LAND AT WESTHIDE SOLAR PARK

Natural Assets and Environmental Net Gain Report

for

Ersun (Westhide SPV) Ltd

December 2021

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**D denotes a Draft version*

The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Institute of Environmental Management and Assessment's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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EXECUTIVE SUMMARY

This report uses the concepts of natural capital assessment and environmental net gain assessment to identify the potential impacts of the proposed solar photovoltaic (PV) development proposals on natural assets. It follows relevant guidance from Defra and the Natural Capital Committee to evaluate the long-term impacts on the environmental assets and the ecosystem services they provide. This report takes a new approach looking at natural capital and environmental net gain (ENG) and approaches ENG and Natural Capital Assessment (NCA) from a development-based perspective. Biodiversity Net Gain (BNG) is a component of ENG – this report considers BNG as part of a wider review of the proposed development's ENG and impacts on a wider set of natural capital assets.

The proposed development is for a circa 34.6 MW ground-mounted solar PV (photovoltaic) development on Land at Westhide, Herefordshire. It is expected that the PV modules will be mounted on metal frames on posts piled into the ground causing minimal impact on the ground surface and will be fully removable on decommissioning. To assess the impacts on natural assets this report defines a vision for environmental gain which was chosen to cover topics most relevant to the proposed development. These are:

- Biodiversity;
- Carbon and air quality;
- Water quality and Resources;
- Agriculture; and
- Recreation and wellbeing.

This report defines a study area, where the scheme will have the most impact, as the application site itself and the wider area (surrounding countryside). The natural assets currently on site primarily provide provisioning, regulating, bundled (biodiversity) and cultural ecosystem services. The site offers services in terms of food provisioning, currently comprising mainly arable/cropland of low biodiversity value. Current habitats nonetheless provide important services, supporting various species which in turn provide essential benefits such as pollination and seed distribution. The site currently acts as a carbon store, although arable soils are acknowledged to have low carbon stocks. The proposed development is shown to be partially located within Flood Zone 3 according to EA flood mapping and the soil at the site has relatively slow levels of water infiltration. At present there is no public access to the site and it therefore offers mainly observational interactions and services in terms of benefits to health and wellbeing that are achieved from 'enjoyment of the countryside.'

The proposed development is predicted to result in significant biodiversity net gain, improving existing habitats, creating a range of new and diverse habitats and enhancing connectivity with the surrounding landscape. This wildlife will in turn assist the reproduction and maintenance of habitats. The proposed development will contribute towards green energy targets and is likely to enhance the soil carbon storage value of the site. The change in land use will not increase water run-off rates, with potential benefits resulting from the change from arable crop to grassland for water supply and reducing flood risk downstream. The diversification into renewable energy will assist the long-term viability of the estate. Losses in arable production will be reversible and offset by enhancements to soil health, a reduction in chemical inputs and run-off and enhancements for pollinators. Proposed tree and hedgerow mitigation planting responds to local character and whilst views may detract from the aesthetic value of the site where they are experienced, views are generally limited. The proposed permissive pathway would bring opportunities for people to engage in recreational and cultural activities, which would improve physical and mental health and wellbeing by allowing people to enjoy time outdoors in a natural context.

On balance the proposed development is predicted to generate valuable long-term improvements for the natural assets of biodiversity, air quality/climate change, agriculture, water and recreation.

CONTENTS

Page

1.0 INTRODUCTION

1.1 The Landmark Practice (TLP) is an award winning multi-disciplinary consultancy offering bespoke and integrated services in ecology, environmental planning, landscape architecture and architectural graphics. We are a Landscape Institute and CIEEM Registered Practice, independent and respected, working on a large range of development projects for our clients throughout the UK. Full details of the practice can be found at http://thelandmarkpractice.com/.

1.2 TLP is appointed by Ersun (Westhide SPV) Ltd to assess the natural assets and environmental net gain impact of the proposed development of a solar park at Land at Westhide, Herefordshire. The proposed Site Layout is provided at **Appendix A**. We have assessed the changes in natural assets arising from the scheme, these are interpreted in a broad sense and include human-related environmental assets (e.g. enjoyment of landscape) as well as natural/environmental and biodiversity capital.

1.3 Promoting environmental net gain and natural capital improvement is on the policy agenda in the UK, including within the Government's Environment Act, which has recently received Royal Assent. This sets out the Government's plan to protect and improve the natural environment in the UK and will act as a key vehicle to deliver the 25 Year Environment Plan and to ensure that the UK becomes carbon neutral by 2050. The Environment Act sets long-term targets that will foster the improvement of the natural environment and ensure people's enjoyment of the nature.

1.4 At the local level, in the past few years Herefordshire Council has been a leading authority in the fight against climate change and the degradation of natural capital, announcing a climate emergency in March 2019 and the aim to get to net carbon zero by 2030. In December 2020, this declaration was strengthened to a 'climate and ecological emergency', which demonstrates the council's commitment to protecting Herefordshire's natural environment, biodiversity and wildlife. The General Scrutiny Committee Task and Finish Group 'Climate and Ecological Emergency Review' (January 2021) notes that the ambitious aims of the Council '… *can only be achieved if very strong measures are embedded in every decision the council makes, in its policies, processes and actions. Moreover, the council needs to consider how it can take the lead in helping our communities and local economy to adapt to climate change and to become more resilient*.'

1.5 This report approaches environmental net gain (ENG) and Natural Capital Assessment (NCA) from a development-based perspective. The National Planning Policy Framework (NPPF, amended 2021) requires plans to '*promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity*' (NPPF para 179, b). Measurable net gains for biodiversity, also known as 'Biodiversity Net Gain' (BNG), is a component of ENG – this report considers BNG as part of a wider review of the proposed development's ENG and impacts on a wider set of natural capital assets. TLP have produced a BNG assessment for the proposed scheme (TLP, Dec 2021).

1.6 This Report follows the general principles set out in '*Enabling a Natural Capital Approach: Guidance*' (Defra, March 2020) and the method that is described in the Natural Capital Committee guidance '*How to do it: a Natural Capital Workbook*' (CCC, April 2017). This report considers the impact of the proposed development on natural capital assets and identifies

opportunities to not only mitigate any potential effects on natural capital, but to contribute to the wider environment and biodiversity. Whilst based on the general principles of Natural Capital Assessment, this report does not go as far as to include a financial assessment of market value of ecosystem services and natural capital.

1.7 The intention of the report is to draw together in one place the findings of the following assessments to identify potential ENG effects from the proposed development, in terms of effects upon natural assets and the services that they provide.

- Preliminary Ecological Appraisal (TLP, February 2021);
- Ecological Appraisal (TLP, December 2021);
- Biodiversity Net Gain Report (TLP, December 2021);
- Landscape and Ecology Management Plan (TLP, December 2021);
- Landscape and Visual Impact Assessment (TLP December 2021);
- Flood Risk Assessment (Nijhuis, December 2021); and
- Agricultural Land Classification (Askew Consulting, November 2021).

1.8 It is intended that this will provide a holistic view of the interactions between the natural environment and the ecosystem services that it provides, and the proposed development.

2.0 METHOD

Natural Capital

2.1 Natural Capital is defined by 'HM Treasury's Green Book: Appraisal and Evaluation in Central Government' as including '*… certain stocks of the elements of nature that have value to society, such as forests, fisheries, rivers, biodiversity, land and minerals. Natural capital includes both the living and non-living aspects of ecosystems. Stocks of natural capital provide flows of environmental or 'ecosystem' services over time*.' Ecosystem services are understood to provide a wide range of benefits, including '*… values that involve interaction with the resource and which can have a market value (minerals, timber, freshwater) or non-market value (such as outdoor recreation, landscape amenity). They also include non-use values, such as the value people place on the existence of particular habitats or species*' (p.45). At its simplest, a natural capital approach is about thinking of nature as an asset, or set of assets that benefit people. The ability of natural capital assets to provide goods and services is determined by their quality, quantity and location. Natural assets can include:

- Species;
- Ecological Communities;
- Soils;
- Freshwaters;
- Land;
- Atmosphere;
- Minerals;
- Sub-soil assets; and
- Oceans and Coasts.

Services and Benefits from Natural Assets

2.2 Natural assets can provide a range of benefits and ecosystem services that can be grouped within the following categories as specified by the ENCA Services Databook (Defra, March 2000):

Table 1: Ecosystem services

Category	Description	Examples
Provisioning Services	Provision of material outputs from nature	**Food**, timber, water supply, **crops**
Abiotic flows of natural capital	Flows which are not dependent upon functioning ecosystems	Minerals, oil & gas; **solar**, wind
Regulating services	Provision of indirect benefits from nature generated through regulation of ecosystem processes	**Air filtration, water regulation**, noise mitigation
Cultural Services	Provision of non-material benefits from nature	Settings for **recreation**, education, **tourism**
Aggregated/ bundled services	In practice the benefits provided by nature are not easily reducible to specific ecosystem services, or can reflect a bundle of cultural or regulating services. There can be overlap with these categories.	**Amenity**, **biodiversity**, **landscape**, **water quality**, non-use values

2.3 Another category of ecosystem services is "supporting services". These do not produce outputs for final consumption or production, but are essential for the functioning of provisioning, regulating and cultural services, which do provide outputs. Examples include soil formation and pollination. This distinction is made to avoid the double counting of services. Supporting services are not included in the table above as their effect is already captured within the other Databook categories, including the bundled categories.

2.4 Alongside ecosystem services, it is important to include consideration of negative environmental effects that are typically caused by human activity (as externalities) and / or cause damage to society. These include air pollution, noise, soil degradation, invasive species, greenhouse gas emissions and flood damage. These negative environmental effects are an important category, because they have both a direct effect on welfare (for example, exhaust fumes harming the health of pedestrians) and also an indirect effect by affecting the condition of natural capital (for example, water pollution affecting recreational benefits) or increasing the importance of regulating services.

The Assessment Process

Step 1: Understand the environmental context to the proposal

2.5 The first step of assessing effects on natural capital is to understand the relevant natural systems that may be affected or contribute to outcomes, and the environmental context of the proposal. This also helps to establish a baseline against which effects can be assessed.

2.6 This step includes setting up the baseline position of the natural assets studied in the assessment, reviewing plans and activities already in place that might have a positive or negative impact on the environment. This report covers this step by defining the project's

parameters, such as the study area covered in the assessment, as well as the wider policy and research context influencing the assessment.

Step 2: Set out the Vision

2.7 Step 2 'Setting out the vision' seeks to define the goals of the strategy to improve natural capital. The goals and themes covered in the vision are based on an initial understanding of the context and the local issues facing natural capital.

Step 3 – Environmental Evidence Base

2.8 Step 3 'Building the evidence base' involves a review of the baseline condition of the natural assets. This requires identifying and analysing several of the features of natural capital in the study area:

- The natural assets and the ecosystem services they provide;
- The range of economic and social benefits provided by the natural assets; and
- The state or condition of the natural assets in relation to the benefits derived from them.

2.9 These features are identified within tables which review the assets' condition/quality, quantity (where applicable) and their boundary/influence, and the ecosystem services provided as well as the economic and social benefits derived from them.

Step 4 – Assessment - Consider how natural assets might be affected

2.10 The next step involves a review of the proposed development against the baseline to develop an understanding of physical, spatial or biological changes in the location, extent, condition and diversity of natural assets.

2.11 Defra's 'The Environmental Benefits from Nature Tool - Beta Test Version' (JP038) has been run to support the assessment process. The EBN Tool calculation was informed by the Biodiversity Net Gain assessment that has been undertaken to inform the proposed development (TLP, December 2021). As this tool is currently only running through 'Beta testing', only the 'basic' level of assessment, which draws mainly upon freely available online datasets, has been run in this instance. The EBN Tool output is provided at **Appendix B.**

Step 5: Monitoring and evaluation

2.12 The last step involves implementing and evaluating an action plan. We highlight the roles of the stakeholders involved in the partnership and in the management of natural assets and the next steps that can be taken to improve natural capital in the study area in the long-term.

3.0 THE PROPOSED DEVELOPMENT

Site Location and Description

3.1 The application site is located 9 km north-east from Hereford (approximate central grid reference SO 577 443, **Figure 1** refers). The local planning authority (LPA) is Herefordshire County Council.

3.2 The habitats which comprise the site are for the most part typical of Herefordshire, comprising arable farmland. The site itself comprises a network of eight fields (approximately 152 acres in total), which are all arable with an extensive network of mature hedgerows with trees, with drainage ditches at their bases.

3.3 At time of survey, the arable fields comprised a mixture of amenity lawn turf and arable crops. Two areas of plantation woodland were present within the site (one of which was recently planted, whilst the other was considerably more mature). Several areas of semi-natural broadleaved woodland were also present within the site boundary, this included a thin strip along the northern boundary, a patch around a pond and section of woodland. Scattered mature trees are also found within some of the fields (refer to Ecological Appraisal (TLP, December 2021).

3.4 The hedgerows which bound and bisect the site are a mixture between species-poor and species-rich in terms of species composition. Hedgerows are also for the most part intact, with few gaps and are of good quality in terms of size, structure and connectivity. Some hedgerows contained a scattering of mature trees. The northern boundary comprises a row of trees (which have probably developed from an un-managed hedgerow) which leads onto woodland a small strip of which is included within the site.

Development Proposals

3.5 The proposed development is for a 34.6 megawatts (MW) ground-mounted solar PV (photovoltaic) development. The solar park will include 70,980 panels, set out as solar arrays, with sufficient space between the arrays to avoid one array of PV modules overshadowing the next.

3.6 It is expected that the PV modules will be mounted on metal frames on posts piled into the ground causing minimal impact on the ground surface and will be fully removable on decommissioning. The highest point of the modules will be circa 3 m above ground.

3.7 The solar park will also encompass central inverters and a Distribution Network Operator (DNO) substation.

3.8 The application site will be protected with a security fence of circa 2.5 m. The security fencing will not be dug into the ground and will, therefore, provide badgers and other small mammals with continued access to the site. There would also be scope for installing small mammal and badger gates. The application site will not be artificially lit.

3.9 All existing boundary hedgerows and associated features will be retained, with the exception of the removal of six poor-quality ash trees and the creation of four small (max 2 m width) hedgerow gaps to facilitate a new permitted path. The external security fence will be offset internally from the perimeter hedgerows by at least 5 m. Once the solar park is established, the system will require minimal on-going maintenance. Experience has shown that PV modules are cleaned to a considerable degree by rainfall but will also be manually cleaned several times a year. Activity at the solar park will be limited to

periodic repair and/or maintenance. Grassland will be managed over the likely 30-year life of the installation by a sensitive ecological management plan.

3.10 **Table 2** below summarises the existing and proposed land use in the planning application's redline boundary.

Table 2: Existing and proposed land use

Land Use	Existing Site	Proposed Development
Arable cropland	51 ha	0.5 ha
Grazing land	4.5 ha	53 ha
Solar PV	0 ha	16.3 ha

Supporting Documents and Proposals

3.11 The scheme is currently subject to a planning application. Documents that have been prepared for the application that are relevant to this assessment include:

- Preliminary Ecological Appraisal (TLP, February 2021);
- Ecological Appraisal (TLP, December 2021);
- Biodiversity Net Gain Report (TLP, December 2021);
- Landscape and Ecology Management Plan (TLP, December 2021);
- Landscape and Visual Impact Assessment (TLP December 2021);
- Flood Risk Assessment (Nijhuis, December 2021); and
- Agricultural Land Classification (Askew Consulting, November 2021).

4.0 ENVIRONMENTAL CONTEXT

Study Area

4.1 Defining a study area for this type of natural capital assessment is challenging due to the interlocking and interlinked nature of ecosystems and natural capital assets. While the quantity and quality of some assets can be identified in the application site (i.e. the number of trees; habitats; presence of animals for activities such as commuting, roosting or foraging), the living environment of some wildlife species will extend far beyond the application site. Effects are therefore generally considered in terms of two zones of influence, the application site itself and the wider area (surrounding countryside).

Policy Context

4.2 This section provides wider context on natural capital in Herefordshire, by reviewing policy, guidance and research.

Local Policy

4.3 At the local level, in the past few years Herefordshire Council has been a leading authority in the fight against climate change and the degradation of natural capital, announcing a climate emergency in March 2019 and the aim to get to net carbon zero by 2030. In December 2020, this declaration was strengthened to a 'climate and ecological emergency', which demonstrates the council's commitment to protecting Herefordshire's natural environment, biodiversity and wildlife. The General Scrutiny Committee Task and Finish Group 'Climate and Ecological Emergency Review' (January 2021) notes that it is *'important that Herefordshire's Natural Capital is valued and protected. It was also felt important that the local plan should give greater weight both to the vulnerability of the natural environment and to resilience.' 'In light of the declared climate and ecological emergency, it is vital that emerging policies should have greater focus on climate and biodiversity and these policies be given greater weight. The group also felt that consideration should be given to the relative weight of the NPPF, the Climate Change Act 2008, the Environment Bill and the Paris Agreement in refocusing the Core Strategy.*'

4.4 Herefordshire Council sets out its roadmap to 'getting the county to net zero' on the web page 'Herefordshire Zero Carbon and Nature Rich - The county-wide action plan and how you can make a difference' (https://zerocarbon.herefordshire.gov.uk/getting-the-county-to-net-zero/). It is noted that *'Large scale deployment of renewables such as solar farms will have an impact on land use and will need to be part of a larger conversation about this finite resource.'*

4.5 With specific regard to land use and farming the Council notes that *'To ensure the county can grow its own food, generate its own energy, travel sustainably and support population growth, land use will have to be considered very carefully. By planting additional trees, hedgerows and other biodiverse areas such as wetlands for offsetting, the use of land and competing priorities must be considered. By working to increase biodiversity county-wide and promoting low carbon farming practices and local sustainable food produce, we can work towards a more sustainable future for the county.'*

Herefordshire Council's Economic Development Strategy

4.6 'Economic Vision' identifies the ambitions and intentions of a range of stakeholders and partners, to help make Herefordshire an even better to place to live, work and learn. Aim 7 of the Vision document includes an ambition that '*The overall quality of Herefordshire's landscape will have been enhanced through a series of conservation and ecology projects*

that attract visitors and serve local communities. Sites will be linked by a series of trails and facilities that encourage participation and access to conservation activities. Additionally projects will maintain and enhance the county's natural capital by increasing resilience to flooding, climate change, and loss of pollinators that service agriculture.'

National Planning Policy Framework (NPPF, updated July 2021)

4.7 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and is a material consideration in planning decisions. The NPPF confirms that '*the purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without comprising the ability of future generations to meet their own needs*.' The NPPF identifies three overarching objectives – economic, social and environmental. The environmental objective (9c) is '*to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy*.'

4.8 Chapter 15, 'Conserving and enhancing the natural environment' requires that planning policies and decisions should recognise *'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*.

4.9 Chapter 14 refers specifically to '*meeting the challenge of climate change, flooding and coastal change*' and emphasises that the planning system should support renewable energy and associated infrastructure. Paragraph 156 states '*Local planning authorities should support community-led initiatives for renewable and low carbon energy.'*

4.10 Paragraph 158 describes that when determining planning applications for renewable and low carbon development, Local Planning Authorities should:

> *'a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and*
>
> *b) approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.'*

Planning Practice Guidance – Renewable and Low Carbon Energy March 2014

4.11 National Planning Practice Guidance (NPPG) was adopted in March 2014. The NPPG has been designed to support the National Planning Policy Framework and the two should be read in conjunction. The NPPG states that the aim of environmental net gain is *'to reduce pressure on and achieve overall improvements in natural capital, ecosystem services and the benefits they deliver. For example, habitat improvements can provide a range of benefits such as improvements to soil, water and air quality, flood risk management and opportunities for recreation.'*

4.12 NPPG gives specific guidance on planning for renewable and low carbon energy developments and notes that renewable energy developments should be acceptable for their location, in addition to this principle; the NPPG provides guidance on considerations associated with particular technologies. Paragraph 13 of the NPPG relates to ground mounted solar PV development with key matters identified and addressed in this statement. These are:

- '*encouraging the effective use of land by focussing large scale solar farms on previously developed and non-agricultural land, provided that it is not of high environmental value;*
- *where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays;*
- *that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use;*
- *the proposal's visual impact, the effect on landscape of glint and glare (see guidance on landscape assessment) and on neighbouring uses and aircraft safety;*
- *the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun;*
- *the need for, and impact of, security measures such as lights and fencing;*
- *great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large-scale solar farms on such assets. Depending on their scale, design and prominence, a large-scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset;*
- *the potential to mitigate landscape and visual impacts through, for example, screening with native hedges; and*
- *the energy generating potential, which can vary for a number of reasons including, latitude and aspect*.'

4.13 With regard to potential cumulative effects, the NPPG, states that '*The approach to assessing cumulative landscape and visual impact of large-scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero*.' (paragraph 12 refers).

4.14 Chapter 15 'Conserving and Enhancing the Natural Environment' requires that planning decisions contribute to and enhance the natural and local environment and protect valued sites of biodiversity in a manner commensurate with their statutory status or as identified in the development plan.

Environmental Context (Natural Assets)

4.15 A practical approach to thinking about natural assets comes from UK National Ecosystem Assessment which captures the diversity of the UK's ecology, geology and climate in eight 'broad habitat types.' This typology of 'broad habitats' offers an entry point into understanding natural capital and the benefits that nature provides.

4.16 The application site falls within Enclosed Farmland which is described as '*The most extensive form of land use in the UK, comprising arable, horticultural land and improved grassland as well as associated boundary features such as hedgerows. It accounts for around 40% of land area and supplies the majority of the UK's food. As well as playing a crucial role in provisioning services, Enclosed Farmland is also of great cultural significance and is a major determinant of landscape in much of lowland UK. Note that land in other habitat categories will also involve farming*.'

4.17 The ENCA Assets Databook identifies a list of benefits/services that are potentially relevant to this 'broad habitat' type. These benefits/services are listed in **Table 3** below and those that are relevant to this assessment are highlighted and colour coded into the following broad themes:

- Biodiversity;
- Carbon and air quality;
- Water quality and Resources;
- Agriculture; and
- Recreation and wellbeing.

4.18 These themes are taken forward within this assessment and are identified by consideration of the natural assets identified on/near to the site, given that the scheme is likely to impact them and has the most potential to yield benefits.

Table 3: Ecosystem Services Themes relevant to the site

Category	Current Benefit/service	Relevance to the site	Considered within
Provisioning and abiotic flows	Food production	Yes	Agriculture
	Renewable Energy	Yes	Carbon and air quality
	Pollination		Agriculture
	Water Supply	Yes	Water quality and Resources
Regulating services	Organic waste disposal	No	-
	Air filtration	No	-
	Carbon sequestration	Yes	Carbon and air quality
	Flood regulation	Yes	Water quality and Resources
Cultural service	Enabling Recreation	Yes	Recreation and wellbeing
	Enabling Physical Activity	Yes	Recreation and wellbeing
	Supporting Mental Health	Yes	Recreation and wellbeing
	Educational Interactions	No	-
	Volunteering	No	-

	Nature-Based Tourism	No	-
Bundled services	Amenity	Yes	Recreation and wellbeing
	Biodiversity	Yes	Biodiversity
	Soil Health	Yes	Agriculture
	Water Quality	Yes	Water quality and Resources
	Landscape	Yes	Recreation and wellbeing
Negative environmental effects	Air Pollution	Yes	Carbon and air quality
	Greenhouse Gas Emissions	Yes	Carbon and air quality
	Water Pollution	Yes	Water quality and Resources
	Flood Damage	Yes	Water quality and Resources
	Invasive non-native species	No	Biodiversity

5.0 THE VISION

5.1 The vision for environmental net gain for the proposed development is to achieve the following five objectives over the long term:

- Ensure biodiversity net gain;
- Reduce the carbon footprint and improve air quality;
- Ensure that water quality is maintained and if possible enhanced;
- Minimise reduction in food production; and
- Enhance recreational, landscape and welfare value.

Biodiversity Net Gain

5.2 The Environment Act acknowledges that natural assets have been in long-term decline, a trend that needs to be reversed given nature's essential role in regulating and providing support to and resources for human activities.

5.3 The proposed development aims to:

- Achieve at least a 10 % measurable biodiversity net gain in line with Environment Act requirements[1]; and
- Ensure that all planting utilises native species.

Reduced Carbon Footprint and Improved Air Quality

5.4 The Environment Act (2021) is key in ensuring the UK meets its carbon emission reduction targets and sets ambitious targets to improve air quality and reduce emissions of key pollutants, with a focus on particulate matter. The Act will join an existing raft of energy policy which seeks a reduction in carbon emissions and encourages renewable energy development to ensure continued security of energy supply.

[1] Mandatory biodiversity net gain as set out in the Environment Act applies in England only by amending the Town & Country Planning Act (TCPA) and is likely to become law in 2023.

5.5 The proposed development aims to result in an overall reduction in the carbon footprint of the application site and a positive contribution to the supply of renewable energy.

Water quality and resource management

5.6 The 25 Year Environment Plan sets out goals for clean and plentiful water and to reduce the risks of harm from environmental hazards.

5.7 Drainage is a key consideration for solar PV development and the proposed development will aim to maximise the opportunities that a sensitively designed drainage scheme offers from the establishment and long-term maintenance of wetland habitats.

Minimise reduction in food production

5.8 Installation of a solar farm on agricultural (arable) land will change the way that the land is managed for food production and will affect outputs.

5.9 The proposed development will aim to avoid Best Most Versatile cropland. The Government's 25 Year Plan for the Environment[2] recognises soil as an important national resource, and the Plan states that '*We will ensure that resources from nature, such as food, fish and timber, are used more sustainably and efficiently. We will do this (in part) by ...improving our approach to soil management: by 2030 we want all of England's soils to be managed sustainably, and we will use natural capital thinking to develop appropriate soil metrics and management approaches…*'

5.10 The proposed development will aim to minimise reduction in food productivity and will provide the landowner with a way to diversify their income and provide greater financial security for the estate to ensure longevity.

Enhanced Recreational and Wellbeing Value

5.11 The Environment Act (2021) emphasises the need to protect and improve natural assets not just for the biodiversity benefits they provide, but also due to people's appreciation of nature in its own right. It also emphasises the role nature can play in improving people's physical and mental health.

5.12 In addition to benefiting biodiversity, the proposed development will aim to minimise adverse effects on amenity and to enhance landscape features and recreation opportunities (with subsequent benefits for wellbeing).

Vision for Environmental Net Gain

5.13 From the policy requirements, targets and aspirations outlined above, it is clear that the proposed development aims are aligned with the goals of the Environment Act, and that the proposal has strong potential to meet the Act's ambitions. Meeting these objectives will contribute toward the vision for natural capital improvements. Achieving a biodiversity net gain, reducing carbon emissions, reducing waste and enhancing recreational value will all help to enable long term positive environmental gain, improve habitats and ensure improved user welfare.

[2] Department for Environment, Food and Rural Affairs (2009). A Green Future: Our 25 Year Plan to Improve the Environment. Available online @ https://www.gov.uk/government/publications/25-year-environment-plan Last accessed June 2021

6.0 ENVIRONMENTAL EVIDENCE BASE

Data Sources

- Ecological Appraisal (TLP, December 2021);
- Biodiversity Net Gain Report (TLP, December 2021);
- Landscape and Visual Impact Assessment (TLP, December 2021);
- Flood Risk Assessment (Nijhuis, December 2021); and
- Agricultural Land Class Assessment (Askew Consulting, November 2021).

Biodiversity Net Gain

6.1 The baseline conditions of biodiversity in the study area have been analysed based on the habitats available and the presence of wildlife. Natural assets providing biodiversity benefits have different boundaries and zones of influence. Their conditions and quality can be observed at the local level. However, most habitats form part of wider or regional networks of habitats.

Habitats

6.2 The principal habitats within and around the site, together with their dominant/ characteristic plant species, were identified during the Extended Phase 1 habitat survey.

6.3 **Table 4** summarises the key natural assets that relate to habitats and biodiversity. As shown by the description of ecosystem service and benefits provided, the assets have biodiversity values and provide economic and social benefits primarily on the basis that they provide essential habitats to other species. These species require specific habitats to be maintained, and in turn themselves provide other ecosystem services. Some habitat assets in the subject area offer food sources and opportunities for pollination. Overall, the majority of habitats within the site are considered to be of low intrinsic ecological value (namely the arable fields) due to the limited quality, distinctiveness and extent of the habitats present. The habitats are common and widespread but do offer opportunities for a range of protected species across the site, as discussed below. The hedgerows, ponds and woodland are of higher ecological value.

Table 4: Natural capital habitat assets relating to biodiversity

Natural Asset	Area	Asset condition	Ecosystem service and Economic and/or social benefits provision
Arable land	Area of 44.73 ha within application site. All 8 fields. One of these fields comprised lawn turf, whilst the others had been recently sown and therefore lacked vegetation.	Generally of low biodiversity value (no condition assessment under BNG).	Biodiversity (bundled) service - arable fields are considered to be of low ecological value habitats but can be used by ground nesting birds.
Broad-leaved woodland (Semi-natural and plantation) and Mixed woodland (Semi natural and plantation)	Area of 5.5 ha within application site. Present on the southern side of field A. Two areas present in the approximate centre of the site.	Mainly moderate condition with good quality and diversity, a small area of poor quality.	Biodiversity (bundled) service. Habitat of Principal Importance. Native species of high biodiversity value, provides habitats and food sources to useful

			species: small birds, mammals and invertebrates.
Hedge with/without trees	Length of 2.2 km within the application site.	Good to moderate condition, ranging from intact to defunct.	Biodiversity (bundled) service. Habitat of Principal Importance. Supports invertebrates and amphibians, offers foraging habitat for bats and birds.
Semi-improved/modified grassland	Area of 4.5 ha within application site. A number of small areas on the edges of the arable fields.	Moderate to poor condition.	Biodiversity (bundled) service. Poor semi-improved grassland with few wildflowers which are unable to compete with the grasses.
Buildings and bare ground (sealed surface)	Area of 0.3 ha within application site. Barn (unused corrugated metal with a wooden frame) and access tracks and between some of the fields.	Poor condition.	Biodiversity (bundled) service. Limited provision of habitats to useful species, e.g. bats/birds.
Ponds	Area of 0.17 ha within application site. Three ponds are present on-site.	Assessed as moderate and good condition. Below average-good habitat for breeding amphibians.	Biodiversity (bundled) service. Habitat of Principal Importance. Offers breeding habitat for amphibians/fish and invertebrates which are prey for other species.
Scattered Broadleaved trees	Area of 0.2 ha within application site. Species include English oak, ash, hawthorn, willow sp. and poplar among others	Moderate condition.	Biodiversity (bundled) service. Native species of high biodiversity value, provides habitats and food sources to useful species: small birds, mammals and invertebrates.. Enable pollination for bees/insects.
Tall ruderal and scattered scrub	Area of 0.05 ha within application site. Number of areas of tall ruderal vegetation and scrub (bramble) on the edges of some of the arable fields, around the ponds and eastern access track.	Poor condition.	Biodiversity (bundled) service. Native species of high biodiversity value, provides habitats and food sources to useful species: small birds, mammals, invertebrates. Enable pollination for bees/insects.
Running water	Application site: a number of wet ditches/drains are present within and on the boundary.	Good quality and diversity (no condition assessment under BNG).	Biodiversity (bundled) service. Offers breeding habitat for fish and

			invertebrates which are prey for other species.
Dry ditch	Application site: two dry ditches are present within the site.	Low quality and low biodiversity value (no condition assessment under BNG).	Biodiversity (bundled) service. Offers breeding habitat invertebrates which are prey for other species.

Species

6.4 Aside from these natural assets, the study area and its various habitats are likely to be able to support a range of other animals, such as insects and birds. Ecology assessment that has been undertaken has focussed on species that received legal protection in the United Kingdom (commonly known as 'protected species') and species with conservation designations, but no legal protection (known as 'notable species'). **Table 5** summarises the 'protected' and 'notable' species natural capital assets relating to biodiversity and wildlife at the site.

Table 5: Natural capital species assets relating to biodiversity

Natural Asset	Area	Asset condition	Ecosystem service and Economic and/or social benefits provision
Badger	Site and wider area	Badgers are using the site for foraging.*	Biodiversity (bundled) service. Provide pest control, population control as predators. Seed dispersal.
Bats	Site and wider area	The site is relatively well used by foraging and commuting bats (mainly common species) and is considered to be of *Local* value. The linear boundary features (hedgerows, trees, ponds and ditches) are of greatest value, the arable fields are of lower suitability.	Biodiversity (bundled) service. Provide pest control, population control (predators of species such as insects).
Dormouse	Site and wider area	Hedgerows offer some potential habitats but sub-optimal.	Biodiversity (bundled) service. Prey for other species. Seed dispersal.
Otter	Site and wider area	No evidence of otters was recorded during the survey. Otters could be using the streams and ditches north of the site, but it is considered highly unlikely that otters would access the site.	Biodiversity (bundled) service. Provide pest control, population control as predators.
Polecat	Site and wider area	The site offers potential foraging and refuge habitat.	Biodiversity (bundled) service. Provide pest control, population control as predators.
Hedgehog	Site and wider area	The site offers potential foraging and refuge habitat.	Biodiversity (bundled) service. Provide pest control, population control (predators of species such as insects). Prey for other species.
Brown hare	Site and wider area	The site offers potential foraging and refuge habitat.	Biodiversity (bundled) service. Prey for other species. Seed dispersal.

Birds	Site and wider area	The site and surrounding area support a good assemblage of breeding bird species, including eight 'target species' of conservation concern and is of local value to breeding birds. The suite and numbers of wintering bird species is likely to be largely consistent with other areas of local agricultural land. The site is therefore considered to be of Site value to wintering birds.	Biodiversity (bundled) service. Provide pest control, population control (predators of species such as insects/fish/small mammals). Seed dispersion. Likely to contribute to enjoyment of the countryside.
Amphibians	Site and wider area	Site is of *Local* value. Field margins provide some opportunities and ponds offer breeding habitat.	Biodiversity (bundled) service. Provide pest control, population control (predators of species such as invertebrates and insects). Prey for other species.
Reptiles	Site and wider area	Field margins provide some opportunities but majority of the site which are arable fields are not deemed suitable for reptiles.	Biodiversity (bundled) service. Provide pest control, population control (predators of species such as rodents).
Invertebrates	Site and wider area	No rare or protected invertebrates were recorded during the Phase 1 Habitat Survey. Due to the lack of habitat diversity, the site is unlikely to support invertebrates of conservation concern.	Biodiversity (bundled) service. Pollination of flowers, fields and crops. Prey for other species.
Flora	Site and wider area	The habitats on site were considered to be common and widespread, with no indication of rare species being present.	Biodiversity (bundled) service. Food sources for other species. Likely to contribute to enjoyment of the countryside.

** A Confidential Badger Report has been produced for the site; this can be viewed upon request (contact The Landmark Practice).*

Summary of Ecosystem services and benefits provided

6.5 The biodiversity assets in the study area primarily provide aggregated/bundled services that are not easily reducible to a specific ecosystem service. Land use change has potential to result in effects on nature – both positive and negative.

6.6 Habitats in the study area such as hedgerows, scattered trees, ponds and woodland, are significant on the basis that they provide high value habitats for other useful species to roost, commute, forage or breed. Aside from the hedgerows, these assets are limited in area within the site and the most abundant habitat type (arable fields) is of comparably low ecological value for these purposes, and therefore provides limited ecosystem services and benefits for biodiversity.

6.7 In terms of species that are present, the site has value as part of a larger ecosystem, linking with habitats at the landscape level and allowing species to move from one to the other. There is significant potential for improvement of habitats within the site, which would, in turn, serve to improve opportunities for wildlife in the wider area.

6.8 The presence of a wide range of wildlife species provides several important regulating services. Many are predators, and therefore help in regulating and controlling the population of other species. This can in turn contribute to pest control, by reducing the

population of species likely to be a nuisance if left to grow. Animals and insects that feed on berries, seeds and pollen contribute to creating new habitats and maintaining existing ones, by allowing plants to spread and grow. Economic and social benefits are therefore provided through the regulation and maintenance of the habitats in the wider area, which support the population of pollinating insects, who play an essential role in the development of crops and other plantations. Biodiversity, and most particularly protected species, can also offer economic benefits under the form of tourism, conservation and education.

Carbon and Air Quality

6.9 The site's carbon footprint and impact on carbon emissions is a factor of both the carbon dioxide (CO_2) emissions caused by on-site uses and in terms of carbon storage and sequestration services from habitats and vegetation within the site.

6.10 The natural asset that is linked to carbon storage and emission is the atmosphere. Whilst this is a global asset and there are international targets to bring greenhouse gas emissions to net zero, 'think global, act local' is a widely acknowledged approach to encourage action at all levels.

Carbon sequestration

6.11 Vegetation in the site currently contributes to carbon sequestration by capturing CO_2 and releasing oxygen. The main vegetation type/habitat within the application site is currently arable/cropland.

Greenhouse Gas Emissions

6.12 According to Herefordshire Council[3], circa 77 % of Herefordshire is farmed and agriculture accounts for 7 % of Herefordshire County's CO_2 emissions. This is based on a review of the burning of fossil fuel used in machinery/vehicles and only includes energy from agricultural processes and not necessarily food processing, which is included within the industrial processes energy use, depending on the supply chain.

Air pollution

6.13 Air quality in the atmosphere provides essential provisioning ecosystem services through the air that we breathe, as well as larger regulating and supporting services. Poor air quality can have high social costs and detrimental impacts upon health and habitats.

6.14 Air quality across Herefordshire is generally good. Although a number of local authorities have identified locations that do not currently achieve air quality objectives, the site does not lie within or near to any Air Quality Management Areas (Herefordshire Council and the local authorities of Worcestershire, July 2009). Whilst air quality is not problematic locally, it should be noted that in addition to carbon sequestration, vegetation can assist with improving air quality via purification and dust filtration/trapping.

6.15 The natural assets, ecosystem services and benefits associated with carbon emissions and air quality are set out below in **Table 6**.

Table 6: Natural Capital Assets Relating to Carbon and Air Quality

Natural Asset	Area	Asset condition	Ecosystem service and Economic and/or social benefits provision

[3] https://zerocarbon.herefordshire.gov.uk/getting-the-county-to-net-zero/

Atmosphere	Global	Some carbon emissions from ongoing arable uses (machinery and equipment). No air pollution concerns in local area	Provisioning/regulating service Provision of oxygen for breathing and cell respiration. Dilution of carbon emissions and air pollutants using the atmosphere as a pollution sink, by providing a carbon sink into soil via plant growth.
Vegetation	Site	Mainly arable habitats, but some significant areas of woodland, trees and hedgerows	Provisioning/regulating service Contribution to regulation of the chemical composition of the atmosphere via dust filtration, carbon sequestration and storage, air pollutant purification.

Summary of Ecosystem services and benefits provided

6.16 Carbon footprint and impact on carbon emissions is a factor of both the carbon storage and sequestration services from habitats and vegetation within the site, and the carbon dioxide (CO_2) emissions caused by on-site uses (negative environmental effects from agricultural vehicles and machinery).

6.17 The natural capital assets relating to carbon storage and air quality primarily provide regulating services. The site currently acts as a carbon store (via the carbon capture actions of the vegetation on-site), although arable soils are acknowledged to have the lowest carbon stocks of all habitats recorded by the Countryside Survey Soils Report 2007 (CEH, January 2010).

6.18 Soil organic carbon (SOC) is the carbon that is stored within soils, and the amount of SOC varies from area to area. Agricultural systems operate on a broad range of soil types, often considerably modified from their natural state through drainage, cultivation and fertilisation in order to produce a crop. These agricultural improvements and practices can lead to the loss of soil organic carbon (SOC), which is generally relatively small within arable soils due to annual harvesting which means that the only large and persistent organic carbon stock is in the soil, not associated vegetation (Natural England, April 2021).

6.19 Agricultural land currently covers 70 % of the terrestrial area of England. The UK target to meet net zero is dependent on making changes to the way we use and manage our land, with agricultural land often forming the baseline of land use change. The Committee on Climate Change (CCC 2020) recommend that around one-fifth of agricultural land will need to be released before 2050 for actions that reduce emissions and sequester carbon.

6.20 The key natural asset that is linked to carbon storage and emission is the atmosphere and, whilst there are international targets to bring greenhouse gas emissions to net zero, 'think global, act local' is a widely acknowledged approach to encourage action at all levels.

Water quality and resources

6.21 The application site is located in an area of relatively flat countryside. The surrounding area comprises mainly of agricultural land and small hamlets. There is a watercourse at the northern boundary which comprises of a network of tributaries to the River Cale. The application site is currently managed for agricultural (arable) purposes. The crops are not irrigated but are subject to application of approved pesticides and herbicides to optimise outputs.

Flood regulation/flood damage

6.22 The proposed development is shown to be partially located within Flood Zone 3 (high risk) according to EA fluvial flood mapping.

6.23 The application site is composed of several soil types, including 'Slightly acid loamy and clayey soils with impeded drainage', this was further confirmed by percolation testing on site which failed to drain. No groundwater was encountered within the trial pits. The Environment Agency Risk of Flooding from Surface Water map indicates that the site is generally not at risk of Surface Water Flooding, but there are areas to the north-west at 'low' risk of surface water flooding. The flooding is below a depth of 300 mm, and the site is not at risk during a high-risk scenario.

Water quality/pollution

6.24 The Rivers Wye and Lugg (circa 3.6 km west of the site at their nearest point) are Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs), protected under European and UK legislation (Habitats Directive, Water Framework Directive, Natura 2000) for their aquatic habitats and associated interested species.

6.25 The River Lugg is currently failing the water quality targets set for phosphates, current data shows that the source apportionment of phosphate is around 70 % agriculture/diffuse and 30 % housing, point pollution. The proportion is likely to shift further towards agriculture/diffuse (General Scrutiny Committee Task and Finish Group, January 2021).

6.26 The natural assets, ecosystem services and benefits associated with water quality and resources are set out below in **Table 7.**

Table 7: Natural Capital Assets Relating to Water Quality and Resources

Natural Asset	Area	Asset condition	Ecosystem service and Economic and/or social benefits provision
Arable land	Area of 44.73 ha within application site.	Permeable ground which provides varying degrees of infiltration depending on the subsoil,	Regulating services Site is mainly permeable ground which assists with water flow regulation. However, arable uses (frequent unvegetated state) combined with low infiltration from soil means that this benefit will be relatively low. Agricultural uses likely to result in deterioration of water quality at times from run-off of pesticides/herbicides and soil erosion from periodic bare ground (i.e. after ploughing).
Other habitats	Circa 10.25 ha of habitats including grassland, woodland and scrub	Permeable ground which provides varying degrees of infiltration depending on the subsoil.	Regulating and bundled services Areas not subject to arable farming likely to have healthier soils which typically offer greater infiltration and storage rates. Reduction in siltation and improvement in quality of run-off via these areas due to filtration action of vegetation and soils.

Ponds	Area of 0.17 ha within application site. Three ponds are present on-site.	Provide attenuation of water from nearby areas.	Regulating services Assist with attenuation of water on-site and provide benefits for wildlife in terms of habitat diversity (for foraging and breeding).
Running water	Application site: a number of wet ditches/drains are present within and on the boundary.	Facilitate surface water run-off to stream catchment.	Regulating services Provide benefits for wildlife in terms of habitat diversity (for foraging and breeding)
Buildings and bare ground (sealed surface)	Area of 0.3 ha within application site. Barn (unused corrugated metal with a wooden frame) and access tracks and between some of the fields.	Likely low levels of infiltration.	Regulating services Likely adverse effect from increased run-off rates from these areas.

Ecosystem services and benefits provided

6.27 The key natural asset that is linked to water quality and pollution is the aquatic environment. Examples of ecosystem services include water purification, water flow regulation, and opportunities for recreation and tourism.

6.28 The application site is within an area of flood risk and currently has limited infiltration capacity. It is likely that current arable management results in at least some run-off of herbicides/pesticides that could contribute to the ongoing failure of the River Lugg to meet its water quality targets set for phosphates. It is also likely that, due to low levels of infiltration, soil erosion occurs particularly during times when the site has been ploughed/before crops establish/when turf is harvested, from surface water run-off. Poor water quality and sedimentation have associated disbenefits for aquatic flora and fauna.

Agriculture

6.29 The site is currently farmed for arable production (managed as cropland) on a rotational basis, with varying outputs including lawn turf, potatoes, maize, oats and barley. As a commercial business, the current management includes application of approved pesticides and herbicides to optimise outputs.

Food production

6.30 The land within the site is classified as Grade 2 (i.e., 11.5 ha, or 18.6 %), Subgrade 3a (i.e., 4 ha, or 6.5 %) and Subgrade 3b (i.e., 29 ha, or 47 %) is limited by soil wetness (Askew Land and Soil Ltd, November 2021). The remaining land is not limited and is placed in Grade 1 (i.e., 12 ha, or 19.5 %). Provisional (Pre 1988) ALC information shows that Herefordshire has a high proportion of agricultural land in Grade 1 (i.e., 4.1 % compared with 2.7 % in England as a whole). Therefore, the presence of Grade 1 land at the site is unsurprising, as it is widespread in the area. However, the high proportion of Subgrade 3b at the site indicates that it is some of the poorest quality land in Herefordshire.

6.31 With an increasing human population requiring additional sources of food, a key natural capital benefit of food production is food production, a necessary output to sustain our society. Local food production also helps to reduce environmental costs of transport.

6.32 Nonetheless, there are also natural capital costs from food production, including those associated with the processes that are necessary for arable production, for example greenhouse gas and air pollutant emissions from operation of machinery and vehicles, water use, use of pesticides (reducing pollinators) and degradation of soil health.

Pollination

6.33 Beneficial insects deliver a wide variety of ecosystem services essential to human life. In agricultural systems, two of the most economically important services are pollination and natural control of crop pests by predatory or parasitic 'natural enemies' (John W. Redhead et al, July 2020).

6.34 Pollinators are therefore vital to the farm ecosystems but UK population numbers are crashing because of the effects of climate change, habitat loss and distribution of pathogens. Bees, butterflies and hoverflies are a vital part of the farm ecosystem and contribute to UK agriculture by performing pollination functions. It is estimated that crop-pollination species contribute about £600 million per annum to the UK agricultural economy.[4.] Pollinator population numbers are, however, reducing dramatically, and a report published in 2019 (Gary D. Powney et al, 2019) found that circa 33 % of 353 species that were studied have declined in the extent of their range across the UK since 1980.

6.35 Interestingly, the study also found that the key group of 22 wild bees and hoverflies behind crop pollination had bucked this trend, increasing their range between 1980 and 2013. Whilst not immediate cause for alarm in terms of food production, the shrinking of the rest of the pollinator species' range is a concern for non-crop pollination and a resulting loss of richness in biodiversity. Climate change, loss of habitats, intensification of arable production and pathogens all contribute to these falling numbers.

Soil Health

6.36 Soil health can be defined as a soil's ability to function and sustain plants, animals and humans as part of the ecosystem.

6.37 The Soil Strategy for England (Defra 2009), which builds on Defra's 'Soil Action Plan for England (2004-2006), sets out an ambitious vision to protect and improve soil to meet an increased global demand for food and to help combat the adverse effects of climate change. The Soil strategy for England states that '… *soil is a fundamental and essentially non-renewable natural resource, providing the essential link between the components that make up our environment. Soils … all perform a number of valuable functions or ecosystem services for society including:*

- *nutrient cycling;*
- *water regulation;*
- *carbon storage;*
- *support for biodiversity and wildlife; and*

[4] https://www.soilassociation.org/our-work-in-scotland/scotland-farming-programmes/resources-for-farmers/farming-for-wildlife/increasing-pollinators-on-arable-farms/

- *providing a platform for food and fibre production and infrastructure*'.

6.38 The natural assets, ecosystem services and benefits associated with agriculture are set out below in **Table 8.**

Table 8: Natural Capital Assets Relating to Agriculture

Natural Asset	Area	Asset condition	Ecosystem service and Economic and/or social benefits provision
Arable cropland Grade 1	Area of 12 ha (19.5 % of field area).	Excellent quality land but comparatively poor quality (compared with local trends).	Provisioning and bundled services Agricultural commodities for human consumption – likely high yield and widely versatile.
Arable cropland Grade 2	Area of 11.5 ha, (18.6 % of field area),	limited by soil wetness - very good quality agricultural land but comparatively poor quality (compared with local trends).	Provisioning and bundled services Agricultural commodities for human consumption – likely high yield and widely versatile with minor limitations.
Arable cropland Grade 3a	Area of 4 ha (6.5 % of field area)	limited by soil wetness - good quality agricultural land but comparatively poor quality (compared with local trends).	Provisioning and bundled services Agricultural commodities for human consumption, land capable of consistently producing moderate to high yields of a narrow range of arable crops.
Arable cropland Grade 3b	Area of 29 ha, (47 % of field area)	Moderate quality agricultural land.	Provisioning and bundled services Agricultural commodities for human consumption, land capable of producing moderate yields of a narrow range of crops.
Grassland	Area of 4.5 ha within application site.	Not currently used for agricultural production.	Bundled services Species diversity offers opportunities for pollinating insects. Plant biomass stock enhances soil health and resilience.
Hedgerows	Length of 2.2 km within the application site.	Good to moderate condition, ranging from intact to defunct.	Bundled services Species diversity offers opportunities for pollinating insects, structure provides connectivity across the landscape. Plant biomass stock enhances soil health and resilience.
Ponds	Area of 0.17 ha within application site.	Good to moderate condition.	Bundled services Species diversity offers opportunities for pollinating insects.
Woodland	Area of 5.5 ha within application site.	Mainly moderate condition.	Provisioning and bundled services Species diversity offers opportunities for pollinating insects, structure provides

			connectivity across the landscape. Plant biomass stock enhances soil health and resilience. Can offer opportunities for timber production, but not managed for this output in this case.
Wildlife	Site and wider area	Range of habitats in generally favourable condition, although biodiversity value of arable cropland is limited. Range of generally common and widespread species in stable conditions.	Bundled services Provides pest control, population control (predators of species such as invertebrates and insects).

Summary of Ecosystem services and benefits provided

6.39 The natural capital assets relating to agriculture provide provisioning services (food production, pollination), but also bundled services with regard to soil health.

6.40 The site has a high proportion of 'Best Most Versatile' (BMV, Grade 1 to 3a) land, albeit alongside a significant proportion of some of the poorest quality land in Herefordshire, (which generally has a large proportion of BMV land). Provision of agricultural commodities is therefore currently a significant economic and social benefit that is provided by the site. Agricultural improvements and practices can, however, lead to soil degradation and associated environmental impacts (e.g. soil erosion, compaction and loss of farmland biodiversity). Soil degradation was calculated in 2010 to cost £1.2 billion every year (Environment Agency 2019). The maintenance, and improvement, of soil health is therefore a material consideration when deciding if a development is appropriate on agricultural land.

6.41 Due to limited diversity and use of insecticides, arable land (which comprises the majority of the site) has limited value for insects and therefore the site currently offers little in the way of a provisioning service for pollinator species.

Enhanced Recreational and Wellbeing Value

6.42 The natural assets and habitats on-site contribute to the recreational and landscape value of the site and its environs. The site itself offers no recreational value as there are no public rights of way (PRoW) across the site and it is not publicly accessible. The site is currently comprised of eight arable fields, divided internally by clipped hedgerows (1-2 m high) with some standard trees and small areas of woodland.

Enabling Recreation and Physical Activity

6.43 The network of PRoW is typically focussed in and around the settlement areas, with limited connectivity across the site's environs. There are only a few PRoW near to the site, the closest being PRoW OP10 at Kymin, 260 m to the north-east, which connects with the Three Choirs Way, a long distance circular path between Hereford, Worcester and Gloucester. At Westhide, to the south-west, there are two PRoW which run from the village up to higher ground to the south-east, including PRoW WS1 which climbs Shucknall Hill. PRoW WT31 traverses an area of higher ground on the eastern edge of Withington, 850 m south-west of the site.

Amenity and Landscape

6.44 Herefordshire Landscape Character Assessment (2004, Updated 2009) identifies that the majority of the site, including fields to the centre, east and south, falls within an area identified as 'Estate Farmlands'. Key relevant characteristics include *'...medium to large fields defined by hedgerows ..., mixed farming land use, planned woodland character, small geometrically shaped plantation woodlands, medium-framed views and clustered settlement pattern.'* The site is considered to demonstrate these characteristics. The disused Herefordshire to Gloucestershire Canal which runs along the northern boundary of the site is a historic feature of interest.

6.45 There is generally a sense of tranquillity due to the rural location of the site, the enclosure from mature vegetation and the gently undulating nature of the landscape. Layers of mature vegetation across the local landscape, including the mature wet woodland along the canal, result in limited opportunities for views towards the site. Local views (under 0.5 km) are limited to local roads, PRoW and the church yard at Westhide, south-east and east of the site. Medium distance views (0.5 -2 km) are afforded from local roads, PRoW and the church yard at Withington, south-west of the site, together with PRoW to the north, including the Three Choirs Way. No distance views (over 2 km) were recorded.

Supporting Mental Health

6.46 Access to and perceived connections to the natural environment, can benefit both mental and physical wellbeing[5]. Physical access to the countryside enables activities that allow recreation, can help to improve fitness, nature-based-recreation and 'de-stressing'. This can improve both physical and mental health, recuperation or enjoyment via passive or immersive interactions, and through passive or observational interactions.

6.47 The main ecosystem services and benefits associated with recreational and wellbeing value are cultural, as set out below in **Table 9.**

Table 9: Natural capital assets relating to recreation and wellbeing

Natural Asset	Area	Asset condition	Ecosystem service and Economic and/or social benefits provision
Arable farmland	Site and wider area	Landscape in good condition, valued at local level with cultural features including disused canal.	Cultural services Local views from PRoW and local roads. Promotes health and enjoyment through passive or observational interactions, which improves physical and mental health.
Trees and hedgerows	Site and wider area	Landscape in good condition, valued at local level with cultural features including disused canal.	Cultural services Local views from PRoW and local roads. Promotes health and enjoyment through passive or observational interactions, which improves physical and mental health.
Wildlife and access to nature	Site and wider area	Range of habitats in generally favourable condition, although biodiversity value of	Cultural services Promotes health and enjoyment through passive or observational

[5] https://www.mind.org.uk/information-support/tips-for-everyday-living/nature-and-mental-health/how-nature-benefits-mental-health/

		arable cropland is limited. Range of generally common and widespread species in stable conditions.	interactions, which improves physical and mental health. Promotes tourism, users of nearby PRoW and wildlife watching.

Ecosystem services and benefits provided

6.48 The key natural asset that is linked to recreation and wellbeing is the landscape, and the landscape features that comprise this, the most visible aspects being the open arable farmland and the taller elements (trees and hedgerows). Wildlife also makes a contribution, with mobile species likely being most appreciable currently.

6.49 These natural capital assets relating to recreation and wellbeing primarily provide cultural services and bundled services of amenity and landscape appreciation. At present the site offers mainly passive or observational interactions and services in terms of benefits to health and wellbeing that can be achieved from 'enjoyment of the countryside'. There is currently no public access across the site (no PRoW) that facilitate immersive interactions.

6.50 The site is, however, in good condition, in landscape and visual terms and is locally valued with landscape and heritage features that are characteristic of the area, contributing to 'sense of place'.

7.0 EFFECTS ON NATURAL ASSETS

7.1 The next step involves a review of the effects of the proposed development against the baseline to develop an understanding of physical, spatial or biological changes in the location, extent, condition and diversity of natural assets. The findings of the application of the EBN tool (output supplied at **Annex B**) have been set out under each natural capital theme as appropriate.

Biodiversity Net Gain

7.2 The proposed development will result in the replacement of the arable cropland habitat with species-rich grassland within the fields. The value of existing arable fields will be improved through the creation of species rich grassland. This will provide a variety of diverse plant communities in the future. Areas of wild bird seed mix will also be incorporated in sections of the margins of two of the fields.

7.3 The ponds within the site will be indirectly enhanced through cessation of arable practices and restoration of more semi-natural habitats which will improve their condition.

7.4 To facilitate a proposed permissive path, four small gaps of no more than 2 m will be created within existing hedgerows (with the aim to limit to 1 m). These small losses will be offset by an improved management regime which will ensure that the condition of existing hedgerows (2.2 km in length) are enhanced, largely through improvements to their height and width. Furthermore, several new species-rich hedgerows are proposed resulting in 1.24 km of new hedgerow. A total of 219 new trees will also be planted throughout the site. These measures will also help screen the site from the surroundings. These measures will enhance connectivity of the site with surrounding habitats and support the resilience of wildlife.

7.5 A summary of the changes to habitats within the site is provided at **Table 10** below.

Table 10: Change in habitats at the site pre/post development

Land Use	Existing Site	Proposed Development
Arable cropland	44.7 ha	0.5 ha
Grassland	4.5 ha	48 ha
Hedgerows	2200 m	3440 m
Woodland	5.5 ha	5.5 ha
Ponds	0.17 ha	0.2 ha
Developed Land/sealed surface	1.21 ha	2.38 ha
Miscellaneous*	1 ha	0.4 ha

**Includes bramble scrub, urban trees and bare ground*

7.6 It is proposed that the grassland below the solar panels will be managed by low-intensity grazing (likely by sheep). A combination of low stocking density and breaks in grazing can lead to a high diversity of wildflowers and invertebrates as well as benefitting ground nesting birds and mammals. This will result in an increase in the richness and functional diversity of both pollinators and other prey and subsequently predator species, with benefits for pest control.

7.7 The EBN tool finds that benefits from pest control will have a large increase from baseline levels from circa year 10 onwards (**Plate 1** refers), once the new grassland and

tree/hedgerow planting that is associated with the proposed development has had time to establish.

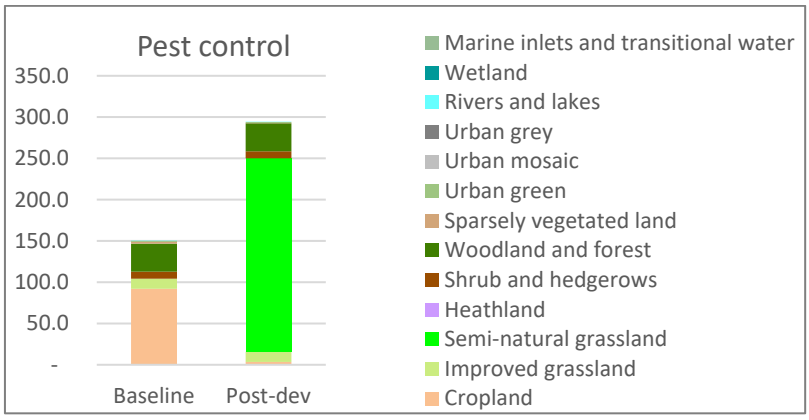

Plate 1: EBN Chart showing Pest Control changes

7.8 The current level of net gain on-site stands at a gain of 223.49 habitat (area) units, which equates to 134.39 % net gain, and a gain of 22.40 hedgerow (linear) units, representing a 61.95 % net gain. In addition to this measurable biodiversity net gain, species-specific enhancement measures targeting bats, birds, great crested newt and reptiles, will also be delivered in conjunction with the scheme as follows (detailed in the Ecological Appraisal, TLP 2021):

- Provision of wild bird seed mix in parts of the buffer areas;
- Incorporation of bat and bird boxes on retained trees throughout the site to increase roosting/nesting opportunities;
- Great crested newt buffer wildlife corridor; and
- Provision of 5 reptile hibernacula.

7.9 This overall enhancement will support Herefordshire Council in delivering biodiversity enhancements within its authority area in response to its Ecological Emergency declaration.

Reduced Carbon Footprint and Improved Air Quality

7.10 The proposal at Westhide is for a ground-mounted solar power scheme of approximately 34.6 megawatts (MW) of installed capacity. A site of this size would be expected to generate approximately 36,300 MWh of green electricity per year – enough to power over 12,500 medium-usage UK households (and equivalent to around 38 % of the number of households in the Hereford locality). This would also displace around 8,400 tonnes of CO_2 every year.

7.11 Development and installation of any energy technology will have energy requirements and associated indirect Greenhouse Gas (GHG) emissions. This can be seen as the hidden 'carbon debt' of a technology. Recent life-cycle assessments and analyses show that for solar PV these full life-cycle emissions are *significantly lower* than for fossil fuels, as well as some other low-carbon technologies, including bioenergy and hydro (Pehl et al, 2017).

7.12 The concept of "energy return on investment" (EROI) was developed to give a common measure for comparing very different fuel sources. Finding out fuels' EROI means working out how much energy it takes to make the technology usable and how much energy you

get afterwards. What these analyses show is that the (EROI) for solar PV is 4 %, meaning that 4 % of the energy generated by solar PV is offset by energy needed to build the plant and supply the electricity. (For comparison, it is 11% for coal). Another way of looking at it is by getting an EROI ratio – you divide the energy output by the energy input. A high EROI ratio means you get a lot of energy out for very little energy expended. The EROI ratio for solar is 26:1.

7.13 As a result of the proposed development, the main habitat at the site, arable cropland, will be replaced by species rich grassland that will likely be managed by grazing. Studies have shown that zero tillage (uncultivated), planting of trees (Freibauer et al, 2004) and conversion of arable land to grassland results in an increase in soil organic carbon (SOC) (Bell, M.J, 2011). Grazed grassland sequesters more carbon than mown grassland due to the greater return of soil organic matter (SOM) and nutrients. In addition, grazing alters the soil microbial community which enhances the availability of substrate which favours SOC sequestration. Global evidence suggests that zero tillage results in more total soil carbon storage when applied for 12 years or more (Askew Ltd, November 2021). Therefore, there is evidence that conversion of land from arable to grassland which is uncultivated over the long-term (>12 years), such as that under solar PV arrays, increases SOC and SOM. Carbon sequestration at the site is therefore likely to increase as a result of the proposed development.

7.14 The EBN Tool concurs with this finding, showing an increase in carbon storage benefits at the application site resulting from the proposed development (across its lifetime, from year 1), as shown in **Plate 2** below:

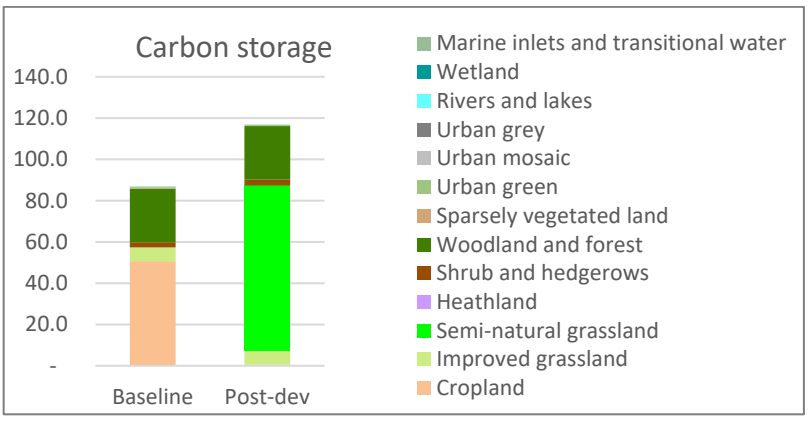

Plate 2: EBN Chart showing Carbon Storage changes

7.15 Furthermore, air pollution and greenhouse gas emissions from agricultural operations (farm vehicles and machinery) will significantly reduce as food production will cease. Operational maintenance will be limited to around 2 visits a month (light van or 4x4) for maintenance of equipment, and annual hedge trimming. An increase in natural vegetation cover (all year round), including significant hedgerow and tree planting (paragraph 7.4 above refers) will furthermore provide benefits (albeit minor, ENB output at **Plate 3** refers) with regard to air quality regulation via purification and dust filtration/trapping.

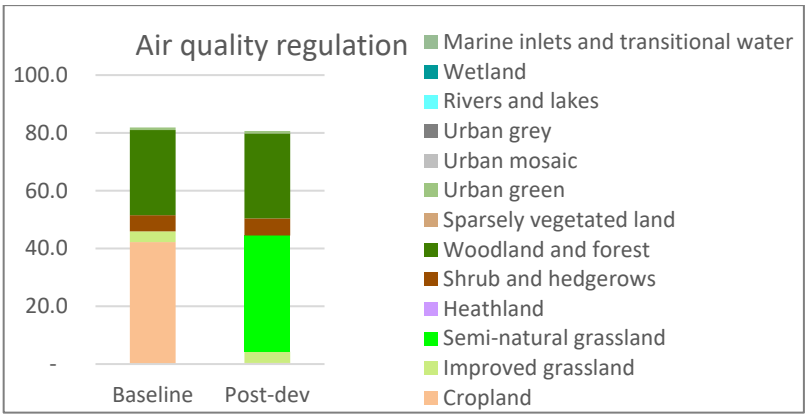

Plate 3: EBN Chart showing Air Quality Regulation changes

7.16 The proposed development will therefore assist Herefordshire Council in reducing greenhouse gas emissions in line with local and national targets, in addition to supporting its strategy for its Climate Emergency declaration.

Water quality and resource management

7.17 The proposed development includes a sustainable drainage scheme to minimise increase in surface water run-off from the proposed panels and infrastructure. Drainage is a key consideration for solar PV development and drainage presents opportunities for the establishment and long-term maintenance of wetland habitats.

7.18 Due to limited infiltration rates, an attenuation based scheme has been proposed (Nijhuis, December 2021). Implementation of open drainage structures (ditches, swales or ponds) as part of a sustainable drainage scheme can create rich habitats for many water dependent amphibians, and for invertebrates and the species of fauna that these support (e.g. bats, birds). '*Evidence suggests that fields with open drainage have significantly higher plant and invertebrate diversity than those without, or those with aggressive drainage structures*' (Solar Trade Association 2019).

7.19 Furthermore, there is evidence to show that the use of wetland habitats for drainage solutions at solar parks can assist with management of chemical run-off from intensive agriculture on surrounding land. *'Nitrogen can be reduced by 30 % when hydraulic pathways in artificial wetlands are optimised, whilst intermittent pesticide fluxes can be reduced by up to 50-80 %*' (Solar Trade Association 2019). The EBN tool output concurs with this finding, identifying an increase in water quality regulation benefits that will result from the proposed development across its lifetime (from year 1), **Plate 4** refers.

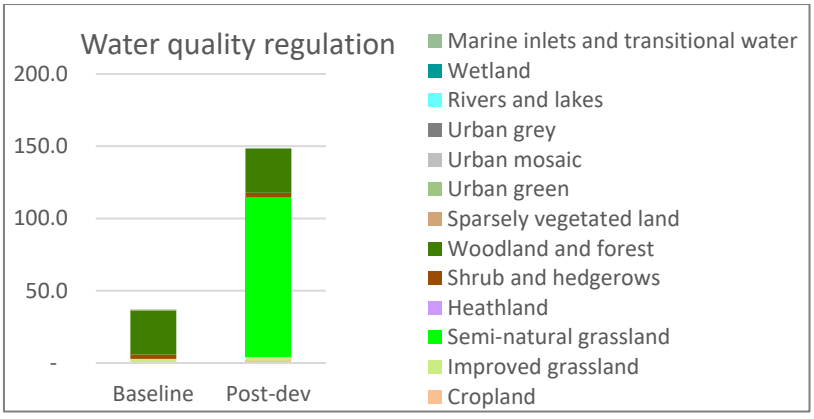

Plate 4: EBN Chart showing Water Quality Regulation changes

7.20 As a result of conversion of the arable cropland into species rich grassland, over time the water attenuation and infiltration properties of the site are likely to increase. Year-round vegetation cover (without creation of bare soil from ploughing and crop harvesting), an increase in organic matter content and creation of cracks and pores for water to move through (from establishment of root systems and earthworms) will, over time, result from grazed grassland. This will create greater water storage capacity, aiding aquifer recharge which is beneficial for water supply, as supported by the EBN tool output at **Plate 5**.

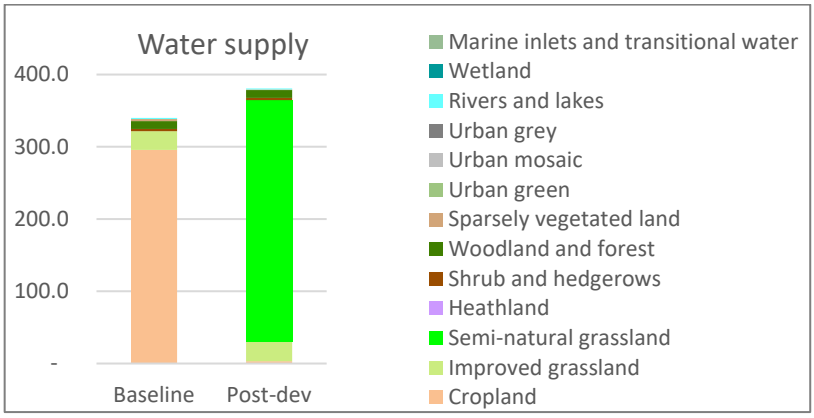

Plate 5: EBN Chart showing Water Supply changes

7.21 Dependent on the nature of the sub-soils, creation of permanent grassland may also result in lower run-off rates and higher evapotranspiration. High densities of grazing animals can compact soils and contribute to sedimentation, however, low-density stock rates are proposed for ongoing management. The use of heavy plant on wet land can cause the topsoil to be disrupted which in-turn can pose a pollution risk to local watercourses. It is advised that silt fences are installed during the construction phase of the proposed development to intercept silt laden run-off, if construction traffic or adverse weather is likely to cause damage to the topsoil.

7.22 The EBN tool concurs that the proposed development is likely to result in an increase in flood regulation benefits at the application site from year 1 across the lifetime of the proposed development (**Plate 6** refers).

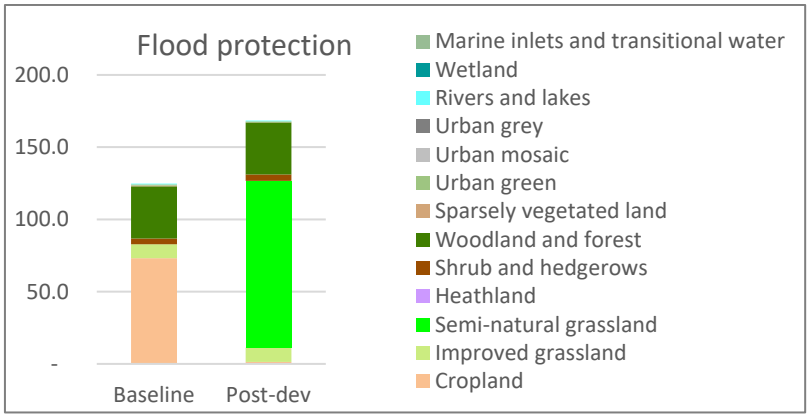

Plate 6: EBN Chart showing Flood Protection changes

7.23 Furthermore, the conversion to grassland will act to filter and slow the flow of water (Natural England, 2009), increasing the soil erosion protection benefits offered by the application site. The EBN tool finds that the proposed development will result in an

increase in erosion protection benefits at the application site from year 1 across the lifetime of the proposed development (**Plate 7** refers).

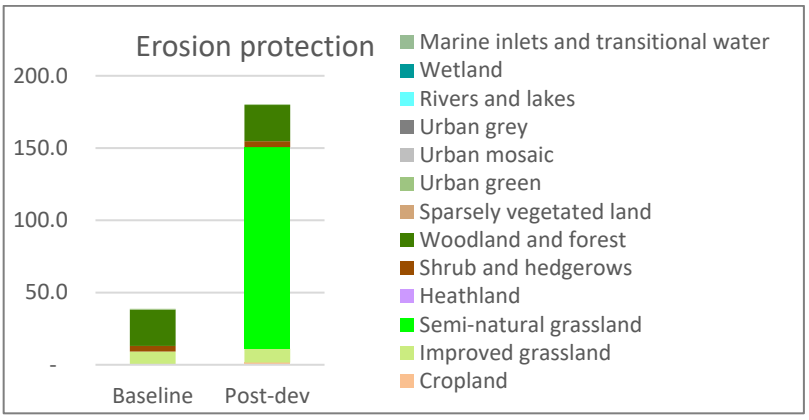

Plate 7: EBN Chart showing Erosion Protection changes

7.24 The change from arable production to species rich grassland will also result in a cessation of herbicide and pesticide inputs to the site and a likely reduction in chemical runoff and associated improvement in water quality (Fezzi, C.et al, 2010). This will have associated benefits for aquatic flora and fauna, and will contribute to the water quality targets for the nearby River Lugg. An increase in water quality regulation benefits at the application site is also predicted by the EBN tool, from year 1 across the lifetime of the proposed development (**Plate 8** refers).

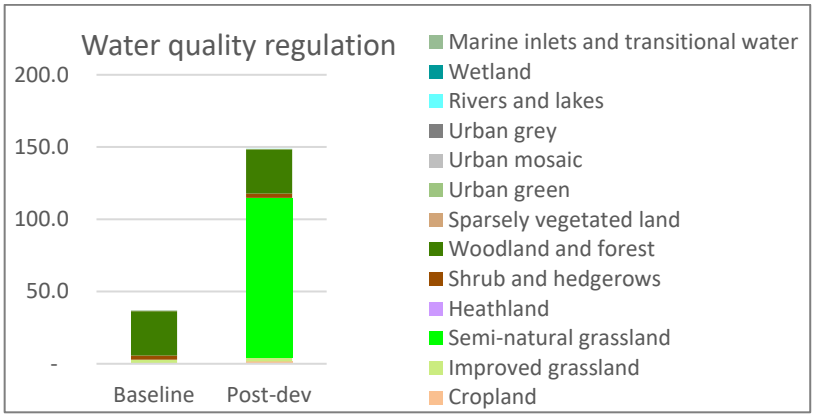

Plate 8: EBN Chart showing Water Quality Regulation changes

Agriculture and Food production

7.25 The proposed development will provide the landowner with a way to diversify their income and provide greater financial security for the estate to ensure longevity.

7.26 In the short term, the food production benefits of the site will reduce significantly as crop production will cease. There will, however, be an element of agricultural production that is retained by ongoing management of the site via low density grazing (sheep). The EBN tool predicts a large decrease in food production benefits from the application site over the lifetime of the proposed development (**plate 9** refers)

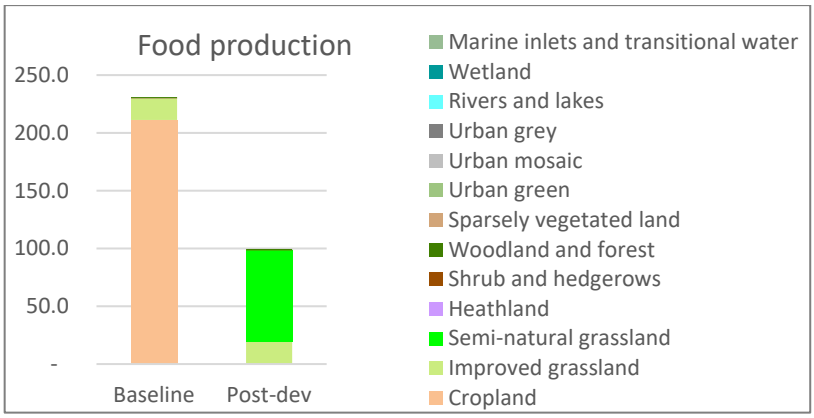

Plate 9: EBN Chart showing Food Production changes

7.27 It should be noted, however, that the proposed development at the site, the installation of a solar PV array, is reversible with minimal physical changes proposed aside from access tracks and minor infrastructure foundations. This means that the agricultural land can be returned to its former agricultural productivity (food provisioning service) once the generation of renewable electricity has ceased, and the solar panels and associated infrastructure is removed.

7.28 Although the majority of the site qualifies as 'best most versatile' farmland, when compared to the abundance of Grade 1 farmland in Herefordshire the Agricultural Land Classification Report (Askew Land and Soil Ltd, November 2021) finds that the site is likely to offer some of the poorest quality land in Herefordshire. Looking at the national trend, field scale solar PV forms an extremely small portion of land use (0.06 % in 2019).

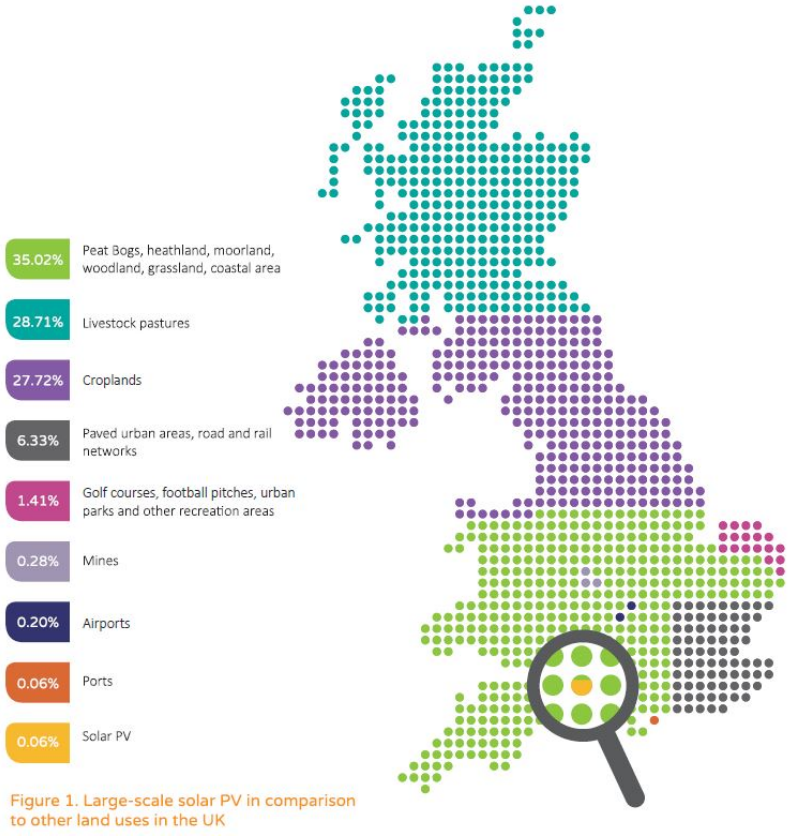

Plate 10: Large Scale Solar PV in Comparison to other Land Uses in the UK

(*Graphic source: Solar Trade Association 2019: The Natural Capital Value of Solar)*

7.29 This temporary development will allow the land to 'rest' for the period of operation. In many respects, the management of the land under solar PV panels as grassland can benefit soil health, as described in detail in the Agricultural Land Classification Report (Askew Land and Soil Ltd, November 2021). A healthy soil has a well-developed soil structure, where soil particles are aggregated into structural units separated by pores or voids. This allows the free movement of water through the soil and facilitates gaseous exchange between the plant roots and the air. These soils are well aerated (oxygenated), which encourages healthy plant (crop) growth and an abundance of soil fauna and aerobic microbes.

7.30 Soils are habitats for millions of species, ranging from bacteria, fungi, protozoa, and microscopic invertebrates to mites, springtails, ants, worms and plants. Soil biota are strongly influenced by land management. Modern farming has led to the loss of soil biodiversity. Changes in land management practice and land use can have large effects on soil biodiversity over relatively short time scales. Reducing the intensity of management, introducing no-tillage management, and converting arable land to pasture, such as grassland under solar PV arrays, has substantial beneficial effects. Soil structure is improved when the land is uncultivated over time (no tillage), and when soil organic matter content (SOM) is increased through the accumulation of plant material, such as roots, in the soil. The aerobic (oxygenated) decomposition of SOM helps to bind soil particles together into aggregates (peds). Therefore, the conversion of land which is tilled for arable to long-term grassland (no tillage), such as that under solar PV arrays, improves soil structure over time.

7.31 Conversion of the arable cropland to species rich grassland will also result in an increase in the richness and diversity of both pollinators which could result in enhancement of pollination of nearby crops. Natural grassland, with flower/weed species helps to support a variety of pollinators (not limited to crop pollinators) and helps to maximise productivity in insect-pollinated crops (Carvalheiro, L.G et al, 2011). It is therefore likely that conversion of an area of cropland to species rich grassland will not only benefit diversity on-site but also enhance the pollination of surrounding agricultural land. The EBN tool concurs with this prediction (**plate 11** refers), identifying a large increase in pollination benefits as the new grassland/hedge and tree planting that will be associated with the proposed development establishes (i.e. from circa year 10 onwards).

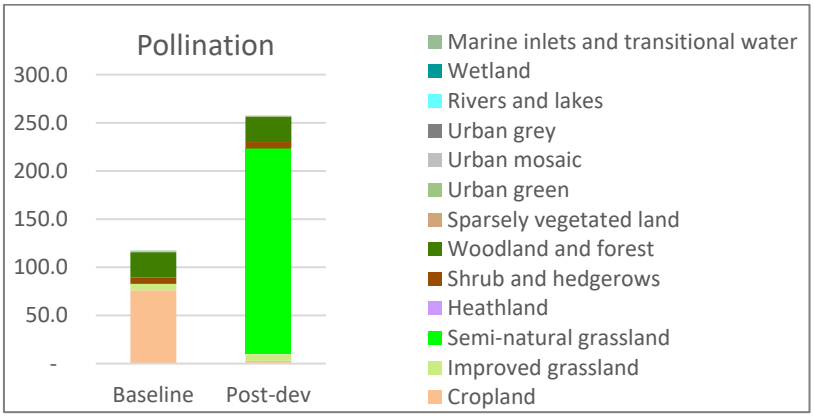

Plate 11: EBN Chart showing Pollination changes

Recreation and wellbeing

7.32 The proposed development will introduce PV panels and associated infrastructure to a number of fields within the Estate Farmlands landscape character area. Structures of this type and scale are generally uncommon within this lightly settled, rural landscape, with the exception of large polytunnel schemes. The proposed development will however retain much of the existing field pattern and landscape features, with any tree and hedgerow removal barely discernible. New hedgerow planting will enhance connectivity of landscape features and re-create historic field patterns, reducing some fields in area but retaining the scale typical of the local field pattern. New tree planting will contribute to the planned woodland character of the area, which is prevalent around the site. The EBN tool acknowledges that the proposed habitat amendments will increase the 'sense of place' of the application site as the proposed planning establishes (i.e. from circa year 10), **Plate 12** refers.

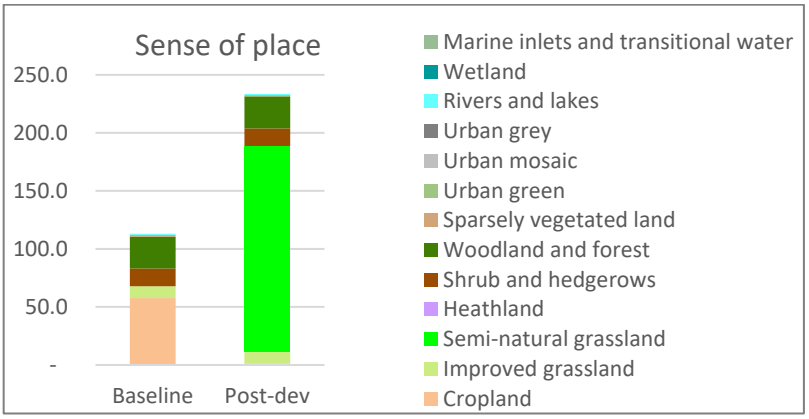

Plate 12: EBN Chart showing Sense of Place changes

7.33 The proposed habitat changes will enhance the opportunities for wellbeing benefits from interactions with nature, as the proposed change from cropland to grassland habitats will result in an overall increase in biodiversity value of the site. Species specific enhancement measures targeting larger mobile species such as bats, birds, reptiles, will also be delivered in conjunction with the scheme.

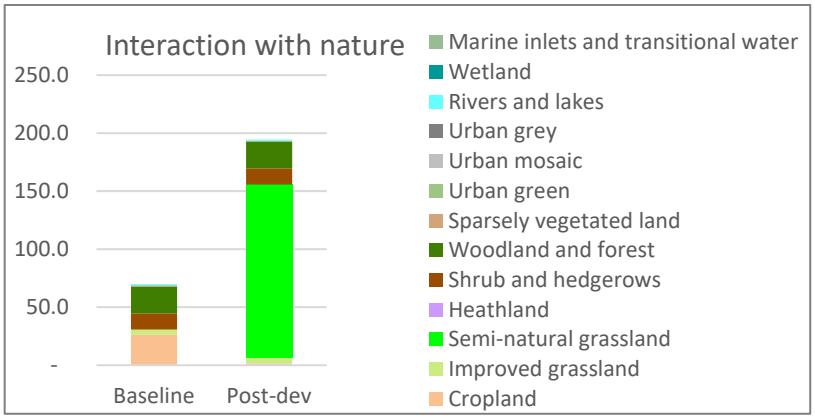

Plate 15: EBN Chart showing Interaction with Nature changes

7.34 Mature boundary vegetation provides a high level of containment from the landscape to the north and west of the site. The design of the array at the eastern parts of the site positions the PV panels beyond the high ground to reduce inter-visibility with the landscape to the south and east. Due to the partial openness of the southern boundary, there will be inter-visibility between the development in the western fields and the wider

area to the south. Due to the limited public access within the local landscape, the changes will be experienced from limited areas within the immediate vicinity of the site. On maturity of proposed mitigation planting, the existing and proposed planting will assist in the filtering views of the development and breaking up the expanse of panels, however, there will be some remaining filtered and partial views.

7.35 Interestingly, the EBN tool identifies an overall increase in aesthetic value of the site resulting from the proposed development, and a large increase after circa year 10 as vegetation and planting establishes (**Plate 13** refers). It should be noted, however, that the EBN tool outputs are based on inputs from the Biodiversity Net Gain calculation (i.e. changes in habitats). Therefore, although the tool acknowledges the enhancements to aesthetic value of changes from arable to grassland habitats and proposed tree and hedgerow planting, it does not account for the aesthetic attributes of the proposed development itself (i.e. the solar panels). Whilst some visual receptors may view renewables as a positive development, solar PV is generally assessed as an aesthetic and visual detractor.

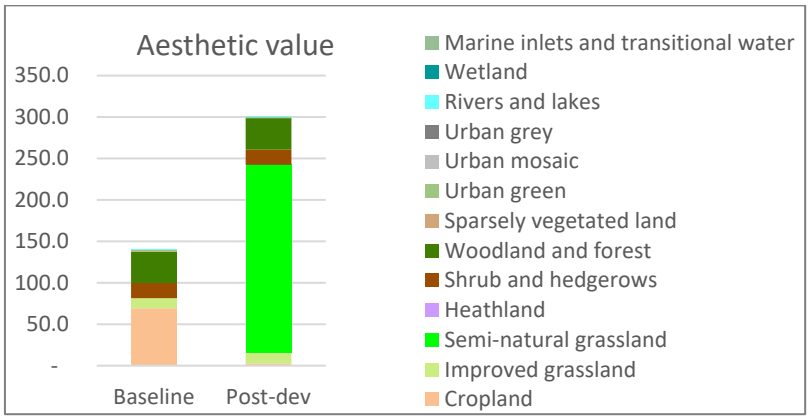

Plate 13: EBN Chart showing Aesthetic Value changes

7.36 The proposed development will therefore result in the long term, but reversible, change to the character of the site by introducing PV panels and associated infrastructure across all areas of arable land. The site is provided some containment by local landform and existing boundaries in the form of mature wet woodland along the canal, woodland blocks, overgrown hedgerows and mature, clipped hedgerows. However more open boundaries to the south provide inter-visibility with the wider landscape. Other than the removal of a small number trees and small amounts of hedgerow, the majority of landscape features will be unaffected by the proposed development and will be enhanced by additional mitigation planting.

7.37 As part of the scheme, there is a proposed permissive footpath in the immediate vicinity of the Herefordshire to Gloucestershire Canal, in accordance with aspirations within Policy LD4 (HCS) and the Herefordshire Green Infrastructure Strategy. In order to provide further connectivity along the canal and to the wider PRoW network in the future, the route would need to be coordinated across cross-boundary land ownerships. However, the panels on the current site have been set back from the canal in order to respect this Policy aspiration and the onsite permissive route will be in operation for the lifetime of the scheme (30 years). Increased public access would enhance the physical and immersive recreational value of the site. The EBN tool finds a large increase in recreational value of the site in the longer-term (**Plate 14** refers).

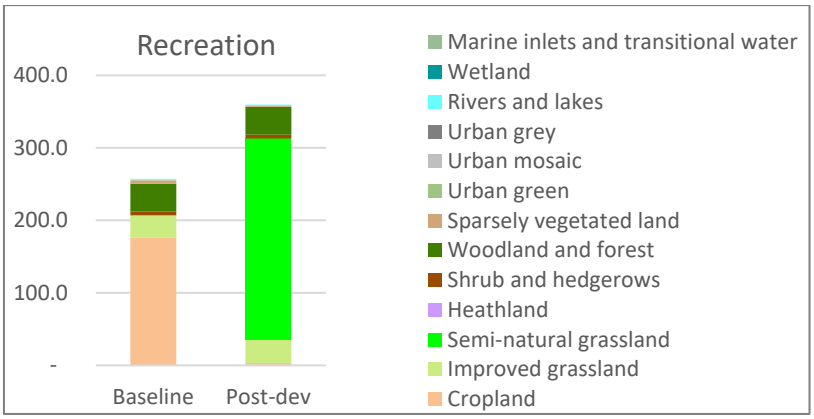

Plate 14: EBN Chart showing Recreation changes

Summary

7.38 **Table 11** below summarises the key aspects, measures and interventions that form part of the proposed development, and their impacts on identified natural assets and associated ecosystem services.

7.39 The proposed development is predicted to bring welfare benefits in terms of human-related environmental assets (e.g. enjoyment of landscape) as well as natural/environmental and biodiversity capital.

7.40 The proposed development is predicted to result in substantial, long-term and sustainable gains in the biodiversity of the site and surrounding area via provision of higher biodiversity-value habitats and enhanced connectivity with the surrounding landscape. The improvement of biodiversity value will enhance and encourage recreational and education activities such as wildlife watching and increase the likelihood of interactions occurring. The proposed permissive path will increase opportunities for both active and passive recreational activities.

7.41 The expected reduction in carbon emissions from installation of renewable energy generation infrastructure, and enhancement of the benefits of carbon storage in soil at the site will contribute to national and international targets.

7.42 The proposed development includes a sustainable drainage scheme to minimise increase in surface water run-off from the proposed panels and infrastructure. A likely reduction in water pollutants will contribute to local pollution prevention targets and enhance the value of the site and wider area for aquatic biodiversity. Improvements to water infiltration rates and retention may be possible that would serve to reduce flood risk and erosion, with beneficial outcomes for downstream land uses (in terms of flood risk) and aquifer recharge (water availability).

7.43 In terms of agriculture, there will be a large loss in food production benefits (at the site level) for the lifetime of the proposed development. The transfer from cropland to grassland over the lifetime of the scheme is, however expected to enhance the health of the soil within the site in the long-term, likely providing an enhancement for any future return to arable management on completion of the lifetime of the proposed development (following decommissioning). Enhancements from sustainable drainage on-site and benefits for pollinators are furthermore likely to benefit surrounding arable crop production over the lifetime of the proposed development.

Table 11: Summary of Impact on Natural Capital Assets and Environmental Gain

Theme	Design /intervention	Impacts
Biodiversity	• Loss of max 8 m of hedgerow across four locations; • Improved management regime for existing hedgerows to enhance to 'Good' condition; • Planting of 2.2 km of new hedgerow; • A total of 190 new trees will also be planted throughout the site; • Provision of wild bird seed mix in parts of the buffer areas; • Incorporation of 10 no. bat and 10 no. bird boxes on retained trees throughout the site; • Site to increase roosting/nesting opportunities; and • Provision of 5 reptile hibernacula.	• Improved management of regime and new planting will provide better habitats for local wildlife; • Enhanced and more diverse types of habitats for a range of species with benefits for pest control; • Enhancements to connectivity with surrounding habitats which supports the resilience of local wildlife; and • Biodiversity net gain of c. 134 % habitat (area) units and c. 62 % hedgerow (linear) units.
Carbon and air quality	• Ground-mounted 34.6 MW solar power scheme; • Conversion of cropland to grassland habitats; and • Minimal operational vehicular movements (maintenance visits).	• Estimated generation of circa 36,300 MWh of green electricity per year – enough to power over 12,500 medium-usage UK households; • Increase in soil organic carbon (SOC, or soil carbon storage); • Likely reduction in vehicle emissions resulting from cessation of arable crop production; and • Minor benefits with regard to air quality regulation via purification and dust filtration/trapping.
Water quality and Resources	• Sustainable drainage scheme to minimise increase in surface water run-off from the proposed panels and infrastructure; and • Use of silt traps to minimise effects on water quality during construction.	• Drainage features enhance plant and invertebrate diversity; • Reduction in chemical run-off from agriculture is beneficial for water supply and aquatic wildlife; and • Potential increase in water storage capacity could reduce run-off, flood risk and soil erosion.
Agriculture	• Change from arable production to species rich grassland, likely to be managed by low-density grazing; • Annual cutting of hedgerows; and • Proposed development is removable at the end of its lifetime – land can be returned to agricultural productivity.	• Income diversification provides greater financial security for wider estate business; • Loss of food production over the lifetime of the proposed development from the application site; • Proposed development will allow the land to 'rest', benefitting soil health in the long-term; and • Change to species rich grassland will be beneficial to pollinators,

		with resulting benefits for surrounding agricultural land.
Recreation and wellbeing	• Most trees/hedgerows retained with any losses barely discernible; • Landscape and mitigation planting to minimise visibility of the site; • Proposed development is removable at the end of its lifetime; • Provision of a permissive footpath, with potential for being a future connection to the Herefordshire to Gloucestershire Canal; and • Provision of habitats for various species.	• New hedgerow planting will enhance connectivity of landscape features and re-create historic field patterns; • Habitat changes will enhance the opportunities wellbeing benefits from interactions with nature; • Some filtered/partial views of the solar panels may detract from the amenity value of the site; and • Increased public access would enhance the physical and immersive recreational value of the site.

8.0 MONITORING AND EVALUATION

8.1 This assessment has undertaken a high-level analysis of local natural assets and the opportunities for natural capital and environmental benefits.

8.2 The design and embedded mitigation measures that are discussed in the report above will form part of any planning permission. In addition to this, pre-commencement and ongoing monitoring measures that are required to ensure environmental gain are set out below.

Construction Environmental Management Plan (CEMP)

8.3 A range of ecological mitigation measures are required to be applied to ensure that the proposed development does not result in significant negative impacts on biodiversity. Many of these measures need to be implemented prior to, or during, the site clearance /construction phase of development. A CEMP should therefore be prepared to detail these mitigation requirements and provide a working site manual to inform site contractors and associated personnel.

Landscape and Ecological Management Plan (LEMP)

8.4 To ensure that maximum benefit is gained from the creation of the site mitigation areas (boundary features, wild bird seed mix, species rich grassland and new hedgerows), a LEMP should be produced to detail the ongoing annual management requirements. The LEMP would include specifications for:

- The ongoing management of existing habitats;
- The management of newly created habitat features; and
- Ongoing ecological monitoring.

8.5 Long-term safeguarding and management of new habitats in accordance with the LEMP can be secured by an appropriately worded planning condition.

9.0 CONCLUSIONS

Approach

9.1 This report has undertaken a review of natural capital assets present at the application site and evaluated the potential impacts that the proposed development could have to determine the scheme's environmental benefits/environmental net gain.

9.2 The vision for natural capital gain in the proposal was first defined, emphasising biodiversity net gain, reduction in carbon footprint and improvements to air quality, maintain and enhance water quality, minimise effects on food production and enhancing the area's recreational, landscape and welfare value.

9.3 To inform review this an initial study of policy and research relating to natural capital in Herefordshire was undertaken. Following this, reporting that has been repaired to inform the planning application was reviewed to identify the baseline environment. This reporting informed the assessment of potential effects on natural capital and environmental gain, supplemented by application of the Environmental Benefits from Nature Tool (Beta Test Version (JP038)).

The Natural Capital Baseline

9.4 Our review of natural capital in the study area concluded that natural assets primarily provide provisioning, regulating, bundled (biodiversity) and cultural ecosystem services.

9.5 The majority of the application site currently comprises arable/cropland which is generally of low biodiversity. Other habitats that are present are common offer opportunities for a range of protected species across the site, with the hedgerows, ponds and woodland of higher ecological value. Current habitats range in condition from poor to good, but provide important services facilitating the regulation and reproduction of various species of insects, bats and birds in the area. These species in turn provide essential benefits through for instance pollination and seed control to allow for the pollination of crops and reproduction of habitats.

9.6 The site currently acts as a carbon store (via the carbon capture actions of the vegetation on-site), although arable soils are acknowledged to have low carbon stocks.

9.7 The site is within an area of flood risk and currently has limited infiltration capacity. It is likely that current arable management results in at least some run-off of herbicides/pesticides and that soil erosion occurs.

9.8 The site has a high proportion of 'Best Most Versatile' land and therefore currently offers services in terms of food provisioning. Agricultural improvements and practices can, however, lead to soil degradation and associated environmental impacts, such as soil erosion, compaction and loss of farmland biodiversity and pollinators.

9.9 Natural assets such as trees hedgerows provide cultural services by promoting health and enjoyment through passive or observational interactions, which improves physical and mental health. At present there is no public access to the site and it therefore offers mainly passive or observational interactions and services in terms of benefits to health and wellbeing that can be achieved from 'enjoyment of the countryside.'

Environmental Net Gain

9.10 The proposed development is expected to achieve a BNG score of c. 134 % for habitat gain and c. 62 % for hedgerow gain and can be predicted to significantly expand biodiversity in the application site and its environs by improving existing habitats, creating a range of new and diverse habitats and enhancing connectivity with the surrounding landscape. Measures are also embedded that will support wildlife that is known to be active in the site and in the wider area. This wildlife would contribute to animal population (pest) controls, crops pollination and seed dispersal, allowing for the reproduction and maintenance of habitats.

9.11 The proposed development will contribute towards national and international green energy targets and is likely to enhance the soil carbon storage value of the site. The change in land use may help to reduce water run-off rates, with benefits for water supply (both in terms of quantity and quality) and reducing flood risk.

9.12 The diversification into renewable energy will assist the long-term viability of the estate and contributes to the recommendation of the Committee on Climate Change (CCC, 2020) that around one-fifth of agricultural land will need to be released before 2050 for actions that reduce emissions and sequester carbon. Losses in arable production will be reversible and offset by enhancements to soil health, a reduction in chemical inputs and run-off and enhancements for pollinators.

9.13 Proposed tree and hedgerow mitigation planting will enhance landscape connectivity and re-create historic field patterns, which encourages the 'sense of place'. Whilst filtered and partial views may detract from the aesthetic value of the site where they are experienced, views are generally limited. The permissive path would enhance opportunities for people to engage in physical, recreational and cultural activities, which would improve physical and mental health and wellbeing by allowing people to enjoy time outdoors in a natural context.

9.14 On balance the proposed development is predicted to generate valuable long-term improvements for the natural assets of biodiversity, air quality/climate change, agriculture, water and recreation.

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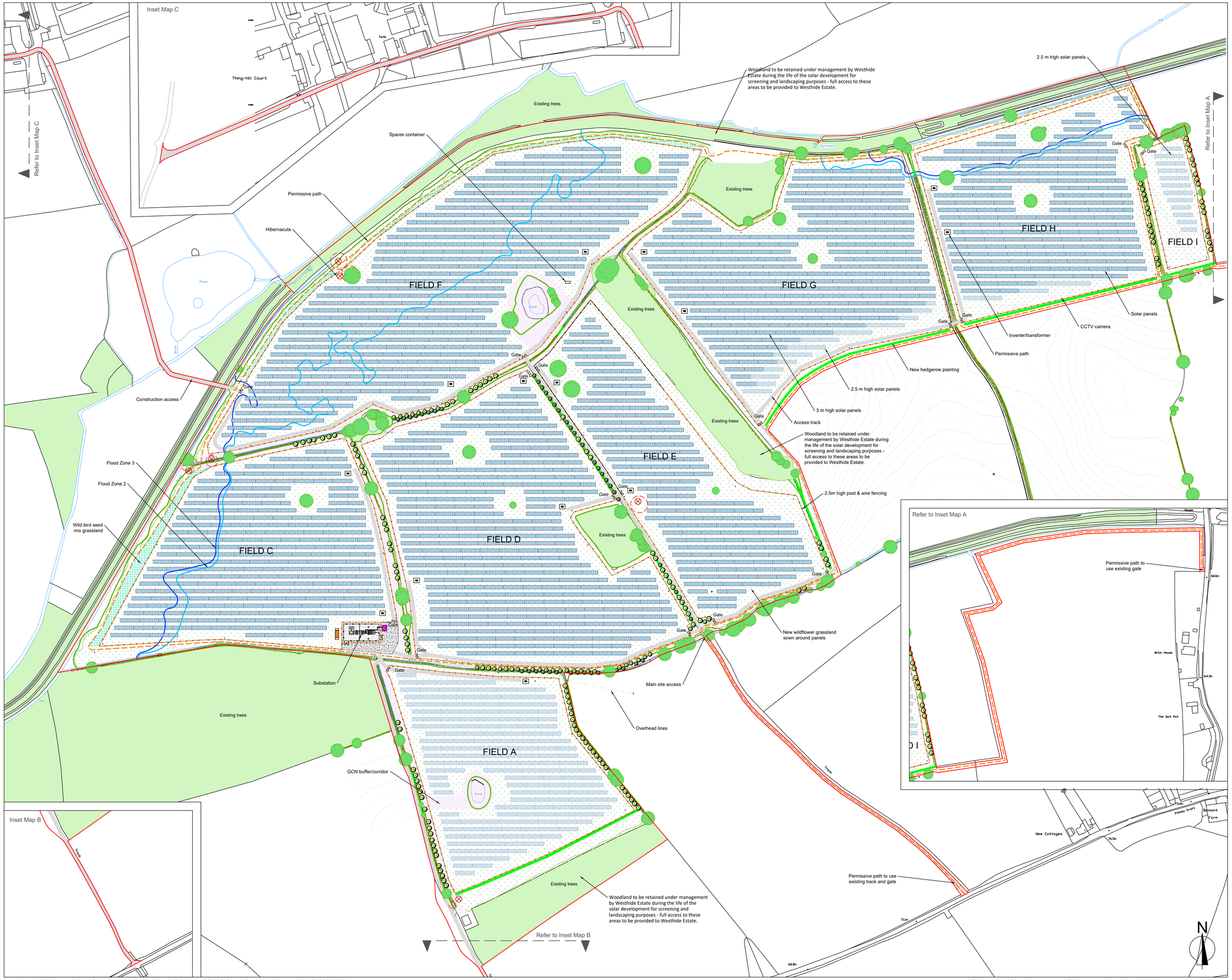
APPENDIX A: SITE LAYOUT

APPENDIX A: SITE LAYOUT

S:\PROJECTS\3350 - 3359\3352 - Westhide Solar\3 GRAPHICS\CAD\PLOT FILES



GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS SHALL BE CHECKED ON SITE PRIOR TO CONSTRUCTION WORK COMMENCING.
2. ALL LANDSCAPE DRAWINGS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEER'S AND ARCHITECT'S DRAWINGS AND SPECIFICATIONS.
3. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH THE LANDSCAPE SPECIFICATION.
4. ANY DISCREPANCY CONCERNING THE DRAWINGS SHOULD BE REFERRED TO THE CA IMMEDIATELY.
5. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
6. ALL LEVELS IN METRES.
7. DO NOT SCALE OFF THIS DRAWING.
8. EXISTING SERVICE ALIGNMENTS SHALL BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION WORK COMMENCING.

Site boundary

Existing

- Existing woodland
- Existing tree (surveyed)
- Existing hedgerow (surveyed) all to be retained and enhanced to 3m high winter cut height
- Existing overhead utility/electricity lines (surveyed)
- Existing water course / pond
- Existing tree planting retained and enhanced
- Flood zone 2
- Flood zone 3

Proposed

- Proposed tree planting (*Indicative - refer to Landscape Mitigation and Enhancement Plans*)
- Poor quality trees to be removed (please refer to arb survey, drwg # 210409-WSS-SP-AM)
- New species-rich hedgerow planting
- Proposed species-rich grassland
- Proposed wild bird seed mix grassland (0.5 ha total)
- Great Crested Newt (GCN) ecological buffer
- Hibernacula
- 2.5 m high post and wire fencing to have mammal gates for mammal access
- 2.4 m high palisade fencing (around DNO customer substation)
- Access track
- CCTV camera
- Inverter transformer unit
- DNO switch housing
- Customer substation
- Substation hardstanding
- Proposed solar panels 2.5 m high
- Proposed solar panels 3 m high
- Permissive path

DRAWING NOTES:

Fields A, G, H and I to have 2.5 m high solar panels and 3m high for the others.

During the design development process Field B was removed from the proposals and, therefore, it is not shown or referred to on the Masterplan.

Rev:	Date:	Description:	Drawn	Ch'd
A	21/09/2021	Ecology and landscape additions as per comments	GS	JH
B	04/10/2021	Site access and permitted path amended as per comments	GS	JH
C	01/11/2021	Contours added	GS	JH
D	16/11/2021	Substation relocated and redline boundary updated. Minor amendments as per comments	JH	AS
E	18/11/2021	Redline boundary update	JH	AS
F	23/11/2021	Redline boundary update	JH	AS

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CLIENT
ERSUN (WESTHIDE SPV) LTD

PROJECT
WESTHIDE SOLAR

TITLE
MASTERPLAN

Status:	Drawn:	Checked:
PLANNING	GS	JH
Scale:	Date:	Approved:
1:2,000@A1	20.07.21	GM

Drawing Number: 3352_L_GA_0_01 Rev: F

Environmental Planning EIA Landscape Architecture Ecology

APPENDIX B: ENVIRONMENTAL BENEFITS FROM NATURE TOOL OUTPUTS

APPENDIX B: ENVIRONMENTAL BENEFITS FROM NATURE TOOL OUTPUTS

Name of project Land at Westhide, Solar Park

	Name	Organisation	e-mail
Lead	Gemma Melvill	The Landmark Practice	
Other			

Description of project The proposed development is for a circa 34.6 MW ground-mounted solar PV (photovoltaic) development. It is expected that the PV modules will be mounted on metal frames on posts piled into the ground causing minimal impact on the ground surface and will be fully removable on decommissioning.

Enter Biodiversity Metric 3.0 outputs

This tool is designed to be used in conjunction with the Biodiversity Metric 3.0. Biodiversity net gain is a pre-requisite. Please enter the output of the metric manually here to check whether net gain is acheived.

	Baseline (before change)			Delivered (post-development)			Change	Comments (optional)
	Onsite	Offsite	Total	Onsite	Offsite	Total		
Biodiversity units	166.3		166.3	389.8		389.8	223.5	
Hedgerow units	36.2		36.2	58.6		58.6	22.4	

The tool is designed to work best with separate estimates of the areas of buildings / sealed surfaces, gardens, street trees, amenity grassland and other urban habitats. However, the user can also enter a generic 'suburban mosaic' habitat for convenience, if desired. A standard composition is used, but this can be altered.

Set number of decimal places for display of habitat areas in hectares (lengths are in metres and will use two less than this)

2 Apply change

Assumptions for default composition of suburban mosaic, if used (users can change this if actual composition is known):

Sealed surfaces and buildings	60.00%
Artificial unvegetated unsealed surfaces	5.00%
Gardens	25.00%
Amenity green space	8.00%
Woodland or trees	2.00%
Total (should be 100%)	**100.00%**

% gardens that are assumed to be vegetated 50%

User comments

Use this space to enter any comments, or provide QA and review information. Further space for comments is on the habitat data entry sheets.

2. Baseline habitats (before change)

Instructions | Menu

Level	Select habitat classification system for drop-down:
BASIC	Biodiversity Metric 3.0

Line & point features (ha)	1.07	61.71 Total area before change (ha)
	1.07	61.71 *On site (ha)*
	0.00	0.00 *Off site (ha)*

Area where indicator is "not known"								62.775	62.775	62.775	62.775	62.775	62.775	62.775	62.775	62.775				
								BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC				
								Online ma	Online map	Online r	Online map	Online r	Online r	Online r	Online r	Online c				
								ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ				
								1	2	3	4	7	8	9	11	30				
ID	Onsite / offsite?	Habitat type The input habitat will be translated to the appropriate eco-metric habitat provided that it is listed on the habitat translation sheet. This includes Phase 1, UK Hab and Biodiversity Metric 3.0 habitats.	Length, m	Width, m	Area, ha	Calculated area, ha	Eco-metric habitat	Agricultural Land Class	Surface water availability	Groundwater availability	Natural Flood Management priority	Water quality: WFD status	Water quality management area	Rainfall	Soil drainage	Population density				
ID	OnOffSite	Input_habitat	Length	Width	Area_in	Area_before_tab	Eco-metric_habitat	ALC_before	Surface_water_	Groundw	Flood_priority	WQ_befo	WQMA_b	Rainfall_b	Drainage_	Proximity				
1	On site	Lakes - Ponds (Priority Habitat)			0.03	0.03	Standing open water	NK	NK	NK	NK	NK	NK	NK	NK	NK				
2	On site	Lakes - Ponds (Priority Habitat)			0.04	0.04	Standing open water	NK	NK	NK	NK	NK	NK	NK	NK	NK				
3	On site	Woodland and forest - Other woodland; broadleaved			0.38	0.38	Broadleaved, mixed and yew plantation	NK	NK	NK	NK	NK	NK	NK	NK	NK				
4	On site	Woodland and forest - Other woodland; broadleaved			1.42	1.42	Broadleaved, mixed and yew plantation	NK	NK	NK	NK	NK	NK	NK	NK	NK				
5	On site	Woodland and forest - Lowland mixed deciduous woodland			0.24	0.24	Broadleaved, mixed and yew semi-natural	NK	NK	NK	NK	NK	NK	NK	NK	NK				
6	On site	Urban - Urban Tree			0.18	0.18	Tree	NK	NK	NK	NK	NK	NK	NK	NK	NK				
7	On site	Urban - Vacant/derelict land/ bareground			0.51	0.51	Bare ground	NK	NK	NK	NK	NK	NK	NK	NK	NK				
8	On site	Cropland - Cereal crops			41.65	41.65	Arable fields, horticulture and temporary	NK	NK	NK	NK	NK	NK	NK	NK	NK				
9	On site	Grassland - Modified grassland			3.08	3.08	Improved grassland	NK	NK	NK	NK	NK	NK	NK	NK	NK				
10	On site	Grassland - Modified grassland			1.25	1.25	Improved grassland	NK	NK	NK	NK	NK	NK	NK	NK	NK				
11	On site	Woodland and forest - Lowland mixed deciduous woodland			0.07	0.07	Broadleaved, mixed and yew semi-natural	NK	NK	NK	NK	NK	NK	NK	NK	NK				
12	On site	Heathland and shrub - Bramble scrub			0.05	0.05	Dense scrub	NK	NK	NK	NK	NK	NK	NK	NK	NK				
13	On site	Cropland - Non-cereal crops			8.64	8.64	Arable fields, horticulture and temporary	NK	NK	NK	NK	NK	NK	NK	NK	NK				
14	On site	Cropland - Non-cereal crops			0.12	0.12	Arable fields, horticulture and temporary	NK	NK	NK	NK	NK	NK	NK	NK	NK				
15	On site	Grassland - Modified grassland			0.12	0.12	Improved grassland	NK	NK	NK	NK	NK	NK	NK	NK	NK				
16	On site	Cropland - Cereal crops			0.27	0.27	Arable fields, horticulture and temporary	NK	NK	NK	NK	NK	NK	NK	NK	NK				
17	On site	Woodland and forest - Other woodland; broadleaved			1.19	1.19	Broadleaved, mixed and yew plantation	NK	NK	NK	NK	NK	NK	NK	NK	NK				
18	On site	Woodland and forest - Other woodland; broadleaved			0.54	0.54	Broadleaved, mixed and yew plantation	NK	NK	NK	NK	NK	NK	NK	NK	NK				
19	On site	Woodland and forest - Lowland mixed deciduous woodland			1.71	1.71	Broadleaved, mixed and yew semi-natural	NK	NK	NK	NK	NK	NK	NK	NK	NK				
20	On site	Lakes - Ponds (Priority Habitat)			0.10	0.10	Standing open water	NK	NK	NK	NK	NK	NK	NK	NK	NK				
21	On site	Urban - Vacant/derelict land/ bareground			0.30	0.30	Bare ground	NK	NK	NK	NK	NK	NK	NK	NK	NK				
22	On site	Native Species Rich Hedgerow	110	3		0.03	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
23	On site	Native Hedgerow	230	3		0.06	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
24	On site	Native Species Rich Hedgerow	110	3		0.03	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
25	On site	Native Hedgerow - Associated with bank or ditch	210	3		0.05	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
26	On site	Native Hedgerow	70	3		0.02	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
27	On site	Native Hedgerow with trees	60	3		0.02	Hedgerow with trees	NK	NK	NK	NK	NK	NK	NK	NK	NK				
28	On site	Native Species Rich Hedgerow	160	3		0.04	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
29	On site	Native Hedgerow	160	3		0.04	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
30	On site	Native Species Rich Hedgerow - Associated with bank or	170	3		0.04	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
31	On site	Native Hedgerow	320	3		0.08	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
32	On site	Native Species Rich Hedgerow	120	3		0.03	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
33	On site	Native Species Rich Hedgerow	110	3		0.03	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
34	On site	Native Species Rich Hedgerow	270	3		0.07	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				
35	On site	Native Species Rich Hedgerow	220	3		0.06	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK				

36	On site	Native Species Rich Hedgerow - Associated with bank or	210	3		0.05	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK
37	On site	Native Hedgerow	300	3		0.08	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK
38	On site	Native Hedgerow with trees	70	3		0.02	Hedgerow with trees	NK	NK	NK	NK	NK	NK	NK	NK	NK
39	On site	Native Hedgerow - Associated with bank or ditch	360	3		0.09	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK
40	On site	Native Hedgerow - Associated with bank or ditch	180	3		0.05	Hedgerows	NK	NK	NK	NK	NK	NK	NK	NK	NK
						0.00		NK	NK	NK	NK	NK	NK	NK	NK	NK
42	On site	Native Species Rich Hedgerow with trees - Associated wi	100	3		0.03	Hedgerow with trees	NK	NK	NK	NK	NK	NK	NK	NK	NK
43						0.00		NK	NK	NK	NK	NK	NK	NK	NK	NK

62.775	62.775	62.775	62.775	62.775	62.775	62.775	62.775
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31	32	33	34	35	36	37	39
Nature designation	Ancient habitat	Cultural or historic importance	Special recreation value	Public access	Educational use	Managed for nature	Landscape diversity
Desig_nat	Ancient_b	Historic_b	Special_re	Access_before	Education	Manage_	Land_dive
NK	NK	NK	NK	NK	NK	NK	NK
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3. Post-development habitats

Instructions | Menu

Level	Select habitat classification system for drop-down:
BASIC	Biodiversity Metric 3.0

Areas before and after match (within 0.1 ha)

Line & point features (ha)

1.07	61.71	Total area before change (ha)
1.05	61.71	Total area after change (ha)
1.05	61.71	*On site (ha)*
0.00	0.00	*Off site (ha)*

									Area where indicator is "not known"	62.755	62.755	62.755	62.755	62.755	62.755	62.755	62.755	62.755
										BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC
										Online r	Online ma	Online r	Online m	Online r	Online r	Online r	Online r	Online c
										ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ
										1	2	3	4	7	8	9	11	30
	Onsite / offsite?	Habitat type The input habitat will be translated to the appropriate eco-metric habitat provided that it is listed on the habitat translation sheet. This includes Phase 1, UK Hab and Biodiversity Metric 3.0 habitats.	Length, m	Width, m	Area, ha	Calculated area, ha	Eco-metric habitat	Type of change	Starting habitat (default bare ground)	Agricultural Land Class	Surface water availability	Groundwater availability	Natural Flood Management priority	Water quality: WFD status	Water quality management area	Rainfall	Soil drainage	Population density
ID	Onsite	Input_habitat	Length	Width	Area_in	Area_after_tab	Eco-metric_habitat	Change	Starting_hab	ALC_after	Surface_wate	Groundw	Flood_polic	WQ_after	WQMA_a	Rainfall_a	Drainage_	Proximity
1	On site	Cropland - Arable field margins game bird mix			0.50	0.50	Arable field margins	Create	Arable fields, h	NK	NK	NK	NK	NK	NK	NK	NK	NK
2	On site	Grassland - Other neutral grassland			48.28	48.28	Neutral grassland	Create	Arable fields, h	NK	NK	NK	NK	NK	NK	NK	NK	NK
3	On site	Urban - Developed land; sealed surface			0.33	0.33	Sealed surface and buildi	Create	Bare ground	NK	NK	NK	NK	NK	NK	NK	NK	NK
4	On site	Urban - Developed land; sealed surface			0.12	0.12	Sealed surface and buildi	Create	Arable fields, h	NK	NK	NK	NK	NK	NK	NK	NK	NK
5	On site	Urban - Developed land; sealed surface			0.12	0.12	Sealed surface and buildi	Create	Improved gras	NK	NK	NK	NK	NK	NK	NK	NK	NK
6	On site	Grassland - Modified grassland			0.27	0.27	Improved grassland	Create	Arable fields, h	NK	NK	NK	NK	NK	NK	NK	NK	NK
7	On site	Urban - Developed land; sealed surface			1.51	1.51	Sealed surface and buildi	Create	Arable fields, h	NK	NK	NK	NK	NK	NK	NK	NK	NK
8	On site	Lakes - Ponds (Priority Habitat)			0.03	0.03	Standing open water	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
9	On site	Lakes - Ponds (Priority Habitat)			0.04	0.04	Standing open water	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
10	On site	Woodland and forest - Other woodland; broadleaved			0.38	0.38	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
11	On site	Woodland and forest - Other woodland; broadleaved			1.42	1.42	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
12	On site	Woodland and forest - Lowland mixed deciduous woodland			0.24	0.24	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
13	On site	Urban - Urban Tree			0.16	0.16	Tree	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
14	On site	Urban - Vacant/derelict land/ bareground			0.18	0.18	Bare ground	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
15	On site	Grassland - Modified grassland			3.08	3.08	Improved grassland	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
16	On site	Grassland - Modified grassland			1.25	1.25	Improved grassland	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
17	On site	Woodland and forest - Lowland mixed deciduous woodland			0.07	0.07	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
18	On site	Heathland and shrub - Bramble scrub			0.05	0.05	Dense scrub	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
19	On site	Woodland and forest - Other woodland; broadleaved			1.19	1.19	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
20	On site	Woodland and forest - Other woodland; broadleaved			0.54	0.54	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
21	On site	Woodland and forest - Lowland mixed deciduous woodland			1.71	1.71	Broadleaved, mixed and	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
22	On site	Lakes - Ponds (Priority Habitat)			0.10	0.10	Standing open water	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
23	On site	Urban - Developed land; sealed surface			0.30	0.30	Sealed surface and buildi	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
24	On site	Native Species Rich Hedgerow with trees	110	3		0.03	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
25	On site	Native Hedgerow	230	3		0.06	Hedgerows	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
26	On site	Native Species Rich Hedgerow	110	3		0.03	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
27	On site	Native Hedgerow - Associated with bank or ditch	210	3		0.05	Hedgerows	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
28	On site	Native Species Rich Hedgerow with trees	70	3		0.02	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
29	On site	Native Hedgerow with trees	60	3		0.02	Hedgerow with trees	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
30	On site	Native Species Rich Hedgerow with trees	160	3		0.04	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
31	On site	Native Species Rich Hedgerow with trees	160	3		0.04	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
32	On site	Native Species Rich Hedgerow - Associated with bank or d	170	3		0.04	Hedgerows	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
33	On site	Native Hedgerow	320	3		0.08	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
34	On site	Native Species Rich Hedgerow	120	3		0.03	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
35	On site	Native Species Rich Hedgerow with trees	110	3		0.03	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK

36	On site	Native Species Rich Hedgerow with trees	270	3		0.07	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
37	On site	Native Species Rich Hedgerow	160	3		0.04	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
38	On site	Native Species Rich Hedgerow with trees	60	3		0.02	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
39	On site	Native Species Rich Hedgerow with trees - Associated with	210	3		0.05	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
40	On site	Native Hedgerow	90	3		0.02	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
41	On site	Native Species Rich Hedgerow with trees	210	3		0.05	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
42	On site	Native Hedgerow with trees	70	3		0.02	Hedgerow with trees	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
43	On site	Native Hedgerow - Associated with bank or ditch	360	3		0.09	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
44	On site	Native Hedgerow - Associated with bank or ditch	120	3		0.03	Hedgerows	Retain		NK	NK	NK	NK	NK	NK	NK	NK	NK
45	On site	Native Species Rich Hedgerow with trees - Associated with	60	3		0.02	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
						0.00				NK	NK	NK	NK	NK	NK	NK	NK	NK
47	On site	Native Species Rich Hedgerow with trees - Associated with	100	3		0.03	Hedgerow with trees	Enhance		NK	NK	NK	NK	NK	NK	NK	NK	NK
48						0.00				NK	NK	NK	NK	NK	NK	NK	NK	NK

62.755	62.755	62.755	62.755	62.755	62.755	62.755	62.755
BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC	BASIC
Online r	Online r	Online r	Online r	Online r	Local au	Local kn	Site plar
ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ	ⓘ
31	32	33	34	35	36	37	39
Nature designation	Ancient habitat	Cultural or historic importance	Special recreation value	Public access	Educational use	Managed for nature	Landscape diversity
Desig_nat	Ancient_a	Historic_a	Special_re	Access_af	Education	Manage_	Land_dive
NK	NK	NK	NK	NK	NK	NK	NK
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NK	NK	NK	NK	NK	NK	NK	NK

4. Results overview

This is an initial scoping assessment to be used alongside or in advance of detailed impact assessments such as an EIA. See 'Links to other tools' for tools that can be used to assess individual ecosystem services in more detail.

The arrows indicate the direction and magnitude of the change in score for each ecosystem service at three points in time compared to the baseline before the intervention. They do not take account of the cumulative impact up to that time. The interpretation text flags where there is a decrease of an ecosystem service in year 30, or a net loss over 30 years (even if the final time slice shows a gain). See the Interpretation charts for a breakdown of the underlying habitat changes that drive these impacts. The results should be considered in the context of demand for different services, which can be local (e.g. recreation), regional (e.g. flood protection), national (e.g. food production) and global (e.g. climate change regulation). There are trade-offs between some services and universal gains may not be possible, especially on greenfield sites, but mitigating actions such as those suggested in the interpretation text can help to reduce any losses.

Potential impacts of on-site and off-site habitat change at three time points (not cumulative): Whole area

Select area of interest:

Whole area	1 year	10 year	30 year	Confidence	Interpretation
Food production	↘	↘	↘		The results 30 years after development indicate a decrease in the ecosystem service of food production. Consider
Wood production	→	→	→		
Fish production	→	→	→		
Water supply	↗	↗	↗		
Flood regulation	↗	↗	↗		
Erosion protection	↗	↗	↗		
Water quality regulation	↗	↗	↗		
Carbon storage	↗	↗	↗		
Air quality regulation	→	→	→		The results 30 years after development indicate little change in the ecosystem service of air quality regulation.
Cooling and shading	→	→	→		The results 30 years after development indicate little change in the ecosystem service of cooling and shading.
Noise reduction	→	→	→		
Pollination	→	↑	↑		
Pest control	→	↑	↑		
Recreation	↗	↗	↗		
Aesthetic value	↗	↑	↑		
Education	→	↗	↗		
Interaction with nature	→	↗	↗		
Sense of place	→	↗	↗		

Instructions
4a. Compare on and off site results
4b. Interpretation charts
4c. Results breakdown tables
4d. Save scenario
4e. Comparison with 100% suburban mosaic
Menu
Links to other tools
Print
See underlying calculations

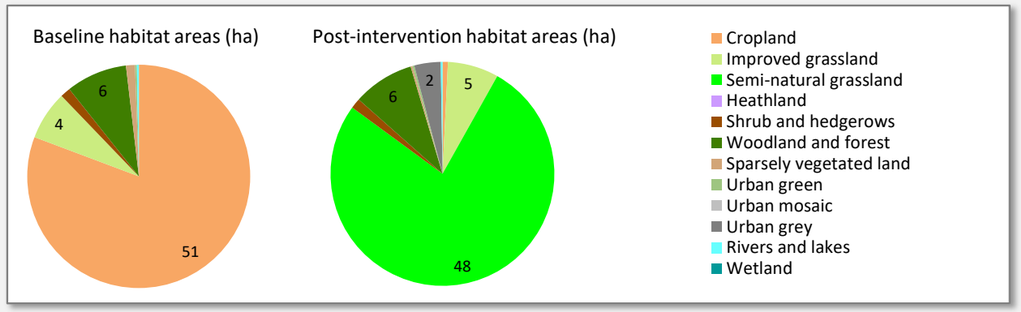
Change in average score per hectare

Large decrease (more than -2.5 points out of 10)
Decrease (-0.25 to -2.5 points out of 10)
Minor change (-0.25 to 0.25 points out of 10)
Increase (0.25 to 2.5 points out of 10)
Large increase (more than 2.5 points out of 10)

Confidence

	The relationship between the provision of the ecosystem service and habitats is complex. Evidence for scoring/multipliers is partial, although may be stronger for some habitats than others. Evidence gaps have been filled by consulting experts and with a degree of subjectivity, particularly for cultural services.
	We have some suitable evidence to calibrate our range of scores across habitats and multipliers and/ or scoring applied to a limited range of habitats/ multipliers for which there is a sound and simple rationale.
	We have a strong evidence base upon which to base scores across the range of habitats and multipliers used for this ecosystem service.

Changes in Natural Capital Assets (total on site and off site)



This shows the percentages of the extent (area) of different habitats, comprising soil, rocks, water, plants and the species these habitats support. Sub-surface natural capital assets (groundwater bodies and mineral deposits) are not included. The condition of the assets is reflected in the condition indicators, which modify the habitat scores.

Biodiversity net gain check

YES BNG demonstrated (Change >+10%)

Data completeness

	Baseline	Post-dev	*Out of*	Overall	*Out of*	
Overall indicators	0	0	*40*	0	*80*	Number of indicators completed (i.e. no rows 'Not known')
BASIC	0	0	*17*	0	*34*	Number of Basic indicators completed
STANDARD	0	0	*6*	0	*12*	Number of Standard indicators completed
ADVANCED	0	0	*17*	0	*34*	Number of Advanced indicators completed
Level achieved	NONE	NONE		NONE		

Errors and missing values

Errors on 'Baseline habitats' and 'Post-dev habitats' sheets are usually caused by **missing or invalid indicator values**. All values must be filled in except for cells that are greyed out because they are not applicable for that habitat. If you do not know a value enter "NK". Other errors can arise if you have auto-filled a numeric cell (e.g. for rainfall range) by dragging the autofill handle from the top cell only. This can cause values in each cell to be incremented by one unit. To avoid this, fill in and select the first two cells before autofilling numeric fields. The values will then remain constant when you autofill.

Only the first error or missing value on each calculation sheet will be displayed below. As each error is corrected, the next error will then be displayed.

Project details	OK	No errors
Baseline habitats	OK	No errors
Post-dev habitats	OK	No errors
Ancient habitats	OK	No errors

Area check — **Areas before and after match (within 0.1 ha)**

Some linear and point features (e.g. hedges, trees, green walls) are measured separately and entered in addition to the underlying habitat; these are split out below.

	Baseline	Post-dev	Changed
Check ancient habitats retained	0.00	0.00	0.00
Any ancient habitats enhanced?	0.00	0.00	0.00

Onsite footprint area	61.71	61.71	51.58
Onsite line and point features	1.07	1.05	0.15
Total onsite area	62.78	62.76	51.73
Check total onsite area	62.78	62.76	
Offsite footprint area	0.00	0.00	0.00
Offsite line and point features	0.00	0.00	0.00
Total offsite area	0.00	0.00	0.00
Check total offsite area	0.00	0.00	
Total footprint area	61.71	61.71	51.58
Total line and point features	1.07	1.05	0.15
Total area	62.78	62.76	51.73
Check total footprint	61.71	61.71	
Check total line and point	1.07	1.05	
Check total area	62.78	62.76	

Post-dev footprint - baseline footprint	0.00
Difference in onsite footprint	0.00
Difference in offsite footprint	0.00

Line and point features assumed to be entered separately (in addition to the area of the underlying habitat)

	Baseline		
	Onsite	**Offsite**	**Total**
Hedgerows	0.83	0.00	0.83
Hedgerows with trees	0.00	0.00	0.00
Tree	0.18	0.00	0.18
Footpath / cycle path - green	0.00	0.00	0.00
Green wall	0.00	0.00	0.00
Total	1.01	0.00	1.01

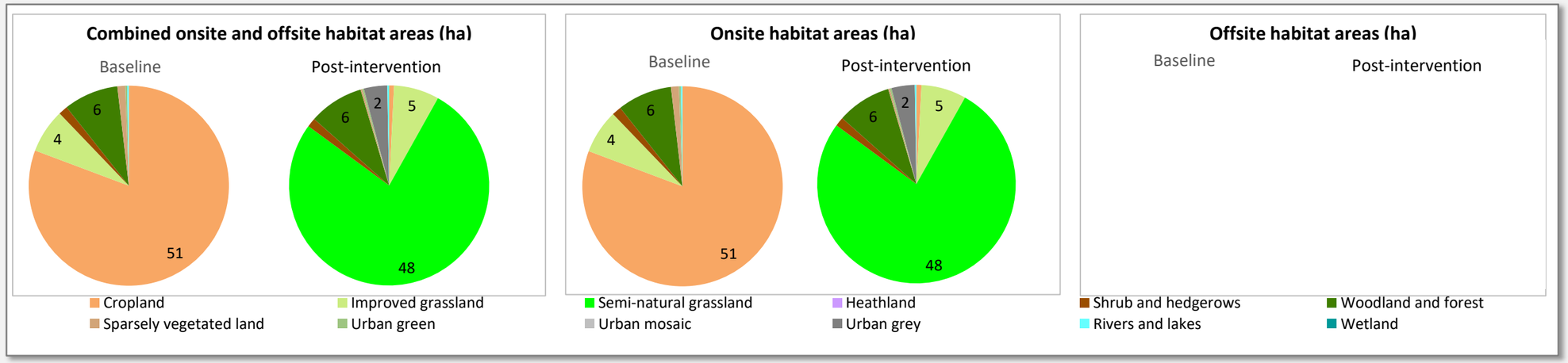
	Post-development		
	Onsite	**Offsite**	**Total**
Hedgerows	0.47	0.00	0.47
Hedgerows with trees	0.00	0.00	0.00
Tree	0.16	0.00	0.16
Footpath / cycle path - green	0.00	0.00	0.00
Green wall	0.00	0.00	0.00
Total	0.63	0.00	0.63

	Changed		
	Onsite	**Offsite**	**Total**
Hedgerows	0.15	0.00	0.15
Hedgerows with trees	0.00	0.00	0.00
Tree	0.00	0.00	0.00
Footpath / cycle path - green	0.00	0.00	0.00
Green wall	0.00	0.00	0.00
Total	0.15	0.00	0.15

4a. On site and off site results

Instructions | Menu | 4. Back to main results

Changes in Natural Capital Assets



Potential impacts on ecosystem service flows: Whole area

Change in total score after each time period compared to baseline before development / intervention

The arrows indicate the direction and magnitude of the change in scores at three points in time after the development or intervention. They do not take account of the cumulative impact up to that time.

Whole area	Combined on site and off site: 1 year	10 year	30 year	On site: 1 year	10 year	30 year	Off site: 1 year	10 year	30 year
Food production	↘	↘	↘	↘	↘	↘			
Wood production	→	→	→	→	→	→			
Fish production	→	→	→	→	→	→			
Water supply	↗	↗	↗	↗	↗	↗			
Flood regulation	↗	↗	↗	↗	↗	↗			
Erosion protection	↗	↗	↗	↗	↗	↗			
Water quality regulation	↗	↗	↗	↗	↗	↗			
Carbon storage	↗	↗	↗	↗	↗	↗			
Air quality regulation	→	→	→	→	→	→			
Cooling and shading	→	→	→	→	→	→			
Noise reduction	→	→	→	→	→	→			
Pollination	→	↑	↑	→	↑	↑			
Pest control	→	↑	↑	→	↑	↑			
Recreation	↗	↗	↗	↗	↗	↗			
Aesthetic value	↗	↑	↑	↗	↑	↑			
Education	→	↗	↗	→	↗	↗			
Interaction with nature	→	↗	↗	→	↗	↗			
Sense of place	→	↗	↗	→	↗	↗			

Key

Size of change:

	Change in average score per hectare
↓	Large decrease (more than -2.5 points out of 10)
↘	Decrease (-0.1 to -2.5 points out of 10)
→	Minor change (-0.1 to 0.1 points out of 10)
↗	Increase (0.1 to 2.5 points out of 10)
↑	Large increase (more than 2.5 points out of 10)

Underlying changes in scores

See calculations

Combined on site and off site

				Changes per ha after:		
	1 year	10 year	30 year	1 year	10 year	30 year
Food production	↘	↘	↘	-2.1	-2.1	-2.1
Wood production	→	→	→	0.0	0.0	0.0
Fish production	→	→	→	0.0	0.0	0.0
Water supply	↗	↗	↗	0.7	0.7	0.7
Flood regulation	↗	↗	↗	0.7	0.7	0.7
Erosion protection	↗	↗	↗	2.3	2.3	2.3
Water quality regulation	↗	↗	↗	1.8	1.8	1.8
Carbon storage	↗	↗	↗	0.5	0.5	0.5
Air quality regulation	→	→	→	0.0	0.0	0.0
Cooling and shading	→	→	→	-0.1	-0.1	-0.1
Noise reduction	→	→	→	0.0	0.0	0.0
Pollination	→	↑	↑	0.2	2.7	2.7
Pest control	→	↑	↑	0.2	2.8	2.8
Recreation	↗	↗	↗	1.7	1.7	1.7
Aesthetic value	↗	↑	↑	0.5	2.8	2.8
Education	→	↗	↗	0.2	2.4	2.4
Interaction with nature	→	↗	↗	0.2	2.4	2.4
Sense of place	→	↗	↗	0.2	2.3	2.3

On site

				Changes per ha after:		
	1 year	10 year	30 year	1 year	10 year	30 year
Food production	↘	↘	↘	-2.1	-2.1	-2.1
Wood production	→	→	→	0.0	0.0	0.0
Fish production	→	→	→	0.0	0.0	0.0
Water supply	↗	↗	↗	0.7	0.7	0.7
Flood regulation	↗	↗	↗	0.7	0.7	0.7
Erosion protection	↗	↗	↗	2.3	2.3	2.3
Water quality regulation	↗	↗	↗	1.8	1.8	1.8
Carbon storage	↗	↗	↗	0.5	0.5	0.5
Air quality regulation	→	→	→	0.0	0.0	0.0
Cooling and shading	→	→	→	-0.1	-0.1	-0.1
Noise reduction	→	→	→	0.0	0.0	0.0
Pollination	→	↑	↑	0.2	2.7	2.7
Pest control	→	↑	↑	0.2	2.8	2.8
Recreation	↗	↗	↗	1.7	1.7	1.7
Aesthetic value	↗	↑	↑	0.5	2.8	2.8
Education	→	↗	↗	0.2	2.4	2.4
Interaction with nature	→	↗	↗	0.2	2.4	2.4
Sense of place	→	↗	↗	0.2	2.3	2.3

Off site

				Changes per ha after:		
	1 year	10 year	30 year	1 year	10 year	30 year
Food production						
Wood production						
Fish production						
Water supply						
Flood regulation						
Erosion protection						
Water quality regulation						
Carbon storage						
Air quality regulation						
Cooling and shading						
Noise reduction						
Pollination						
Pest control						
Recreation						
Aesthetic value						
Education						
Interaction with nature						
Sense of place						

4e. Comparison to 'typical' suburban mosaic

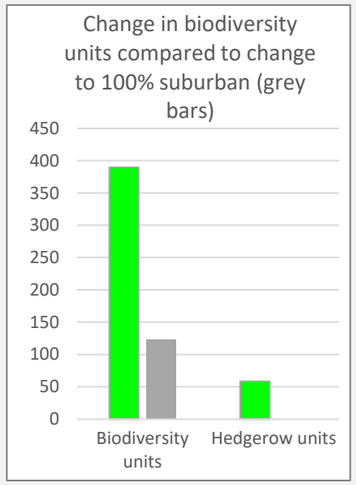
Instructions | Menu | 4. Back to main results

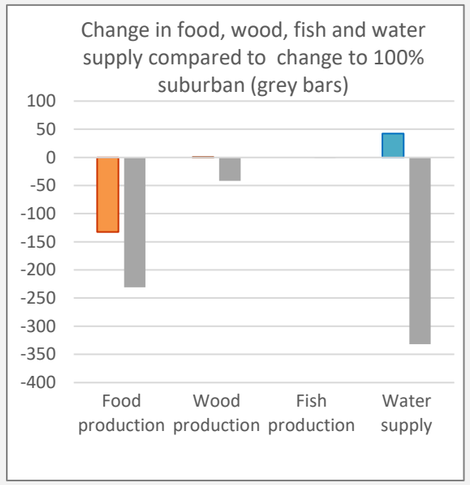
These charts are only relevant for housing developments

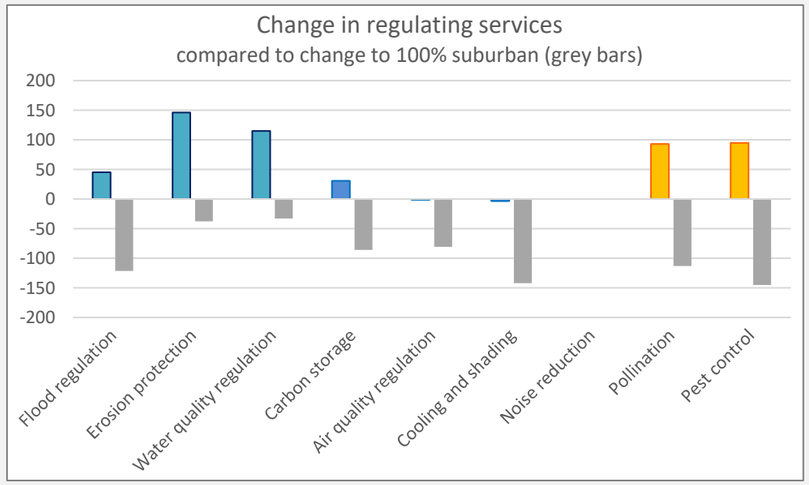
They illustrate the benefits of housing development projects which achieve biodiversity net gain, compared to the impact of changing the entire onsite development site to a typical suburban mosaic of sealed surfaces, gardens and amenity grass, leaving the off-site area unchanged.

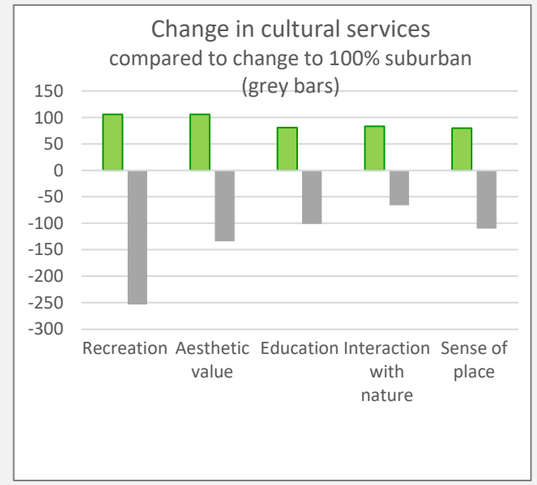
This is intended to demonstrate that even if there are losses in certain services, those losses are lower than for a typical development that does not deliver biodiversity net gain.

Change in services due to onsite development, compared to changing the whole onsite area to a 'typical' suburban mosaic (grey bars) and leaving the offsite area unchanged









Composition of 'typical' suburban mosaic is 60% sealed surfaces and buildings, 30% gardens and 10% amenity green space

	Normalised score on-site					
	Baseline	Post-development		100% suburban		
	Score	Average change/ha over 30 years	Change from baseline	Normalisation factor	Score	Change from baseline
Food production	231	-2	-132	2.40	0.16	-231
Wood production	42	0	0	1.00	0.00	-42
Fish production	1	0	0	1.44	0.00	-1
Water supply	340	1	42	1.20	7.84	-332
Flood regulation	125	1	45	1.52	3.09	-122
Erosion protection	39	2	146	1.93	0.97	-38
Water quality regulation	37	2	115	1.58	4.16	-33
Carbon storage	87	0	31	2.00	0.94	-86
Air quality regulation	82	0	-1	1.20	0.78	-81
Cooling and shading	145	0	-3	1.20	3.14	-142
Noise reduction	0	0	0	1.00	0.94	1

Typical' suburban mosaic used for this comparison - not the same as the user-defined mosaic on the project details sheet.

Sealed surfaces and buildings	60%
Artificial unvegetated unsealed surfaces	0
Gardens	30%
Amenity green space	10%
Woodland or trees	0
% of gardens assumed vegetated	50%

Pollination	117	1	93	1.33	4.24	-113
Pest control	151	2	95	1.10	5.13	-145
Recreation	257	2	106	1.44	3.92	-253
Aesthetic value	141	2	106	1.46	6.43	-134
Education	105	1	81	1.74	3.24	-101
Interaction with nature	70	1	83	1.94	3.89	-66
Sense of place	113	1	80	1.76	3.21	-110
Biodiversity units	0	390	390		123.42	123
Hedgerow units	0	59	59		0.00	0

Calculation of scores for the typical mosaic is on the Scores sheet, rows 101 to 122

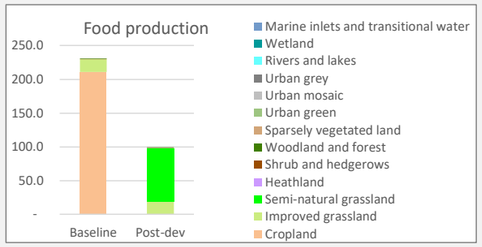
Note: the suburban mosaic is assumed to score 2 biodiversity units per ha, in accordance with the Defra biodiversity metric 3.0

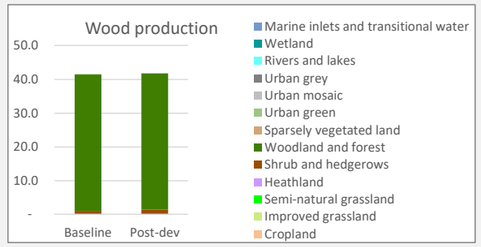
4b. Charts

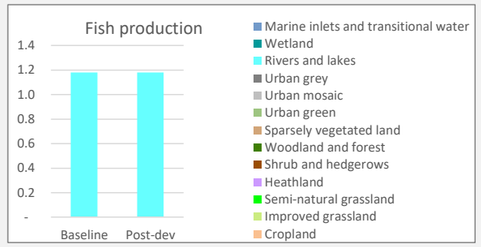
Instructions | Menu | 4. Back to main results

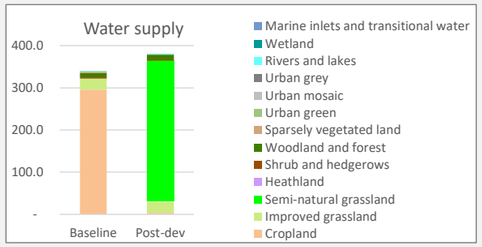
Breakdown of scores before and after development or intervention, by habitat group

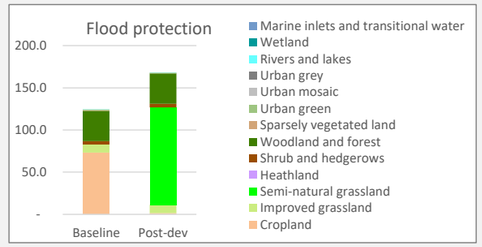
These charts show how different natural capital assets are influencing the baseline and post development scores for each ecosystem service. They are intended to help users interpret the main results and identify existing or proposed habitats playing particularly important roles in service provision.

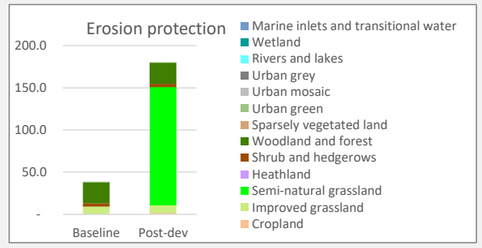


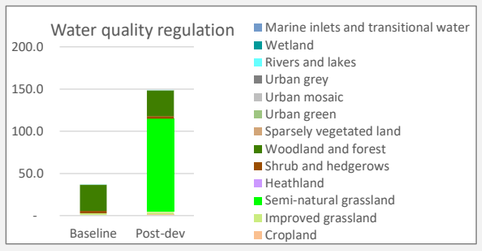


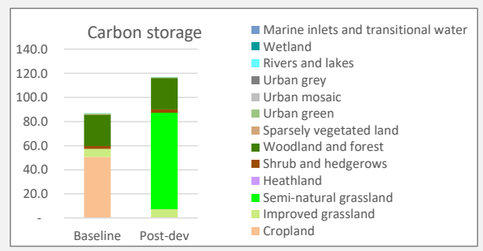


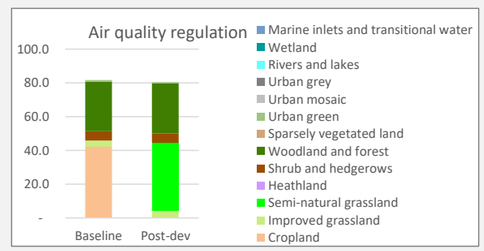


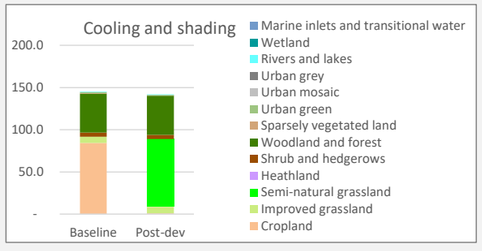


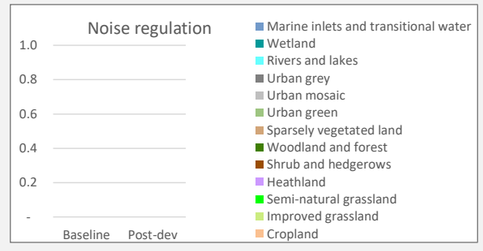


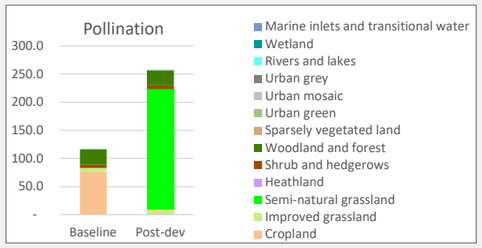








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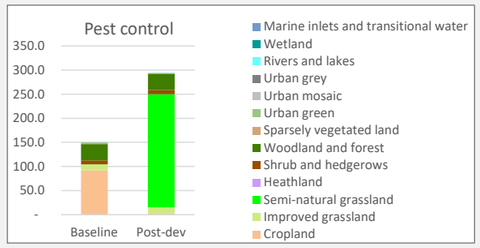
300.0
250.0
200.0
150.0
100.0
50.0
-
Baseline
Post-dev
Marine inlets and transitional water
Wetland
Rivers and lakes
Urban grey
Urban mosaic
Urban green
Sparsely vegetated land
Woodland and forest
Shrub and hedgerows
Heathland
Semi-natural grassland
Improved grassland
Cropland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150.0
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Baseline
Post-dev
Marine inlets and transitional water
Wetland
Rivers and lakes
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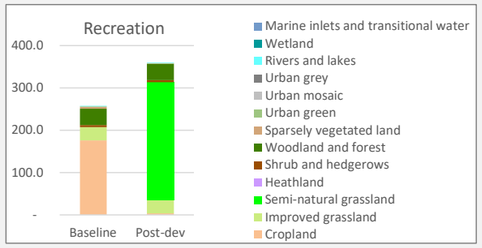
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Baseline
Post-dev
Marine inlets and transitional water
Wetland
Rivers and lakes
Urban grey
Urban mosaic
Urban green
Sparsely vegetated land
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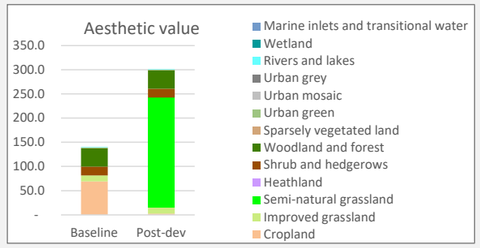
Cropland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Post-dev
Marine inlets and transitional water
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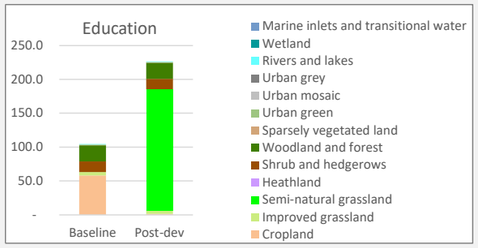
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Baseline
Post-dev
Marine inlets and transitional water
Wetland
Rivers and lakes
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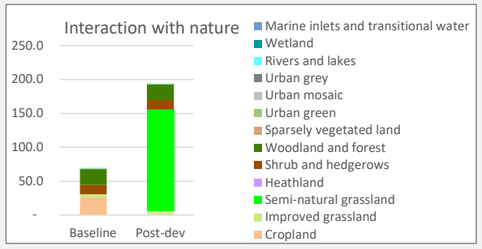
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Post-dev
Marine inlets and transitional water
Wetland
Rivers and lakes
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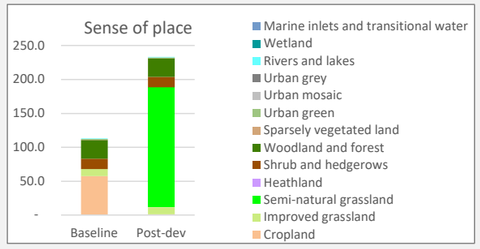
Sense of place
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Post-dev
Marine inlets and transitional water
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Improved grassland
Cropland

Technical user menu

Information sheets

Welcome	About the tool
Instructions	Quick start guide and instructions

Data entry sheets

1. Enter project details	Enter project name, description, contacts and comments
2. Enter baseline habitats	Enter baseline habitat areas and condition and spatial indicators
3. Enter post-development habitats	Enter post-development habitat areas and condition and spatial indicators

View all sheets	Un-hides all the technical sheets
Reset view	Hides all the technical sheets

Results sheets

4. Results	Main results overview
4a. Compare on and off site results	Compare on-site and off-site results side by side
4b. Charts	Charts showing how the scores for each ecosystem service have changed
4c. Results breakdown tables	Breakdown of results by service and habitat
4d. Save scenarios	Save and compare results for up to three scenarios
4e. Comparison with 100% suburban mosaic	Compare with a 'worst case' housing development with little green space

Calculation sheets

Baseline scores	Underlying calculations for baseline habitat scores
Post-development scores	Underlying calculations for post-development habitat scores
Calculations	Underlying calculations for main results sheet (arrows)

Technical user information

Map	Map of how the worksheets link to each other
Data sources	Information on data sources to help users enter the condition and spatial indicators
Scores	Habitat scores, time to reach target condition and delivery risk factors for newly created habitats
Score filter	Easily sortable version of score matrix, to help with understanding relative scores for each service
Multipliers	Multipliers for each condition and spatial indicator
Time factors	Parameters on time period of assessment
Applicability	Which condition and spatial indicators apply to each habitat type
Habitat selection	Allows users to set up a 'short-cut' habitat list with most commonly used habitats at the top
Habitat translation	Translation table used by the tool
Version control	Version control and developer notes
Links to other tools	Links to other tools that could be used for more detailed assessments of certain ecosystem services

Baseline scores (before change)

Instructions | Menu | 2. Baseline habitats | 4. Results

Onsite units 230.94 | Offsite units 0.00 | Onsite units 41.58 | Offsite units 0.00 | Onsite units | Offsite units

No errors | Errors:

offsite incl. hedges etc: -
onsite incl. hedges etc: 62.775
62.775 total area (ha) including hedgerows etc

Max. possible multipliers and scores (excluding linear multiplier)

						2.40			2.40	24.00	Arable Grade 1	10			1.2	1	1.2		1.44	14.4	3	River
						1	Food production					2	Wood pr	3	Fish production							
						554.26	Condition				230.94		41.58	1.70	Condition				1.18			
Errors in row?	ID	Onsite / offsite?	Area, ha	Habitat	Basic score per ha	Agricultural Land Class	Applicable?	Condition multiplier	Condition multiplier (normalised)	Condition score per ha	Units	Basic score per ha	Units	Basic score per ha	Water quality: WFD status	Fish barriers	Water body naturalness	Condition multiplier	Condition multiplier (normalised)	Condition score per ha	Linear multiplier	Supply score per ha
	1	On site	0.030	Standing open water	0		0	1	0.417	0.0	0.0	0.0	0.0	10	1	1	1	1	0.69	6.9	1	6.9
	2	On site	0.040	Standing open water	0		0	1	0.417	0.0	0.0	0.0	0.0	10	1	1	1	1	0.69	6.9	1	6.9
	3	On site	0.380	Broadleaved, mixed and yew plantation	0		0	1	0.417	0.0	0.0	8.0	3.0	0	1	1	1	1	0.69	0.0	1	0.0
	4	On site	1.420	Broadleaved, mixed and yew plantation	0		0	1	0.417	0.0	0.0	8.0	11.4	0	1	1	1	1	0.69	0.0	1	0.0
	5	On site	0.240	Broadleaved, mixed and yew semi-natural woodland	1		0	1	0.417	0.4	0.1	6.0	1.4	0	1	1	1	1	0.69	0.0	1	0.0
	6	On site	0.180	Tree	0		0	1	0.417	0.0	0.0	1.0	0.2	0	1	1	1	1	0.69	0.0	1	0.0
	7	On site	0.510	Bare ground	0		0	1	0.417	0.0	0.0	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	8	On site	41.650	Arable fields, horticulture and temporary grass	10	1.00	1	1	0.417	4.2	173.5	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	9	On site	3.080	Improved grassland	10	1.00	1	1	0.417	4.2	12.8	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	10	On site	1.250	Improved grassland	10	1.00	1	1	0.417	4.2	5.2	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	11	On site	0.070	Broadleaved, mixed and yew semi-natural woodland	1		0	1	0.417	0.4	0.0	6.0	0.4	0	1	1	1	1	0.69	0.0	1	0.0
	12	On site	0.050	Dense scrub	1		0	1	0.417	0.4	0.0	2.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
	13	On site	8.640	Arable fields, horticulture and temporary grass	10	1.00	1	1	0.417	4.2	36.0	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	14	On site	0.120	Arable fields, horticulture and temporary grass	10	1.00	1	1	0.417	4.2	0.5	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	15	On site	0.120	Improved grassland	10	1.00	1	1	0.417	4.2	0.5	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	16	On site	0.270	Arable fields, horticulture and temporary grass	10	1.00	1	1	0.417	4.2	1.1	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	17	On site	1.190	Broadleaved, mixed and yew plantation	0		0	1	0.417	0.0	0.0	8.0	9.5	0	1	1	1	1	0.69	0.0	1	0.0
	18	On site	0.540	Broadleaved, mixed and yew plantation	0		0	1	0.417	0.0	0.0	8.0	4.3	0	1	1	1	1	0.69	0.0	1	0.0
	19	On site	1.710	Broadleaved, mixed and yew semi-natural woodland	1		0	1	0.417	0.4	0.7	6.0	10.3	0	1	1	1	1	0.69	0.0	1	0.0
	20	On site	0.100	Standing open water	0		0	1	0.417	0.0	0.0	0.0	0.0	10	1	1	1	1	0.69	6.9	1	6.9
	21	On site	0.300	Bare ground	0		0	1	0.417	0.0	0.0	0.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	22	On site	0.028	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	23	On site	0.058	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
	24	On site	0.028	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	25	On site	0.053	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
	26	On site	0.018	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	27	On site	0.015	Hedgerow with trees	1		0	1	0.417	0.4	0.0	2.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	28	On site	0.040	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	29	On site	0.040	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	30	On site	0.043	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	31	On site	0.080	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
	32	On site	0.030	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	33	On site	0.028	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
	34	On site	0.068	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0

35	On site	0.055	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
36	On site	0.053	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
37	On site	0.075	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
38	On site	0.018	Hedgerow with trees	1		0	1	0.417	0.4	0.0	2.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
39	On site	0.090	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
40	On site	0.045	Hedgerows	1		0	1	0.417	0.4	0.0	1.0	0.0	0	1	1	1	1	0.69	0.0	1	0.0
0		-				0															
42	On site	0.025	Hedgerow with trees	1		0	1	0.417	0.4	0.0	2.0	0.1	0	1	1	1	1	0.69	0.0	1	0.0
43		-				0															

1.18											Onsite units	339.91															Onsite units	124.75				
0.00											Offsite units	0.00															Offsite units	0.00				
		1	*1.1*	*1.1*		*1.2*	*1.2*	*1.2*		*1.2*	***12***	*River*		*1*	*1.05*	*1.1*	*1.1*	*1*	*1.271*						*1.2*		*1.525*	***15.25***	*Coniferous forest*		*1*	*1.1*	*1.1*
	4	**Water supply**											5	**Flood regulation**																6	**Erosion prote**		
1.18	407.89	Condition			407.89	Demand						**339.91**	172.90	**Condition**						172.90	Demand								**124.75**	125.54	Cond		
Units	**Basic score per ha**	Soil drainage	Soil compaction	Condition multiplier	**Condition score per ha**	Surface water availability	Groundwater availability	Demand multiplier	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units**	**Basic score per ha**	Canopy cover	Soil compaction	Tall or tussocky grasses	Shrub layer	Water body naturalness	Condition multiplier	**Condition score per ha**	Natural Flood Management priority	Woodland for flood risk	WWNP target zone	Max demand	Demand multiplier	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units**	**Basic score per ha**	Ground cover	Tall or tussocky grasses	Shrub layer
0.2	10	1	1	1	10.0	1	1	1	1	0.83	8.3	0.3	4	1	1	1	1	1	1	4.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	2.9	0.1	0	1	1	1
0.3	10	1	1	1	10.0	1	1	1	1	0.83	8.3	0.3	4	1	1	1	1	1	1	4.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	2.9	0.1	0	1	1	1
0.0	2	1	1	1	2.0	1	1	1	1	0.83	1.7	0.6	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	2.5	8	1	1	1
0.0	2	1	1	1	2.0	1	1	1	1	0.83	1.7	2.4	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	9.2	8	1	1	1
0.0	3	1	1	1	3.0	1	1	1	1	0.83	2.5	0.6	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	1.6	10	1	1	1
0.0	1	1	1	1	1.0	1	1	1	1	0.83	0.8	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.8	6	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	1.7	1	1	1	1	1	1	1	1.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	0.7	0.4	0	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	243.0	2	1	1	1	1	1	1	2.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	1.4	60.1	1	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	18.0	3	1	1	1	1	1	1	3.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	2.2	6.7	4	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	7.3	3	1	1	1	1	1	1	3.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	2.2	2.7	4	1	1	1
0.0	3	1	1	1	3.0	1	1	1	1	0.83	2.5	0.2	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	0.5	10	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	50.4	2	1	1	1	1	1	1	2.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	1.4	12.47	1	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	0.7	2	1	1	1	1	1	1	2.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	1.4	0.2	1	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	0.7	3	1	1	1	1	1	1	3.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	2.2	0.3	4	1	1	1
0.0	7	1	1	1	7.0	1	1	1	1	0.83	5.8	1.6	2	1	1	1	1	1	1	2.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	1.4	0.4	1	1	1	1
0.0	2	1	1	1	2.0	1	1	1	1	0.83	1.7	2.0	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	7.7	8	1	1	1
0.0	2	1	1	1	2.0	1	1	1	1	0.83	1.7	0.9	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	3.5	8	1	1	1
0.0	3	1	1	1	3.0	1	1	1	1	0.83	2.5	4.3	9	1	1	1	1	1	1	9.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	6.5	11.1	10	1	1	1
0.7	10	1	1	1	10.0	1	1	1	1	0.83	8.3	0.8	4	1	1	1	1	1	1	4.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	2.9	0.3	0	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	1.0	1	1	1	1	1	1	1	1.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	0.7	0.2	0	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.1	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.1	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.1	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	7	1	1	1	1	1	1	7.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	5.1	0.1	9	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.3	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.3	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.1	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.1	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.3	8	1	1	1

0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.3	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.3	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	7	1	1	1	1	1	1	7.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	5.1	0.1	9	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.3	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.4	8	1	1	1
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.2	6	1	1	1	1	1	1	6.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	4.3	0.2	8	1	1	1
								0																									
0.0	4	1	1	1	4.0	1	1	1	1	0.83	3.3	0.1	7	1	1	1	1	1	1	7.0	Medi	Medi	Medi	Medi	1.1	1.1	0.72	5.1	0.1	9	1	1	1
								0																									

												Onsite units	**38.73**															**Onsite units**	**37.19**		
												Offsite units	**0.00**															**Offsite units**	**0.00**		
	1	*1.21*		*1.2*		*1.1*	*1.1*	*1.1*	*1.331*		*1.933*	***19.33***	*Woodland*		*1*	*1.1*	*1*	*1*	*1*	*1*	*1.1*		*1.2*		*1.2*		*1.584*	***15.84***	*Woodland*		
ection														**7**	**Water quality regulation**															**8**	
ition			74.86		74.86	Demand							**38.73**	109.59	Condition							58.91		58.91	Demand				**37.19**	173.76	4743.67
Peat quality	Soil management	Condition multiplier	**Condition score per ha**	Position for erosion prevention	**Supply score per ha**	Soil erodibility	Rainfall	Slope	Demand multiplier	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units**	**Basic score per ha**	Ground cover	Tall or tussocky grasses	Peat quality	Soil management	Soil compaction	Water body naturalness	Condition multiplier	**Condition score per ha**	Position for water quality regulation	Supply score per ha	Water quality management area	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units**	**Basic score per ha**	**Carbon stored, t/ha**
1	1	1	0.0	1	0.0	1	1	1	1	1	0.52	0.0	0.0	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.0	1	27.28333
1	1	1	0.0	1	0.0	1	1	1	1	1	0.52	0.0	0.0	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.0	1	27.28333
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	1.6	8	1	1	1	1	1	1	1	8.0	1	8.0	1	1	0.63	5.1	1.9	9	245.7
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	5.9	8	1	1	1	1	1	1	1	8.0	1	8.0	1	1	0.63	5.1	7.2	9	245.7
1	1	1	10.0	1	10.0	1	1	1	1	1	0.52	5.2	1.2	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	0.63	6.3	1.5	10	273
1	1	1	6.0	1	6.0	1	1	1	1	1	0.52	3.1	0.6	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	0.63	1.3	0.2	7	191.1
1	1	1	0.0	1	0.0	1	1	1	1	1	0.52	0.0	0.0	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.3	1	18.26667
1	0	0	0.0	1	0.0	1	1	1	1	0	0	0.0	0.0	1	1	1	1	0	1	1	0	0.0	1	0.0	1	0	0	0.0	0.0	2	54.7
1	1	1	4.0	1	4.0	1	1	1	1	1	0.52	2.1	6.4	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	1.9	3	82.2
1	1	1	4.0	1	4.0	1	1	1	1	1	0.52	2.1	2.6	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.8	3	82.2
1	1	1	10.0	1	10.0	1	1	1	1	1	0.52	5.2	0.4	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	0.63	6.3	0.4	10	273
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	6	164
1	0	0	0.0	1	0.0	1	1	1	1	0	0	0.0	0.0	1	1	1	1	0	1	1	0	0.0	1	0.0	1	0	0	0.0	0.0	2	54.7
1	0	0	0.0	1	0.0	1	1	1	1	0	0	0.0	0.0	1	1	1	1	0	1	1	0	0.0	1	0.0	1	0	0	0.0	0.0	2	54.7
1	1	1	4.0	1	4.0	1	1	1	1	1	0.52	2.1	0.2	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.1	3	82.2
1	0	0	0.0	1	0.0	1	1	1	1	0	0	0.0	0.0	1	1	1	1	0	1	1	0	0.0	1	0.0	1	0	0	0.0	0.0	2	54.7
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	4.9	8	1	1	1	1	1	1	1	8.0	1	8.0	1	1	0.63	5.1	6.0	9	245.7
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	2.2	8	1	1	1	1	1	1	1	8.0	1	8.0	1	1	0.63	5.1	2.7	9	245.7
1	1	1	10.0	1	10.0	1	1	1	1	1	0.52	5.2	8.8	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	0.63	6.3	10.8	10	273
1	1	1	0.0	1	0.0	1	1	1	1	1	0.52	0.0	0.0	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.1	1	27.28333
1	1	1	0.0	1	0.0	1	1	1	1	1	0.52	0.0	0.0	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	0.63	0.6	0.2	1	18.26667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	9.0	1	9.0	1	1	1	1	1	0.52	4.7	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.0	7	204.8333
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.3	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.3	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.3	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	5	136.6667

1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.3	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.2	5	136.6667
1	1	1	9.0	1	9.0	1	1	1	1	1	0.52	4.7	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	7	204.8333
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.4	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.3	5	136.6667
1	1	1	8.0	1	8.0	1	1	1	1	1	0.52	4.1	0.2	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	5	136.6667
1	1	1	9.0	1	9.0	1	1	1	1	1	0.52	4.7	0.1	5	1	1	1	1	1	1	1	5.0	1	5.0	1	1	0.63	3.2	0.1	7	204.8333

							Onsite units	86.88	86.88								Onsite units	81.78												Onsite units	145.30	145.30
							Offsite units	0.00	0.00								Offsite units	0.00												Offsite units	0.00	0.00
1.00		*1.00*	*2*		*2*	***20***		*Bog*		*1*			*1.2*		*1.2*	***12***	*Woodland*		*1*		*1*			*1.2*		*1.2*	***12.0***		*Woodland*
Carbon storage									**9**	**Air quality regulation**								**10**	**Cooling and shading**													
Condition							**86.88**	**86.88**	98.13	Condition	98.13		Position				**81.78**	174.36	Condition				174.36		Position				**145.30**	**145.30**
Tree size	Tree size 10-40y	Canopy cover	Peat quality	Condition multiplier	Condition multiplier (normalised)	**Condition score per ha**	**Units <10y**	**Units**	**Basic score per ha**	Canopy cover	Condition multiplier	**Condition score per ha**	Air pollution barrier	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units**	**Basic score per ha**	Tree size	Tree size 10-40y	Canopy cover	Condition multiplier	**Condition score per ha**	Shading ability	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units <10y**	**Units**
1	1	1	1	1	0.5	0.5	0.02	0.0	0	1	1	0.0	1	1	0.83	0.0	0.0	4	1	1.00	1	1	4.0	1	1	0.83	3.3	0.1	0.1
1	1	1	1	1	0.5	0.5	0.02	0.0	0	1	1	0.0	1	1	0.83	0.0	0.0	4	1	1.00	1	1	4.0	1	1	0.83	3.3	0.13333333	0.13333333
1	1	1	1	1	0.5	4.5	1.71	1.7	6	1	1	6.0	1	1	0.83	5.0	1.9	10	1	1.00	1	1	10.0	1	1	0.83	8.3	3.16666667	3.16666667
1	1	1	1	1	0.5	4.5	6.39	6.4	6	1	1	6.0	1	1	0.83	5.0	7.1	10	1	1.00	1	1	10.0	1	1	0.83	8.3	11.8333333	11.8333333
1	1	1	1	1	0.5	5.0	1.20	1.2	7	1	1	7.0	1	1	0.83	5.8	1.4	10	1	1.00	1	1	10.0	1	1	0.83	8.3	2	2
1	1	1	1	1	0.5	3.5	0.63	0.6	6	1	1	6.0	1	1	0.83	5.0	0.9	8	1	1.00	1	1	8.0	1	1	0.83	6.7	1.2	1.2
1	1	1	1	1	0.5	0.5	0.26	0.3	0	1	1	0.0	1	1	0.83	0.0	0.0	1	1	1.00	1	1	1.0	1	1	0.83	0.8	0.425	0.425
1	1	1	1	1	0.5	1.0	41.65	41.7	1	1	1	1.0	1	1	0.83	0.8	34.7	2	1	1.00	1	1	2.0	1	1	0.83	1.7	69.4166667	69.4166667
1	1	1	1	1	0.5	1.5	4.62	4.6	1	1	1	1.0	1	1	0.83	0.8	2.6	2	1	1.00	1	1	2.0	1	1	0.83	1.7	5.13333333	5.13333333
1	1	1	1	1	0.5	1.5	1.88	1.9	1	1	1	1.0	1	1	0.83	0.8	1.0	2	1	1.00	1	1	2.0	1	1	0.83	1.7	2.08333333	2.08333333
1	1	1	1	1	0.5	5.0	0.35	0.4	7	1	1	7.0	1	1	0.83	5.8	0.4	10	1	1.00	1	1	10.0	1	1	0.83	8.3	0.58333333	0.58333333
1	1	1	1	1	0.5	3.0	0.15	0.2	7	1	1	7.0	1	1	0.83	5.8	0.3	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.25	0.25
1	1	1	1	1	0.5	1.0	8.64	8.6	1	1	1	1.0	1	1	0.83	0.8	7.2	2	1	1.00	1	1	2.0	1	1	0.83	1.7	14.4	14.4
1	1	1	1	1	0.5	1.0	0.12	0.1	1	1	1	1.0	1	1	0.83	0.8	0.1	2	1	1.00	1	1	2.0	1	1	0.83	1.7	0.2	0.2
1	1	1	1	1	0.5	1.5	0.18	0.2	1	1	1	1.0	1	1	0.83	0.8	0.1	2	1	1.00	1	1	2.0	1	1	0.83	1.7	0.2	0.2
1	1	1	1	1	0.5	1.0	0.27	0.3	1	1	1	1.0	1	1	0.83	0.8	0.2	2	1	1.00	1	1	2.0	1	1	0.83	1.7	0.45	0.45
1	1	1	1	1	0.5	4.5	5.36	5.4	6	1	1	6.0	1	1	0.83	5.0	6.0	10	1	1.00	1	1	10.0	1	1	0.83	8.3	9.91666667	9.91666667
1	1	1	1	1	0.5	4.5	2.43	2.4	6	1	1	6.0	1	1	0.83	5.0	2.7	10	1	1.00	1	1	10.0	1	1	0.83	8.3	4.5	4.5
1	1	1	1	1	0.5	5.0	8.55	8.6	7	1	1	7.0	1	1	0.83	5.8	10.0	10	1	1.00	1	1	10.0	1	1	0.83	8.3	14.25	14.25
1	1	1	1	1	0.5	0.5	0.05	0.1	0	1	1	0.0	1	1	0.83	0.0	0.0	4	1	1.00	1	1	4.0	1	1	0.83	3.3	0.33333333	0.33333333
1	1	1	1	1	0.5	0.5	0.15	0.2	0	1	1	0.0	1	1	0.83	0.0	0.0	1	1	1.00	1	1	1.0	1	1	0.83	0.8	0.25	0.25
1	1	1	1	1	0.5	2.5	0.07	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.1375	0.1375
1	1	1	1	1	0.5	2.5	0.14	0.1	7	1	1	7.0	1	1	0.83	5.8	0.3	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.2875	0.2875
1	1	1	1	1	0.5	2.5	0.07	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.1375	0.1375
1	1	1	1	1	0.5	2.5	0.13	0.1	7	1	1	7.0	1	1	0.83	5.8	0.3	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.2625	0.2625
1	1	1	1	1	0.5	2.5	0.04	0.0	7	1	1	7.0	1	1	0.83	5.8	0.1	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.0875	0.0875
1	1	1	1	1	0.5	3.5	0.05	0.1	8	1	1	8.0	1	1	0.83	6.7	0.1	7	1	1.00	1	1	7.0	1	1	0.83	5.8	0.0875	0.0875
1	1	1	1	1	0.5	2.5	0.10	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.2	0.2
1	1	1	1	1	0.5	2.5	0.10	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.2	0.2
1	1	1	1	1	0.5	2.5	0.11	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.2125	0.2125
1	1	1	1	1	0.5	2.5	0.20	0.2	7	1	1	7.0	1	1	0.83	5.8	0.5	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.4	0.4
1	1	1	1	1	0.5	2.5	0.08	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.15	0.15
1	1	1	1	1	0.5	2.5	0.07	0.1	7	1	1	7.0	1	1	0.83	5.8	0.2	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.1375	0.1375
1	1	1	1	1	0.5	2.5	0.17	0.2	7	1	1	7.0	1	1	0.83	5.8	0.4	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.3375	0.3375

1	1	1	1	1	0.5	2.5	0.14	0.1	7	1	1	7.0	1	1	0.83	5.8	0.3	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.275	0.275
1	1	1	1	1	0.5	2.5	0.13	0.1	7	1	1	7.0	1	1	0.83	5.8	0.3	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.2625	0.2625
1	1	1	1	1	0.5	2.5	0.19	0.2	7	1	1	7.0	1	1	0.83	5.8	0.4	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.375	0.375
1	1	1	1	1	0.5	3.5	0.06	0.1	8	1	1	8.0	1	1	0.83	6.7	0.1	7	1	1.00	1	1	7.0	1	1	0.83	5.8	0.10208333	0.10208333
1	1	1	1	1	0.5	2.5	0.23	0.2	7	1	1	7.0	1	1	0.83	5.8	0.5	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.45	0.45
1	1	1	1	1	0.5	2.5	0.11	0.1	7	1	1	7.0	1	1	0.83	5.8	0.3	6	1	1.00	1	1	6.0	1	1	0.83	5.0	0.225	0.225
1	1	1	1	1	0.5	3.5	0.09	0.1	8	1	1	8.0	1	1	0.83	6.7	0.2	7	1	1.00	1	1	7.0	1	1	0.83	5.8	0.14583333	0.14583333

Onsite units **0.00** Offsite units **0.00**

Onsite units **117.42** Offsite units **0.00**

Onsite units **150.55** Offsite units **0.00**

Onsite
Offsite

	1	1	10	Woodland		1.1	1.1	1.1		1.331	13.31			1.1	1.1		1.1	11			1	1.15	1.2	1.2		3		1.2			1.44
11	**Noise reduction**				**12**	**Pollination**							**13**	**Pest control**						**14**	**Recreation**										
105.92	Position			**0.00**	156.29	Condition						**117.42**	165.61	Condition					**150.55**	370.50	Condition				370.50		370.50	Demand			
Basic score per ha	Noise barrier	Combined multipliers (normalised)	Combined score per ha	**Units**	**Basic score per ha**	Flowers	Invertebrate nest sites	Habitat patterns	Condition multiplier	Condition multiplier (normalised)	Condition score per ha	**Units**	**Basic score per ha**	Invertebrate nest sites	Habitat patterns	Condition multiplier	Condition multiplier (normalised)	Condition score per ha	**Units**	**Basic score per ha**	Public access	Size of network	Special recreation value	Condition multiplier	**Condition score per ha**	Linear multiplier	Supply score per ha	Population density	Demand multiplier	Combined multipliers	Combined multipliers (normalised)
0	0	0	0.0	0.0	1	1	1	1	1	0.75	0.8	0.0	2	1	1	1	0.91	1.8	0.1	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
0	0	0	0.0	0.0	1	1	1	1	1	0.75	0.8	0.0	2	1	1	1	0.91	1.8	0.1	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
8	0	0	0.0	0.0	6	1	1	1	1	0.75	4.5	1.7	6	1	1	1	0.91	5.5	2.1	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
8	0	0	0.0	0.0	6	1	1	1	1	0.75	4.5	6.4	6	1	1	1	0.91	5.5	7.7	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
8	0	0	0.0	0.0	7	1	1	1	1	0.75	5.3	1.3	8	1	1	1	0.91	7.3	1.7	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
4	0	0	0.0	0.0	7	1	1	1	1	0.75	5.3	0.9	8	1	1	1	0.91	7.3	1.3	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
0	0	0	0.0	0.0	1	1	1	1	1	0.75	0.8	0.4	3	1	1	1	0.91	2.7	1.4	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	62.6	2	1	1	1	0.91	1.8	75.7	5	1	1	1	1	5.0	1	5.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	4.6	3	1	1	1	0.91	2.7	8.4	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	1.9	3	1	1	1	0.91	2.7	3.4	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
8	0	0	0.0	0.0	7	1	1	1	1	0.75	5.3	0.4	8	1	1	1	0.91	7.3	0.5	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.3	10	1	1	1	0.91	9.1	0.5	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	13.0	2	1	1	1	0.91	1.8	15.7	5	1	1	1	1	5.0	1	5.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	0.2	2	1	1	1	0.91	1.8	0.2	5	1	1	1	1	5.0	1	5.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	0.2	3	1	1	1	0.91	2.7	0.3	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
1	0	0	0.0	0.0	2	1	1	1	1	0.75	1.5	0.4	2	1	1	1	0.91	1.8	0.5	5	1	1	1	1	5.0	1	5.0	1	1	1	0.69
8	0	0	0.0	0.0	6	1	1	1	1	0.75	4.5	5.4	6	1	1	1	0.91	5.5	6.5	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
8	0	0	0.0	0.0	6	1	1	1	1	0.75	4.5	2.4	6	1	1	1	0.91	5.5	2.9	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
8	0	0	0.0	0.0	7	1	1	1	1	0.75	5.3	9.0	8	1	1	1	0.91	7.3	12.4	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
0	0	0	0.0	0.0	1	1	1	1	1	0.75	0.8	0.1	2	1	1	1	0.91	1.8	0.2	10	1	1	1	1	10.0	1	10.0	1	1	1	0.69
0	0	0	0.0	0.0	1	1	1	1	1	0.75	0.8	0.2	3	1	1	1	0.91	2.7	0.8	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.2	10	1	1	1	0.91	9.1	0.3	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.4	10	1	1	1	0.91	9.1	0.5	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.2	10	1	1	1	0.91	9.1	0.3	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.4	10	1	1	1	0.91	9.1	0.5	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.1	10	1	1	1	0.91	9.1	0.2	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
7	0	0	0.0	0.0	10	1	1	1	1	0.75	7.5	0.1	10	1	1	1	0.91	9.1	0.1	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.3	10	1	1	1	0.91	9.1	0.4	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.3	10	1	1	1	0.91	9.1	0.4	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.3	10	1	1	1	0.91	9.1	0.4	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.5	10	1	1	1	0.91	9.1	0.7	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.2	10	1	1	1	0.91	9.1	0.3	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.2	10	1	1	1	0.91	9.1	0.3	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.5	10	1	1	1	0.91	9.1	0.6	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69

6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.4	10	1	1	1	0.91	9.1	0.5	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.4	10	1	1	1	0.91	9.1	0.5	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.5	10	1	1	1	0.91	9.1	0.7	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
7	0	0	0.0	0.0	10	1	1	1	1	0.75	7.5	0.1	10	1	1	1	0.91	9.1	0.2	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.6	10	1	1	1	0.91	9.1	0.8	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
6	0	0	0.0	0.0	9	1	1	1	1	0.75	6.8	0.3	10	1	1	1	0.91	9.1	0.4	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69
7	0	0	0.0	0.0	10	1	1	1	1	0.75	7.5	0.2	10	1	1	1	0.91	9.1	0.2	8	1	1	1	1	8.0	1	8.0	1	1	1	0.69

e units	257.29																Onsite units	140.65	140.65																	
e units	0.00																Offsite units	0.00	0.00																	
14.4			*1.1*	*1.1*		*1.1*	*1.1*	*1*	*1.464*		*3*			*1.464*	*14.64*				*1.1*	*1.2*	*1.2*	*1.1*	*1.1*		*1.452*		*3*		*1.2*						
		15	**Aesthetic value**																16	**Education**																
	257.29	188.22	Condition							188.22		205.92				**140.65**	**140.65**	164.74	Condition							164.74		182.44				Deman		
Combined score per ha	**Units**	**Basic score per ha**	Flowers	Tree size	Tree size 10-40y	Landscape diversity	Tranquility	Water body naturalness	Condition multiplier	**Condition score per ha**	Linear multiplier	Supply score per ha	Combined multipliers	Combined multipliers (normalised)	Combined score per ha	**Units < 10y**	**Units**	**Basic score per ha**	Educational use	Nature designation	Cultural or historic importance	Managed for nature	Tree size	Tree size 10-40y	Condition multiplier	**Condition score per ha**	Linear multiplier	Supply score per ha	Population density	Demand multiplier	Combined multipliers				
6.9	0.2	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	0.2	0.2	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	1			
6.9	0.3	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	0.3	0.3	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	1			
6.9	2.6	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	2.6	2.6	6	1	1	1	1	1	1	1	6.0	1	6.0	1	1	1			
6.9	9.9	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	9.7	9.7	6	1	1	1	1	1	1	1	6.0	1	6.0	1	1	1			
6.9	1.7	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	1.6	1.6	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	1			
5.6	1.0	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	1.2	1.2	8	1	1	1	1	1	1	1	8.0	1	8.0	1	1	1			
5.6	2.8	1	1	1	1	1	1	1	1	1.0	1	1.0	1	0.68	0.7	0.3	0.3	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	1			
3.5	144.6	2	1	1	1	1	1	1	1	2.0	1	2.0	1	0.68	1.4	56.9	56.9	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
6.9	21.4	4	1	1	1	1	1	1	1	4.0	1	4.0	1	0.68	2.7	8.4	8.4	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
6.9	8.7	4	1	1	1	1	1	1	1	4.0	1	4.0	1	0.68	2.7	3.4	3.4	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
6.9	0.5	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	0.5	0.5	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	1			
5.6	0.3	8	1	1	1	1	1	1	1	8.0	1	8.0	1	0.68	5.5	0.3	0.3	6	1	1	1	1	1	1	1	6.0	1	6.0	1	1	1			
3.5	30.0	2	1	1	1	1	1	1	1	2.0	1	2.0	1	0.68	1.4	11.8	11.8	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
3.5	0.4	2	1	1	1	1	1	1	1	2.0	1	2.0	1	0.68	1.4	0.2	0.2	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
6.9	0.8	4	1	1	1	1	1	1	1	4.0	1	4.0	1	0.68	2.7	0.3	0.3	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
3.5	0.9	2	1	1	1	1	1	1	1	2.0	1	2.0	1	0.68	1.4	0.4	0.4	2	1	1	1	1	1	1	1	2.0	1	2.0	1	1	1			
6.9	8.3	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	8.1	8.1	6	1	1	1	1	1	1	1	6.0	1	6.0	1	1	1			
6.9	3.8	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	3.7	3.7	6	1	1	1	1	1	1	1	6.0	1	6.0	1	1	1			
6.9	11.9	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	11.7	11.7	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	1			
6.9	0.7	10	1	1	1	1	1	1	1	10.0	1	10.0	1	0.68	6.8	0.7	0.7	10	1	1	1	1	1	1	1	10.0	1	10.0	1	1	1			
5.6	1.7	1	1	1	1	1	1	1	1	1.0	1	1.0	1	0.68	0.7	0.2	0.2	1	1	1	1	1	1	1	1	1.0	1	1.0	1	1	1			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.6	0.6	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.3	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.2	1.2	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.6	0.6	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.3	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.1	1.1	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.1	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.4	0.4	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.1	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.3	0.3	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.8	0.8	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.8	0.8	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.9	0.9	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.4	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.6	1.6	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.6	0.6	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.2	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.6	0.6	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			
5.6	0.4	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.4	1.4	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3			

5.6	0.3	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.1	1.1	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3
5.6	0.3	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.1	1.1	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3
5.6	0.4	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.5	1.5	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3
5.6	0.1	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.4	0.4	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3
5.6	0.5	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	1.8	1.8	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3
5.6	0.3	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.9	0.9	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3
5.6	0.1	10	1	1	1	1	1	1	1	10.0	3	30.0	3	2.05	20.5	0.5	0.5	10	1	1	1	1	1	1	1	10.0	3	30.0	1	1	3

Onsite units		**104.71**	**104.71**																			**Onsite units**	**69.90**	**69.90**										
Offsite units		**0.00**	**0.00**					*max of tree size / ancient applied*						*max of nature designation / managed for nature appl*								**Offsite units**	**0.00**	**0.00**		*max of tree s*		*max of nature designation / cultural designat*						
1.742	*17.42*				*1*	*1.1*	*1.1*	*1.1*		*1.05*	*1.05*	*1.2*	*1.1*	*1.1*	*1.1*	*1*	*1.2*		*1.937*		*3*	*19.4*				*1.1*		*1.2*	*1.2*	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*
				17	**Interaction with nature**																				**18**	**Sense of place**								
d		**104.71**	**104.71**	117.69	Condition															60.76			**69.90**	**69.90**	181.06	Condition								
Combined multipliers (normalised)	Combined score per ha	**Units < 10y**	**Units**	**Basic score per ha**	Public access	Tall or tussocky grasses	Shrub layer	Tree size	Tree size 10-40y	Flowers	Invertebrate nest sites	Nature designation	Ancient habitat	Managed for nature	Resources for local species	Fish barriers	Water body naturalness	Condition multiplier	Condition multiplier (normalised)	**Condition score per ha**	Linear multiplier	Supply score per ha	**Units < 10y**	**Units**	**Basic score per ha**	Tree size	Tree size 10-40y	Nature designation	Cultural or historic importance	Ancient habitat	Managed for nature	Resources for local species	Local distinctiveness	Water body naturalness
0.57	5.7	0.2	0.2	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	1	5.2	0.2	0.2	10	1	1	1	1	1	1	1	1	1
0.57	5.7	0.2	0.2	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	1	5.2	0.2	0.2	10	1	1	1	1	1	1	1	1	1
0.57	3.4	1.3	1.3	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	3.6	1	3.6	1.4	1.4	8	1	1	1	1	1	1	1	1	1
0.57	3.4	4.9	4.9	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	3.6	1	3.6	5.1	5.1	8	1	1	1	1	1	1	1	1	1
0.57	5.7	1.4	1.4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	1	5.2	1.2	1.2	10	1	1	1	1	1	1	1	1	1
0.57	4.6	0.8	0.8	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	4.1	1	4.1	0.7	0.7	10	1	1	1	1	1	1	1	1	1
0.57	0.6	0.3	0.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	0.5	1	0.5	0.3	0.3	1	1	1	1	1	1	1	1	1	1
0.57	1.1	47.8	47.8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	0.5	1	0.5	21.5	21.5	2	1	1	1	1	1	1	1	1	1
0.57	1.1	3.5	3.5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	1.0	1	1.0	3.2	3.2	4	1	1	1	1	1	1	1	1	1
0.57	1.1	1.4	1.4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	1.0	1	1.0	1.3	1.3	4	1	1	1	1	1	1	1	1	1
0.57	5.7	0.4	0.4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	1	5.2	0.4	0.4	10	1	1	1	1	1	1	1	1	1
0.57	3.4	0.2	0.2	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	4.1	1	4.1	0.2	0.2	6	1	1	1	1	1	1	1	1	1
0.57	1.1	9.9	9.9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	0.5	1	0.5	4.5	4.5	2	1	1	1	1	1	1	1	1	1
0.57	1.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	0.5	1	0.5	0.1	0.1	2	1	1	1	1	1	1	1	1	1
0.57	1.1	0.1	0.1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	1.0	1	1.0	0.1	0.1	4	1	1	1	1	1	1	1	1	1
0.57	1.1	0.3	0.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	0.5	1	0.5	0.1	0.1	2	1	1	1	1	1	1	1	1	1
0.57	3.4	4.1	4.1	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	3.6	1	3.6	4.3	4.3	8	1	1	1	1	1	1	1	1	1
0.57	3.4	1.9	1.9	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	3.6	1	3.6	2.0	2.0	8	1	1	1	1	1	1	1	1	1
0.57	5.7	9.8	9.8	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	1	5.2	8.8	8.8	10	1	1	1	1	1	1	1	1	1
0.57	5.7	0.6	0.6	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	1	5.2	0.5	0.5	10	1	1	1	1	1	1	1	1	1
0.57	0.6	0.2	0.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	0.5	1	0.5	0.2	0.2	1	1	1	1	1	1	1	1	1	1
1.72	17.2	0.5	0.5	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.4	0.4	10	1	1	1	1	1	1	1	1	1
1.72	17.2	1.0	1.0	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.9	0.9	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.5	0.5	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.4	0.4	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.9	0.9	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.8	0.8	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.3	0.3	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.3	0.3	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.3	0.3	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.2	0.2	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.7	0.7	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.6	0.6	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.7	0.7	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.6	0.6	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.7	0.7	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.7	0.7	10	1	1	1	1	1	1	1	1	1
1.72	17.2	1.4	1.4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	1.2	1.2	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.5	0.5	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.5	0.5	10	1	1	1	1	1	1	1	1	1
1.72	17.2	0.5	0.5	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.4	0.4	10	1	1	1	1	1	1	1	1	1
1.72	17.2	1.2	1.2	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	1.0	1.0	10	1	1	1	1	1	1	1	1	1

1.72	17.2	0.9	0.9	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.9	0.9	10	1	1	1	1	1	1	1	1
1.72	17.2	0.9	0.9	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.8	0.8	10	1	1	1	1	1	1	1	1
1.72	17.2	1.3	1.3	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	1.2	1.2	10	1	1	1	1	1	1	1	1
1.72	17.2	0.3	0.3	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.3	0.3	10	1	1	1	1	1	1	1	1
1.72	17.2	1.5	1.5	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	1.4	1.4	10	1	1	1	1	1	1	1	1
1.72	17.2	0.8	0.8	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.7	0.7	10	1	1	1	1	1	1	1	1
1.72	17.2	0.4	0.4	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.52	5.2	3	15.5	0.4	0.4	10	1	1	1	1	1	1	1	1

				Onsite units	113.13	113.13
				Offsite units	0.00	0.00
	1.8		3	17.6		
		103.06			113.13	113.13

Condition multiplier	Condition multiplier (normalised)	Condition score per ha	Linear multiplier	Supply score per ha	Units < 10y	Units
1	0.57	5.7	1	5.7	0.2	0.2
1	0.57	5.7	1	5.7	0.2	0.2
1	0.57	4.6	1	4.6	1.7	1.7
1	0.57	4.6	1	4.6	6.5	6.5
1	0.57	5.7	1	5.7	1.4	1.4
1	0.57	5.7	1	5.7	1.0	1.0
1	0.57	0.6	1	0.6	0.3	0.3
1	0.57	1.1	1	1.1	47.4	47.4
1	0.57	2.3	1	2.3	7.0	7.0
1	0.57	2.3	1	2.3	2.8	2.8
1	0.57	5.7	1	5.7	0.4	0.4
1	0.57	3.4	1	3.4	0.2	0.2
1	0.57	1.1	1	1.1	9.8	9.8
1	0.57	1.1	1	1.1	0.1	0.1
1	0.57	2.3	1	2.3	0.3	0.3
1	0.57	1.1	1	1.1	0.3	0.3
1	0.57	4.6	1	4.6	5.4	5.4
1	0.57	4.6	1	4.6	2.5	2.5
1	0.57	5.7	1	5.7	9.7	9.7
1	0.57	5.7	1	5.7	0.6	0.6
1	0.57	0.6	1	0.6	0.2	0.2
1	0.57	5.7	3	17.1	0.5	0.5
1	0.57	5.7	3	17.1	1.0	1.0
1	0.57	5.7	3	17.1	0.5	0.5
1	0.57	5.7	3	17.1	0.9	0.9
1	0.57	5.7	3	17.1	0.3	0.3
1	0.57	5.7	3	17.1	0.3	0.3
1	0.57	5.7	3	17.1	0.7	0.7
1	0.57	5.7	3	17.1	0.7	0.7
1	0.57	5.7	3	17.1	0.7	0.7
1	0.57	5.7	3	17.1	1.4	1.4
1	0.57	5.7	3	17.1	0.5	0.5
1	0.57	5.7	3	17.1	0.5	0.5
1	0.57	5.7	3	17.1	1.2	1.2

1	0.57	5.7	3	17.1	0.9	0.9
1	0.57	5.7	3	17.1	0.9	0.9
1	0.57	5.7	3	17.1	1.3	1.3
1	0.57	5.7	3	17.1	0.3	0.3
1	0.57	5.7	3	17.1	1.5	1.5
1	0.57	5.7	3	17.1	0.8	0.8
1	0.57	5.7	3	17.1	0.4	0.4