7th July 22 (Rev B)

Technical Note – Preliminary Biodiversity Net Gain Assessment

6302E– SWANSTREE AVENUE, SITTINGBOURNE

FPCR Environment and Design Ltd. (FPCR) have been instructed by Gladman to complete a preliminary biodiversity offsetting assessment at the above-named site. The assessment has been undertaken to inform the outline planning application for the creation of a residential development, associated infrastructure and green infrastructure on Land off Swanstree Avenue in Sittingbourne, Kent.

A Phase 1 habitat and protected species surveys, including great crested newt *Triturus cristatus* (GCN), bats, badger *Meles meles*, reptiles and dormice *Muscardinus avellanarius* were undertaken by FPCR in 2014, for a previous application which encompassed the arable fields to the east and south of the site. The red line boundary has since been reduced for the application in 2021 and a walkover survey was undertaken on 11th March 2021 to update the baseline information.

The habitats are described in detail within the FPCR Ecological Appraisal Report, which should be referred to throughout this document (October 2021).

The framework details the illustrative development proposals, providing greenspace in the western and northern extents of the site. The green infrastructure will comprise enhanced grassland, scrub, hedgerow and tree lines along with the inclusion of a wildlife pond in addition to the SuDs basin. These habitats will be supported through hedgerow, scrub and tree planting to support the habitat connections on and off site.

Calculations for the potential net gains available have been undertaken using the DEFRA Biodiversity Metric 3.0 Auditing and Accounting for Biodiversity Calculation tool. It should be noted that a full condition assessment was not undertaken during the site walkover however the majority of the site is arable, which is pre-defined in the metric as *Poor* condition.

The below document sets out the results of the survey work undertaken, the potential for each parcel of land and the next steps in terms of biodiversity units.

Baseline Habitats

The development site is mapped and divided into existing habitat criteria, with linear features overlaid; this information is primarily gained from Phase 1 Habitat and UK habs Surveys and is used to assess the habitat area, hedgerow lengths and distinctiveness which are used to calculate the value of each habitat and hedgerow. The areas/lengths of habitats/hedgerows to be retained, enhanced or lost are also calculated.

The potential of incorporating all notable species in the metric calculations is currently considered to be overly complex and difficult to accurately quantify (potentially leading to over or under calculating the value of certain parcels of land).

It has been agreed that existing legal processes for protecting species will take precedent and there are mechanisms by which impacts are to be addressed. Further to this, species not covered by specific legislation will be dealt with appropriately through a targeted mitigation approach factored into the habitat creation process.

On-site compensation

In addition to quantifying the biodiversity value of habitats/hedgerows to be lost, to determine the offsetting requirement it is also necessary to measure the offsetting potential of on-site mitigation measures. This allows for the potential quantity of off-site units (if required) to be calculated. For this to take place a number of factors must be considered:

- the accurate size of the mitigation areas;
- the habitat distinctiveness, and the target distinctiveness once improved; and
- the condition of the habitat at the start of the offset project, and its condition at the end

The potential compensation value is derived from the difference in quality and quantity between the habitat to be lost and that to be created. The area from which the same number of units can be achieved may allow for the area required for mitigation to be smaller than that which is being lost. For example, if a habitat of low distinctiveness and poor condition is improved to create a habitat of high distinctiveness in good condition, the area needed to offset can theoretically be less than that lost.

Risk Multipliers

Once the maximum potential value of the mitigation is calculated (the difference between the current value and the proposed value) a set of risk multipliers is utilised to quantify the difference between the area to be lost and the area to be created/enhanced.

The aim of a multiplier is to correct for a disparity or risk. There are two main types of risk that are associated with habitat creation:

- Delivery risks: The risks associated with the actual delivery of the offset due to the uncertainty in the effectiveness of restoration and/or habitat creation/management techniques.
- Spatial risks: These reflect ecological risks deriving from the change in location of the habitat or resource. For example, it may be that recreating a type of habitat in a new location may reduce its biodiversity value.

Once there is an estimate of the failure risk, it is possible to work out the necessary multiplier to achieve a suitable level of confidence.

Through the delivery of offsets, there may be a difference in time between the negative effect on biodiversity and the offset reaching the required quality or level of maturity, resulting in a loss of biodiversity for a period of time. To address the issue of a time-lag, a multiplier is applied. The number of years that time discounting should take into consideration, is from the point of impact to the estimated time that it will take for the habitat to reach the pre-agreed target quality.

Calculating Biodiversity Units

The DEFRA 3.0 Metric was used to inform this application. Once all factors of distinctiveness, target condition, risk and temporal multipliers have been assigned for each habitat type, the calculation results in a Habitat Mitigation Score (HMS), which is the biodiversity units that the site will provide post-development.

To calculate the overall net biodiversity loss or gain for the scheme being assessed, which is termed the Habitat Biodiversity Impact Score (HBIS), the pre-development biodiversity units, i.e. the Habitat Impact Score (HIS), is subtracted from the post-development biodiversity units, the Habitat Mitigation Score (HMS). Therefore:
HBIS = HMS – HIS

Considerations

Natural ecological communities are susceptible to change; at times this change can be rapid as a result of internal and external environmental factors.

Due to the early planning stages in the development, the illustrative framework does not contain specific details regarding the habitat creation and enhancement onsite. Where possible these habitat creation and enhancement details have been selected as part of this biodiversity offsetting assessment, to provide the most appropriate habitats for the greenspace provided in the proposals. However, it is accepted that additional habitat types will be created in more developed framework plans, and thus the biodiversity offsetting score will likely change.

It should be noted that the phase 1 survey of this site was completed outside of the optimal survey season period (April – September), and thus this limits the accuracy of the ecological assessments gleaned from biodiversity offsetting calculations, however, due to the habitat types present and the availability of historical data it is considered that the data provided is appropriate. When completing the assessment at the reserved matters stage, a condition assessment during the optimal surveying period should accompany the assessment, to improve the accuracy and reliability of the offsetting calculations.

Site Context

The site sits on the south-eastern periphery of Sittingbourne, with pastoral and arable environs dominating the landscape to the south. The site measures approximately 5.9ha and comprised two large field compartments of arable and intensive orchards, partially bisected laterally by a tree line, with a small field compartment of modified grassland in the north-eastern corner. Other small areas of habitat on site included semi-improved grassland, tall herb/ruderal herb, and ephemeral vegetation.

The northern site is bound by a fence line along Swanstree Avenue, beyond which lies the residential area of Sittingbourne and the A2 road. The site can be accessed via Chilton Manor Farmhouse and shop to the north-west of the Site off Highsted Road, which separates the site from further residential areas to the west. Tall mature treelines are present along the southern and eastern boundaries and a short section of isolated hedgerow along the north.

A desk top study and protected species surveys were undertaken in support of the application, with full details provided in the accompanying Ecological Appraisal Report (FPCR, October 2021).

BASELINE INFORMATION & ASSESSMENT (FIGURE 1 BASELINE HABITATS)

The baseline habitats have been described below and are illustrated in *Figure 1 Baseline Habitats* (detailed descriptions and species lists are provided in the accompanying Ecological Appraisal Report, (FPCR, October 2021). The information collected has been used to inform the framework design. The biodiversity units for the habitat and hedgerows on the site have been calculated using the DEFRA 3.0 metric, and can be found in *Appendix A Headline Results.*

Arable

The site was predominately in use as arable fields, which were compartmentalised for the orchards. The larger of the arable fields was growing cabbage at the time of survey with plots of fruit-bearing species. As is typical of this habitat type, floral diversity was low due to the intensive management practices and the input of fertiliser, pesticide and herbicide. Wide field margins present in between the plots supported modified grassland.

Grassland

A small field compartment in the north-eastern corner comprised species poor semi-improved grassland that was relatively uniform in height, comprising common and widespread species with a low diversity of herbs.

This was assessed as being in *Poor* condition.

Intensive Orchards

Two areas of intensively managed fruit orchard were present onsite, which largely comprised fruit trees including cherry, plum and apple. Areas of sweetcorn and strawberries were also present. The ground flora within the orchards was dominated by modified grassland.

Treelines

Tree lines were present in the southern extent of the site, all of which comprised single species Lombardy-poplar *Populus nigra*.

Hedgerows

One intact species-poor hedgerow was present forming a section of the western boundary of the site and continuing outside of the site boundary along Highsted Road. The hedgerow was dominated by beech *Fagus sylvatica* with no standards or connections. The hedgerow contained over 80% native woody species and were therefore identified as a Habitat of Principal Importance under Section 41 of the NERC Act (2006).

The baseline habitats consisted of:

- 3.9965ha of horticulture (arable) (N/A condition) – 7.99 habitat units lost
- 1.5535ha intensive orchards – 3.11 habitat units lost
- 0.174ha of other neutral grassland (poor condition) – 0.70 habitat units lost
- 0.1805ha of developed land/sealed surface (N/A condition) – 0 habitat units

The arable habitats and grassland will be lost and the linear boundary features retained and enhanced.

The baseline hedgerows and linear features consisted of:

- 0.023km of native hedgerows (moderate condition) – 0.24 hedgerow units
- 0.874km of moderate condition tree lines – 1.741 treeline units retained
- 0.031km of moderate condition tree lines – 0.12 treeline units lost

BIODIVERSITY NET GAIN RESULTS (FIGURE 2 PROPOSED HABITATS)

Habitat Creation (*Figure 2*)

Proposed habitats and linear features are illustrated on the framework plan (*Ref 06302-FPCR-ZZ-ZZ-DR-L-0002-07).* The biodiversity units for proposed on-site habitat compensation have been calculated and can be found in *Appendix A Headline Results*. A description of the proposed habitats to be created can be found below.

Urban – Developed Land; Sealed Surface
This habitat type comprises residential buildings and hardstanding including roads and pavements and a pumping station next to the SuD. This assessment has taken a conservative approach and split the developable area with vegetated gardens on a 70/30 ratio.

Urban – Vegetated Garden
This habitat type comprises residential gardens, the developable area has been split with vegetated gardens at a 70/30 ratio.

Grassland – Other neutral grassland
The north-east and western extents of the site will be converted to wildflower grassland via seeding with an appropriate wildflower seed mix and subject to a regular management regime to promote the quality of the habitat.

This falls under the same broad habitat type of 'other neutral grassland' and is expected to achieve *Moderate* condition within 10 years with low difficulty.

Grassland – Modified Grassland
An amenity species mix (i.e. Emorsgate EG22) will likely be used in areas in close proximity to buildings and infrastructure which will be intensively managed for frequent recreational use.

This grassland has the potential to achieve *Poor* condition within 1 year at low difficulty.

Areas of the amenity grassland areas should be seeded with a flowering lawn mix and subject to relaxed mowing, to promote sward variety to increase the habitat value to invertebrates and other wildlife.

Heathland and Shrub – Mixed Scrub
Areas of native mixed scrub/shrubs are proposed around the development, largely on the eastern and southern boundary edges as buffer planting and surrounding the SuDs. This habitat type is illustrated as scattered tree and shrub planting on the framework however, due to the species being planted, the denseness, and the proposed management, it is considered that the habitat will establish as a mix of scrub and woodland habitat. A diverse mixture of fruit and nut-bearing species will be managed to develop habitat structure suitable for a variety of wildlife onsite.

The mixed scrub is expected to reach *Good* condition in ten years with low difficulty.

Grasslands – Traditional Orchards
Areas of orchard planting are proposed around the development, which would contain a variety of fruit trees, characteristic of the local area. To achieve *Moderate* condition within 20 years at low difficulty, the baseline habitat would need to be seeded with a wildflower seed mix and managed as other neutral grassland.

Should the need arise, there is the potential for some of these areas to be managed as allotments/community growing areas, which would need to contain a variety of vegetation structure including trees, scattered scrub and wildflower grassland, to achieve *Good* Condition.

Lakes – Ponds (Non Priority Habitat)
A pond is proposed in the north-eastern extent of the site, the pond will be permanently wet and designed specifically for wildlife with shallow profiles and scalloped edges.

New aquatic, marginal and pond edge vegetation planting will be required to achieve *Good* condition, which is expected to be achieved within five years, with low difficulty.

Urban – Sustainable Urban Drainage Feature
No specific habitat creation for planting in this feature have been finalised at this stage. It is suggested that the SuDs should be sown with an appropriate wildflower seed mix and managed appropriately.

There arises the option of lining the SuDs to create a permanently wet feature and the addition of wet meadow grassland creation around the pond and SuDs would provide further enhancements. A species mix such as Emorsgate EP1 would help to further promote a diverse assemblage of wildflowers and would increase the net gain score.

Urban – Urban Tree
Areas of tree planting are proposed around the development, native specie should be used. The trees are expected to achieve moderate condition in 27 years, with low difficulty.

Table 1 Potential Unit Gains

Proposed Habitat	Proposed Condition	Area/ Length	Distinctiveness	Strategic significance	Habitat units delivered
Traditional Orchard	*Moderate*	0.1475	*High*	*Medium*	0.95
Other neutral grassland	*Moderate*	0.5986	*Medium*	*Medium*	4.41
Modified Grassland	*Poor*	*0.6707*	*Low*	*Medium*	*3.45*
Mixed scrub	*Good*	0.3553	*Medium*	*Medium*	3.28
Non Priority Pond	*Good*	0.0109	*Medium*	*Medium*	0.12
SuDs feature	*Moderate*	0.2267	*Low*	*Medium*	0.60
Vegetated Gardens	*Poor*	1.16301	*Low*	*Medium*	2.47
Developed Land	*N/A*	2.73169	*V.Low*	*Medium*	0
Urban Tree	*Moderate*	0.04205088	*Medium*	*Medium*	0.14

Enhancements

Hedgerows – Native Species-Rich hedgerow with Trees
The existing hedgerow will be retained and enhanced by increasing species diversity, through the addition of native fruit and nut-bearing species, as well as appropriate management schemes to improve the structure and form of all the hedgerows.

The hedgerow enhancement is calculated to have a time to *Medium* condition of 10 years, with a low difficulty of creation.

Treelines – Native Species Rich Hedgerows with Trees
The existing treelines will be retained and enhanced by increasing species diversity, through the planting of native fruit and nut-bearing species, as well as appropriate management schemes to improve the structure and form of all the boundary features / hedgerows.

The treeline enhancements are calculated to have a time to *Medium* condition of 12 years, with a low difficulty of creation.

Conclusion

The results of the assessment demonstrate that the scheme currently could potentially lead to the delivery of a total net gain in biodiversity for habitats and linear features.

The whole development area is currently valued at 11.80 units for habitats and 1.12 units for linear features. Where losses are unavoidable, the creation and management of new areas of high-quality habitat and the enhancement of retained habitats, results in a delivery of 13.40 units, meaning that there is a net gain in biodiversity of 1.72 units. This is a percentage increase of 13.62%.

The enhancement of existing hedgerows and treelines results in a delivery of 2.53 units providing a net gain in biodiversity of 1.41 units. This is a percentage increase of 126.27%.

ANALYSIS AND RECOMMENDATIONS

The site does not fall within the *Network Enhancement Zones* within the Natural England Habitat Network mapping.

The existing arable, intensive orchards and modified grassland habitat across the site is of low nature conservation value and supports limited biodiversity. Proposals for habitats of higher distinctiveness and condition would measurably and demonstrably increase the value onsite. Species-rich grassland has significantly declined in the past century and would be a valuable addition to the ecological network of the area. Mixed scrub is also a valuable habitat for a number of species, especially when in combination with grassland and or woodland.

The mixed scrub planting and a combination of Other Neutral Grassland and Mixed Scrub as a mosaic with scrub edge to grassland ecotones is proposed. Such ecotones are a diverse and ecologically valuable habitat transition which are worth more than the sum of their numerical parts in the metric.

Based upon the information provided, it is considered that the proposed scheme has the potential to provide 10% net gain. Further enhancements have been suggested which can be finalised once the landscaping scheme is finalised at the reserved matters stage. However, it must be noted that changes to the proposed landscaping scheme or to the existing baseline (e.g. through a change in management) could significantly alter the assessment. For example, should the grassland diversity increase as a result of a change/lack of management, a net gain will be considerably harder to achieve as the development footprint will result in the loss of better-quality habitat.

Next Steps

The next steps include the following:

- Update habitat condition assessment,
- Design enhancement/habitat creation and re-run metric for final unit values;
- Update to new version of metric if available;
- Produce management plan(s) for establishment and long-term management (30 years) in order to achieve and maintain target habitats and conditions.
- Engage with Local Planning Authority for management

Key

- Red Line Boundary

Area Habitats

- Developed land; sealed surface
- Horticulture
- Intensive orchards
- Other neutral grassland

Hedgerows

- Line of Trees (w1g6NE2)
- Native Hedgerow (h2NE5)

H1
T1
T1
T1
T2
ROMAN BURIAL GROUND
Swanstree Avenue
Highfield Road
Chilton Manor Farm
Path (adj)

0 25 50 m

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client
Gladman

project
Land off Swanstree Avenue, Sittingbourne

drawing title
Baseline Habitats

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Figure 1

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Key

- Red Line Boundary

Area Habitats

- Developed land; sealed surface
- Mixed scrub
- Modified grassland
- Other neutral grassland
- Ponds (Non- Priority Habitat)
- Sustainable urban drainage feature
- Traditional orchards

Hedgerows

- Line of Trees (w1g6NE2)
- Native Hedgerow (h2NE5)

Urban Trees

- Proposed Small

Developable area estimated 70/30 ratio with developed surface and vegetated garden.

ROMAN BURIAL GROUND

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client: Gladman

project: Land off Swanstree Avenue, Sittingbourne

drawing title: Proposed Habitats

scale @ A3: 1:1500 | drawn: DS | issue: 7/7/2022

drawing / figure number: **Figure 2**

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Key

- Red Line Boundary

Area Habitats

- Lost

Hedgerows

- Retained
- Lost

Urban Trees

- Created

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Habitat Retention

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Figure 3

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Key

Red Line Boundary

Area Habitat Condition

- Poor
- N/A - Other
- (N/A -Agricultural)

Area Habitat Distinctiveness

- Medium
- Low
- V.Low

Hedgerow Condition

- Moderate

Hedgerow Distinctiveness

- Low

ROMAN BURIAL GROUND

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drawing title
Baseline Habitat Condition / Distinctiveness

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Figure 4

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Key

- Red Line Boundary

Area Habitat Condition

- Good
- Moderate
- Poor
- N/A - Other

Area Habitat Distinctiveness

- High
- Medium
- Low
- V.Low

Hedgerow Condition

- Moderate

Hedgerow Distinctiveness

- Low

Urban Trees Condition

- Good

Developable area estimated on 70/30 ratio with developed surface and vegetated garden (at low distinctiveness).

ROMAN BURIAL GROUND

0 25 50 m

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drawing title
Proposed Habitat Condition / Distinctiveness

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Figure 5

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APPENDIX A – METRIC HEADLINE RESULTS (REV B)

Headline Results

Return to results menu

On-site baseline	*Habitat units*	11.80
	Hedgerow units	1.12
	River units	0.00
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	13.40
	Hedgerow units	2.53
	River units	0.00
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	13.62%
	Hedgerow units	126.27%
	River units	0.00%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	1.61
	Hedgerow units	1.41
	River units	0.00
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	13.62%
	Hedgerow units	126.27%
	River units	0.00%
Trading rules Satisfied?		Yes