TUNLEY
ENVIRONMENTAL

BIODIVERSITY NET GAIN REPORT

TRUSTED SCIENTISTS®

BIODIVERSITY NET GAIN ASSESSMENT

FOR

‘PROPOOSED RESIDENTIAL DEVELOPMENT’

SCENARIO ADAPTED FROM DEFRA CASE STUDY

Contents

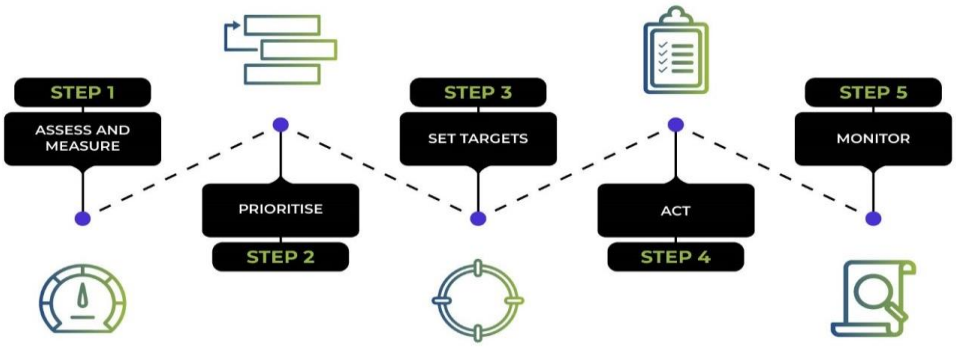
Nomenclature

Nomenclature	Description
Baseline Assessment	Before a development project begins, a baseline assessment is conducted to determine the existing biodiversity of the project site. This assessment establishes the current state of habitats, species, and ecosystem functions.
Biodiversity	The variety of life within a defined area for example, globally or in a specific habitat which can be described by a variety of metrics including species abundance or the living plant index and which we are dependent on to provide us with food, clean water and many more essentials. Areas with high biodiversity are typically found in the tropics which have a huge variety and abundance of life; however, these areas are increasingly affected by both industry and climate change, lowering their biodiversity.
Biodiversity Credits/Offsetting	Biodiversity credits are tradable units representing quantifiable contributions to biodiversity conservation or restoration. Developers or projects with unavoidable negative impacts on biodiversity can purchase these credits to offset their ecological footprint. Biodiversity credits provide a market-based approach to achieving Biodiversity Net Gain, allowing for flexibility in meeting conservation goals.
Biodiversity Loss	The reduction in the variety and abundance of species in a particular ecosystem or across the entire planet. It can result from factors such as habitat destruction, pollution, climate change, and invasive species.
Biodiversity Net Gain	A concept that aims to ensure that development projects have a positive impact on biodiversity by enhancing or creating habitats.
Biodiversity Net Gain (BNG) Assessment	The quantification of the overall positive impact on biodiversity resulting from a specific activity or project. While biodiversity gain refers to the increase in the numbers, genetic variability, and species variety in a given area, BNG goes a step further by assessing whether the difference between biodiversity losses and gains leads to a net positive impact.
Biodiversity Net Loss	Net loss is the opposite of net gain, indicating a decrease or reduction in a particular quantity or measure, such as biodiversity, habitat, or resources.
Biodiversity Units	A measure to describe the level of biodiversity present on a given site.
Department of Energy, Food, and Rural Affairs	DEFRA is a government department in the United Kingdom responsible for policy and regulations related to the environment, food, agriculture, fisheries, and rural communities.
DEFRA Statutory (Official) Biodiversity Metric	Is a tool developed by the UK Government that provides a standardised approach to quantifying changes in biodiversity resulting from development activities. It assigns values to different habitats and species based on their ecological importance, and it allows for the calculation of a numerical score that reflects the overall biodiversity impact of a development.
Ecosystem Restoration	The process of actively assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Restoration involves the reinstatement of ecological functionality and can include rehabilitation, reclamation, and rewilding efforts.
Habitat	The specific environment or type of ecosystem in which a particular species of organism lives. Habitats can range from forests and wetlands to grasslands and urban areas.
Habitat Condition	The state or quality of a habitat, taking into consideration factors such as biodiversity, ecological processes, and overall health. Habitat condition

Nomenclature	Description
	assessment is essential in determining the effectiveness of conservation or restoration efforts.
Habitat Distinctiveness	The unique characteristics and features that differentiate one habitat from another. Distinctiveness is often assessed based on the diversity of species, ecological functions, and physical attributes of a habitat.
Habitat Strategic Significance	The local importance of a habitat determined by assessing both its geographic location and the specific type of habitat it represents. This evaluation helps in understanding the unique value and contribution of the habitat in its surrounding ecosystem. By considering factors such as ecological connectivity, species interactions, and ecosystem services, we can better comprehend the role and significance of the habitat within its broader context.
Nature Positive	Refers to actions and initiatives that contribute to the conservation and restoration of nature, ensuring a net positive impact on the environment.
Science-Based Targets for Nature (SBTN)	Rigorous framework that uses measurable goals and guidelines for conserving biodiversity, developed using scientific data and analysis.
On-Site	Refers to activities, impacts, or features that occur within the boundaries of a specific development or project site. In the context of Biodiversity Net Gain, on-site measures may include habitat creation, enhancement, or protection within the project area.
Off-Site	Relates to actions or effects that occur outside the boundaries of the development or project site. Off-site measures in Biodiversity Net Gain may involve compensatory actions, such as creating or enhancing habitats in a different location to offset any biodiversity loss caused by the development.
Small Site	A small residential site is a development which is less than 1 hectare with less than 9 dwellings, or where the number of dwellings is unknown an area of less than 0.5 hectares. A small non-residential site is a development which has created floor space of less than 1,000 m^2 or with a total site area of less than 1 hectare. Small sites have a specific statutory metric developed by DEFRA and Natural England which is to be used when sites fall under these guidelines.
Major Development	A major development is any development, either residential or non-residential, which falls out of the requirements of a small site. This means more than 9 dwellings or greater than 0.5 hectares for residential developments or greater than 1,000 m^2 floor space, or over a hectare for non-residential developments. The statutory biodiversity metric developed by DEFRA and Natural England must be used in this case, and not the small sites metric.

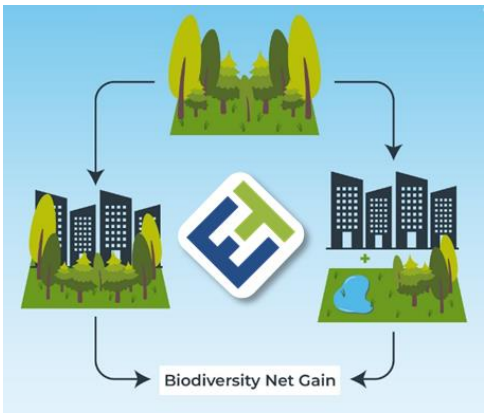
Methodology and Quantification Standards

This Biodiversity Net Gain (BNG) report has been completed using methodology consistent with the Science Based Targets for Nature (SBTN), Nature Positive Initiatives, and DEFRA Regulations.



Science-Based Targets for Nature Steps which Tunley Environmental's Biodiversity Net Gain (BNG) services aligns with to achieve reduced impact on nature.

Biodiversity was quantified using the DEFRA (Department for Environment, Food & Rural Affairs) statutory (official) biodiversity metric as a tool to assess and measure biodiversity in the context of development projects. This metric is specifically designed to assist in quantification of the impact that development activities have on biodiversity and determine whether Biodiversity Net Gain (BNG) is achieved. Where BNG refers to the idea that the biodiversity value of a site should be enhanced due to development, ensuring a "net gain" in ecological terms.



Tunley Environmental's conceptualisation of Biodiversity Net Gain.

Where applicable, the equivalent small site biodiversity metric was utilised for developments under the requirements for the statutory (official) biodiversity metric. The BNG assessment was further completed using methodology consistent with the international standard BS 8683:2021 (Process for designing and implementing BNG). Information on data sources and assumptions made to support this analysis are provided in Appendix A.

Executive Summary

Biodiversity is the foundation of the global economy. The World Economic Forum (WEF) estimates that over 50% of the world's GDP, equivalent to 33 trillion pounds, significantly depends on nature and the services it provides. However, biodiversity is amid a severe global crisis. Human-induced changes in land and sea use, overexploitation, invasive species, pollution, and climate change are the primary drivers of rapid biodiversity decline. Human activity threatens approximately a million species with extinction, some within decades, and species are disappearing at a rate tens to hundreds of times faster than the natural pace. Between 1970 and 2016, populations of mammals, birds, amphibians, reptiles, and fish have, on average, decreased by 68%. Human activity has dramatically altered 75% of the land surface, significantly impacted 66% of the ocean, and led to the loss of 85% of wetlands.

These losses present significant risks to the global economy and human well-being. It is increasingly evident that natural resources are finite, and without protection, ecosystems and their services may be severely compromised. Since 2009, when biodiversity loss first appeared as a global risk in the World Economic Forum's annual Global Risk Report, its significance has steadily grown. Biodiversity loss has consistently ranked among the top 10 global threats since 2016.

Recognising the severity of this crisis, the integration of Biodiversity Net Gain (BNG) and ecosystem restoration emerges as a crucial strategy for mitigating the adverse effects of human activities on biodiversity. BNG aims to ensure that development projects not only avoid causing harm to ecosystems but actively contribute to a net positive impact on biodiversity. By implementing measures such as habitat creation, restoration, and protection, BNG seeks to counterbalance the negative ecological footprint of development. Simultaneously, ecosystem restoration, a proactive approach to rehabilitating degraded ecosystems, becomes integral to reversing the alarming trends in biodiversity decline. This involves initiatives such as reforestation, habitat restoration, and sustainable land management to enhance ecological resilience and promote the recovery of threatened species.

Tunley Environmental have conducted an independent assessment to quantify the biodiversity value of the site before and after development to assess biodiversity of the site. Using the hypothetical data from the DEFRA residential case study scenario, the baseline biodiversity units of the site were calculated to be 12.11 units for area 'habitats' and 1.91 units for 'hedgerows' over a total area of 4.19 ha. The biodiversity units comprised of 2.6 ha/km of 'modified grassland', 0.53 of 'other woodland; broadleaved', 0.52 of 'other neutral grassland', 0.19 of 'other woodland; broadleaved', and 0.16 of 'bramble scrub'. The hedgerow units consist of 0.14 'species-rich native hedgerow', 'species-rich native hedgerow with trees', and 0.01 'line of trees'.

Overall, the hypothetical residential development will result in a total biodiversity units net gain of 15.51% for area 'habitat' and 29.02% for 'hedgerow'. Thus, meeting, and surpassing the new national requirement to achieve **10% Biodiversity Net Gain.**

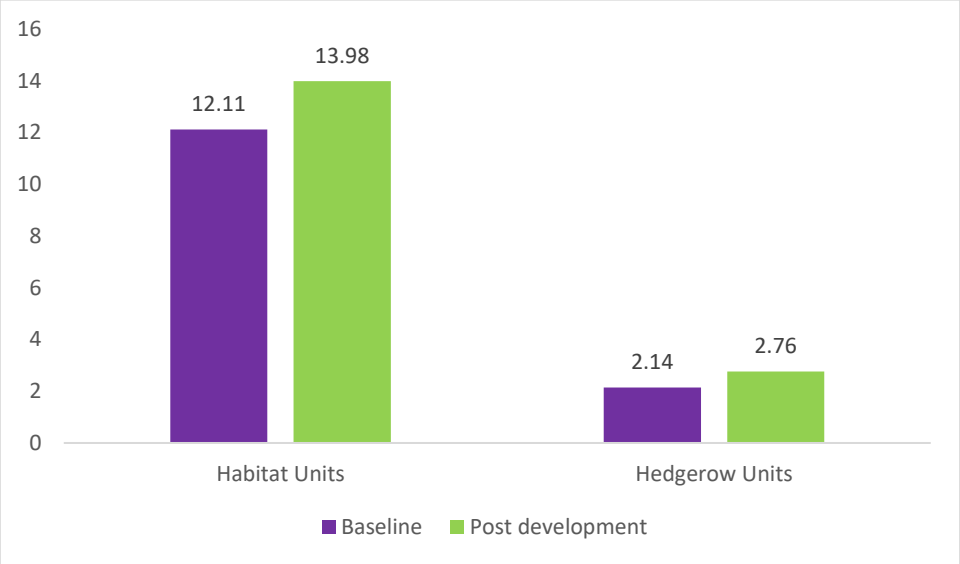


Figure 1. Total biodiversity units of the site, before and after development on proposed site.

Introduction

This case study covers a hypothetical residential development occurring at the edge of a town in north-west England, which is hereafter referred to as 'the proposed development'. All land within the project boundary of the proposed development classes as 'on-site'. The habitats on-site are predominantly 'modified grassland', with small areas of 'bramble scrub' and 'other neutral grassland'. There are plantations of 'other woodland; broadleaved' located to the north and east of the site, and some 'species-rich native hedgerows' and 'lines of trees' forming the field boundaries in the south and west. This case study does not include any watercourse habitats.

Accordingly, the proposed development site has been asked by the Local Planning Authority to provide evidence of 10% Biodiversity Net Gain (BNG) post-development to obtain planning permission.

Tunley Environmental has conducted an independent large site BNG assessment to identify and quantify the biodiversity of the site before and after the development. This BNG assessment calculates the biodiversity value of the land by evaluating the number of habitats present, the habitat types, size, condition, and location. These data inputs are utilised within the small site's statutory metric, due to the development size, to quantify the biodiversity units present before development. This is the baseline habitats and gives a value for baseline biodiversity units.

Below shows an example aerial image of the proposed development site where the perimeter of the site is outlined in red.

Figure 2. Example aerial view of the hypothetical site at pre-development.

Baseline Results (Pre-development)

Prior to analysing the biodiversity units post development, we must conduct a baseline assessment on the site pre-development to determine the existing biodiversity on the project site. This assessment establishes the current state of habitats, species, and ecosystem functions.

The baseline assessment for the proposed development site was conducted onsite by a certified ecologist at Tunley Environmental.

Figure 3. Examples of survey pictures of site that will inform the assessment. These habitats consist of broadleaf woodlands, bramble scrub, and neutral grassland on the hypothetical residential development project.

The UK habitat classification (UKHab) system is utilised to define most habitats inputted within the metric. For the proposed site for development, different 'habitat types' and 'hedgerows' biodiversity units were identified pre-development (see Figure 4 and Table 1). The different 'habitat types' identified on-site for this project included other woodland mixed habitats, developed land with a sealed surface, artificial unvegetated land with an unsealed surface, mixed scrub, vegetated garden, and ruderal/ephemeral land (see Figure 5). As for the different 'hedgerows' habitats, a 39 m length line of trees was identified on-site pre-development.

Table 1. Explanation of baseline habitat types, habitat characteristics, and predevelopment habitat area/length.

Habitat Type	Habitat Characteristics	Habitat Area or Length	Biodiversity/Hedge Units
Modified Grassland	Classifies under the broad habitat of **'Grassland'** and is defined as a species poor vegetation (<9 species per meters squared), dominated by fast growing grasses on fertile neutral soils.	2.6 ha.	5.20
Other woodland; broadleaved	Classifies under the **'Woodland and Forest'** broad habitat and consists of a mixture of broadleaved tree species.	0.72 ha.	4.19
Other neutral grassland	Classifies under the **'Grassland'** broad habitat that meets one of the three following criteria; more than 20% cover broadleaved herbs and sedges, more than 8 species per meter squared, more	0.52 ha.	2.08

	than 1 grass species that is not intensively sown, or there is a cover of rye-grasses and white clover.		
Bramble scrub	Classifies under the **'Heathland and Shrub'** broad habitat and is defined as dense scrub with bramble rubus friticosus agg. Dominant.	0.16 ha.	0.64
Species-rich Native hedgerow	Classifies under the broad habitat of **'Hedgerows and Lines of Trees'** is defined as native hedgerows with 5 or more UK-native or archeaophyte woody species in a 30 meter section.	0.14km	1.29
Species-rich native hedgerow with trees	Classifies under the broad habitat of **'Hedgerows and Lines of Trees'** and is defined as native hedgerows with 5 or more UK-native or archeaophyte woody species, with tree species present in a 30 meter section.	0.04km	0.83
Line of Trees	Classifies under the broad habitat of **'Hedgerows and Lines of Trees'** and is defined as a line of trees that is ≥20m long and <5m wide at the base. The canopy base is >2m height and there is open habitat on each side.	0.01 km	0.02

These areas are also depicted in Figure 5 as percentage contributions of the site by area, with 'modified grassland' comprising the greatest portion of 65%. With baseline units totalling 12.11 biodiversity units, 1.21 biodiversity units are required to achieve the biodiversity net gain 10% target in these 'area' habitats.

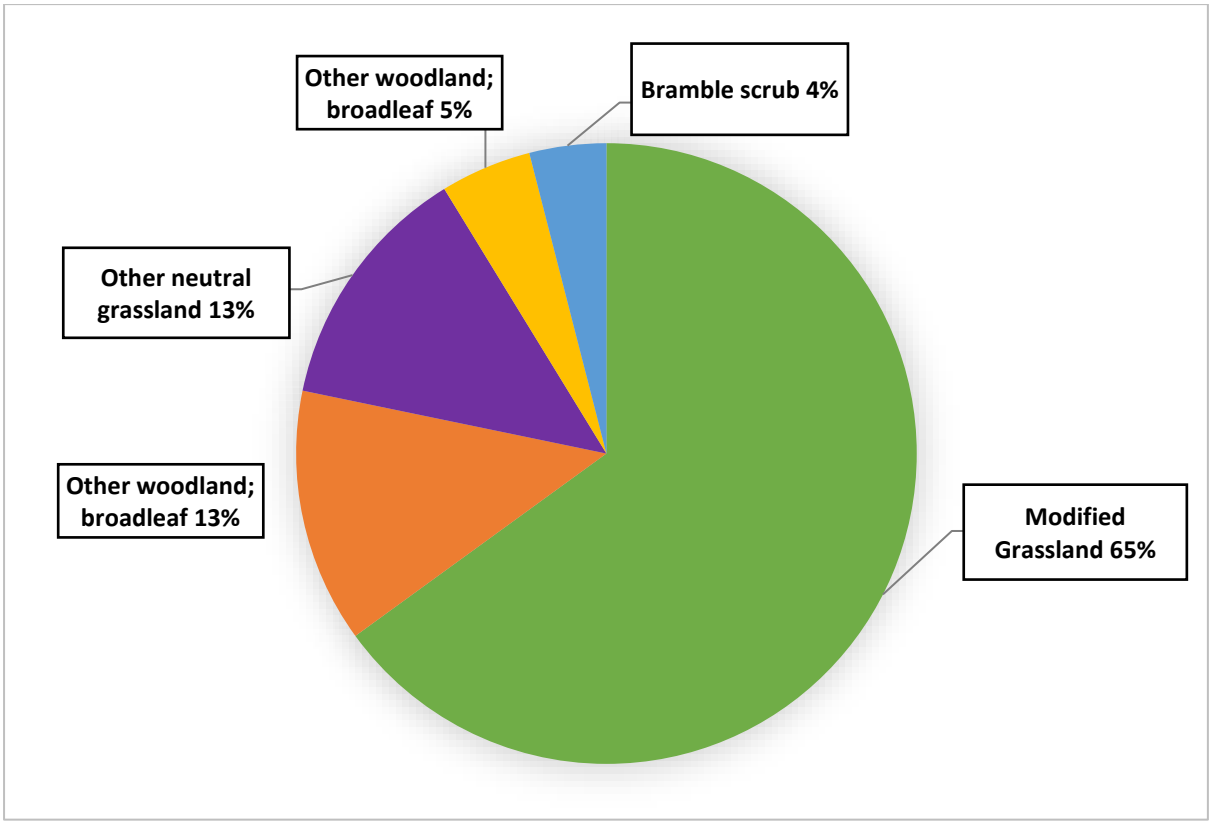


Figure 5. Percentage contribution of 'habitats' by area pre-development.

Within the proposed sites there are also habitats classed as 'hedgerows' habitat, thus it is necessary to show enhancement of 10% for this type of habitat in addition to 'area' habitats identified. Therefore, with a total of 2.14 hedgerow units at baseline requires a minimum of 0.214 hedgerow units is necessary within the 'hedgerow' habitat type to achieve this target.

The baseline 'hedgerow' habitats consist of 0.14 km 'species-rich native hedgerow', 0.04 km 'species-rich native hedgerow with trees', and 0.01 'line of trees'. The percentage composition pre-development can be seen in Figure 6.

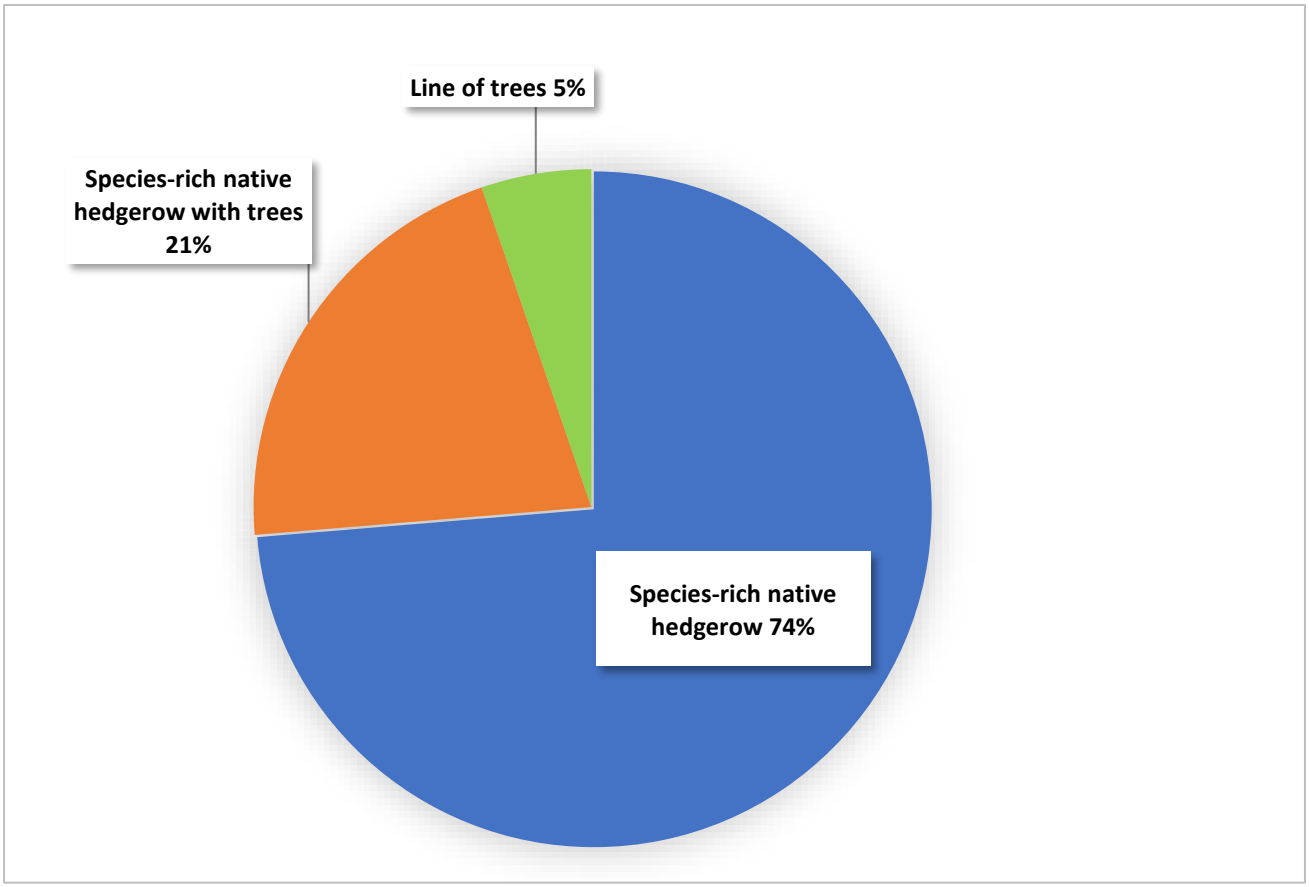


Figure 6 Composition percentage of baseline hedgerow habitats

Biodiversity Net Gain Results

The proposed development site aims to consider biodiversity impact by maximising habitat retention where possible and ensuring habitat creation to account for any biodiversity net loss due to construction, as well as to improve/enhance the site for the users whilst still contributing to BNG goals.

The proposed site will retain 0.19 ha of 'other woodland; broadleaved' in moderate condition as this is formally identified in local planning strategies with a value of 1.75 biodiversity units.

The proposed site will lose 2.6 ha of 'modified grassland' habitat for the core developments will result in a loss of 2.86 of biodiversity units. There will be a habitat creation of 1.6 ha of 'developed land, sealed surface', 0.06 ha 'built linear features', 0.7 ha 'vegetated garden', 0.1 ha 'intensive green roof', 0.2 ha 'rain garden', and 0.2 'willow scrub' in place of the original 'modified grassland habitat'. These changes will result in a loss of 2.86 of biodiversity units.

Table 2. Explanation of habitat type, habitat characteristics, and habitat area of all 'habitats' and 'hedgerows' to be created post-development.

Habitat Type	Habitat Characteristics	Habitat Area	Biodiversity/ Hedge Units
Rain garden	Classifies under the **'Urban'** broad habitat and is defined as shallow depression planted with dee-rooted native plants and grasses, located near a runoff source like a downspout, driveway, or sump pump to capture rainwater runoff and stop the water from reaching the sewer system.	0.2 ha	1.00
Intensive Green Roof	A high-maintenance green roof that is designed as a park or garden and includes shrubs, trees, perennials, and grasses.	0.1 ha	0.50
Built linear features	Walls, fences, and surfaced paths.	0.06 ha	0.00
Vegetated garden	Classifies under the broad habitat of **'Grassland'** and is principally vegetated, for example with large areas of grass and flower beds.	0.7 ha	1.35
Willow scrub	Dense scrub with Willow Salix spp. dominant	0.2	0.94
Developed land; sealed surface	Classifies under the **'Urban'** broad habitat and is defined as soil surface sealed with impervious materials as a result of urban development and infrastructure construction.	1.6 ha	0.00
Ecologically valuable line of trees- associated with bank or ditch	A line of trees that has at least one mature, veteran, or ancient tree per 30 m length.	0.01 km	0.04

Post-development the greatest portion of the site will be developed land; sealed surface, at 42%, however enhanced, existing high biodiversity value habitats also form a significant portion of the site, such as 'other neutral grassland' which can be seen in Figure 7.

Changes proposed for this site replace an area of current 'modified grassland' with a housing development that have created 'developed; sealed surface', 'built linear feature', 'rain garden', 'vegetated garden', and 'intensified green roof'. Additionally, habitat areas were either retained or enhanced to a higher condition in order to reach a 15.51% biodiversity net gain. Additionally, 'willow scrub' was created in place of 'bramble scrub' to yield higher biodiversity units.

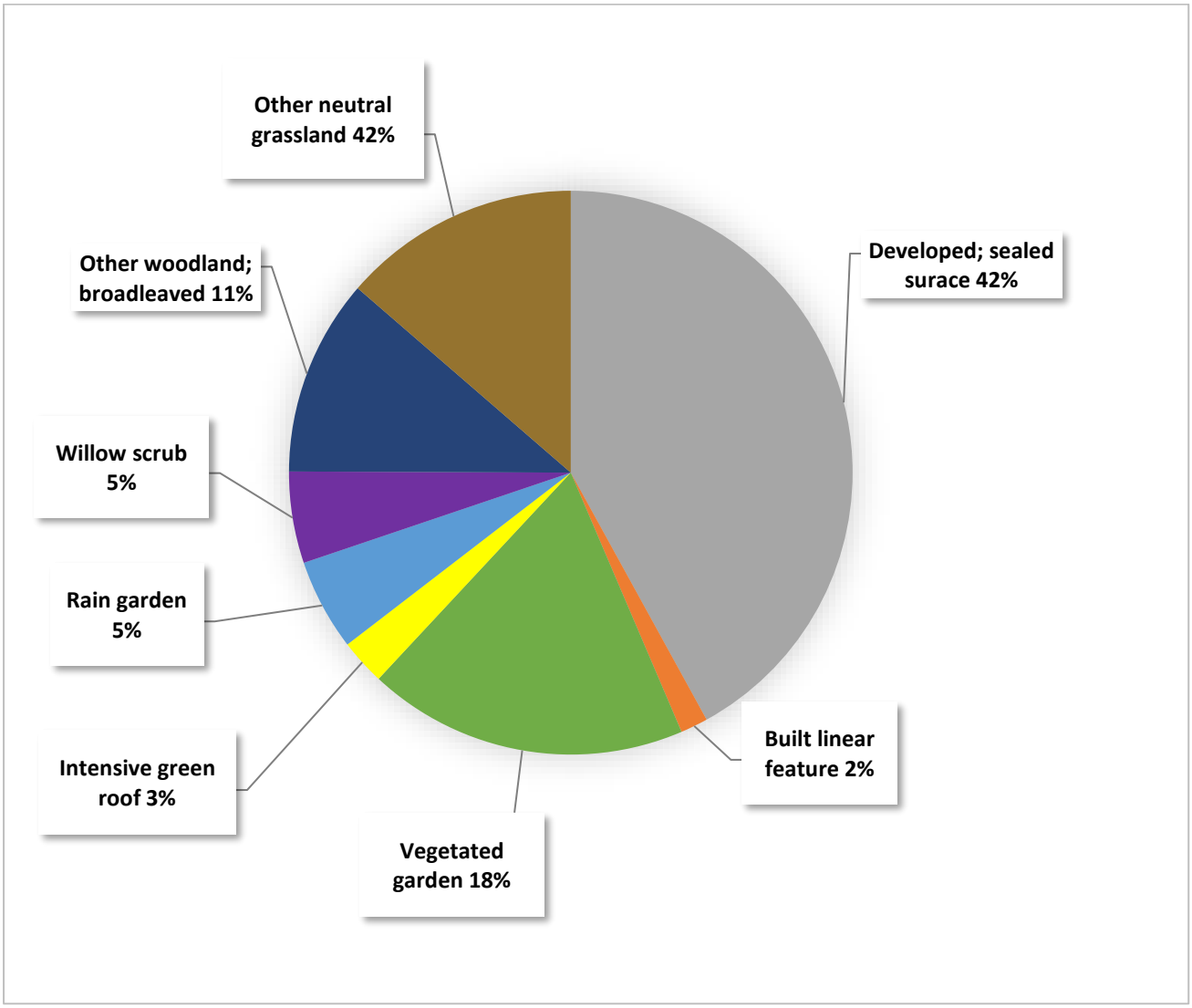


Figure 7. Percentage contribution of area 'habitats' post-development.

The incorporation of these habitat creations, retentions, or enhancements creates 1.88 biodiversity units, which brings the site to a total of 13.98 biodiversity units post-development, translating to 15.51% net gain in biodiversity. These initiatives therefore ensure that the minimum of 10% net gain target for biodiversity will be met (see Table 3).

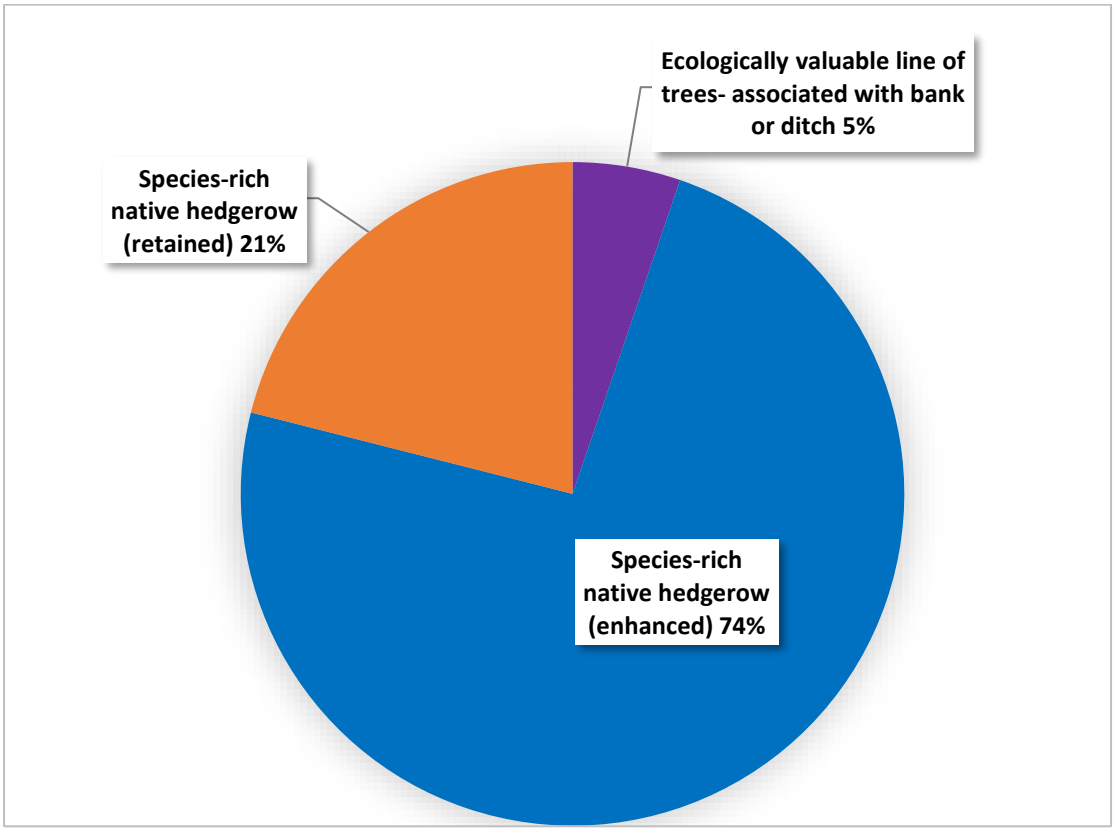


Figure 8. Percentage contribution of area 'hedgerow habitats' post-development.

In post-development the greatest portion of the site will 'species-rich native hedgerow' (enhanced), at 74%, however enhanced, existing high biodiversity value hedgerows also form a significant portion of the site, such as 'species-rich native hedgerow' (retained) at 21%, and the created 'ecologically valuable line of trees- associated with bank or ditch' which can be seen in Figure 7.

The changes proposed for this site are to enhance a hedgerow area of current 'species-rich native hedgerow' from a poor condition to a good condition; retain 'species-rich native hedgerow' at a good condition; and create a hedgerow habitat of 'ecologically valuable line of trees-associated with a bank or ditch' in order to reach biodiversity net gain of 29.02%. This changes in hedgerow habitat post-development can be seen in Figure 8.

We note that habitats created and maintained during development of this site should be monitored and protected for the next 30 years in a habitat management and monitoring plan. This includes regular checks of the site over the coming years to ensure that condition, habitat types and areas are conserved.

Conclusion

The BNG assessment by Tunley Environmental will assist the proposed development site in reaching the national standard of 10% biodiversity net gain by achieving a **15.51% net gain** for 'habitats' and **29.02% net gain** for 'hedgerows'.

BNG approaches offer a pathway to not only safeguard the intricate web of life on Earth but also to preserve the essential ecosystem services that underpin the global economy and human prosperity. As the urgency of addressing biodiversity loss intensifies, a

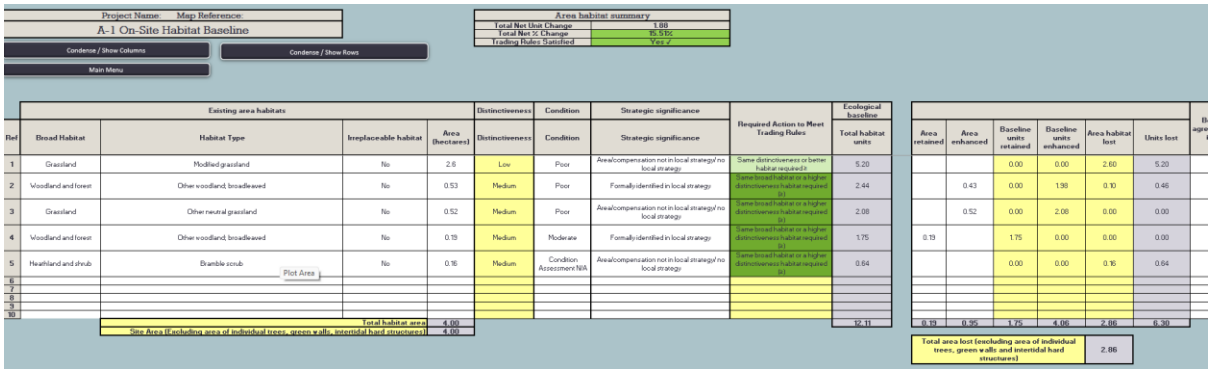
comprehensive strategy that integrates conservation, sustainable development, and restoration efforts is essential to ensure a resilient and biodiverse future for the planet.

Appendix

Data Sources and Assumptions

All data results were analysed through the Statutory large site DEFRA metric. Below are the results directly from this metric for the Moss Architecture site.

Area Habitats:



Project Name: Map Reference:
A-1 On-Site Habitat Baseline

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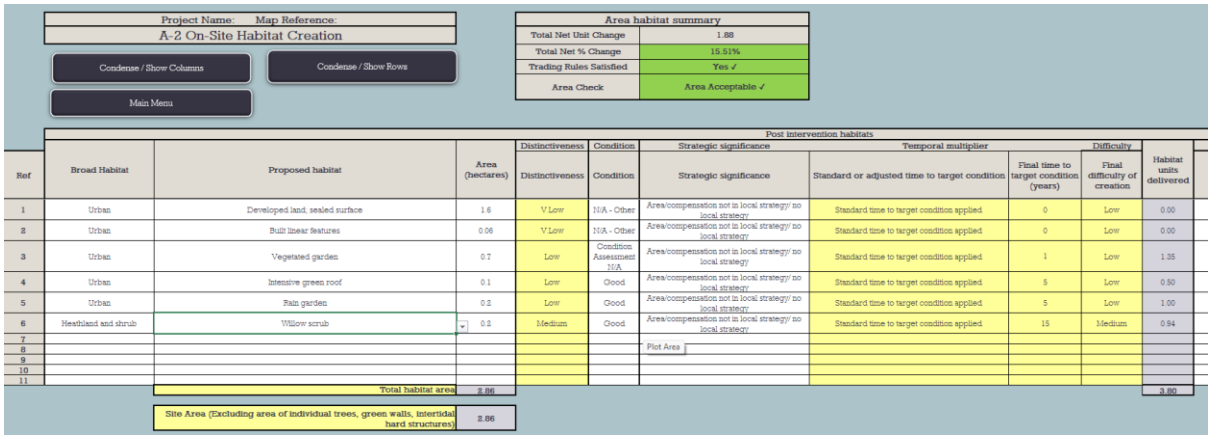
Area habitat summary

Total Net Unit Change	1.88
Total Net % Change	15.51%
Trading Rules Satisfied	Yes ✓

Ref	Broad Habitat	Habitat Type	Irreplaceable habitat	Area (hectares)	Distinctiveness	Condition	Strategic significance	Required Action to Meet Trading Rules	Ecological baseline: Total habitat units	Area retained	Area enhanced	Baseline units retained	Baseline units enhanced	Area habitat lost	Units lost
1	Grassland	Modified grassland	No	2.6	Low	Poor	Area/compensation not in local strategy/ no local strategy	Same distinctiveness or better habitat required (c)	5.20			0.00	0.00	2.60	5.20
2	Woodland and forest	Other woodland; broadleaved	No	0.53	Medium	Poor	Formally identified in local strategy	Same broad habitat or a higher distinctiveness habitat required (b)	2.44		0.43	0.00	1.98	0.10	0.46
3	Grassland	Other neutral grassland	No	0.52	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required (b)	2.08		0.52	0.00	2.08	0.00	0.00
4	Woodland and forest	Other woodland; broadleaved	No	0.19	Medium	Moderate	Formally identified in local strategy	Same broad habitat or a higher distinctiveness habitat required (b)	1.75	0.19		1.75	0.00	0.00	0.00
5	Heathland and shrub	Bramble scrub	No	0.16	Medium	Condition Assessment N/A	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required (b)	0.64			0.00	0.00	0.16	0.64
6															
7															
8															
9															
10															
		Total habitat area		6.00					12.11	0.19	0.95	1.75	4.08	2.86	6.30
		Site Area (Excluding area of individual trees, green walls, intertidal hard structures)		6.00											

Plot Area

Total area lost (excluding area of individual trees, green walls and intertidal hard structures) 2.86



Project Name: Map Reference:
A-2 On-Site Habitat Creation

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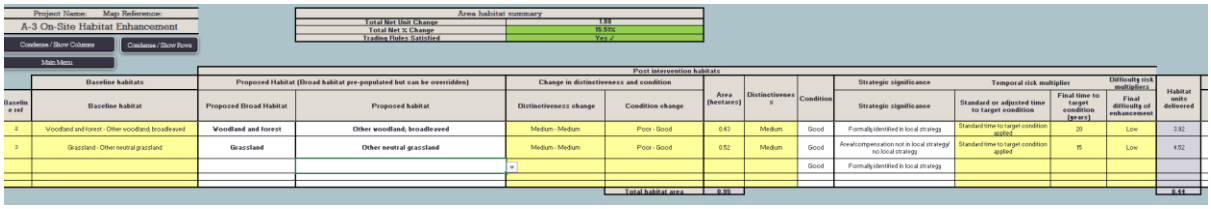
Area habitat summary

Total Net Unit Change	1.88
Total Net % Change	15.51%
Trading Rules Satisfied	Yes ✓
Area Check	Area Acceptable ✓

Post intervention habitats

Ref	Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness	Condition	Strategic significance	Temporal multiplier: Standard or adjusted time to target condition	Temporal multiplier: Final time to target condition (years)	Difficulty: Final difficulty of creation	Habitat units delivered
				Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition (years)	Final difficulty of creation	Habitat units delivered
1	Urban	Developed land; sealed surface	1.6	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Low	0.00
2	Urban	Built linear features	0.06	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Low	0.00
3	Urban	Vegetated garden	0.7	Low	Condition Assessment N/A	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	1	Low	1.35
4	Urban	Intensive green roof	0.1	Low	Good	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	0.50
5	Urban	Rain garden	0.2	Low	Good	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	1.00
6	Heathland and shrub	Willow scrub	0.2	Medium	Good	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	15	Medium	0.94
7										
8										
9										
10										
11										
		Total habitat area	2.86							3.80
		Site Area (Excluding area of individual trees, green walls, intertidal hard structures)	2.86							

Plot Area



Project Name: Map Reference:
A-3 On-Site Habitat Enhancement

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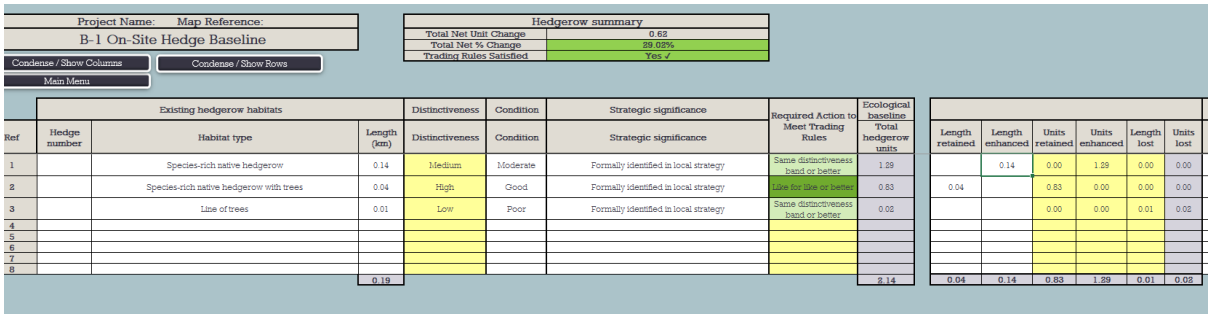
Area habitat summary

Total Net Unit Change	1.88
Total Net % Change	15.51%
Trading Rules Satisfied	Yes ✓

Post intervention habitats

Baseline habitats: Baseline habitat	Proposed Habitat (Broad habitat pre-populated but can be overridden): Proposed Broad Habitat	Proposed Habitat (Broad habitat pre-populated but can be overridden): Proposed habitat	Change in distinctiveness and condition: Distinctiveness change	Change in distinctiveness and condition: Condition change	Area (hectares)	Distinctiveness	Condition	Strategic significance	Temporal risk multiplier: Standard or adjusted time to target condition	Temporal risk multiplier: Final time to target condition (years)	Difficulty risk multipliers: Final difficulty of enhancement	Habitat units delivered
2 Woodland and forest - Other woodland; broadleaved	Woodland and forest	Other woodland; broadleaved	Medium - Medium	Poor - Good	0.43	Medium	Good	Formally identified in local strategy	Standard time to target condition applied	20	Low	3.92
3 Grassland - Other neutral grassland	Grassland	Other neutral grassland	Medium - Medium	Poor - Good	0.52	Medium	Good	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	15	Low	4.52
							Good	Formally identified in local strategy				
				Total habitat area	0.95							8.44

Hedge Habitats:



Project Name: Map Reference:
B-1 On-Site Hedge Baseline

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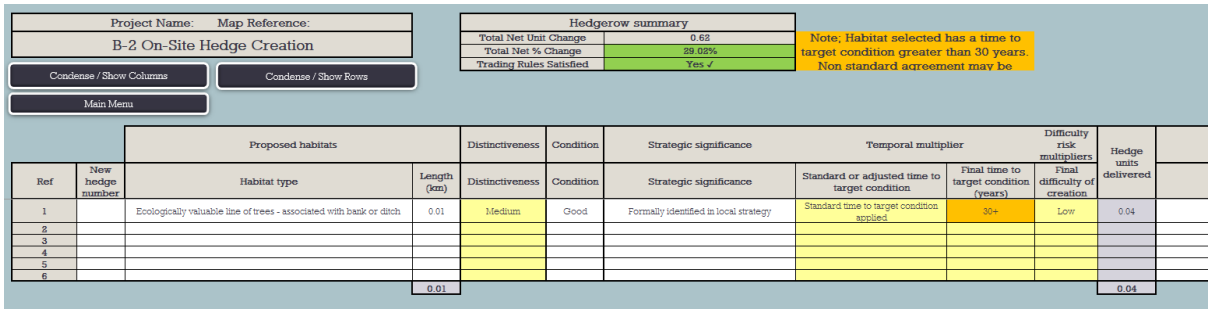
Hedgerow summary	
Total Net Unit Change	0.62
Total Net % Change	29.02%
Trading Rules Satisfied	Yes ✓

Ref	Existing hedgerow habitats: Hedge number	Habitat type	Length (km)	Distinctiveness	Condition	Strategic significance	Required Action to Meet Trading Rules	Ecological baseline: Total hedgerow units	Length retained	Length enhanced	Units retained	Units enhanced	Length lost	Units lost
1		Species-rich native hedgerow	0.14	Medium	Moderate	Formally identified in local strategy	Same distinctiveness band or better	1.29		0.14	0.00	1.29	0.00	0.00
2		Species-rich native hedgerow with trees	0.04	High	Good	Formally identified in local strategy	Like for like or better	0.83	0.04		0.83	0.00	0.00	0.00
3		Line of trees	0.01	Low	Poor	Formally identified in local strategy	Same distinctiveness band or better	0.02			0.00	0.00	0.01	0.02
4														
5														
6														
7														
8														
			0.19					2.14	0.04	0.14	0.83	1.29	0.01	0.02



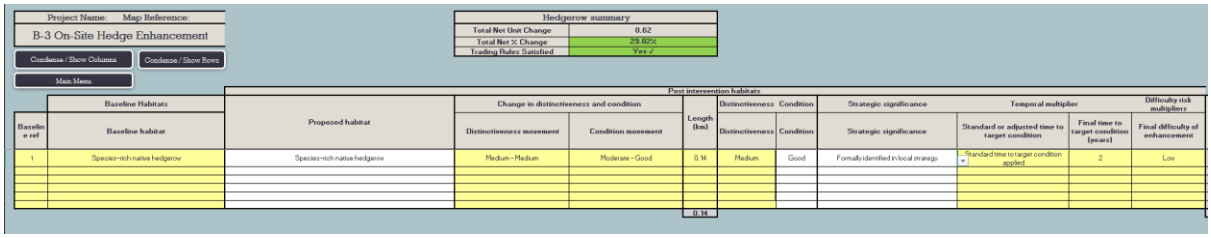
Project Name: Map Reference:
B-2 On-Site Hedge Creation

Condense / Show Columns | Condense / Show Rows | Main Menu

Hedgerow summary	
Total Net Unit Change	0.62
Total Net % Change	29.02%
Trading Rules Satisfied	Yes ✓

Note; Habitat selected has a time to target condition greater than 30 years. Non standard agreement may be

Ref	New hedge number	Proposed habitats: Habitat type	Length (km)	Distinctiveness	Condition	Strategic significance	Temporal multiplier: Standard or adjusted time to target condition	Final time to target condition (years)	Difficulty risk multipliers: Final difficulty of creation	Hedge units delivered
1		Ecologically valuable line of trees - associated with bank or ditch	0.01	Medium	Good	Formally identified in local strategy	Standard time to target condition applied	30+	Low	0.04
2										
3										
4										
5										
6										
			0.01							0.04



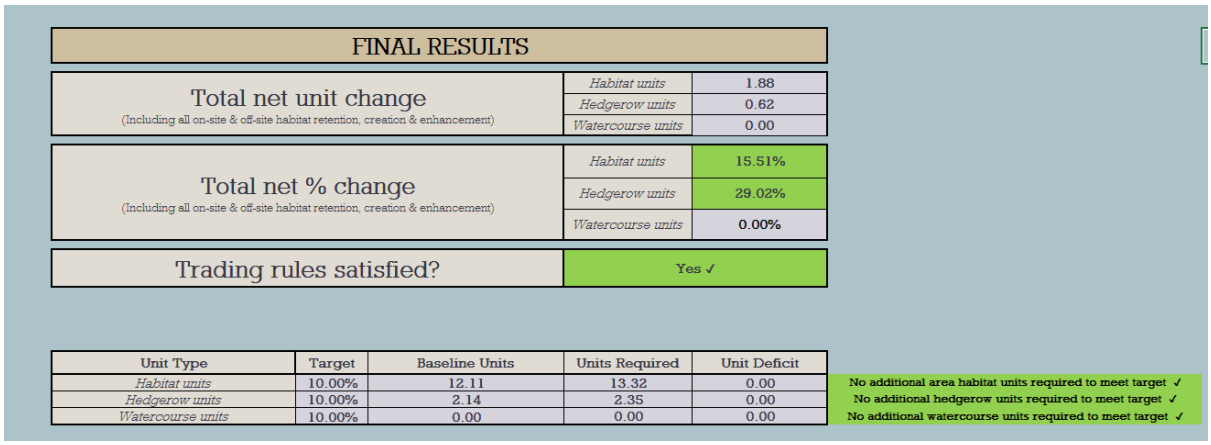
Project Name: Map Reference:
B-3 On-Site Hedge Enhancement

Condense / Show Columns | Condense / Show Rows | Main Menu

Hedgerow summary	
Total Net Unit Change	0.62
Total Net % Change	29.02%
Trading Rules Satisfied	Yes ✓

Baseline Habitats: Baseline ref	Baseline habitat	Post intervention habitats: Proposed habitat	Change in distinctiveness and condition: Distinctiveness movement	Condition movement	Length (km)	Distinctiveness	Condition	Strategic significance	Temporal multiplier: Standard or adjusted time to target condition	Final time to target condition (years)	Difficulty risk multipliers: Final difficulty of enhancement
1	Species-rich native hedgerow	Species-rich native hedgerow	Medium - Medium	Moderate - Good	0.14	Medium	Good	Formally identified in local strategy	Standard time to target condition applied	2	Low
					0.14						

Final Metric Results



FINAL RESULTS

Total net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	1.88
	Hedgerow units	0.62
	Watercourse units	0.00
Total net % change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	15.51%
	Hedgerow units	29.02%
	Watercourse units	0.00%
Trading rules satisfied?		Yes ✓

Unit Type	Target	Baseline Units	Units Required	Unit Deficit	
Habitat units	10.00%	12.11	13.32	0.00	No additional area habitat units required to meet target ✓
Hedgerow units	10.00%	2.14	2.35	0.00	No additional hedgerow units required to meet target ✓
Watercourse units	10.00%	0.00	0.00	0.00	No additional watercourse units required to meet target ✓

Specification of Habitat and Hedgerow modifications:

Description of modifications	Habitats	Hedgerows
Total on-site and baseline units	12.11	2.14
Total on-site and off-site baseline units retained	1.75	0.83
Total on-site and off-site baseline units proposed for enhancement	+4.06	+1.29

Total on-site baseline units lost	-6.30	-0.02
Total on-site creation of area habitats: - 1.6 ha. developed land, sealed surface - 0.06 ha. Built linear features - 0.7 ha. Vegetated garden - 0.1 intensive green roof - 0.2 ha. Rain garden - 0.2 ha. Willow scrub	 0.00 0.00 +1.35 +0.5 +1.00 +0.94	
Total on-site enhancement of area habitats: - .43 ha Other woodland, broad leaved (poor condition -> good condition) -0.52 ha Other neutral grassland (poor condition -> good condition)	 +3.92 +4.52	
Total on-site creation of hedgerow: -0.01 ha ecologically valuable line of trees-associated with a bank or ditch		+0.04
Total on-site enhancement of hedgerow: - 0.14 km Species-rich native hedgerow (moderate condition -> good condition)		+1.89
Total on-site area retention: **-** 0.04km Species-rich native hedgerow (good condition) - 0.19 ha Other woodland; broadleaved (moderate condition)		0.83 1.75
Total Net Gain %	**Habitat net gain 15.51%**	**Hedgerow net gain 29.02%**

Specifications of Habitats Created:

Rain Garden:

Rain Garden

Refer to the Drainage Engineers Specification for details of:

- Swale construction
- Exact Cross Section Profile and levels
- SUDS capacity
- Surface Water Inlet & Outfall surface water connections
- Outfall Manhole detail

Swale Appearance & Planting

Refer to Typical Rain Garden Cross Section for Construction Build Up:

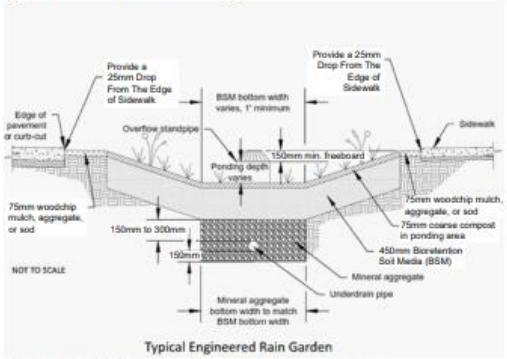
Swale Pond Base: to be pebble finish

Planting

Pond Base: Mixed Reeds and water plants selected to match applicable planting condition depth.

- **Side Boards:** Mixed wild grasses / gravel mulch

Typical Rain Garden Image



Typical Engineered Rain Garden

Typical Rain Garden Swale Construction Cross Section

Neutral Grassland:

Wided Grass & Flower Border

Supplier: Land Life Wild Flowers

https://www.wildflower.co.uk/products/wildflower-seed-mixtures/100-wildflower-seed-mixtures/lw6-wetland-pond-edge-100.html

Description

Wetland & Pond Edge Wildflower Seeds LW6P

Comprising of a wide variety of native UK nectar rich wildflowers to attract pollinators , well suited to pond edge / rain garden locations. Contains 22 different native wildflower species.

See images of seed mix adjacent.

	Common Name	Latin Name	Quantity	Flowers	Height	Type
1	Agrimony, Hemp	Eupatorium cannabinum	1%	Jul - Sep	60 - 150cm	Perennial
2	Angelica, Wild	Angelica sylvestris	8%	Jul - Aug	100 - 200cm	Perennial
3	Avens, Water	Geum rivale	3%	May - Aug	50 - 70cm	Perennial
4	Bedstraw, Hedge	Galium mollugo	6%	Jun - Oct	10 - 50cm	Perennial
5	Bedstraw, Lady's	Galium verum	6%	Jun - Sep	50 - 80cm	Perennial
6	Buttercup, Meadow	Ranunculus acris	8%	May - Jun	30 - 100cm	Perennial
7	Campion, Red	Silene dioica	7%	Apr - Sep	60 - 90cm	Perennial
8	Figwort	Scrophularia nodosa	1%	Jun - Sep	35 - 80cm	Perennial
9	Gypsywort	Lycopus europaeus	2%	Jul - Sep	60 - 100cm	Perennial
10	Hard Rush	Juncus inflexus	3%	Jun - Sep	35 - 60cm	Perennial
11	Iris, Yellow-Flag	Iris pseudacorus	10%	Jun - Sep	60 - 100cm	Perennial
12	Loosestrife, Purple	Lythrum salicaria	2%	Jun - Sep	100 - 200cm	Perennial
13	Meadowsweet	Filipendula ulmaria	7%	Jun - Aug	80 - 200cm	Perennial
14	Ragged Robin	Lychnis flos-cuculi	4%	May - Aug	30 - 90cm	Perennial
15	Scabious, Devil's-bit	Succisa pratensis	4%	Jul - Sep	50 - 80cm	Perennial
16	Sedge, Pendulous	Carex pendula	4%	May - Aug	80 - 100cm	Perennial
17	Self-heal	Prunella vulgaris	9%	Jun - Sep	15 - 30cm	Perennial
18	Sneezewort	Achillea ptarmica	3%	Jul - Sep	40 - 60cm	Perennial
19	Soft Rush	Juncus effusus	3%	Jun	45 - 100cm	Perennial
20	St John's-wort, Sq. Stem	Hypericum tetrapterum	2%	Jun - Sep	60 - 100cm	Perennial
21	Trefoil, Greater Bird's-foot	Lotus uliginosus	4%	Jun - Aug	20 - 60cm	Perennial
22	Vetch, Tufted	Vicia cracca	3%	Jun - Sep	100 - 150cm	Perennial

Approval

Author:	Tara Garraty
Position:	Biodiversity Specialist and Sustainability Scientist
Written Date:	20th February 2024
Approved by:	Dr Aaron Yeardley, AMIChemE
Position:	Senior Scientist
Approved Date:	22nd February 2024
Reference:	Case_Study_Defra
Revision:	A

Revision History:	Change Description:	Changed by:	Date:	Approved by:	Date:
B					
C					
D					
E					
F					

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