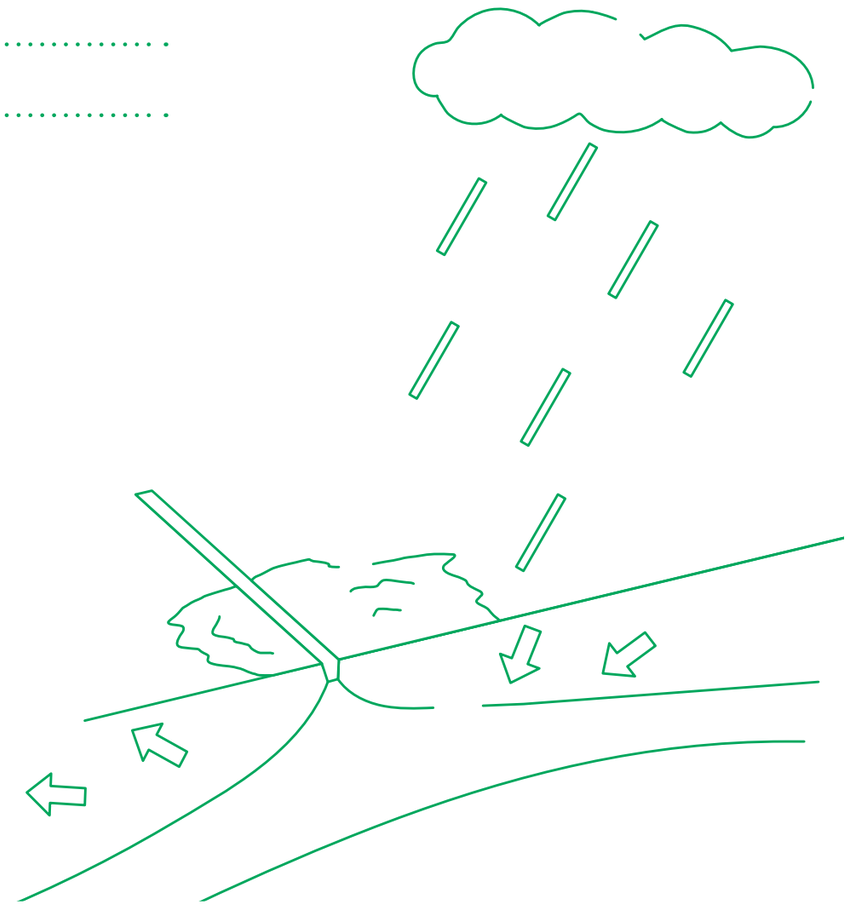
How is it calculated?

The development is scored based on how it performs against the London Plan hierarchy, as shown in the table below. A high performing project will have the majority of rainwater discharged under the first three levels. The more rainwater that goes directly to a watercourse or sewer, the lower the project's score.

London Plan 2021 – Drainage hierarchy

Stage	Drainage solution
1	Rainwater use as a resource (for example, rainwater harvesting, blue roofs for irrigation)
2	Rainwater infiltration to ground at or close to source
3	Rainwater attenuation in green infrastructure features for gradual release
4	Rainwater discharge direct to a watercourse (unless not appropriate)
5	Controlled rainwater discharge to a surface water sewer or drain
6	Controlled rainwater discharge to a combined sewer

1. For Stage 2 encourage partial infiltration where it is safe and suitable to do so as recommended by qualified drainage engineering professional
2. Green infrastructure features within Stage 3 of the drainage hierarchy are in accordance with CIRA 753, The SuDS Manual including; Filter Strips, Filter Drains, Swales, Bioretention Systems, Trees, Permeable Paving, Detention Basins, Ponds and Wetlands, Rain Gardens



Metric type

%

Percentage

Units

%

Percent of rainwater discharged via stages 1–3 of the London Plan hierarchy

Range

0 — ✓ 50% Good Practice — ★ 100% Leading Practice

How is it calculated? (continued)

The calculation is to be undertaken by summing the volumes of attenuation provided by Stages 1-3 within the surface water drainage strategy as a proportion of the total attenuation provided on the scheme. This is expressed in the following formula:

$$\%\text{ of rainwater discharged through Stages 1-3 in the hierarchy} = \frac{\text{Volume of attenuation provided by Stages 1-3}}{\text{Total volume of attenuation provided on the scheme} \times 100}$$

Please note that the above calculations are to be carried out for the critical storm event with a one in 100 year return period including an allowance for climate change in accordance with Environment Agency guidance.

For sites where partial infiltration is utilised an additional calculation will need to be performed to calculate the percentage of rainwater discharged through Stage 2.

Additional Note

In some scenarios Stages 1-3 may be challenging to achieve, for example:

- No space for infiltration on site ie no useable space > 5 metres away from the building footprint (no infiltration is permitted by Building Regulations within 5 metres of any building footprint).
- Poor infiltration rates on site – ie underlying strata does not infiltrate.
- No space for blue roof / rainwater harvesting on the roof area due to plant requirement etc.

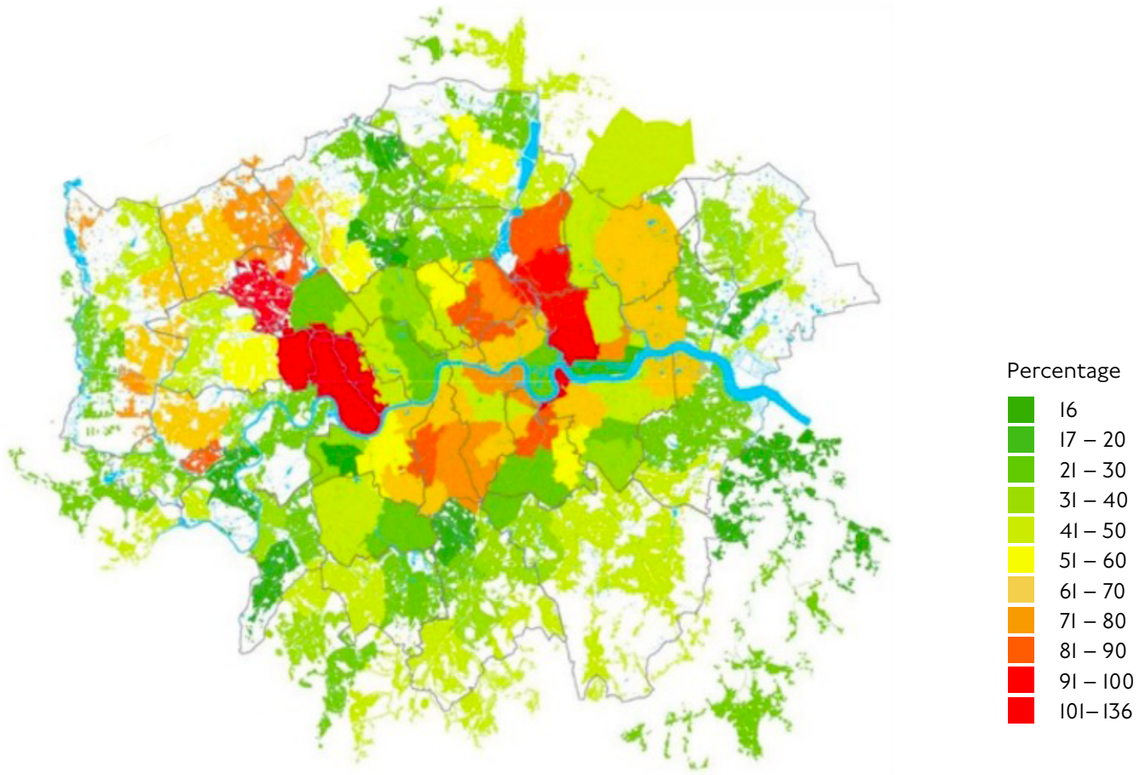
If any of these scenarios apply then it is unlikely that the site will meet this indicator due to constraints outside of the control of the project development team. In these instances the indicator is to be scored as not applicable. However, these developments should focus on Indicators CR04 and 05 – measuring a reduction in surface water run-off.

Figure 51: Number of properties at risk of surface water flooding in London

	Residential properties	Commercial properties
High (1 in 30 year event)	**68,499**	**12,148**
Medium (1 in 100 year event)	**164,546**	**25,623**

Source: London Environment Strategy

Flow Capacity Utilisation – 2050



What is the process?

Action

RIBA Stage 0

RIBA Stage 1: Optimise

Development manager

Make sure there is reference to the London Plan drainage hierarchy and local surface water management plan in the development brief

Civil engineer

Carry out flood risk assessment, drainage survey and geotechnical survey of the site to establish existing constraints and parameters, such as existing local drainage infrastructure, infiltration rates and surface water flood risk

Architect

Design initial site plan to make best use of the existing site characteristics to maximise opportunities for sustainable drainage

RIBA Stage 2: Plan / Design

Civil engineer

Explore viability of different attenuation and infiltration strategies based on ‘control at source’ principles and develop initial sustainable drainage strategy

Architect

Make sure the initial drainage strategy is compatible with initial layout proposals

Landscape architect (and ecologist as necessary)

Work with civil engineer to strengthen the naturalistic and green infrastructure elements of the drainage strategy

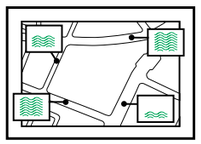
RIBA Stage 3: Plan / Design

Civil engineer

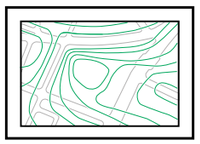
Develop a full sustainable drainage strategy in collaboration with the architect and landscape architect – as part of site specific flood risk assessment, if necessary

Action

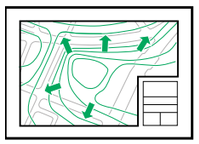
Documentation



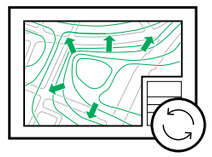
Flood risk assessment (if necessary)



Drainage and geotechnical survey



Initial sustainable drainage strategy



Sustainable drainage strategy

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Civil engineer

Provide detailed specification for sustainable drainage scheme, in association with the landscape architect as necessary

RIBA Stage 5: Deliver

Contractor

Identify any unforeseen practical constraints to using the sustainable drainage scheme and agree changes with the civil engineer as necessary. Deliver the scheme as per specifications provided

Civil engineer

Provide quality control function as required

RIBA Stage 6: Monitor

Development manager

Make sure verification documents have been provided along with any bespoke management and maintenance documents that will be required by the property manager. Put in place agreements for the adoption, long-term operation and maintenance of all SuDS for the design life of the development

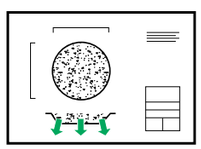
RIBA Stage 7: Monitor

Property manager

Make sure the drainage scheme is maintained in line with agreements

Action

Documentation



Sustainable drainage scheme specification

Verification report

Management and maintenance plans of source control structures, etc

SuDS adoption agreement

Documentation

Relevant policy

The London Plan, Policy, SI 13, Sustainable drainage

Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the … drainage hierarchy. [Refer to full drainage hierarchy in policy text].

The London Plan, Policy GG6, Increasing efficiency and resilience

To help London become a more efficient and resilient city, those involved in planning and development must (point B): ensure buildings and infrastructure are designed to adapt to a changing climate, making efficient use of water, reducing impacts from natural hazards like flooding and heatwaves, while mitigating and avoiding contributing to the urban heat island effect

National Planning Policy Framework, paragraph 169

Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate.

Further reading

- London Sustainable Drainage Action Plan 2016
- Construction Industry Research and Information Association (CIRIA) SuDS Manual
- Sustainable Drainage Systems(SuDS) maintenance and adoption options
- Achieving Sustainable Drainage: a review of delivery by Lead Local Flood Authorities
- Sustainable Drainage – Design & Evaluation Guide, London Borough of Merton

ID no

CR 6

Key Performance Indicator (KPI) name

Biodiversity

What is it?

In common with nationwide trends, London's biodiversity is in decline. A variety of factors including climate change, difficulties in managing sensitive habitats in urban locations, and continued development are eroding the city's wildlife habitat. Consequently, all new developments are required by the new Environment Act to contribute a measurable minimum 10 per cent uplift in biodiversity by retaining, improving or creating habitat in the development site, or off-site if this is not possible.

This indicator measures the percentage change in the amount of habitat that is retained, created or improved (or provided off-site) before and after a development is complete, to meet the mandatory biodiversity net gain.

How does it add value?

Biodiversity is an important indicator of the health of the ecological systems on which we all depend. Since 1970, 41 per cent of UK species have declined and 15 per cent are threatened with extinction. By retaining, improving or creating a range of wildlife habitats on development sites, the project directly helps to reverse the decline in biodiversity. A range of high-quality habitats and features, such as green walls and roofs, offers residents and local people greater access to nature and this contributes to improved health and wellbeing.

.

What type of project does the indicator apply to?

- ☑ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Ecologist	●●●	leading
Development Manager	●●○	accountable
Landscape Architect	●○○	supporting
Architect	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design	Specify	Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
15 Life on Land

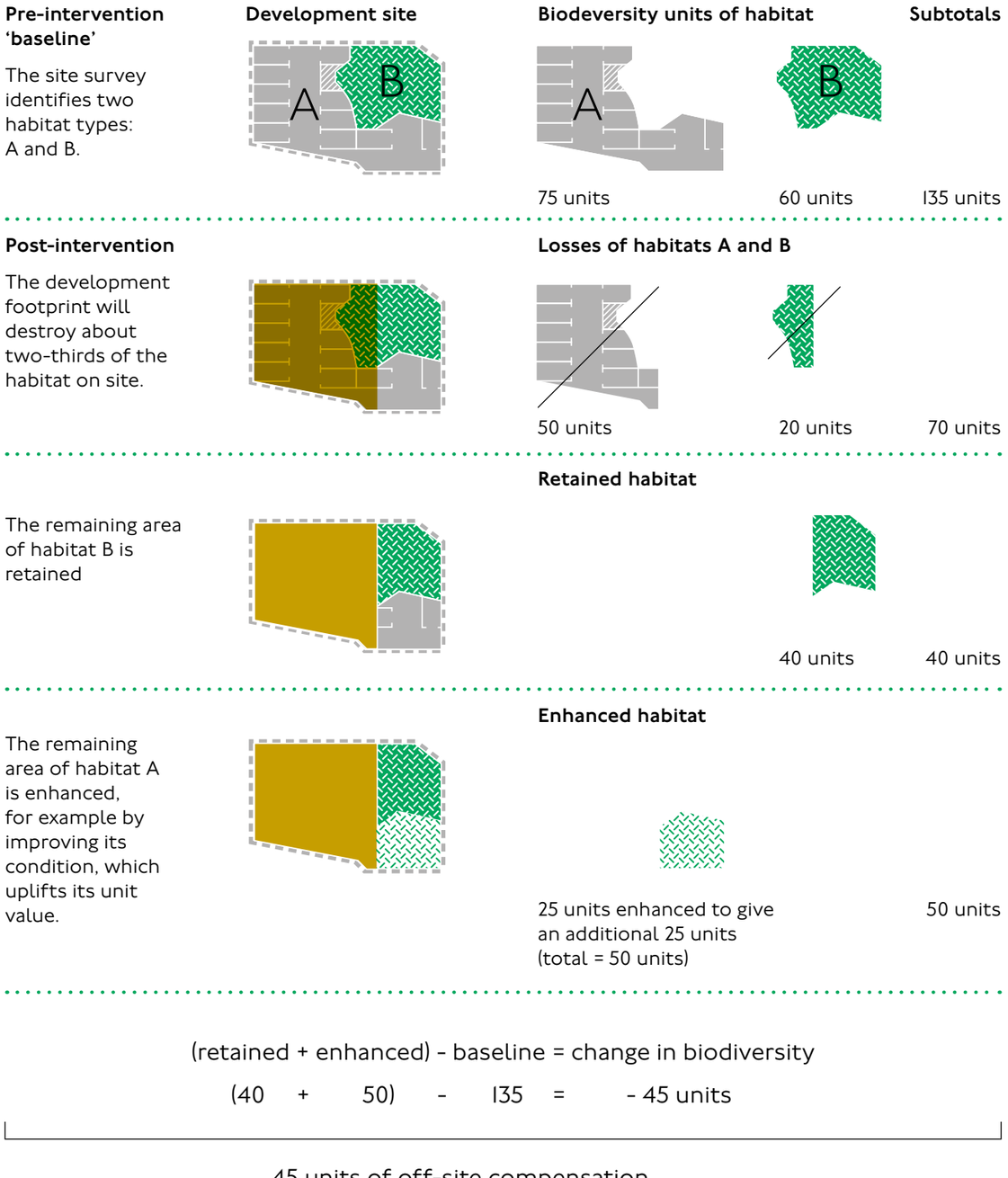
Connected SDF indicators

- ☑ Access to Nature
- ☑ Healthy Streets
- ☑ Public Realm
- ☑ Urban Greening Factor

How is it calculated?

This indicator calculates the percentage change in biodiversity using the Department for Environment, Food & Rural Affairs (Defra) Biodiversity Metric 3.0. This worksheet sets out the value of habitats, before and after development has taken place, based on the area they cover, their distinctiveness and their condition.

For habitats created as part of the post-development landscape, other factors, such as the time it will take to reach maturity and the difficulty of creating the habitat, are also taken into account. The net gain or loss of biodiversity is a result of the difference between the value of the habitats 'before' and 'after', expressed as a percentage change.



Metric type

%

Percentage

Units

%

Percentage change in biodiversity units

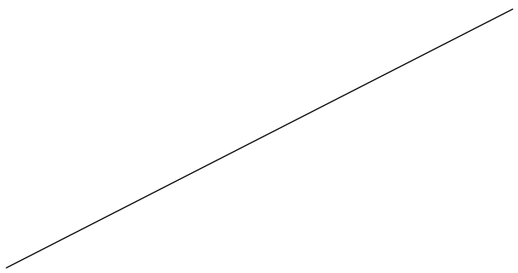
Range

Extensive – could in theory range from minus 100% (or more) to plus 100% (or more)

What is the process?

Action

RIBA Stage 0



RIBA Stage 1: Optimise

Development manager

Set out requirements to achieve a biodiversity net gain of 10 per cent or more in the project brief

Ecologist

Carry out baseline surveys of habitats and species (especially protected species) and an assessment of the ecological value of the site and any ecological connections linking the site to other areas of wildlife habitat

RIBA Stage 2: Plan / Design

Ecologist

Assess development impacts on existing features, including networks with adjoining sites, and identify strategy for avoiding or mitigating any adverse effects and potential opportunities for securing biodiversity net gain. Carry out initial biodiversity net gain calculation to inform landscape and architectural designs

Landscape architect

Work with the ecologist to ensure ecological parameters and opportunities are informing the landscape strategy

Architect

Develop layout and massing (general shape, form and size of the development) to avoid and/or minimise impacts on existing valuable ecological assets

RIBA Stage 3: Plan / Design

Landscape architect

Prepare landscape plan, setting out the range of different landscape interventions including retention of existing trees, planting of new trees or herbaceous planting, other soft landscaping proposals and layout of hard-landscaping proposals

Ecologist

Provide recommendations for retaining or enhancing existing habitats, and the creation of new ones

Action

Documentation

Preliminary ecological appraisal

Ecology strategy (often part of the landscape strategy)

Landscape and ecology plan

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Landscape architect

Provide detailed specification and planting palettes for all soft and hard landscaping and the protection and management requirements for retained and planted trees during construction and during the establishment phase

Ecologist

Make sure the specifications provided by the landscape architect align with ecological objectives for the site. Provide specialist input to the landscape and ecology management plan, including any necessary measures to avoid or mitigate impact on protected species. Carry out detailed biodiversity net gain calculation

RIBA Stage 5: Deliver

Contractor

Deliver the scheme as set out in detailed plans and specifications

Ecologist

Provide an ecological clerk of works service if required (for example, to make sure of legal compliance in relation to protected species)

RIBA Stage 6: Monitor

Development manager

At end of defect period make sure that habitats retained, enhanced or created on-site are consistent with those set out in the biodiversity net gain calculation and report. Make sure appropriate long-term management agreements (typically 25-30 years) are in place to confirm that habitats enhanced and created will be maintained and achieve their intended condition

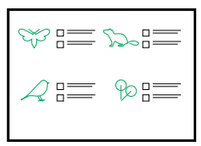
RIBA Stage 7: Monitor

Property manager

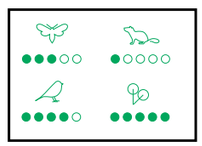
Manage and maintain habitats enhanced or created in line with adopted management and maintenance plans and biodiversity net gain management plan. Carry out an audit after 10 years to make sure biodiversity net gain targets have been achieved or are on track to be achieved

Action

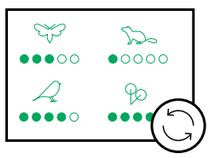
Documentation



Detailed planting plans and specifications



Landscape and ecology management plan with biodiversity net gain score



Biodiversity net gain management plan

Documentation

Relevant policy

The London Plan, Policy G6, Biodiversity and access to nature

Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain.

National Planning Policy Framework, paragraph 174

Planning policies and decisions should contribute to and enhance the natural and local environment by: (d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

Environment Act (forthcoming)

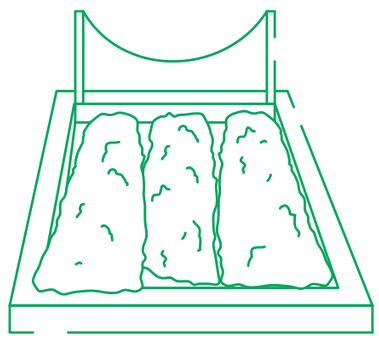
A 10 per cent biodiversity net gain requirement on new development

Further reading

The Biodiversity Metric 3.0, Natural England

Biodiversity net gain. Good practice principles for development. A practical guide, Construction Industry Research and Information Association (CIRIA),

UK State of Nature 2019, National Biodiversity Network



ID no

CR7

Key Performance Indicator (KPI) name

Soils Protection

What is it?

The health of soil can affect its capacity to hold or drain water, its susceptibility to damage, especially from compaction, and its ability to support particular habitats. This indicator aims to promote good practice in the protection of soil structure and focuses on inherited carbon in soil, the sustainable use of soils in developments, and the creation and use of recycled and reused soil, where possible.

Many soils on urban development sites have been degraded through pollution, compaction or mixing of layers through successive disturbance. This can result in the destruction of typical soil layers or horizons and lead to unsuccessful landscaping schemes and a reduction in the environmental benefits.

How does it add value?

Good soils, also described as substrates, are the foundation for every successful landscaping scheme. Good onsite soil management saves on cost, and negates the additional expense of having to improve the existing soil or import good quality replacement. With a good soil, a development's landscaping scheme can fulfil its potential and provide the benefits intended, for example, in relation to drainage or habitat creation, climate adaptation, biodiversity conservation and liveable neighbourhoods. Landscaped plants can also thrive in materials produced onsite by recycling and reusing crushed brick and concrete mixed, if necessary, with an organic soil conditioner. In addition to providing a base in which plants can successfully grow, good soils guarantee a range of other environmental benefits. These include absorbing rainfall and lessening flood risk, removing pollutants from water and air, providing habitat for the fungi, bacteria and earthworms that transform waste into nutrients, and storing atmospheric carbon.

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What type of project does the indicator apply to?

- ☑ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Soil Scientist and / or Landscape Architect	●●●	leading
Development Manager	●●○	accountable
Civil Engineer	●○○	supporting
Ecologist	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design		Specify	Deliver	Monitor	

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
15 Life on Land

Connected SDF indicators

- ☑ Recycled Materials
- ☑ Access to Nature
- ☑ Public Realm
- ☑ Construction Waste – Residential
- ☑ Construction Waste – Commercial

How is it calculated?

The indicator is calculated by combining the credits available for the conservation of soils in situ and/or sourcing soils sustainably.

Conserve soil onsite

1.1	Carry out an assessment of any existing soils onsite and set out a soil management plan, including a strategy for importing suitable soils and substrates or creating them onsite	2 credits
1.2	Safeguard areas where existing soils will be retained or reused onsite, and areas where any imported soils will be stored	1 credit
1.3	Strip soils identified for reuse and retain onsite in heaps no higher than 1.5 metres	1 credit
Subtotal possible credits		**4 credits**

Source soil sustainably

2.1	No soil from site is sent to landfill	2 credits
2.2	Check imported soils are compliant with BS 3882:2015 (Topsoil) and BS8601:2013 (Subsoil)	1 credit
2.3	Retain crushed concrete or other suitable demolition by-products (to five millimetres sieve size) and add Compost Quality Standard PAS 100 compliant compost (as necessary) to create suitable growing medium	2 credits
Subtotal possible credits		**5 credits**

Metric type

#

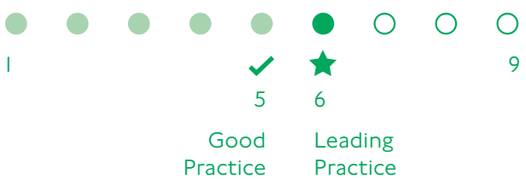
Percentage

Units

#

Credits

Range



What is the process?

Action

RIBA Stage 0

RIBA Stage 1: Optimise

Development manager

Make sure the need to protect and optimise soils onsite is within the project brief

Other specialist – soil scientist

Carry out an audit of existing soils onsite to establish the soil quality, quantity, variability and suitability for the proposed landscape scheme

Landscape architect

Understand the existing soil resource onsite and use this as a basis for the landscape design

RIBA Stage 2: Plan / Design

Other specialist – soil scientist

Identify the potential for reusing existing materials onsite (for example, brick, concrete, etc, treated and mixed with suitable composts) as potential substrates for the landscaping scheme

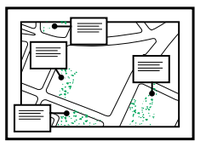
Landscape architect

Based on information provided by the soil scientist, develop a strategy for use or reuse of existing soils and substrates onsite

RIBA Stage 3

Action

Documentation



Soil resource survey and assessment

Soil management strategy

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Other specialist – soil scientist or landscape architect

Prepare specifications for topsoil protection, management and maintenance during construction and the production of new growing mediums

RIBA Stage 5: Deliver

Contractor

Deliver landscaping scheme and soil resource plan as per the specifications

RIBA Stage 6: Monitor

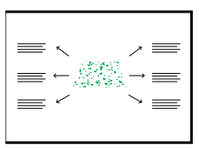
Development manager

On completion of landscaping scheme verify that no soil has been sent to landfill and report on the amount of material recycled and reused as a growing medium

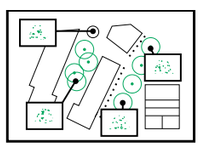
RIBA Stage 7

Action

Documentation



Soil resource plan and detailed specifications



Construction management plan (as required)

Documentation

Relevant policy

As no current policies exist, the following documents are guidance and advice:

Climate Change Committee – Independent Assessment of UK Climate Risk 2021

Soil health features in all of the current national adaptation plans across the UK, but the necessary adaptation responses are not yet commensurate with the level of risk. There is not yet a comprehensive soil monitoring strategy to understand and measure progress on climate change adaptation, nor are there targeted interventions and land management strategies to improve soil health, locally or at national scale.
Available here.

Natural England – Carbon Storage and Sequestration by Habitat 2021 (NERR094)

The natural environment can play a vital role in tackling the climate crisis as healthy ecosystems take up and store a significant amount of carbon in soils, sediments and vegetation.
Available here.

Parliament – Sustaining the Soil Microbiome 2019

In the urban environment soil sealing from construction is degrading soils, disconnecting them from the wider environment so they cannot support plants and trees which provide the inputs to support soil biodiversity. Sealing also prevents water percolation into soil, so flood risk is increased. Urban soils are also impacted by legacy contamination which puts the health of people and wildlife at risk.
Available here.

Further reading

- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, Department for Environment, Food and Rural Affairs
- Working with Soil Guidance Note: Benefitting from soil management in development and construction, British Society of Soils Science
- BS 3882:2015 Specification for topsoil, BSI
- BS 8601:2013 Specification for subsoil and requirements for use, BSI
- BS 18504:2017 Soil quality. Sustainable remediation, BSI

ID no

CR 8

Key Performance Indicator (KPI) name

Landscape Future-Proofing

What is it?

As local climatic conditions continue to change, landscaping in the public realm needs to be increasingly resilient and adaptable. Soft landscaping or planting within a development must be capable of surviving and thriving in a climate that may be noticeably different from today. A future-proofed landscape, specially planned and designed to cope with hotter, drier summers and warmer, wetter winters will prevent failed planting schemes and protect the landscaping investment.

This indicator measures the degree to which landscaped areas are more resilient to the effects of climate change and biodiversity loss by guarding against potential new pests and diseases that are likely to appear as the climate alters.

How does it add value?

Landscaping that is designed to respond to a changing climate and biosecurity with nature-based solutions, helps to reduce the effects of flooding and heat, and prevents new pests and diseases becoming established onsite. With planting suitable for a changing climate and good aftercare, a future-proofed landscape offers more structure and variety in terms of species, landscape form and habitats. In turn, this provides a wider range of benefits for residents and local communities, and supports the legal requirement for new developments to create a measurable, minimum 10 per cent uplift in onsite biodiversity.

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What type of project does the indicator apply to?

- ☑ Residential
- ☑ Commercial
- ☐ Masterplan

Who is responsible?

Landscape Architect	●●●	leading
Development Manager	●●○	accountable
Ecologist	●○○	supporting
Architect	●○○	supporting
Contractor	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design	Specify	Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
15 Life on Land

Connected SDF indicators

- ☑ Access to Nature
- ☑ Healthy Streets
- ☑ Responsible Sourcing of Materials
- ☑ Urban Greening
- ☑ Biodiversity
- ☑ Air Quality

How is it calculated?

This indicator is calculated by summing-up credits available for planting, establishment and maintenance, based on the degree to which a planting scheme is designed, specified and maintained for maximum resilience, and consequently, more likely to mature into high-quality, high performing landscapes.

For Good and Leading practice the project must score at least one point in each category.

This KPI has a prerequisite that there must be no use of peat, chemical herbicide or pesticide unless for targeted use on a listed invasive plant or animal species.

Successful plant establishment	Plants sourced from a horticultural trade association accredited nursery ○ **One point**	Plants grown under contract in the UK ○ ○ **Two points**	Plants watered weekly during establishment phase ○ ○ ○ **Three points**
Disease and climate resilience planting (herbaceous plants)	Planting scheme contains more than 30% of any one plant family, 20% of any one genus and 10% of any one variety ○ **One Point**	Planting scheme does not contain more than 30% of any one plant family, 20% of any one genus and 10% of any one variety ○ ○ **Two points**	Planting scheme contains less than 20% of any one plant family, 10% of any one genus and 5% of any one variety ○ ○ ○ **Three points**
Disease and climate resilient planting (trees)	Planting plans specifies at least three different tree species ○ **One point**	Planting plans specify at least five different tree species ○ ○ **Two points**	Planting plans specify more than five different tree species, from a Plant Healthy Certified supplier ○ ○ ○ **Three points**
Maintenance and management	Landscape contractors are Association or Professional Landscapers (APL) and/or British Association of British Landscape Industries (BALI) accredited ○ **One point**	Management and maintenance requirements are detailed in a Landscape and Ecology Management Plan (LEMP) ○ ○ **Two points**	Any dead, dying or diseased trees – and shrubs and herbaceous plants where failure exceeds 5% – are replaced annually during the first 5 years after planting ○ ○ ○ **Three points**

Metric type

○

Points

Units

○

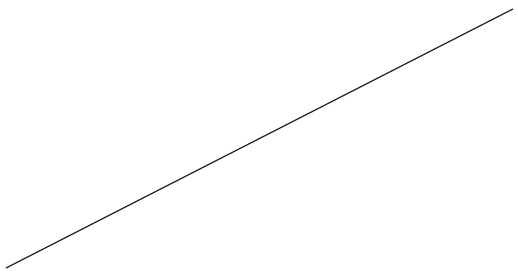
Points for planning, establishment and maintenance

Range

What is the process?*

Action

RIBA Stage 0



RIBA Stage 1: Optimise

Landscape architect

Identify existing landscape features that will contribute to a future-proofed landscape, and opportunities for enhancing or creating landscapes and landscape features that will contribute to a future-proofed landscape

Ecologist (if required)

Understand the policy framework, site context and existing ecology within and outside the red line boundary (the land necessary to carry out the development) by undertaking a preliminary ecological survey

Arboriculturalist (if required)

Establish the distribution and quality of trees on-site by carrying out a tree survey

RIBA Stage 2: Plan / Design

Landscape architect

Set out the approach to retaining existing assets, choice of planting mediums, irrigation and biosecurity

Ecologist and arboriculturalist (if required)

Contribute to the approach devised by landscape architect

RIBA Stage 3: Plan / Design

Landscape architect

Prepare the layout plans for herbaceous planting and tree planting

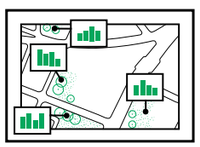
Ecologist and arboriculturalist (if required)

Provide ecological and arboricultural detailing to the layout plans

Action

Documentation

* Note: The process and deliverables for CR 8 Landscape Future-Proofing should be embedded in the process and deliverables for CR 1 Urban Greening.

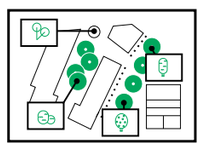


Landscape assessment

Preliminary ecological appraisal

Tree survey

Landscape strategy (incorporating ecology and tree chapters as required)



Landscape plan (incorporating ecology and tree sections if necessary)

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Landscape architect

Prepare detailed planting plan specification and provide table setting out percentages of plant family, genus and variety, and number of tree species proposed. Prepare detailed management and maintenance requirements

Ecologist (if required)

Contribute to the detailing of management and maintenance requirements

RIBA Stage 5: Deliver

Contractor

Obtain planting materials and show the appropriate plant health and biosecurity certification as required. Make sure planting plans are delivered as per specifications provided. Once delivered, do not leave plants in crates or pots for more than 48 hours. Verify that plants, especially trees, are watered weekly from April to October

Landscape architect

Engage with contractors to advise on constraints to practical delivery and monitor adherence to specifications

RIBA Stage 6: Monitor

Development manager

Make sure planting has been completed to specification and appropriate certification provided. Check that any standard trees or shrubs that fail during the establishment period are replaced. Make sure that herbaceous vegetation is replaced if losses are more than five per cent during the establishment period

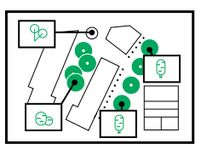
RIBA Stage 7: Monitor

Property manager

Manage the site in line with measures set out in the landscape and ecology management plan

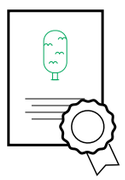
Action

Documentation



Planting plans

Landscape and ecology management plan



Plant health certificates

Landscape & Ecology Management Plan (LEMP) – updated as required

Landscape & Ecology Management Plan (LEMP) – updated as required

Documentation

Relevant policy

The London Plan, Policy D8, Public realm

Development Plans and development proposals should: (I) incorporate green infrastructure such as street trees into the public realm to support rainwater management through sustainable drainage, reduce exposure to air pollution, moderate surface and air temperature and increase biodiversity; (J) ensure that appropriate shade, shelter, seating and, where possible, areas of direct sunlight are provided, with other microclimatic considerations, including temperature and wind, taken into account in order to encourage people to spend time in a place.

Further reading

Plant Health and Biosecurity:
The Landscape Consultant's Toolkit, Landscape Institute
Plant Healthy Certification Scheme, Plant Health Alliance
Plant Health Management Standard, Plant Health Alliance
BS 8545:2014, Trees: from nursery to independence in the landscape. Recommendations

ID no

CR 9

Key Performance Indicator (KPI) name

Construction Impacts on Ecology – Residential

What is it?

The purpose of this indicator is to work out the ecological baseline and zone of influence of a site and identify the risks and opportunities to successfully building and running the project while protecting existing site ecology. This involves assessing the ecological value of the site before construction work begins and the area around it that may be affected by the proposed works.

Development and landscape management can have a significant impact on the broader environment, and this indicator also aims to limit or avoid any negative effects on the ecology of the site and its zone of influence, for example, from damage or disturbance to local wildlife and habitats.

For this indicator, we are following the criteria for BRE Home Quality Mark (HQM) 2.1, Identifying Ecological Risks and Opportunities and HQM 2.2, Managing Impacts on Ecology.

How does it add value?

By complying with ecological design and management practices, the impact from a development on local ecosystems is kept to a minimum and this helps to conserve the existing environmental assets for the surrounding communities. An ecosystem that is valued makes the area more appealing to visit and live in, and creates a sense of wellbeing and community. The use of qualified ecology experts in the decision-making process will improve the ecological value of the site and maintain it for the long term, while still successfully building the project. Using this expert advice also makes sure that legislation, policy and guidelines are followed for the good of the site, and this helps to reduce the risk of local controversy and reputational damage.

What type of project does the indicator apply to?

- ☑ Residential
- ☐ Commercial
- ☑ Masterplan

Who is responsible?

Contractor	●●●	leading
Development Manager	●●○	accountable
Ecologist	●○○	supporting
Architect	●○○	supporting
Landscape Architect	●○○	supporting
HQM Assessor	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design		Specify	Deliver		

Connected UN Sustainable Development Goals

12 Responsible Consumption and Production
13 Climate Action
15 Life on land

Connected SDF indicators

- ☑ Access to Nature
- ☑ Responsible Construction Practices
- ☑ Soils Protection

How is it calculated?

This indicator follows the criteria set out by HQM 2.1, Identifying Ecological Risks and Opportunities, and HQM 2.2, Managing Impacts on Ecology. Refer to: Home Quality Mark ONE England (pages 24 and 32 of 256).

Up to seven credits can be achieved for HQM 2.1, Identifying Ecological Risks and Opportunities.

Assessment route selection (prerequisite)

An assessment route for the project must be established using Guidance Note 34: BREEAM, CEEQUAL, HQM Ecology Risk Evaluation Checklist.

The client or contractor must also confirm compliance is, or will be, monitored against all relevant UK and EU or international legislation relating to the ecology of the site.

Survey and evaluation (up to three credits)

Foundation route – project team member (prerequisite for foundation route)

Completion of the checklist indicates assessment route I can be used. Refer to the methodology section of HQM 2.1, in the HQM ONE England Manual.

Comprehensive route – suitably qualified ecologist (three credits)

Firstly, a suitably qualified ecologist (SQE) must be appointed early in the project stage. The ecologist must then carry out an appropriate level of survey and evaluation for the site and its zone of influence to establish the ecological baseline. Requirements related to the ecological baseline are listed in the manual. Information and data must be collated and shared with the project team for site preparation, design or construction works. The definition of what constitutes an SQE, can be found in the Home Quality Mark ONE Manual.

Determining ecological outcomes (up to three credits)

Foundation route – project team member (two credits)

Firstly, the criteria for the foundation route in the survey and evaluation section must be met to achieve these credits. Also, during early design stage, the design team must liaise and collaborate with wider project team to identify, appraise and agree actions for the project that will achieve the best ecological outcomes in line with the first two points of the mitigation hierarchy: avoidance and protection.

Comprehensive route – suitably qualified ecologist (three credits)

The criteria set out in the comprehensive route are met (see survey and evaluation section above). During early design stage, the project team must also liaise and collaborate with representative stakeholders to identify, appraise and agree actions for the project to achieve the best ecological outcomes, in line with the following mitigation hierarchy of action:

- Avoidance
- Protection
- Reduction or limitation of negative impacts
- Onsite compensation
- Enhancement considering the capacity and feasibility within the site, or where this is not viable, off-site

Comprehensive route – wider site sustainability (one credit)

Firstly, the criteria of the comprehensive route of determining ecological outcomes must be met to achieve this credit. In addition, the wider site sustainability-related activities and the potential for ecosystem service-related benefits have been considered. Refer to the methodology section of HQM 2.1 in the manual for a list of the minimum areas for consideration.

Up to nine credits can be achieved for HQM 2.2, Managing Impacts on Ecology.

Metric type

Points

Units

The metric is based on HQM credits.

Range

How is it calculated? (continued)

Ecological risks and opportunities for the project (prerequisite)

Firstly, the survey and evaluation and determining ecological outcomes criteria within the HQM 2.1 must be achieved via either the foundation or comprehensive routes.

The client or contractor must also confirm compliance is, or will be, monitored against all relevant UK and EU or international legislative requirements relating to the ecology of the site.

Liaison, implementation and data (three credits)

Roles and responsibilities must be clearly defined, allocated and implemented to successfully deliver the actions for achieving the best ecological outcomes agreed in HQM 2.1 and early enough to influence the concept design and design brief (typically by RIBA Stage 2). Site preparation and construction work must also be planned for and carried out early enough to deliver the actions for achieving the agreed best ecological outcomes.

The project team must also liaise and collaborate with representative stakeholders taking into consideration data collated and shared, and have implemented actions during site preparation and construction works.

Routes of rigour – managing negative impacts (up to six credits)

Foundation route – project team member (three credits)

Negative impacts from site preparation and construction works must be managed to minimise their effect and to make sure that no net impact has been the result.

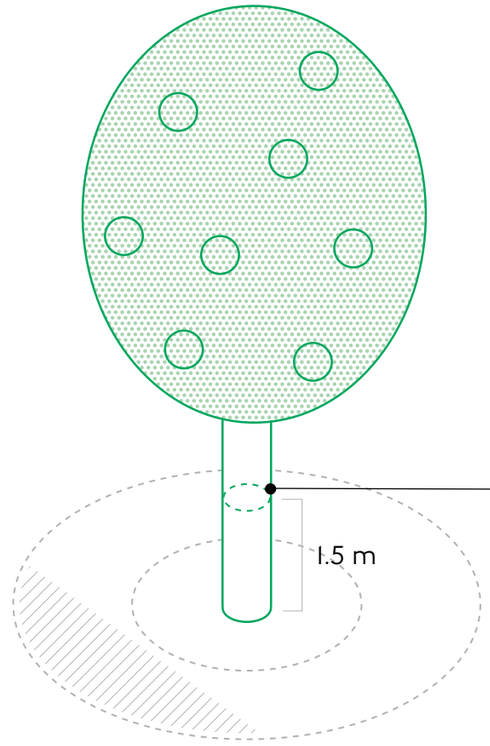
Comprehensive route – suitably qualified ecologist (up to six credits)

Negative impacts from site preparation and construction works have been managed according to the mitigation hierarchy set out in the methodology section of HQM 2.2 in the manual and either:

- No overall loss of ecological value has occurred (six credits)

or

- The loss of ecological value has been limited as far as possible (three credits)



Designated as veteran trees or protected by Tree Preservation Orders/Group Preservation Orders

Diameter of tree at 1.5 metres above grade is 75 mm

What is the process?

Action

RIBA Stage 0

RIBA Stage 1: Optimise

Development manager

Appoint suitably qualified ecologist and make sure findings from their report is shared with the project team to support the site preparation, design or construction works

Ecologist

Prepare survey and evaluation of the site according to the HQM requirements

Architect

Carry out initial feasibility study exploring how to best develop site while protecting existing ecological features identified by the ecologist's report

RIBA Stage 2: Plan / Design

Landscape architect and architect

Liaise and collaborate with representative stakeholders to identify, appraise and agree actions for the project to achieve the best ecological outcomes, in line with the mitigation hierarchy of action:

a: Avoidance

b: Protection

c: Reduction or limitation of negative impacts

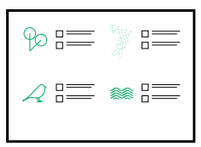
d: Onsite compensation

e: Enhancement considering the capacity and feasibility within the site, or where this is not viable, off-site

RIBA Stage 3

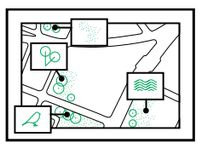
Action

Documentation

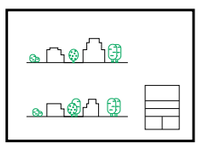


HQM ecology risk evaluation checklist

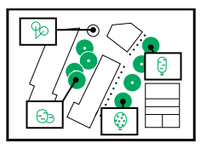
Baseline assessment of existing site by ecologist



Plans, site photographs and specifications confirming presence, or otherwise, of ecological features and the protection measures specified



Proposed plans, sections, elevations



Proposed landscape plan(s)

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Landscape architect

Make sure the ecologist's recommendations are incorporated into the landscape design for planning submission

Architect

Make sure the ecologist's recommendations are incorporated into the design for planning submission

Development manager

Make sure the tender includes a clause requiring that compliance is, or will be, monitored against all relevant UK and EU or International legislation relating to the ecology of the site

RIBA Stage 5: Deliver

Contractor

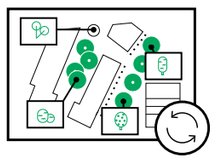
Prepare method statement for site preparation and construction works early enough to deliver the actions for achieving the best ecological outcomes

RIBA Stage 6

RIBA Stage 7

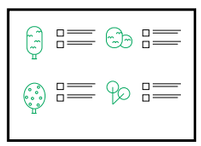
Action

Documentation



Plans, sections, elevations

Landscape plan(s)



Tender documents

Documentation

Relevant policy

The London Plan, Policy G6, Biodiversity and access to nature

Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.

BS 5837:2012, Trees in relation to design, demolition and construction – Recommendations

Wildlife and Countryside Act 1981

The Conservation (Natural Habitats &c.) Regulations 1994 and The Protection of Badgers Act 1992

Further reading

London Priority Species, 2019
UK 25 Year Environment Plan

ID no

CR10

Key Performance Indicator (KPI) name

Construction Impacts on Ecology – Commercial

What is it?

The purpose of this indicator is to establish the existing ecological value of the site and its surrounding areas before construction work begins, and how this can be best preserved during development. Commercial development and landscape management can have a significant impact on the broader environment, and for this reason, it is important to understand the value and condition of the site for the necessary steps to be taken to protect and improve its ecological value as part of the project. In this way, any negative effects associated with the development, such as damage and disturbance to habitats and wildlife, can be avoided or minimised where possible.

For this indicator, we are following the criteria set out in BREEAM UK New Construction 2018 LE 02, Ecological risks and opportunities and LE 03 Managing impacts on ecology.

How does it add value?

By employing the right level of expertise and the services of professional ecologists, the ecological value of the site can be maintained and improved. With professional guidance, the risk of prosecution under environmental and wildlife protection legislation is avoided and the development will comply with future and local government policies on biodiversity. In this way, risk of local controversy over the development and management strategies is also averted. An ecosystem that is valued makes the area more appealing to visit and live in, and creates a community amenity and sense of wellbeing.

What type of project does the indicator apply to?

- ☐ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Contractor	●●●	leading
Development Manager	●●○	accountable
Ecologist	●○○	supporting
Architect	●○○	supporting
Landscape Architect	●○○	supporting
BREEAM Assessor	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design		Specify		Monitor	

Connected UN Sustainable Development Goals

- 12 Responsible Consumption and Production
- 13 Climate Action
- 15 Life on land

Connected SDF indicators

- ☑ Access to Nature
- ☑ Responsible Construction Practices
- ☑ Soils Protection

How is it calculated?

This indicator follows the criteria set out by BREEAM LE 02, Ecological risk and opportunities, and LE 03, Managing impacts on ecology. Refer to the BREEAM UK New Construction 2018 manual (page 299 and 309 of 392).

Up to two credits and an exemplary credit can be achieved following BREEAM LE 02, Ecological risk and opportunities.

Table 11.1
Credits awarded for each assesment role

Foundation route	**Comprehensive route**
Avoidance	Avoidance
Protection	Protection
	Reduction or limitation of negative impacts
	On site compensation
	Enhancement, considering the capacity and feasablity within the site, or where viable, off-site

Metric type	Units	Range
Points	The metric is based on BREEAM credits	1 · · · 4 Good Practice · 6 Leading Practice

Statutory obligations (prerequisite)

The client or contractor must confirm compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.

Survey and evaluation (one credit)

Foundation route (route 1)

The site must be evaluated using the BREEAM Ecological Risk Evaluation Checklist (Guidance Note 34) confirming that the foundation route can be used. Refer to the methodology section of BREEAM LE 02 in the BREEAM UK New Construction 2018 Manual.

Comprehensive route (route 2)

A suitably qualified ecologist (SQE) must carry out a survey and evaluation (see methodology) for the site early enough to influence site preparation works, layout and, where necessary, strategic planning decisions. For the definition of an SQE, refer to the manual.

The SQE's survey and evaluation must establish the site's ecological baseline, meeting the criteria listed in the manual. Information and data must be collated and shared with the project team for site preparation, design or construction works.

How is it calculated? (continued)

Determining ecological outcomes (one credit)

Foundation and comprehensive routes (routes 1 and 2)

The design team must liaise and collaborate with the wider project team early enough to influence key planning decisions (typically the concept design stage), to:

- Identify the best ecological outcomes for the site
- Identify, appraise and select measures to meet the best ecological outcomes for the site in line with the mitigation hierarchy of action, according to the route being used (see BREEAM LE 03 definitions section)

Exemplary level credit (one credit)

Firstly, to achieve this credit, the criteria relating to liaising and collaborating with representative stakeholders, listed in the determining ecological outcomes must be met.

Wider sustainability related activities and potential ecosystem service benefits as set out in BREEAM LE 02 in the BREEAM UK New Construction 2018 Manual, must be considered as part of establishing the best ecological outcomes for the site, including the areas outlined in the methodology section of BREEAM LE 02.

The following credits from the manual must also be met:

- Hea 07, Safe and healthy surroundings – both credits
- Pol 03, Flood and surface water management – achieve credits for 'surface water run-off' and 'minimising watercourse pollution'
- Pol 05, Reduction of noise pollution

Up to three credits can be achieved following BREEAM LE 03, Managing impacts on ecology.

Table 11.1: Credits awarded for each assessment route

	Foundation route (Route 1)	Comprehensive route (Route 2)
Survey and evaluation	1 credit	1 credit
Determining ecological outcomes		1 credit
Exemplary criteria	1 credit	1 credit

Table 11.2: Credits awarded according to asessment route

	Foundation route (Route 1)	Comprehensive route (Route 2)
Planning measures onsite	1 credit	1 credit
Managing negative impacts	1 credit	1 or 2 credits

How is it calculated? (continued)

Ecological risks and opportunities (prerequisite)

Firstly, the BREEAM LE 02 'survey and evaluation' and 'determining ecological outcomes' criteria must be met using either the foundation route or the comprehensive route.

Planning and measures on-site (one credit)

Foundation and comprehensive route (routes 1 and 2)

Further planning to avoid negative ecological impacts on-site must be carried out early enough to influence the concept design and design brief as well as site preparation planning. Onsite measures for managing negative ecological impacts during site preparation and construction must then be put into practice. Actions must also be based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'determining ecological outcomes' section of LE 02.

Managing negative impacts (up to two credits)

Foundation route (route 1) (one credit)
Further planning to avoid negative ecological impacts on-site must be carried out early enough to influence the concept design brief as well as site preparation planning. Onsite measures for managing negative ecological impacts during site preparation and construction must then be put into practice.
Negative impacts from site preparation and construction works must also be managed according to the mitigation hierarchy and no overall loss of ecological value should occur.

Comprehensive route (route 2) (up to two credits)

The criteria set out in the 'planning and measures onsite' section must first be met.

Negative impacts from site preparation and construction works must also be managed according to the mitigation hierarchy in line with the SQE's recommendations and either:

- No overall loss of ecological value occurs (two credits)

Or where this is not possible:

- The loss of ecological value has been minimised (one credit)

What is the process?

Action

RIBA Stage 0

RIBA Stage 1: Optimise

BREEAM assessor

Complete BREEAM checklist table 29

Development manager

If any answers to checklist 29 are Yes, instruct ecologist to carry out a baseline assessment of existing ecological features onsite

Ecologist

Prepare report confirming presence or otherwise of ecological features and the protection measures recommended

Architect

Carry out initial feasibility study exploring how to best develop site while protecting existing ecological features identified by the ecologist's report

RIBA Stage 2: Plan / Design

Landscape architect

Make sure ecologist's recommendations are incorporated into the landscape design for planning submission

Architect

Make sure ecologist's recommendations are incorporated into the design for planning submission

RIBA Stage 3

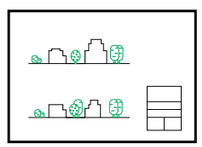
Action

Documentation

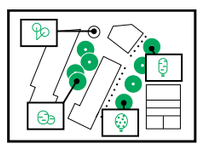
BREEAM checklist 29 signed and dated by client

Baseline assessment of existing site by ecologist

Plans, site photographs and specifications confirming presence, or otherwise, of ecological features and the protection measures specified



Proposed plans, sections, elevations



Proposed landscape plan(s)

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Landscape architect

Make sure the ecologist's recommendations are incorporated into the landscape design for planning submission

Architect

Make sure the ecologist's recommendations are incorporated into the design for planning submission

Development manager

Make sure the building specification includes relevant section/clauses requiring that any planting be completed within 18 months from completion of the development

RIBA Stage 5

RIBA Stage 6: Monitor

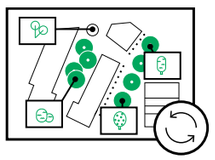
BREEAM assessor

Carry out site inspection, prepare report and photographic evidence confirming planting is in accordance with the design stage plan

RIBA Stage 7

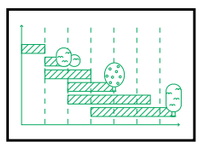
Action

Documentation



Plans, sections, elevations

Landscape plan(s)



Building specification stating that any planting must be completed within 18 months from completion of the development

Documentation

Relevant policy

The London Plan, Policy G6, Biodiversity and access to nature

Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.

BS 5837:2012, Trees in relation to design, demolition and construction – Recommendations

Wildlife and Countryside Act 1981

The Conservation (Natural Habitats &c.) Regulations 1994 and The Protection of Badgers Act 1992

Further reading

London Priority Species, 2019
UK 25 Year Environment Plan

ID no

CR II

Key Performance Indicator (KPI) name

Tree Canopy Cover

What is it?

This indicator anticipates the proportion of the site area that will be covered by trees around 20 years after project completion. Its purpose is to encourage sufficient tree planting in locations where they will be able to thrive and grow to their intended size and stature.

Urban trees and woodland are a valuable natural resource and play an increasingly important role in London where they provide many benefits including improving the air quality and absorbing pollution. Apart from promoting the health and wellbeing of Londoners, the city's eight million trees also provide wildlife habitats, shade and cooling. For these reasons, the Mayor wants to increase the city's tree canopy cover by 10 per cent by 2050, and boost the rate of tree planting in green spaces and in new developments.

How does it add value?

In addition to the wide range of benefits that London's tree canopy already provides, from decreasing the urban heat island effect to creating a sense of place and more walkable streets, urban trees provide valuable ecosystem services. They assist with carbon capture, rainwater run-off and the removal of air pollution and, according to the London i-Tree Eco Project, Valuing London's Forest, existing trees provide benefits valued at £132.7 million per year. A concerted effort to plant more in new developments also increases property values. Research published by CABE Space (2005), titled Does Money Grow on Trees? indicates that good quality trees can increase property prices by 5-18 per cent. Furthermore, they bring colour to an otherwise grey urban landscape.

What type of project does the indicator apply to?

- ☑ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Landscape Architect	●●●	leading
Development Manager	●●○	accountable
Other Specialist – Arboriculturalist	●○○	supporting
Contractor	●○○	supporting
Development Manager	●○○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
	Optimise	Plan / Design	Plan / Design	Specify	Deliver	Monitor	Monitor

Connected UN Sustainable Development Goals

11 Sustainable Cities and Communities
13 Climate Action
3 Good Health and Wellbeing

Connected SDF indicators

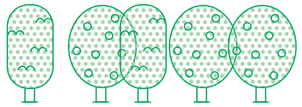
- ☑ Public Realm
- ☑ Healthy Streets
- ☑ Access to Nature

How is it calculated?

This indicator is calculated by projecting the total canopy cover of a development site from the existing trees and those that have been planted, and then expressing this as a percentage of the total site area. The projected canopy cover calculation can be taken from the figures obtained when calculating the Urban Greening Factor score, see indicator CR1.

This can include trees outside the red line boundary if along the perimeter of the site, eg adjacent pavements.

Note: Cutting down trees to increase canopy cover is in conflict with LPG7.

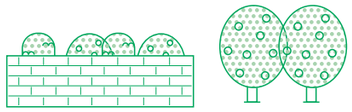


21%

The total area of London under tree canopy. This ranges from less than 3% to over 50% across the capital's council wards

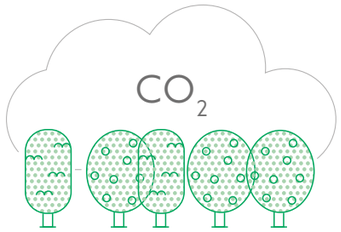
£200 m

The value of cooling provided by London's urban forest in 2018. This value will increase as the climate warms and we experience more summer heatwaves



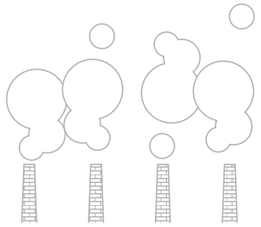
60%

Almost 60% of London's trees are in private ownership, but the trees on public land contribute 60% of the ecosystem service benefits as there is a higher proportion of larger trees



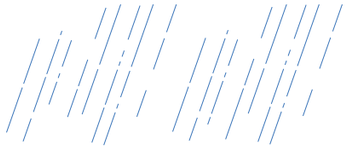
£147 m

The approximate value of the estimated 2,367,000 tonnes of carbon stored in London's trees



2,241 t

of air polution removed by trees annually. The equivalent of 13% of PM_{10} particulates, and 14% of NO_2 emitted annually by road transport



10 ×

Trees prevent 10× the volume of water in the Serpentine from entering London's drainage system each year, reducing the risk of localised flooding

Metric type

%

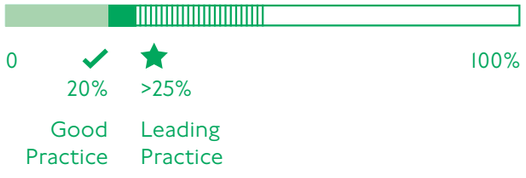
Percentage

Units

m^2

m^2 of canopy cover

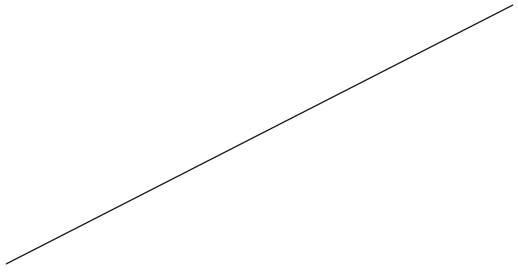
Range



What is the process?

Action

RIBA Stage 0: Optimise



RIBA Stage I: Optimise

Development manager

Make sure objectives and policies relating to retention and expansion of tree canopy cover are set out in the project brief

Arboriculturalist

Carry out a tree survey to establish the extent and quality of existing trees, and the canopy cover provided by retention of protected or high quality (Grade A) trees

Landscape architect

Assess the potential impacts of the initial development proposals on existing trees

RIBA Stage 2: Plan / Design

Landscape architect

Assess the potential for tree retention and new tree planting based on initial architectural layouts and carry out initial calculation of the likely percentage canopy cover that could be achieved

Arboriculturalist

Provide specialist advice to the landscape architect as necessary

Architect

Work with landscape architect to make sure the layouts achieve an appropriate balance between tree retention and planting and the requirements for building layouts to achieve the required housing numbers

RIBA Stage 3: Plan / Design

Landscape architect

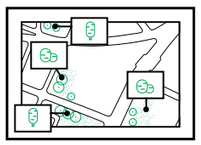
Prepare tree retention and planting plan and select species for new planting. Calculate likely canopy cover that would be achieved 20 years after development

Architect

Refine proposals to make sure layouts are consistent with the objectives of the tree retention and planting plan

Action

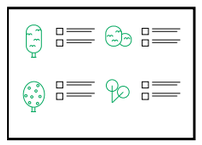
Documentation



Tree survey

Landscape assessment

Tree strategy



Tree retention and planting plan

Documentation

What is the process? (continued)

Action

RIBA Stage 4: Specify

Landscape architect

Prepare detailed specification for new planting and the protection and management requirements for retained and planted trees during construction and during the establishment phase

RIBA Stage 5: Deliver

Contractor

Acquire appropriately sized trees and deliver the scheme to specification provided, paying particular attention to creation of tree-pits with appropriate soil volumes. Comply with measures set out in any construction environment management plan

Landscape architect

Provide quality control as required

RIBA Stage 6: Monitor

Development manager

At the end of the defects period, assess the condition of all retained and planted trees to make sure they are well established and are likely to reach their intended canopy cover. Make sure the landscape and ecology management plan is updated (if necessary) and given to the property manager

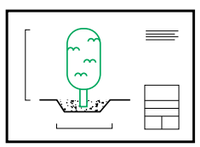
RIBA Stage 7: Monitor

Property manager

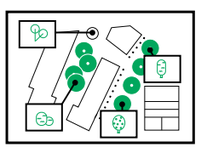
Manage the site in line with measures set out in the landscape and ecology management plan. After 20 years, carry out a tree survey to establish whether intended canopy cover has been achieved

Action

Documentation

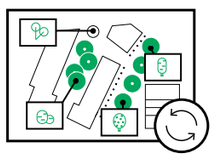


Detailed drawings and specifications for planting



Construction environment management plan (if required)

Landscape and ecology management plan



Updated landscape and ecology management plan

Documentation

Relevant policy

The London Plan, Policy G7, Trees and woodland

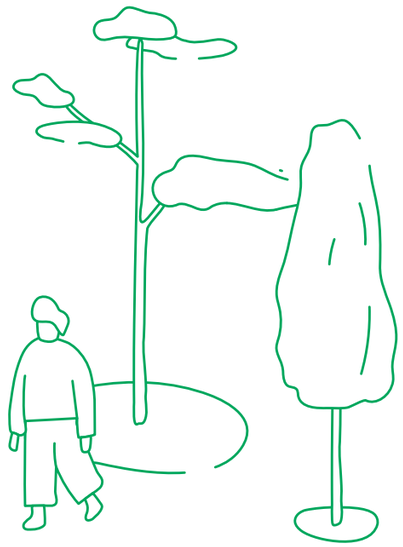
Development proposals should ensure that, wherever possible, existing trees of value are retained. If planning permission is granted that necessitates the removal of trees there should be adequate replacement based on the existing value of the benefits of the trees removed, determined by...an appropriate valuation system. The planting of additional trees should generally be included in new developments – particularly large-canopied species which provide a wider range of benefits because of the larger surface area of their canopy.

National Planning Policy Framework, paragraph 174

Planning policies and decisions should contribute to and enhance the natural and local environment by: (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.

Further reading

- Trees in Hard Landscapes: A Guide for Delivery, Trees and Design Action Group (TDAG)
- Tree Species Selection for Green Infrastructure: A Guide for Specifiers, TDAG
- BS5837:2012 Trees in relation to design, demolition and construction. Recommendations
- Wycombe District Council Canopy Cover Supplementary Planning Document (SPD)



ID no

CR12

Key Performance Indicator (KPI) name

Tree Planting (Reporting)

What is it?

Urban trees and woodland are a valuable natural resource and play an increasingly important role in London where they provide many benefits including improving the air quality and absorbing pollution. Apart from promoting the health and wellbeing of Londoners, the city's eight million trees also provide wildlife habitats, shade and cooling. For these reasons, trees should be designed into developments from the outset to maximise the planting opportunities in locations where they can establish and grow.

This indicator reports on the number of trees planted in a new development.

How does it add value?

Trees play an important role in retaining rainfall and run-off and contribute to naturalistic sustainable drainage systems or SuDS that mimic the way nature manages rainwater. In new developments, these systems can be designed and managed to provide amenity landscaping for residents and habitat for wildlife. As London outgrows its drains and sewers, planting more trees in developments will help to reduce surface-water flooding and overflows.

See indicator CR5 – Sustainable Drainage

.

What type of project does the indicator apply to?

- ☑ Residential
- ☑ Commercial
- ☑ Masterplan

Who is responsible?

Development Manager	● ● ○	accountable
Landscape Architect	● ○ ○	supporting

RIBA Stages

0	1	2	3	4	5	6	7
				Specify		Monitor	

Connected UN Sustainable Development Goals

- 11 Sustainable Cities and Communities
- 13 Climate Action
- 3 Good Health and Wellbeing

Connected SDF indicators

- ☑ Public Realm
- ☑ Healthy Streets
- ☑ Access to Nature

How is it calculated?

This KPI records the total of the number of trees planted as part of the new development.

Metric type

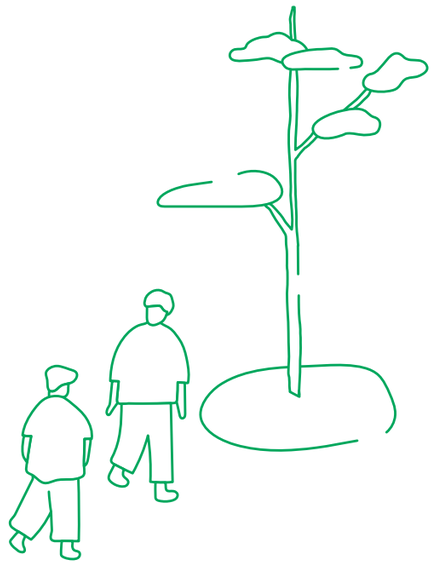
#

Numerical

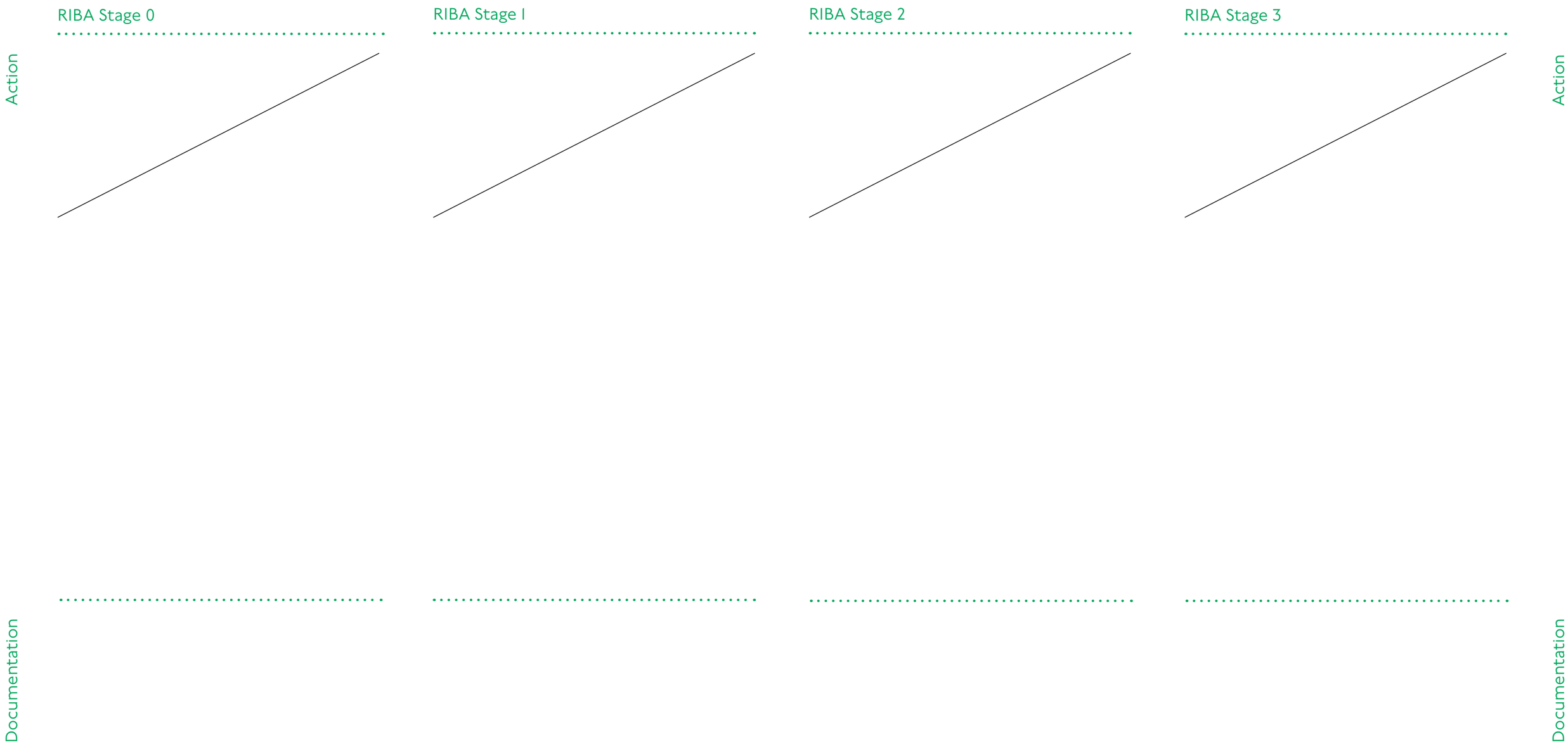
Units

#

Number of trees planted



What is the process?



What is the process? (continued)

RIBA Stage 4: Specify

Action

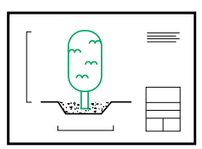
Landscape architect

Prepare detailed specification for new planting, and the protection and management requirements for retained and planted trees during construction and during the establishment phase

Development manager

Report on the number of trees proposed to be planted

Documentation



Detailed drawings and specifications for planting

RIBA Stage 5

RIBA Stage 6: Monitor

Development manager

At the end of the defects period, assess the condition of all planted trees and report on the number of trees actually planted and being maintained to good standard

RIBA Stage 7

Action

Documentation

Relevant policy

The London Plan, Policy G7, Trees and woodland

Development proposals should ensure that, wherever possible, existing trees of value are retained. If planning permission is granted that necessitates the removal of trees there should be adequate replacement based on the existing value of the benefits of the trees removed, determined by…an appropriate valuation system. The planting of additional trees should generally be included in new developments – particularly large-canopied species which provide a wider range of benefits because of the larger surface area of their canopy

Contributors

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CR9 Construction Impacts on Ecology – Residential: BRE
CR10 Construction Impacts on Ecology – Commercial: BRE
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