



Sirius Planning

CYP Solar Farm

Arboricultural Assessment

October 2022

FPCR Environment and Design Ltd

Registered Office: Lockington Hall, Lockington, Derby DE74 2RH

Company No. 07128076. [T] 01509 672772 [F] 01509 674565 [E] mail@fpcr.co.uk [W] www.fpcr.co.uk

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Rev	Issue Status	Prepared / Date	Approved/Date
-	Draft	JRM / 24.06.22	RWM / 07.07.22
A	Following Client Review	JRM / 18.10.2022	RWM / 18.10.2022

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1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Limited on behalf of Sirius Planning to present the findings of an Arboricultural Assessment and survey of trees located at Craig Y Perchych, Glais, Swansea SA7 9HS.
- 1.2 The survey was divided into two areas (hereafter broadly referred to as the site unless specified):
 - a) Solar Farm; and
 - b) Offsite HV Cable
- 1.3 The survey was carried out on 18.05.2022 and 19.05.2022.

Scope of Assessment

- 1.4 The tree survey and assessment of existing trees has been carried out in accordance with guidance contained within British Standard 5837:2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations*' (hereafter referred to as BS5837). The guidelines set out a structured assessment methodology to assist in determining which trees would be deemed either as being suitable or unsuitable for retention.
- 1.5 The guidance also provides recommendations for considering the relationship between existing trees and how those trees may integrate into designs for development; demolition operations and future construction processes so that a harmonious and sustainable relationship between any retained trees and built structures can be achieved.
- 1.6 The purpose of the report is therefore to firstly, present the results of an assessment of the existing trees' arboricultural value, based on their current condition and quality and to secondly, provide an assessment of impact arising from the proposed development of the site.
- 1.7 This report has been produced to accompany a planning application for a solar farm and associated infrastructure and has included an assessment of any impact to the tree cover. The survey has therefore focused on any trees present within or bordering the site that may potentially be affected by the future proposals or will pose a constraint to any proposed development.

Site description

- 1.8 The Solar Farm area sits c.10km north east of Swansea (OS Grid Ref SN 71658 01116) to the east of the settlement of Glais. The northern half of the site is primarily formed by a raised plateau known as Graig Ola. The plateau is given to remnant field compartments bounded by stone walls. The northern edge of the plateau is formed by a steep slope which falls to the north. South and east of the plateau, the site is formed by a mixture woodland and pastoral field compartments bounded by the woodland.
- 1.9 The site was managed extensively. This had resulted in pockets of scrub and successional young trees encroaching into the grassland on site. The Solar Farm site was roughly bisected in a north east/south west orientation by an access road named Graig Y Pal from Glais. The access road became an informal farm track in the north east of the site.

- 1.10 The Offsite HV Cable area is located immediately south west of the settlement of Glais (OS Grid Ref SN SN 69697 00379). It consists of a sealed, tarmac footway/cycleway (approx. 3-5m wide) that continues south from Garth Road, eventually turning in a westerly direction. The route was lined by native trees on both sides. The route is bounded by agricultural fields given to a mix of arable crops and pasture.

2.0 PLANNING POLICY

Planning Policy Wales Edition 11 (February 2021)

- 2.1 National Planning Policy is defined by the Planning Policy Wales (PPW). This sets out the Government's most current and up to date land use planning policies for Wales and how these should be applied.
- 2.2 Paragraph 12 of the PPW states that the primary objective of the policy is to "ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty."
- 2.3 In relation to arboriculture, the PPW also states that:
- 6.4.24 *'Trees, woodlands, copses and hedgerows are of great importance for biodiversity. They are important connecting habitats for resilient ecological networks and make a valuable wider contribution to landscape character, sense of place, air quality, recreation and local climate moderation. They also play a vital role in tackling the climate emergency by locking up carbon, and can provide shade and shelter, a sustainable energy source and building materials. The particular role, siting and design requirements of urban trees in providing health and well-being benefits to communities, now and in the future should be promoted as part of plan making and decision taking'*
 - 6.4.25 *'Planning authorities should protect trees, hedgerows, groups of trees and areas of woodland where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial and identified green infrastructure function. Planning authorities should consider the importance of native woodland and valued trees, and should have regard, where appropriate, to local authority tree strategies or SPG. Permanent removal of woodland should only be permitted where it would achieve significant and clearly defined public benefits. Where woodland or trees are removed as part of a proposed scheme, developers will be expected to provide compensatory planting.'*
 - 6.4.26 *'Ancient woodland and semi-natural woodlands and individual ancient, veteran and heritage trees are irreplaceable natural resources, and have significant landscape, biodiversity and cultural value. Such trees and woodlands should be afforded protection from development which would result in their loss or deterioration unless there are significant and clearly defined public benefits; this protection should prevent potentially damaging operations and their unnecessary loss. In the case of a site recorded on the Ancient Woodland Inventory, authorities should consider the advice of NRW. Planning authorities should also have regard to the Ancient Tree Inventory.'*

- 6.4.27 *'The protection and planting of trees and hedgerows should be delivered, where appropriate, through locally specific strategies and policies, through imposing conditions when granting planning permission, and/or by making Tree Preservation Orders (TPOs)*¹²⁵. *They should also be incorporated into Green Infrastructure Assessments and plans.'*

- 2.4 As the present report relates to a nationally significant renewable energy project, Future Wales: The national Plan 2040 also applies in addition to PPW. The 'Future Wales' document sets out the "national development framework, setting the direction for development in Wales to 2040¹".

Statutory Considerations

- 2.5 Local authorities have a Duty under the Town and Country Planning (Trees) (Amendment) (Wales) Regulations 2017 to create Tree Preservation Orders (TPO) in order to protect and preserve specific trees and woodlands that bring significant amenity benefit to a particular site or location. Under a TPO it is a criminal offence to cut down, top, lop, uproot or wilfully destroy a tree protected by that Order, or to cause or permit such actions, if carried out without the prior written consent of the acting LPA. Anyone found guilty of such an offence is liable and in serious cases, may result in prosecution and incur an unlimited fine.
- 2.6 It is understood following consultation with the Local Planning Authority, Swansea Council, that there are no Tree Preservation Orders or Conservation Area designations that would apply to any trees present on, or in close proximity to the assessment site and therefore no statutory constraints would apply to the development in respect of trees.
- 2.7 Information provided on Tree Preservation Orders and Conservation Areas is accurate to the date of this assessment and cannot be assumed to remain unchanged. The last check was carried out on the 5th July 2022.

Non-Statutory Considerations

- 2.8 In order to compile existing baseline information on relevant arboricultural considerations information was requested from both statutory and non-statutory nature conservation organisations. A desk study using the Lle Geo-Portal for Wales website highlighted tree cover within the site as or included within the following:
- Ancient Woodland Inventory
 - The National Forestry Inventory

3.0 SURVEY METHODOLOGY

- 3.1 The survey of trees has been carried out in accordance with the criteria set out in Chapter 4 of BS5837. The survey has been undertaken by a suitably qualified and experienced arboriculturist and has recorded information relating to all those trees within the site and those adjacent to the site which may be of influence to any proposals. Trees were assessed for their arboricultural quality and benefits within the context of the proposed development in a transparent, understandable and systematic way.
- 3.2 Trees have been assessed as groups or woodland where it has been determined appropriate.

¹Welsh Government (2021). Future Wales: The national Plan 2040. Available at: <https://gov.wales/future-wales-national-plan-2040-0> (Accessed 18.10.2022).

- The term group has been applied where trees form cohesive arboricultural features either aerodynamically, visually or culturally including biodiversity or habitat potential for example parkland or wood pasture.
- For the purposes of this assessment, a hedgerow is described as any boundary line of trees or shrubs less than 5m wide at the base and are managed under a regular pruning regime.
- For the purposes of this assessment woodland is described as a habitat where 'trees are the dominant plant form. The individual tree canopies generally overlap and interlink, often forming a more or less continuous canopy'². Woodlands however, are not just formed of trees and generally include a great variety of other plants. These will include 'mosses, ferns and lichens, as well as small flowering herbs, grasses and shrubs'³.

3.3 An assessment of individual trees within groups or woodland has been made where a clear need to differentiate between them, for example, in order to highlight significant variation between attributes including physiological or structural condition or where a potential conflict may arise.

Ancient Woodland

3.4 Ancient woodland in England is defined as an area that has been continuously wooded since at least 1600 AD. 'Continuously wooded' does not require there to have been a continuous cover of trees and shrubs across the entire area. Habitats such as glades, deer lawns, rides, ponds and streams, as well as gaps created by natural occurrences, and forestry may all occur within woodland.

3.5 Ancient woodland includes both ancient semi-natural woodland and plantations on ancient woodland sites:

- Ancient semi-natural woodland (ASNW) is where the stands are composed predominantly of trees and shrubs native to the site that do not obviously originate from planting. However, woodlands with small planting of trees native to the site would still be included in this category. The stands may have been managed by coppicing or pollarding or the tree and shrub layer may have grown up by natural regeneration.
- Plantations on ancient woodland sites (PAWS) these are areas of ancient woodland where the former native tree cover has been felled and replaced by planted trees, predominantly of species not native to the site. These sites often retain some of the ancient woodland features such as soils, ground flora, fungi and woodland archaeology.

3.6 Ancient woodland is a resource of great importance for its wildlife, soils, recreation, cultural value, history and the contribution to diverse landscapes.

BS5837 Categories

3.7 Trees have been divided into one of four categories based on Table 1 of BS5837, '*Cascade chart for tree quality assessment*'. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).

² http://www.countrysideinfo.co.uk/woodland_manage/whatis.htm

³ http://www.countrysideinfo.co.uk/woodland_manage/whatis.htm

- 3.8 Category U trees are those which would be lost in the short term for reasons connected with their physiology or structural condition. They are, for this reason not considered in the planning process on arboricultural grounds. Categories A, B and C are applied to trees that should be of material considerations in the development process. Each category also having one of three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural or conservation values accordingly.
- 3.9 **Category (U) – (Red):** Trees which are unsuitable for retention and are in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. Trees within this category are:
- Trees that have a serious irremediable structural defect such that their early loss is expected due to collapse and includes trees that will become unviable after removal of other category U trees.
 - Trees that are dead or are showing signs of significant, immediate or irreversible overall decline.
 - Trees that are infected with pathogens of significance to the health and/ or safety of other nearby trees or are very low quality trees suppressing adjacent trees of better quality.
 - Certain category U trees can have existing or potential conservation value which may make it desirable to preserve.
- 3.10 **Category (A) – (Green):** Trees that are considered for retention and are of high quality with an estimated remaining life expectancy of at least 40 years with potential to make a lasting contribution. Such trees may comprise:
- Sub category (i) trees that are particularly good examples of their species, especially if rare or unusual, or are essential components of groups such as formal or semi-formal arboricultural features for example the dominant and/or principal trees within an avenue.
 - Sub category (ii) trees, groups or woodlands of particular visual importance as arboricultural and / or landscape features.
 - Sub category (iii) trees, groups or woodlands of significant conservation, historical, commemorative or other value for example veteran or wood pasture.
- 3.11 **Category (B) – (Blue):** Trees that are considered for retention and are of moderate quality with an estimated remaining life expectancy of at least 20 years with potential to make a significant contribution. Such trees may comprise:
- Sub category (i) trees that might be included in category A but are downgraded because of impaired condition for example the presence of significant though remediable defects, including unsympathetic past management and storm damage.
 - Sub category (ii) trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.
 - Sub category (iii) trees with material conservation or other cultural value.

- 3.12 **Category (C) – (Grey):** Trees that are considered for retention and are of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm. Such trees may comprise:
- Sub category (i) unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.
 - Sub category (ii) trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value or trees offering low or only temporary / transient screening benefits.
 - Sub category (iii) trees with no material conservation or other cultural value.

Site Plans and Schedules

- 3.13 Appendices A (Solar Farm) and B (Offsite HV Cable) presents details of any individual trees, groups, hedgerows and woodlands found during the assessment including heights, diameters at breast height, crown spread (given as a radial measurement from the stem), age class, comments as to the overall condition at the time of inspection, BS5837 category of quality and suitability for retention and the root protection area.
- 3.14 General observations particularly of structural and physiological condition for example the presence of any decay and physical defect and preliminary management recommendations have also been recorded where appropriate.
- 3.15 The individual positions of trees and groups have been shown on the Tree Survey Plan. The positions of trees are based on a topographical / land survey, as far as possible, supplied by the client. Where topographical information has not identified the position of trees these have been plotted using a global positioning system and aerial photography to provide approximate locations. The crown spread, root protection area and shade pattern (where appropriate) are also indicated on this plan.
- 3.16 As part of this assessment, a Tree Retention Plan has been prepared to show the proposed layout in relation to the existing tree cover allowing an assessment of any potential conflicts. The plan also identifies which trees would be required to be removed or retained as part of the proposed development.

Tree Constraints and Root Protection Areas

- 3.17 Below ground constraints to future development are represented by tree roots and the soil environment in which they grow which needs to be protected if the tree is to be retained. Tree rooting systems are essential for the uptake of water and nutrients, serving the storage of carbohydrates for the future growth and function of the tree, and form structural anchorage and support for the stem and crown. The perceived rooting area of the tree; referred to as the root protection area (RPA) needs to be protected if the tree is to be retained.
- 3.18 The RPA is a notional area considered to be the minimum zone that must be protected to avoid any adverse impacts on retained trees. The RPA has been calculated in accordance with Annex C, D and Section 4.6 of BS5837:2012 and requires suitable protection in order for the tree to be successfully incorporated into any future scheme. As such, the RPA of existing trees is an

important material consideration when considering site constraints and planning development activities.

- 3.19 Where applicable the shape of the Root Protection Area has been modified to consider the presence of any nearby obstacles (existing or past) which may have restricted root growth and the likely root distribution i.e. the presence of hard standing, structures and underground apparatus. Where groups of trees have been assessed, the Root Protection Area has been shown based on the maximum sized tree in any one group and so may exceed the Root Protection Area required for some of the individual specimens within the group. Further detailed inspection of the individual trees forming a group may be required where development impacts upon the group.
- 3.20 Whilst it is generally accepted that a tree's roots may extend far greater distances than the notional RPA, with the distribution of the root system relating directly to the availability of suitable conditions for growth (namely oxygen, water and nutrients), with roots predominantly located in the upper 1,000 mm of the soil horizon; the RPA offers an accepted protective buffer from development.
- 3.21 Above ground constraints such as the current crown spread of the trees and an illustration of the shade pattern (where appropriate) have been considered and identified within the Tree Survey Plan and Tree Retention Plan indicates their potential area of shading influence.

Considerations and Limitations of the Tree Survey

- 3.22 Scattered trees and successional scrub had established within a number of the field compartments (see target notes in Results section). Trees included short, shrubby specimens of species such as blackthorn *Prunus spinosa* or semi-mature young examples of trees such as rowan *Sorbus aucuparia* and English oak *Quercus robur*. In the main such trees were less than 4m high, with stem diameters measuring less than 100mm. The tree survey sought to identify the primary arboricultural constraints posed by trees on site. As such, smaller trees forming this scrubby vegetation were not picked out as part of the tree survey. These trees would individually warrant no more than a low value (category C) in accordance with BS5837. These trees were therefore deemed unremarkable from an arboricultural perspective, though it is accepted that they do make an ecological contribution to the site and thus do have value.
- 3.23 The survey was completed from ground level only and from within the boundary of the site. Aerial tree inspections or an assessment of the internal condition of the stem/s or branches were not undertaken at this stage as this level of survey is beyond the scope of the initial assessment.
- 3.24 The statements made in this report regarding the assessed trees does not take into account the effects of extreme / adverse weather conditions, changes in land use prior to the site's development, unforeseen accidents or anti-social behaviours, such as vandalism, which occur since the date of the survey. As such, the assessment of tree condition given within applies to the date of survey and cannot be assumed to remain unchanged.
- 3.25 It will be necessary to review all comments and observations made within this report, in accordance with sound arboricultural practice, within two years of the date of survey (unless explicitly stated elsewhere within this report). Further review may also be necessary where site

conditions change or works to trees are carried out which have not been specified in detail within this report.

- 3.26 It may be necessary during detailed design to undertake further assessment and accurate positioning of woody species within tree groups and hedgerows to assist structural calculations for foundation design of structures in accordance with current building regulations. The exact position of individual trees or species included as part of a tree group should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths in accordance with NHBC Chapter 4.2 Building near Trees.

4.0 RESULTS

Solar Farm

- 4.1 A total of six individual trees, six groups of trees and two woodlands were surveyed as part of the Solar Farm area. Table 1 below summarises the trees assessed.

Table 1: Summary of Trees by Retention Category

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable				
Category A (High Quality / Value)	T2, T3, T4, T5	4	G2, W1, W2	3
Category B (Moderate Quality / Value)	T1	1	G3	1
Category C (Low Quality / Value)	T6	1	G1, G4, G5, G6	4

Woodlands

- 4.2 W1 dominated the views upon entry to the Solar Farm area using the access road (see Photograph 1). It formed the eastern side of the plateau and roughly followed the orientation of the access road. South of the access road, W1 followed a river corridor from which it fringed out in all directions, forming boundaries to the various field compartments.



Photograph 1: Showing W1 formed either side of main access road to Solar Farm area.

- 4.3 W1 was dominated by native trees including a canopy characterised by abundant sessile oak *Quercus petraea*, English oak and silver birch *Betula pendula*. The canopy was interspersed by less common beech *Fagus sylvatica*, alder *Alnus glutinosa* and sycamore *Acer pseudoplatanus*. The understory comprised of species such as holly *Ilex aquifolium*, hawthorn *Crataegus monogyna* and rowan.
- 4.4 Broadly W1 had a good vertical structure. Whilst the survey was conducted in accordance with criteria from BS5837(2012) - rather than a dedicated woodland survey - W1 comprised a shrub and field layer (containing Ancient Woodland Indicator species) and therefore was overall considered valuable woodland habitat, some of which would be considered Ancient Woodland.
- 4.5 To this end, the desk study identified sections of W1 as being classified within the Ancient Woodland Inventory as well as within the National Forestry Inventory – Broadleaved Deciduous Woodland.

- 4.6 In recognition of all of the above information, in particular habitat value, W1 was deemed to warrant a high value Category A classification in accordance with BS5837.
- 4.7 W2 formed the northern boundary of the site. It was located on the steep northern slope of the plateau and roughly followed the orientation of the edge of the plateau in a north east/south west orientation. W2 was surveyed from the plateau and edges of the woodland due to the topography. As with W1, W2 was characterised by large stands of native woodland. W2 differed in that there were also large pockets of plantation trees contained within it. The plantations comprised mostly of stands of common larch *Larix decidua* and pine which were mostly black pine *Pinus nigra spp.*
- 4.8 Sections of W2 were also classified within the Ancient Woodland Inventory as well as within the National Forestry Inventory – Broadleaved Deciduous Woodland.
- 4.9 W2 was therefore deemed to warrant a high value Category A classification, again due to its overall habitat value and, being very visible from the north, its landscape contribution.

Individual trees and groups

- 4.10 A small number of individual trees and groups of trees were recorded aside from the two dominant woodlands.
- 4.11 G2, a group of large, mature beech stood out from W2. G2 consisted of approximately 12 trees with stem diameters estimated to 1100mm. The group had been planted in close proximity which had resulted in coalescent crowns. Typically for a beech dominated canopy, there was practically no understory or field layer below G2. G2 were deemed to warrant a high value Category A classification on account of their size and expected future life expectancies.
- 4.12 Four individual trees (T2, T3, T4 and T5) were also given a high value classification. Each of these trees were oaks, which stood out from neighbouring vegetation as higher value tree stock from an arboricultural perspective. There were no significant defective features associated with these trees. They had high value for biodiversity – T4 was noted to be hosting a bird nest – T5 had internal hollowing providing associated habitat features – and as such were deemed to merit a high value, Category A classification.
- 4.13 Elsewhere there were small pockets of tree groups, not considered to have sufficient qualities to be classified high quality in accordance with BS5837. In the most part (T6, G1, G4, G5, G6) these additional trees and groups were deemed to warrant a low value in accordance with BS5837. They were typical farmland tree stock with little or no targeted management. As such, from an arboricultural perspective, they were considered low value – though their collective value as habitat was recognised. T1 and G3 were deemed to warrant slightly higher classifications, Category B. T1 was given this moderate classification on account of its large size (for a holly) and its prominence on the plateau. Whilst individually trees within G3 were unremarkable, collectively they held a higher landscape value and as such were deemed to warrant a Category B classification.

Target Notes

- 4.14 The Solar farm site was not straight forward to classify as per BS5837 due to the complex mosaic of trees and habitats on site; for example, the aforementioned scrub/tree encroachment forming

scattered pockets throughout certain field compartments. Target Notes describing specific areas of the site have therefore been given on the Tree Survey Plan in order to convey details of the site that are difficult to represent on a plan. Each Target Note (TN) is numbered on the Tree Survey Plan for ease of identification:

- **TN1** – In this area, W1 fringes outwards in roughly linear corridors of woodland enclosing field compartments. There is a greater abundance of ash *Fraxinus excelsior* in comparison to the oak dominance within the primary woodland area.
- **TN2** – W1 transitions to hawthorn and European gorse *Ulex europaeus* scrub on slope.
- **TN3** - Plantation woodland compartments within W2. Stands of European larch and black pine are present. Many of the larch were in a state of decline or dead.
- **TN4** – W1 transitions into European gorse, goat willow *Salix caprea* and bramble *Rubus fruticosus* agg. scrub.
- **TN5** – Field compartments contain scattered scrub comprising European gorse, bramble, holly, hawthorn and goat willow. See Photograph 2 below.



Photograph 2: Showing scattered scrub within field compartment as per TN5.

- **TN6** – W1 has a comparatively open structure, with little in the way of vertical structure. Canopy is oak dominated. Understory is limited to occasional holly.
- **TN7** – Field compartments immediately south are entirely enclosed by W1. Existing field access is gained via a natural break in tree cover at ground level at TN7. Gap is large enough to accommodate a vehicle of the size of a typical tractor.

- **TN8** – Existing field access estimated to be formed by a break in tree cover at ground level approximately 8m wide. Crowns overhang access to a height of approximately 2m above ground level. See Photograph 3 below.



Photograph 3: Existing field entrance located at TN8. Photo taken from north of field entrance, looking south.

- **TN9** – There is an existing break in tree cover forming a natural separation between the higher value W1 and lower value G3.
- **T10** – The immediate area has less densely arranged trees. It is characteristically wet in nature and contains a higher ratio of alder and goat willow in comparison to drier areas of W1.
- **TN11** – Slope here is covered by scrub. There is dense bracken *Pteridium aquilinum* and bramble, interspersed with occasional small trees including goat willow, ash, hawthorn and elder *Sambucus nigra*.
- **TN12** – Scattered scrub present within field compartments. Scrub does not include any mature trees.

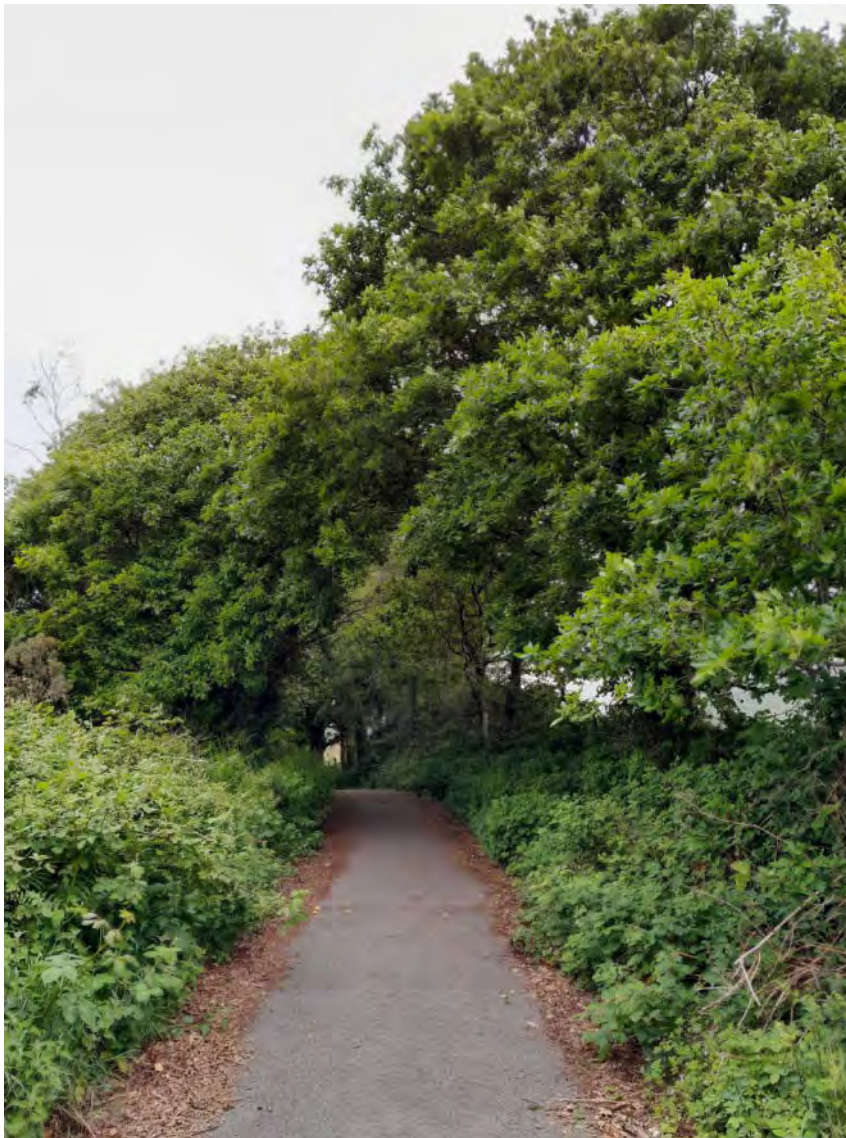
Offsite HV Cable

- 4.15 A total of four individual trees and ten groups of trees were surveyed as part of the proposed Offsite HV Cable Route area. Table 2 below summarises the trees assessed.

Table 2: Summary of Trees by Retention Category – HV Cable Route

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable	T102, T103	2		0
Category A (High Quality / Value)		0		0
Category B (Moderate Quality / Value)	T101	1	G101, G103, G104, G105, G108, G109	6
Category C (Low Quality / Value)	T100	1	G100, G102, G106, G107	4

- 4.16 The trees along the route of the proposed Offsite HV Cable route were self-seeded and had lacked targeted management. All trees were located along the edges of a well-maintained footway/cycleway (see Photograph 4 below).

**Photograph 4: Offsite HV cable route. Tarmac surface with trees present along the each edge.**

- 4.17 The trees were typical of agricultural boundaries and were largely unremarkable. Accordingly, none of the trees along the proposed Offsite HV Cable were deemed to warrant higher than a moderate value, Category B classification.
- 4.18 The groups deemed to warrant a higher, moderate value classification (T101, G101, G103, G104, G105, G108 & G109) had a greater number of higher value (from an arboricultural perspective) trees such as early mature or mature oaks and sycamore. In contrast, the lower value tree stock awarded Category C (T100, G100, G102, G106 and G107) was more typically unremarkable examples of species such as goat willow or young stock, which in accordance with BS5837 did not warrant a higher value classification.
- 4.19 Two Category U trees, both goat willow (T102 & T103) were located within the Offsite HV Cable area, close to the connection between the footway/cycleway and Garth Road. Both trees were multi stemmed from the base. Both were in an advanced state of decline with decay noted throughout. Additionally failed stems were recorded, broken at the basal unions. It would be recommended that both T102 and T103 should be removed to ground level regardless of any future proposals to their proximity of to the footway/cycleway. An alternative option would be to coppice live stems and remove dead stems to ground level.

5.0 ARBORICULTURAL IMPACT ASSESSMENT

- 5.1 The following paragraphs present a summary of the tree survey and discussion of particular trees and groups recorded in the context of any proposed development in the form of an Arboricultural Impact Assessment in accordance with section 5.4 of BS5837. Any final tree retentions will need to be reconciled with the advice contained within this report.

Solar Farm

- 5.2 The AIA for the Solar Farm area has been based upon the FULL SOUTH FACING PV LAYOUT plan (Plan Ref: WIN-SOL-01-DR-03-02-01). The AIA seeks to outline the relationship between the proposals and the existing trees and hedgerows. The drawing shows the proposals for a solar farm and proposed public rights of way (both footpath and bridleway).
- 5.3 Internal HV cables will be required to link the solar panel arrays in separate field compartments. This is in addition to the proposals shown on the aforementioned Plan (Ref: WIN-SOL-01-DR-03-02-01). FPCR were provided with indicative HV cable routes ahead of the tree survey and were able to walk the proposed line of each route. Following the tree survey feedback was given to the design team in order to refine the proposed routes. The proposed routes were subsequently refined.
- 5.4 An overlay of the layout has been incorporated in the Tree Retention Plan to assist in identifying the relationship and any potential conflicts between the proposals and the existing trees. The Tree Retention Plan also indicates the proposed indicative routes for internal HV Cables (HV1 & HV2). These routes are currently indicative but demonstrate feasible routes for connecting the arrays with impacts to trees minimised – based upon the findings of the site walkover.
- 5.5 Table 3 Presents a summary of expects impacts resulting from the proposals.

Table 3: Summary of Impact on Tree Stock – Solar Farm

	Trees to be Retained	Total	Trees to be Removed in full or part	Total
Category U - Unsuitable				
Category A (High Quality / Value)	T2, T3, T4, T5, G2, W1* [#] W2	7		
Category B (Moderate Quality / Value)	T1, G3	2		
Category C (Low Quality / Value)	T6, G1, G4, G5, G6	5		

* - Trees or groups may require select tree removal to accommodate access to solar panels

[#] - Trees or groups may require select tree removal to accommodate internal HV cables

Solar Panels

- 5.6 The solar panels have been located to avoid conflicts with the vast majority of existing tree stock. Each array has been proposed centrally within the respective field compartments as identified by the topographical survey of the site. There should be no loss to trees included within the tree survey as part of the installation of the solar panels.
- 5.7 As described above, there were a number of small trees contained within the field compartments associated with pockets of scattered and dense scrub that were not picked up as part of the tree survey. Any such trees falling within the proposed areas of the solar panels would require removal in order to accommodate the panels. As noted above, any such trees were considered unremarkable with little value from an arboricultural perspective. It is acknowledged that these trees contribute to the overall biodiversity of the site and thus do have a value, though this value is considered on ecological terms, rather than arboricultural.
- 5.8 When considered alongside the retention of the vast majority of tree stock, the removal of such low value trees should not be considered a constraint to the proposals.

Access to Solar Panels

- 5.9 There will be a requirement for vehicles to access the solar panel arrays during both construction and operation of the scheme. As evidenced by the Tree Survey and Retention Plans, in the most part there are natural breaks in tree cover that will allow vehicles to access the proposed array locations. Where there are no obvious breaks in canopies (TN7, TN8), as per the Tree Survey and Retention Plans, there were existing breaks in tree cover observed at ground level allowing access for farm vehicles.
- 5.10 As a consequence of access there may be the requirement to remove select trees either side of narrow existing field access points to provide the required widths for access. Additionally, in these areas there may be the requirement to prune the crowns of retained trees (possible crown lifts and selective reductions) in order to safely gain access to the respective field compartments.

- 5.11 It is noted that trees either side of existing field access locations will already have been subject to impacts from farm machinery movements. The resulting impact would be compaction of the ground around field entrances and possible physical root damage. The site was noted to be rather extensively managed and as such these impacts would expect to be relatively infrequent when compared to a more intensively managed farm. It would therefore be recommended that appropriate ground protection is provided at field access points where they pass through RPAs of retained trees. If access is temporary, then ground protection may also be a temporary solution. However, if access is to be gained frequently, then a permanent solution to ground protection should be sought to avoid compaction and damage to roots in select areas.
- 5.12 All of the above recommendations for possible future pruning and ground protection would also apply to instating primary site access from the existing farm track in the centre of the site.
- 5.13 It is recommended that where required, each of the above tree protection methods be formalised as part of an Arboricultural Method Statement (AMS), which should be conditioned as part of any permission granted for the present application.
- 5.14 The AMS should be produced at the detailed design stage following a walkover of the site between the Project Arboriculturist and the Client/future Site Manager. The AMS should take into account the dimensions and weights of vehicles required to access the site to install the solar panels. The AMS should then detail site specific pruning and ground protection requirements necessary to safely (from a tree perspective) facilitate site wide access for construction and operation of the proposals.

Internal HV Cables

- 5.15 As represented on the Tree Retention Plan various internal HV cable routes are proposed to connect solar panel arrays between field compartments – HV1 & HV2.
- 5.16 Due to the requirement for them to be buried for health and safety purposes it is expected that a trench will be required to install each HV cable. The trench will be no wider than 400mm and is not usually deeper than 1m (to be determined by ground conditions). Accordingly, a mini excavator is expected to be used for digging the trench.
- 5.17 Select tree losses may therefore be required in order to instate the trench and allow access for the excavator. Tree losses and impacts can be minimised through the provision of temporary ground protection either side of the proposed trench to allow the excavator to track upon to prevent compaction and physical harm to roots.
- 5.18 Each of these indicative routes has been refined following the tree survey to minimise impacts to existing trees. Impacts associated with each can be described as follows:
- **HV1** – Indicative route passes through a section of W1 that is dominated by silver birch and goat willow. It would avoid the larger and more slow growing oaks located north and south of the proposed route. HV1 would, at the detailed design stage, be feasible to instate with tree losses limited to lower value, quicker growing birch and willow.
 - **HV2** – No impacts. Access can be gained via existing break in trees from primary vehicular access road.

- 5.19 Tree losses and impacts to retained trees associated with the proposed internal HV cables can therefore be minimised. The indicative routes will in part utilise existing breaks in trees avoiding tree losses. When passing through stands of trees is considered unavoidable the HV cables can be routed to avoid losses and impacts to higher value tree stock (for example slow growing mature oaks).
- 5.20 The indicative HV cable routes should be fixed at the detailed design stage. It would be recommended that the final routes are determined following a walkover of the site between the project Arboricultural Consultant and design engineers. This would allow the routes to be specified so as to minimise impacts to trees. During the same walkover the Project Arboriculturist should be able to quantify any required tree losses associated with the installation of the HV cables.
- 5.21 Following this walkover it would be recommended that a method for installing the HV cables be included within the aforementioned AMS, which should be conditioned as part of any permission granted for the present application. This section of the AMS should detail any requirements for pruning of retained trees associated with the cable installation, temporary ground protection and any safe (from a tree perspective) recommended methods for trenching.

Proposed Public Rights of Way

- 5.22 Proposed bridleway routes will connect from the main site access in the south west of the site, skirt the plateau and finally exit the solar farm in the north east. The proposed bridle way passes close to T1, a large Category B holly tree. There should be no requirement to remove T1 to facilitate the route. There may however be a need to reduce or raise the north western extent of the crown to allow riders to pass the tree safely. The width of the gap between the proposed site fence and the north western edge of the crown of T1 has been measured at approximately 5m. any pruning required to this tree is therefore expected to be minimal at best.
- 5.23 The exact extent (if any) of pruning for T1 should be decided post construction once the solar arrays have been installed and the exact amount of space between the fence and edge of crown is known. If pruning is required, the works should be specified by the Project Arboriculturist in agreement with the Local Planning Authority Tree Officer.
- 5.24 In the north of the site the bridle way is shown close to G2 and W2 on the Tree Retention Plan. Here, tree losses can be avoided by pulling the bridle path south towards the proposed site fence away from the edge of the trees. By doing so, there should be no requirement to remove trees from G2 or W2 for the bridlepath.
- 5.25 A public footpath is proposed connecting an existing Public Right of Way to the proposed bridle way in the north east of the site. This will pass through W1, cross an existing river and pass through the field compartments containing T5. The indicative route was walked during the tree survey. At the time of survey it was noted that the public were presently using the area of the site (without a right of way). There should be no requirement to remove trees in order to establish the proposed public footpath. Additionally, given that the public are already informally walking through the area, there would be no anticipated additional pressure upon to existing trees by providing a formal route.

Offsite HV Cable

- 5.26 An offsite HV cable is proposed that will connect the solar farm to the main electric grid. The HV cable will terminate and connection to the main grid be made partly down a footway/cycleway which adjoins Garth Road, Glais.
- 5.27 The precise alignment of the HV cable is yet to be designed, however it is expected to require a trench that is 400mm wide and a maximum 1800mm deep to install. Excavation can be conducted using a mini excavator.
- 5.28 Table 4 Presents a summary of expects impacts resulting from the proposals for the offsite HV cable.

Table 4: Summary of Impact on Tree Stock – Offsite HV Cable

	Trees to be Retained	Total	Trees to be Removed in full or part	Total
Category U - Unsuitable			T102, T103	2
Category A (High Quality / Value)				
Category B (Moderate Quality / Value)	T101, G101, G103, G104, G105, G108, G109	7		
Category C (Low Quality / Value)	T100, G100, G102, G106, G107	5		

- 5.29 The proposed HV cable should follow a central alignment along the route of the footway/cycleway. The trench can therefore be contained to within already sealed ground.
- 5.30 Outside of the survey area for the offsite HV cable it was noted that the existing footway/cycleway surface had been laid on top of an older tarmac surface. The route therefore appeared to have been sealed for a period of time. The surface of the footway/cycleway was in good condition and as such not porous for water or air. Significant rooting material below the existing footway/cycleway is therefore not expected due to the expected lack of available resources (water and oxygen) below the surface, and the duration that it appeared the surface had been sealed.
- 5.31 By installing the HV cable following the centre line of the footway/cycleway it will therefore keep all excavations as far as possible away from existing trees and potential roots. The existing surface of the footway/cycleway should be retained either side of the trench to provide ground protection. The mini excavator should be driven on the retained tarmac, straddling the trench. Care should be made to avoid taking the mini excavator off the sealed surface and on to the verges. Should it be necessary to access verges within RPAs, outside of the sealed surface of the footway/cycleway, then temporary ground protection must be installed that is appropriate to the required loading.
- 5.32 Where RPAs are present along the proposed route of the cable they should be protected by protective barriers. Barriers should be installed along the entire route and maintained in place for the duration of the works.

- 5.33 This approach will have the added benefit of preventing access to the verges either side of the footway/cycleway during construction. At the time of survey the verges contained dense stands of Japanese knotweed *Reynoutria japonica*. It is important that the proposed trenching works do not cause further spread of this invasive species as that would be in contravention of the Wildlife and Countryside Act 1981 (as amended).
- 5.34 The trenching works to at least 600mm below ground level should be supervised by the Project Arboriculturist as this is the depth to which most roots would be expected. If roots are encountered then the Arboriculturist can decide how best to deal with them on a case by case basis.
- 5.35 No trees should require removal as a result of the proposed offsite HV cable. This is with the exception of T102 and T103 which should be removed, or at least coppiced to ground level due to their poor condition.
- 5.36 It would be recommended that all of the above recommendations be formalised as part of a future AMS, which should be conditioned as part of any permission granted for the present application.

Tree Management

- 5.37 In the course of a detailed design to aspects of the layout, a review of the relationship between the layout and the retained trees should be undertaken by a qualified arboriculturist to assess the existing tree cover and prepare a schedule of tree works.
- 5.38 All retained trees should be subjected to sound arboricultural management as recommended within section 8.8.3 of BS5837 *Post Development Management of Existing Trees*, where there is a potential for public access in order to satisfy the landowner's duty of care. Additionally, inspections annually and following major storms should be carried out by an experienced arboriculturist or arborist to identify any potential public safety risks and to agree remedial works as required.
- 5.39 All tree works undertaken should comply with British Standard 3998:2010 and should therefore be carried out by skilled tree surgeons. It would be recommended that quotations for such work be obtained from Arboricultural Association Approved Contractors as this is the recognised authority for certification of tree work contractors.
- 5.40 All vegetation and, particularly, woody vegetation proposed for clearance should be removed outside of the bird-breeding season (March - September inclusive) as all birds are protected under the Wildlife and Countryside Act, 1981 (as amended) whilst on the nest. Where this is not possible, vegetation should be checked for the presence of nesting birds prior to removal by an experienced ecologist.

6.0 NEW TREE PLANTING

- 6.1 The proposals for the solar farm have been considered in light of both arboricultural constraints and the wider biodiversity of the site. As discussed above arboricultural impacts resulting from the proposals are expected to be minimal.

- 6.2 At present no tree planting is proposed as part of the proposals. A separate, detailed site wide habitat management plan has however been produced, which will ensure that habitats on site are maintained and enhanced through sympathetic management.
- 6.3 Please see separate management plan for details of proposed site habitat management to ensure impacts of proposals can be thoroughly mitigated and compensated.

7.0 TREE PROTECTION MEASURES

- 7.1 Retained trees will be adequately protected during works ensuring that the calculated root protection area for all retained trees can be appropriately protected through the erection of the requisite tree protection barriers. Measures to protect trees should follow the guidance in BS5837 and will be applied where necessary for the purpose of protecting trees within the site whilst allowing sufficient access for the implementation of the proposed layout. These have been broadly summarised below.

General Information and Recommendations

- 7.2 Tree protection should be enacted following methods outlined within a future AMS as recommended within the Arboricultural Impact Assessment (Section 5 of the present report) and the following paragraphs of Section 7.
- 7.3 All trees retained on site will be protected by suitable barriers or ground protection measures around the calculated RPA, crown spread of the tree or other defined constraints of this assessment as detailed by section 6 and 7 of BS5837.
- 7.4 Barriers will be erected prior to commencement of any construction work and before demolition including erection of any temporary structures. Once installed, the area protected by fencing or other barriers will be regarded as a construction exclusion zone. Fencing and barriers will not be removed or altered without prior consultation with the Project Arboriculturist.
- 7.5 Any trees that are not to be retained as part of the proposals should be felled prior to the erection of protective barriers. Particular attention needs to be given by site contractors to minimise damage or disturbance to retained specimens.
- 7.6 Where it has been agreed, construction access may take place within the root protection area if suitable ground protection measures are in place. This may comprise single scaffold boards over a compressible layer laid onto a geo-textile membrane for pedestrian movements. Vehicular movements over the root protection area will require the calculation of expected loading and the use of proprietary protection systems.
- 7.7 Confirmation that tree protective fencing or other barriers have been set out correctly should be gained prior to the commencement of site activity.

Tree Protection Barriers

- 7.8 Tree protection fencing should be fit for the purpose of excluding any type of construction activity and suitable for the degree and proximity of works to retained trees. Barriers must be maintained to ensure that they remain rigid and complete for the duration of construction activities on site.

- 7.9 In most situations, fencing should comprise typical construction fencing panels attached to scaffold poles driven vertically into the ground. For particular areas where construction activity is anticipated to be of a more intense nature, supporting struts, acting as a brace should be added and fixed into position through the application of metal pins driven into the ground to offer additional resistance against impacts.
- 7.10 Where site circumstances and the risk to retained trees do not necessitate the default level of protection an alternative will be specified appropriate to the level / nature of anticipated construction activity. The recommended methods of fencing specifications for this site have been illustrated in Appendix C.

Protection outside the exclusion zone

- 7.11 Once the areas around trees have been protected by the barriers, any works on the remaining site area may be commenced providing activities do not impinge on protected areas.
- 7.12 All weather notices should be attached to the protective fencing to indicate that construction activities are not permitted within the fenced area. The area within the protective barriers will then remain a construction exclusion zone throughout the duration of the construction phase of the proposed development. Protection fencing signs can be provided upon request.
- 7.13 Wide or tall loads etc should not come into contact with retained trees. Banksman should supervise transit of vehicles where they are in close proximity to retained trees.
- 7.14 Oil, bitumen, cement or other material that is potentially injurious to trees should not be stacked or discharged within 10m of a tree stem. No concrete should be mixed within 10m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree.
- 7.15 Fires on sites should be avoided if possible. Where they are unavoidable, they should not be lit in a position where heat could affect foliage or branches. The potential size of a fire and the wind direction should be taken into account when determining its location, and it should be attended at all times until safe enough to leave.
- 7.16 Notice boards, telephone cables or other services should not be attached to any part of a retained tree.
- 7.17 Any trees which need to be felled adjacent to or are present within a continuous canopy of retained trees, must be removed with due care (it may be necessary to remove such trees in sections).

Protection for Aerial Parts of Retained Trees

- 7.18 Where it is deemed necessary to operate wide or tall plant within close proximity to trees it is best advised that appropriate, but limited tree surgery, be carried out beforehand to remove any obstructive branches as any such equipment would have potential to cause damage to parts of the crown material, i.e. low branches and limbs, of retained trees within the protective barriers. This is termed as 'access facilitation pruning' within BS5837. Any such pruning should be undertaken in accordance with a specification prepared by an arboriculturist.
- 7.19 A pre-commencement site meeting with contractors who are responsible for operating machinery is advised to firstly highlight the potential for damage occurring to tree crowns and to ensure that

extra care is applied when manoeuvring machinery during such operations within close proximity to retained trees to avoid any contact.

- 7.20 In the event of having caused any branch or limb damage to retained trees it is strongly recommended that suitable tree surgery be carried out, in accordance with British Standard 3998:2010 and in agreement with the Local Planning Authority prior to correcting the damage, upon completion of development.

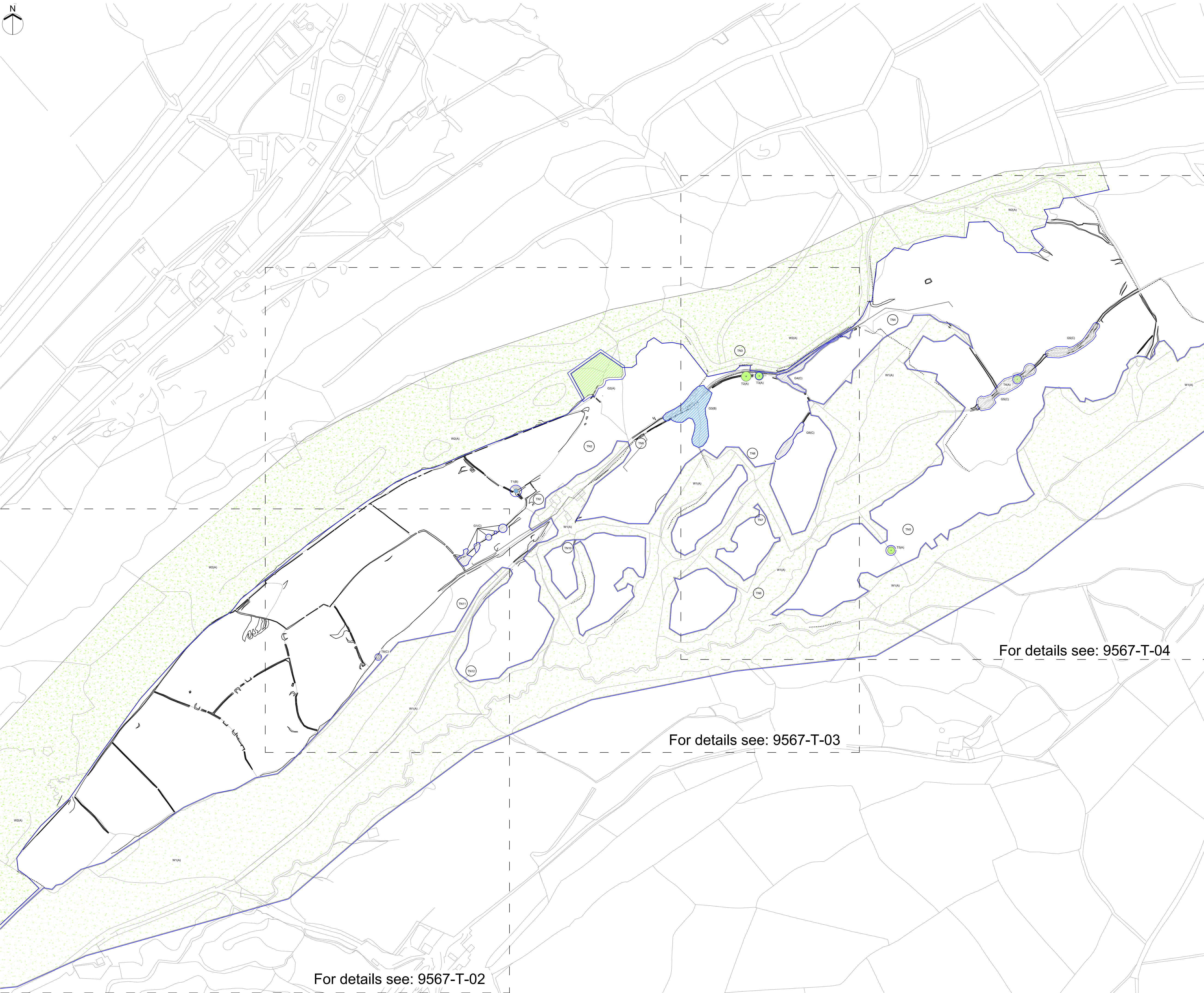
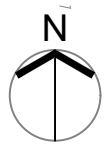
8.0 CONCLUSION

- 8.1 A tree survey in accordance with BS5837(2012) was conducted at Craig-Y-Perchych proposed Solar Farm. The survey sought to assess tree cover and understand arboricultural impacts associated with the installation of a solar farm and an offsite HV cable.
- 8.2 Tree cover in both areas was primarily native. Highest value tree stock including two large woodlands were located within the solar farm site. The two woodlands included areas of woodland falling within the Ancient Woodland Inventory.
- 8.3 Arboricultural impacts associated with both elements of the proposals are limited. No trees are proposed for removal in order to accommodate the installation of the offsite HV cable. The solar farm too has been designed to avoid tree loss; though installation of essential infrastructure, namely internal HV cables and site access, may require select tree removal.
- 8.4 The present report provides recommendations for a formal Arboricultural Method Statement that should be conditioned as part of any future planning permission. The recommendations to be included within the Arboricultural Method Statement will allow for the safe retention of trees as part of the proposals.
- 8.5 A separate landscape management plan has been produced which will ensure that the retained habitats on site can be managed and impacts from the proposals mitigated appropriately.

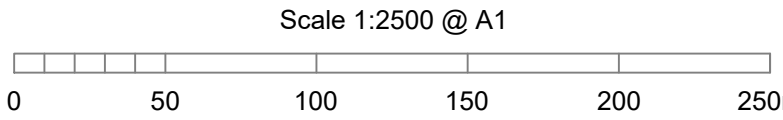
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FIGURES

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- KEY
- Category U - Trees / Groups Unsuitable for Retention (BS 5837:2012)
 - Category A - Trees / Groups of High Quality (BS 5837:2012)
 - Category B - Trees / Groups of Moderate Quality (BS 5837:2012)
 - Category C - Trees / Groups of Low Quality (BS 5837:2012)
 - Woodland Colour Indicates BS5837:2012 Category
 - Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
 - T1 (A) G1 (A) Individual / Group Number and BS5837:2012 Category
 - Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)
 - TN1 Target Number (with reference)



NOTES

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with project Arboriculturalist. Drawing to be read in conjunction with Arboricultural Assessment and Appendix A - Tree Schedule.

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Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked, by the project Arboriculturalist should works commence 12 months after the date of this survey.

SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

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FPCR Environment and Design Ltd
Lockington Hall
Lockington
Derby DE74 2RH

t: 01509 672772
e: mail@fpcr.co.uk
w: www.fpcr.co.uk

client
The Sirius Group

project
**Craig Y Perchych, Solar Farm
Glais, Swansea**

drawing title
TREE SURVEY PLAN

scale
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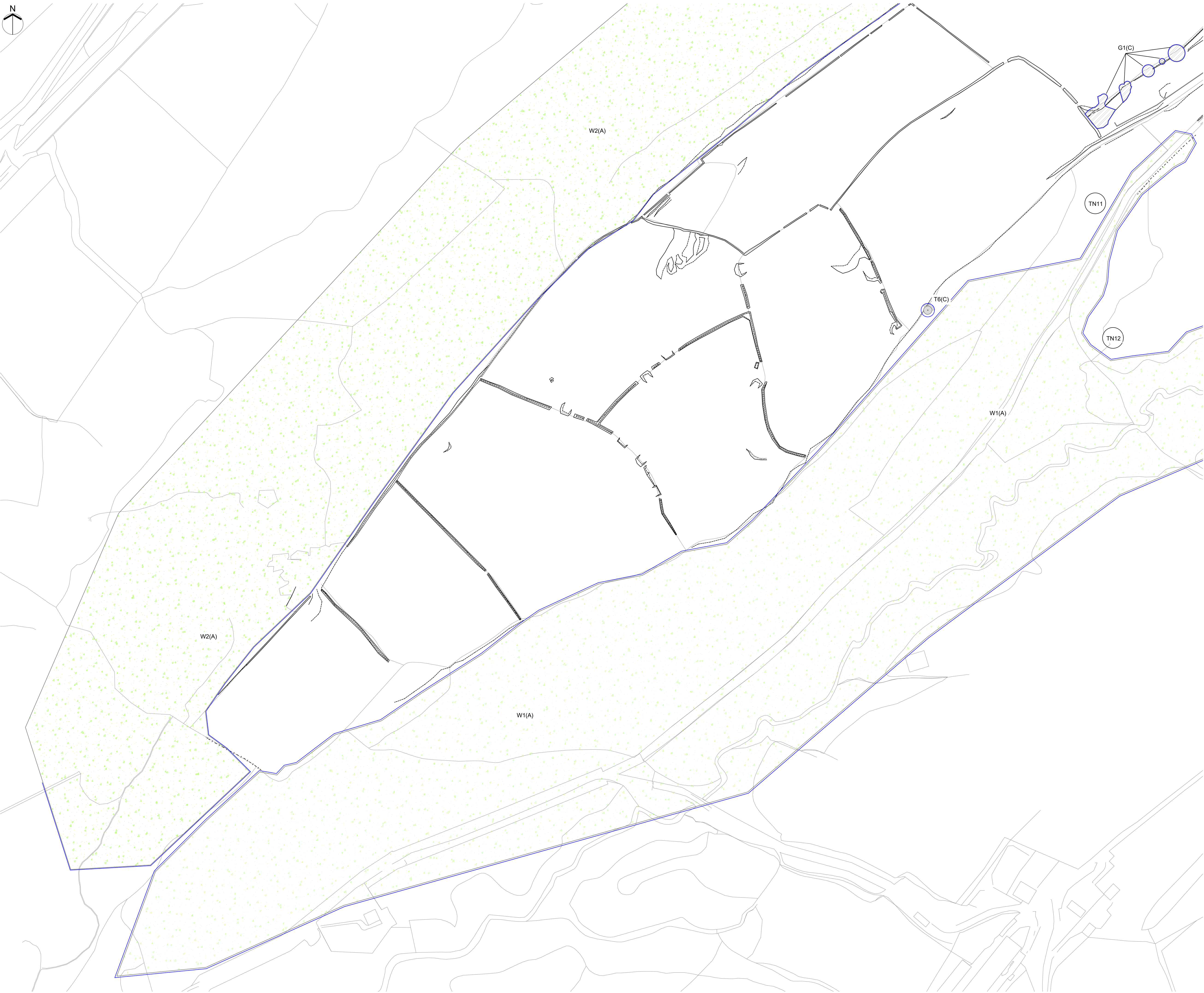
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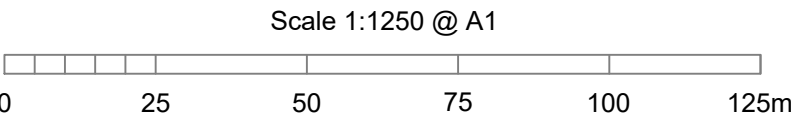
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- KEY
-  Category U - Trees / Groups Unsuitable for Retention (BS 5837:2012)
 -  Category A - Trees / Groups of High Quality (BS 5837:2012)
 -  Category B - Trees / Groups of Moderate Quality (BS 5837:2012)
 -  Category C - Trees / Groups of Low Quality (BS 5837:2012)
 -  Woodland
Colour Indicates BS5837:2012 Category
 -  Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
 -  T1 (A)
G1 (A) Individual / Group Number and BS5837:2012 Category
 -  Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)
 -  TN1 Target Number (with reference)



NOTES

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FPCR Environment and Design Ltd
Lockington Hall
Lockington
Derby DE74 2RH

t: 01509 672772
e: mail@fpcr.co.uk
w: www.fpcr.co.uk

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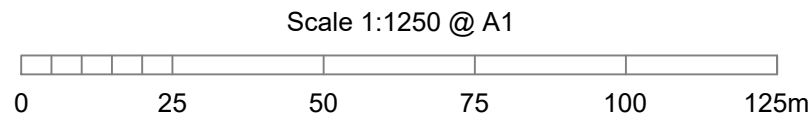
project
**Craig Y Perchych, Solar Farm
Glais, Swansea**

drawing title
TREE SURVEY PLAN

scale 1250: @ A1	drawn/checked TEP/JRM	date May 2022
drawing number 9567-T-02		rev -



- KEY
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 - Category A - Trees / Groups of High Quality (BS 5837:2012)
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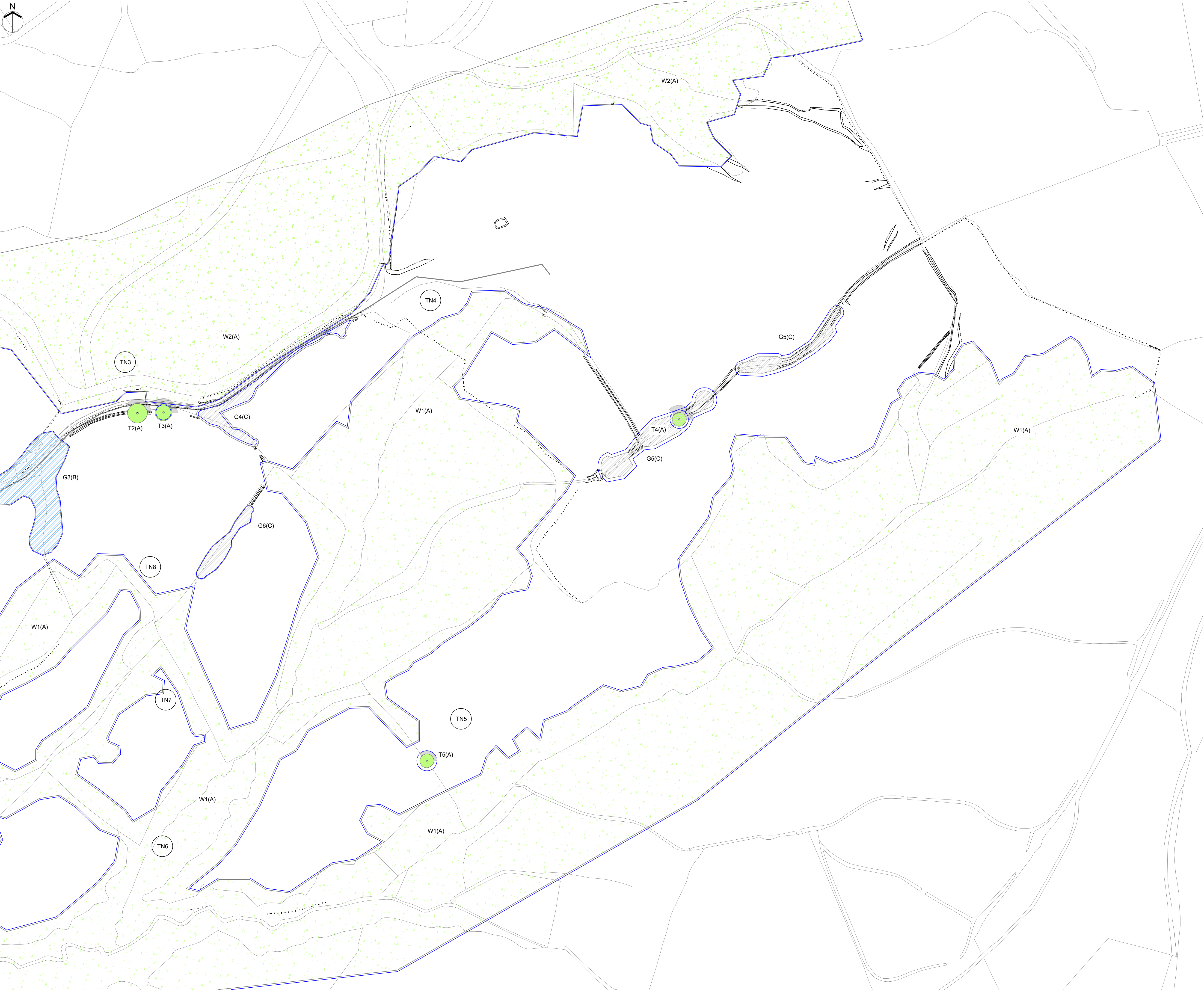
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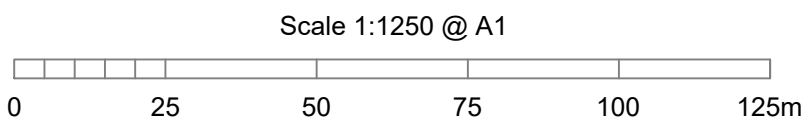
project
**Craig Y Perchych, Solar Farm
Glais, Swansea**

drawing title
TREE SURVEY PLAN

scale 1250:@ A1	drawn/checked TEP/JRM	date May 2022
drawing number 9567-T-03		rev -



- KEY
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 - Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)
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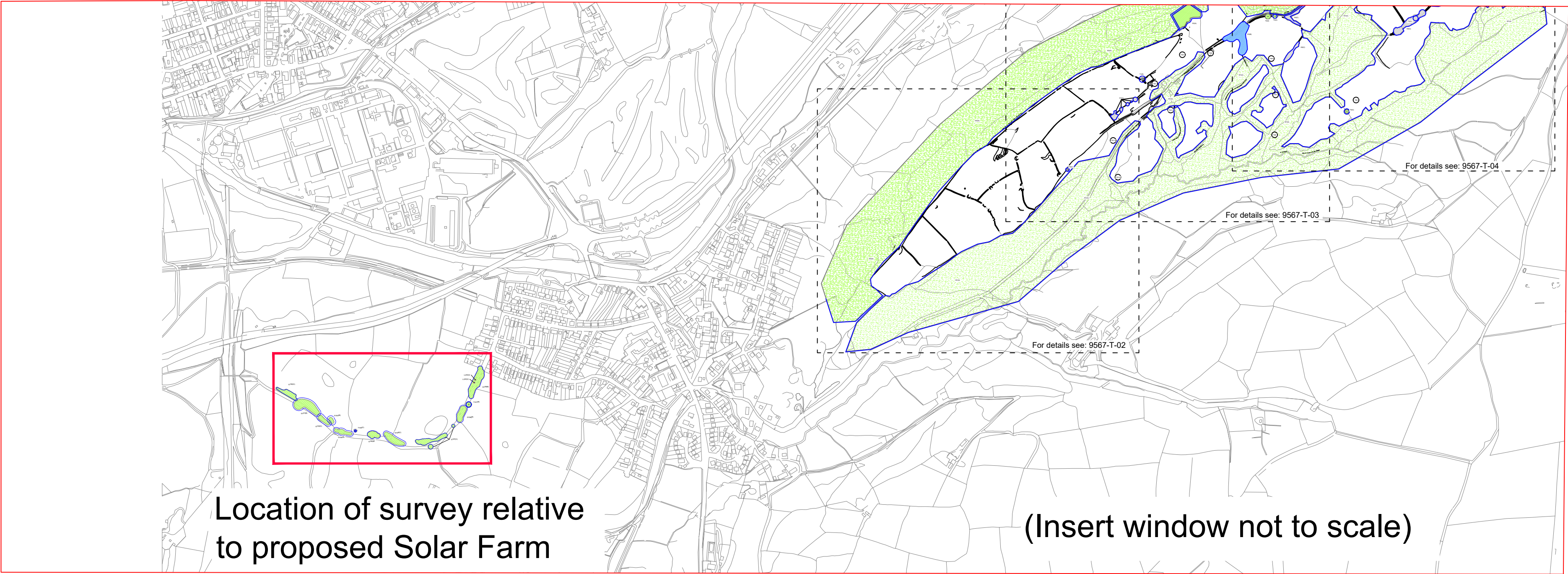
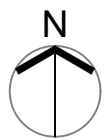
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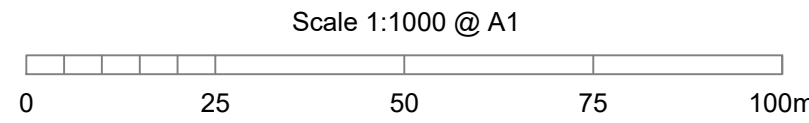
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drawing number 9567-T-04	rev -
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- KEY
- Category U - Trees / Groups Unsuitable for Retention (BS 5837:2012)
 - Category A - Trees / Groups of High Quality (BS 5837:2012)
 - Category B - Trees / Groups of Moderate Quality (BS 5837:2012)
 - Category C - Trees / Groups of Low Quality (BS 5837:2012)
 - Woodland Colour Indicates BS5837:2012 Category
 - Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
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e: mail@fpcr.co.uk
w: www.fpcr.co.uk

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project
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Glais, Swansea

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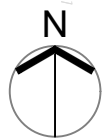
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KEY

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-  Tree/Group proposed to be removed subject to relevant permissions
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Scale 1:2500 @ A1

0 50 100 150 200 250m

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Lockington
Derby DE74 2RH

t: 01509 672772
e: mail@fpcr.co.uk
w: www.fpcr.co.uk

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project
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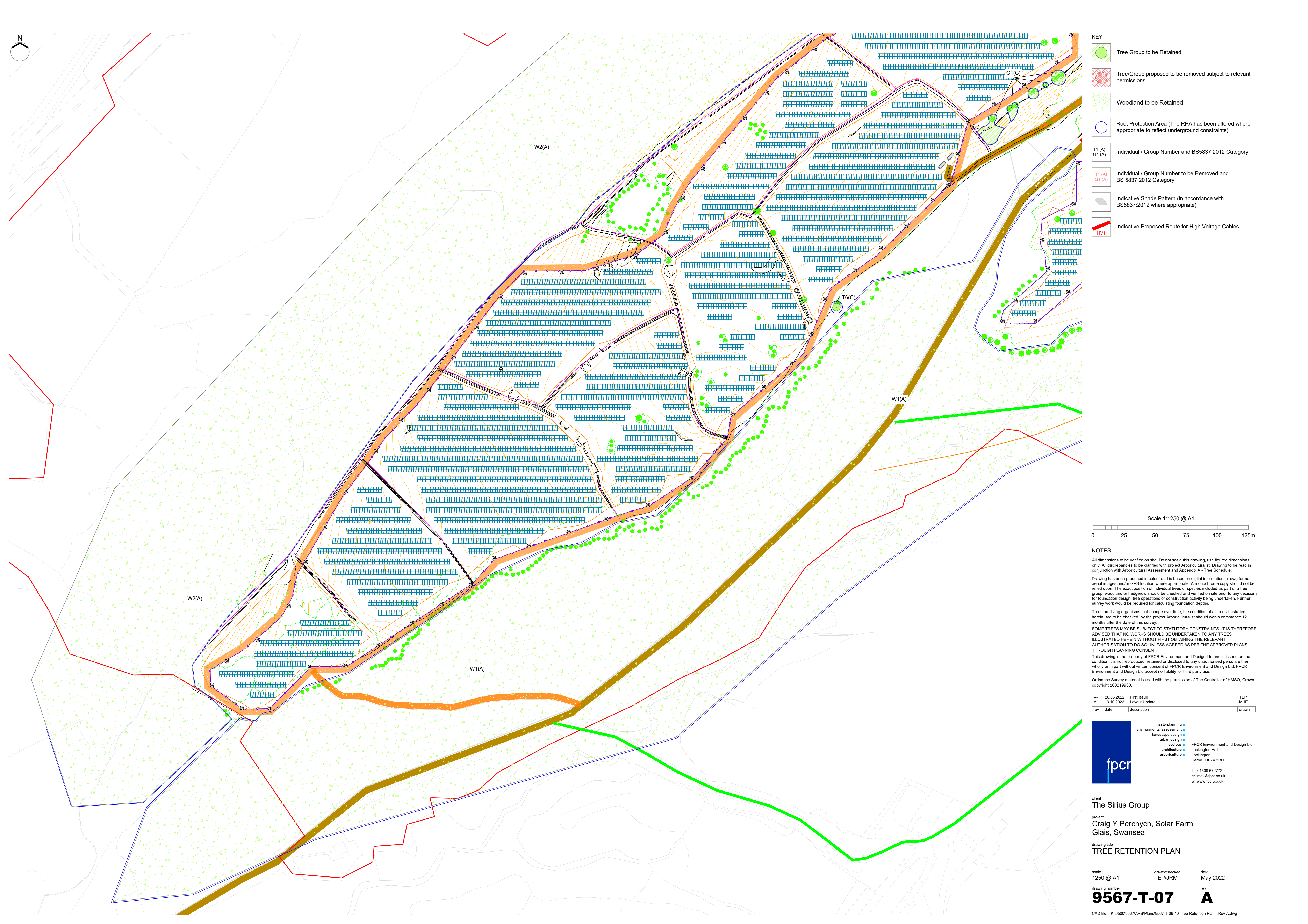
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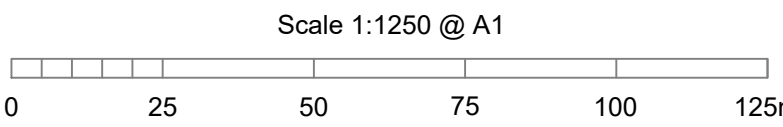
For details see: 9567-T-09

For details see: 9567-T-08

For details see: 9567-T-07



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e: mail@fpcr.co.uk
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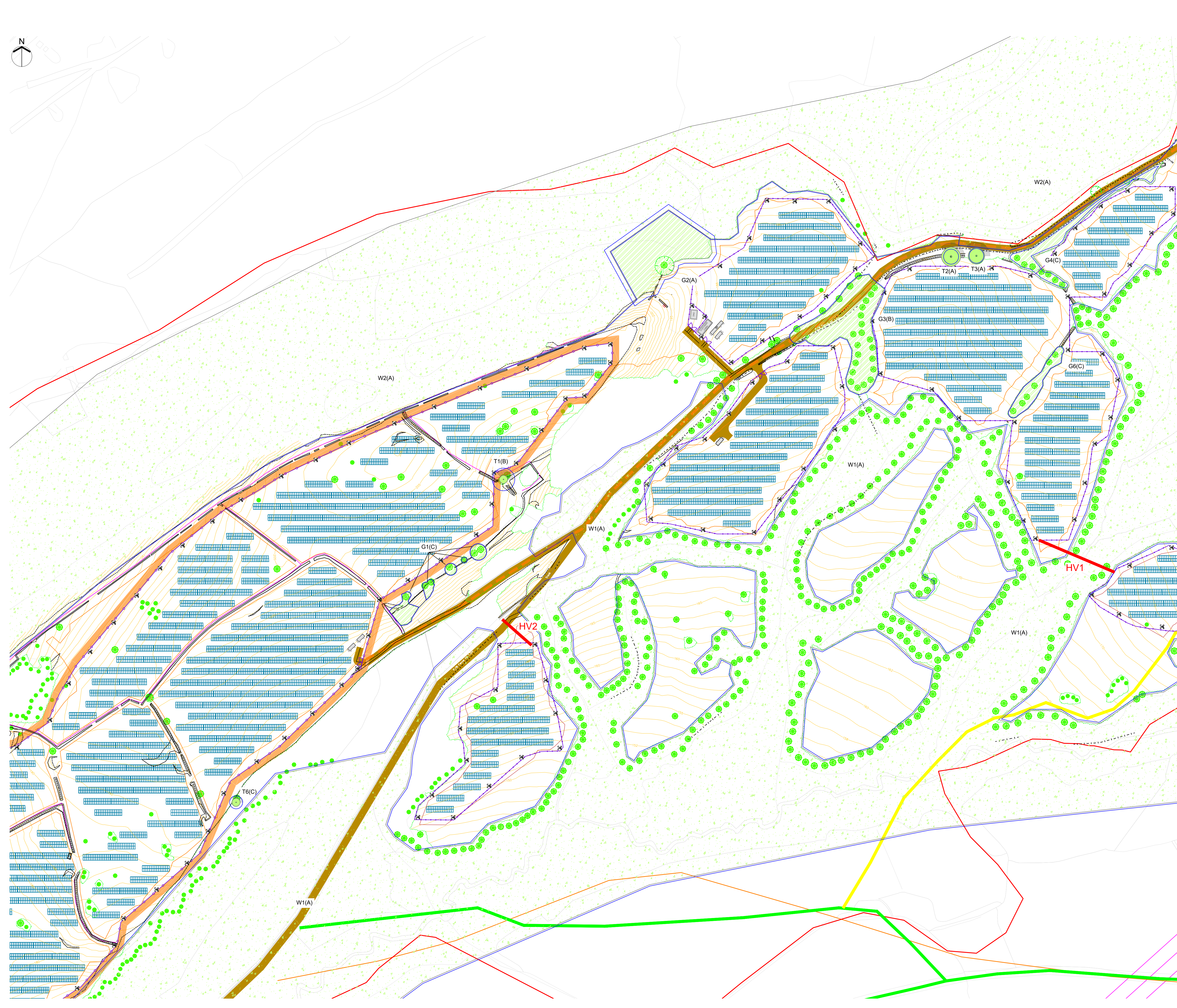
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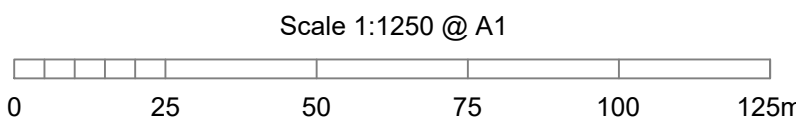
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drawing number 9567-T-07		rev A

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Lockington Hall
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e: mail@fpcr.co.uk
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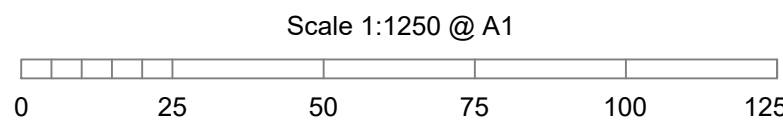
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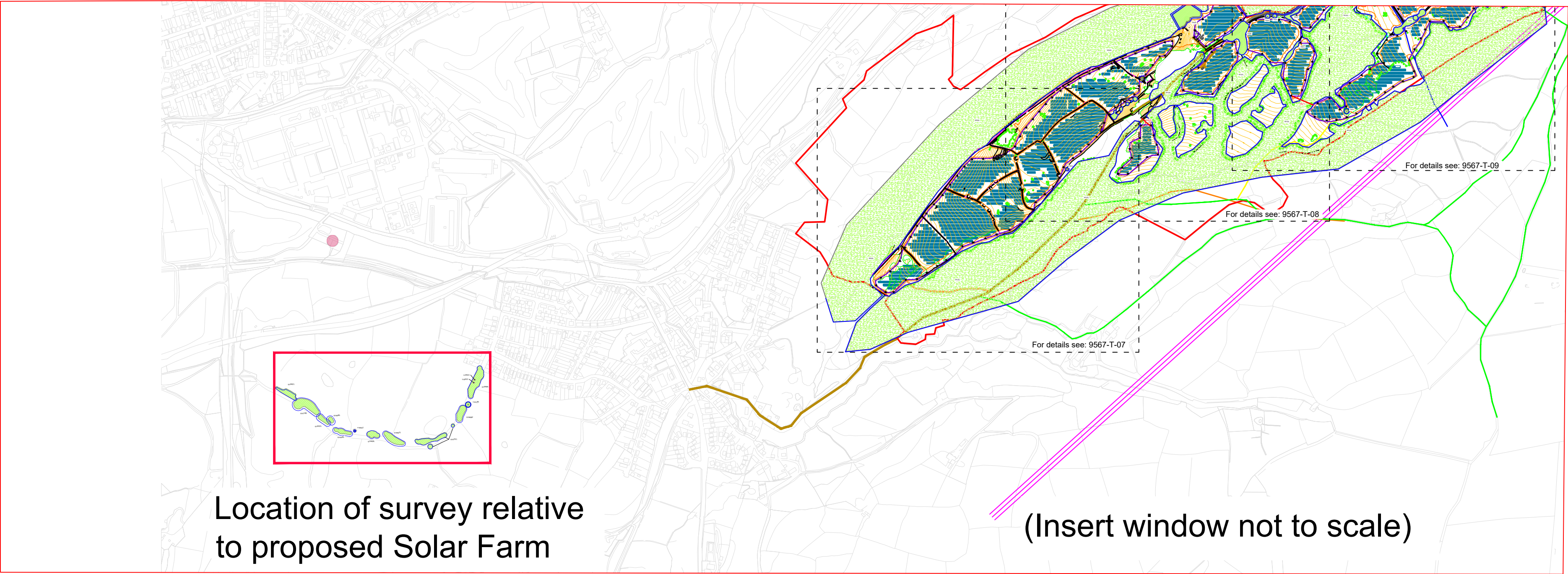
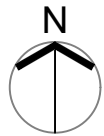
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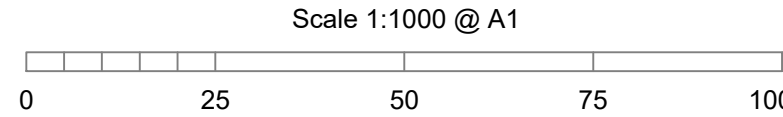
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APPENDICES

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Appendix A - Tree Schedule

Measurements	Age Classes	Quality Assessment of BS Category	ULE (relates to BS Category)
Height - Measured using a digital laser clinometer (m)	YNG: Establishing, typically with good vigour and fast growth rates and strong apical dominance; c. less than 1/3 life expectancy	Category U - Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.	<10 years
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.	40+ years
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Established, typically vigorous and increasing in apical height and lateral spread; 1/3 - 2/3 life expectancy. Offers landscape significance	Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	20-40 years
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group	M: Fully established over 2/3 life expectancy, generally good vigour and achieving full height potential with crown still spreading	Category C - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.	10-20 years
	OM: Fully mature, at the extremes of expected life expectancy, vigour decreasing, declining or moribund	Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value	
	V: biological, cultural or aesthetic value comprising niche saproxylic habitat. Individuals of large proportions (stem girth) in comparison to trees of the same species/surviving beyond the typical age range for their species.	The BS category particular consideration has been given to the following: • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy	

Structural Condition	Physiological Condition
Good - No significant structural defects	Good - No significant health problems
Fair - Structural defects that can be remediated	Fair - Symptoms of ill-health that can be remediated
Poor - Significant defects beyond remediation, present a risk of failure in the foreseeable future	Poor - Significant ill-health. Unlikely the tree will recover in the long term
Dead - Dead tree with structural integrity of tree severely compromised	Advanced Decline / Dead - Advanced state of decline and unlikely to recover or Dead

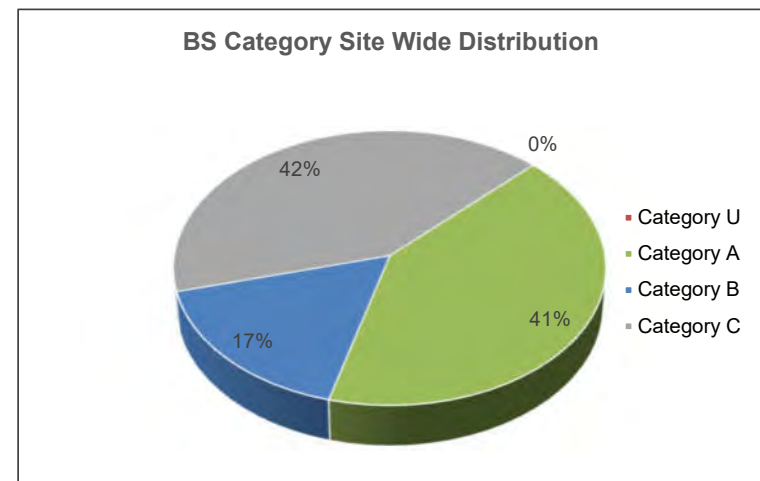
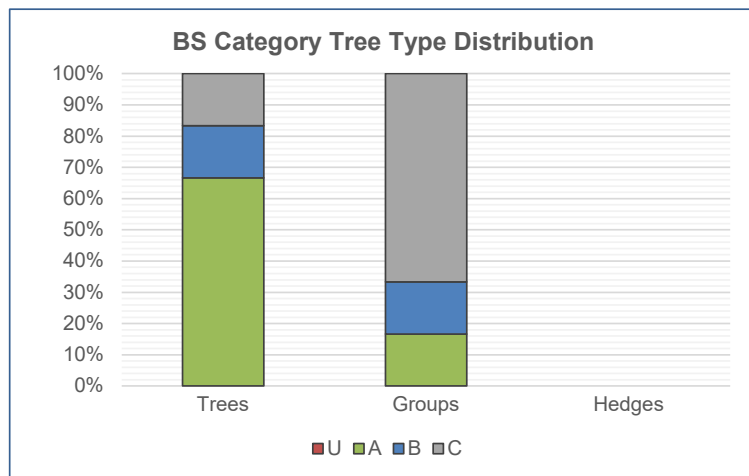
Root Protection Area (RPA)
• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully retained. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped.

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U		0		0
Category A	T2, T3, T4, T5	4	G2, W1, W2	3
Category B	T1	1	G3	1
Category C	T6	1	G1, G4, G5, G6	4
	Total	6	Total	8

BS Category Tree Type Distribution displays the proportion of trees assessed in each type to enable a better understanding of the category distribution.

BS Category Site Wide Distribution shows the proportion of trees assessed in each category across the whole site which allows an interpretation of the site's overall quality.



Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T1	Holly <i>Ilex aquifolium</i>	7	est 12x 200	3	M	F	Multi stemmed from base. Upright form with multiple leaders. Crown dense. Good vitality. Bark damage to lower stems heartwood exposed. Prominent in landscape.	217	8.3	B (ii)
T2	Sessile Oak <i>Quercus petraea</i>	10	est 350 300	7	M	F	Stem bifurcates at c.1m. Tree present on bank c.1m agl. Open crown form showing good vitality. LC above track 1.6m.	96	5.5	A (ii)
T3	Sessile Oak <i>Quercus petraea</i>	10	est 450	6	M	F	Tree present on bank c.1m agl. Open crown form showing good vitality. LC above track 2m.	92	5.4	A (ii)
T4	English Oak <i>Quercus robur</i>	10	est 550	5	M	F	Stem estimated below bifurcation. Bifurcation at c.1.5m. Good vitality. Suspected tit nest in branch tear out wound.	137	6.6	A (ii)
T5	Sessile Oak <i>Quercus petraea</i>	7	est 600	5	M	F	Low open crown form. Large probable branch tear out on south face of lower stem. Wound c.50cm long and 15cm wide. Internal decay and hollowing vertically down to close to base of stem. Strong reaction growth to compensate.	163	7.2	A (ii)
T6	English Oak <i>Quercus robur</i>	5	est 400	3	M	P	Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Crown sparse additionally leaves are being eaten. Bark missing from stem in places with heartwood exposed. Good habitat value.	72	4.8	C (iii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G1	Hawthorn <i>Crataegus monogyna</i>	4	est 10x 60	2	M	F	Scattered linear group follows contour	16	2.3	C (iii)
G2	Beech <i>Fagus sylvatica</i>	20	est 1100	10	M	G	Approx 12 mature beech planted in a cluster. Trees are large mature and have been picked out as a distinct group from W2. Distinctly and typically no understory below G2.	547	13.2	A (ii)
G3	Ash <i>Fraxinus excelsior</i> Elder <i>Sambucus nigra</i> English Oak <i>Quercus robur</i> Hawthorn <i>Crataegus monogyna</i> Holly <i>Ilex aquifolium</i>	9	est 450	5	M	P / F	Mixed group follows field boundaries and access track. Have taken outgrown hedgerow form. Ash, holly and elder are mostly in poor condition. Oaks are typical of area low growing wide spreading forms. Cat B for landscape value.	92	5.4	B (ii)
G4	Goat Willow <i>Salix caprea</i> Hawthorn <i>Crataegus monogyna</i> Downy Birch <i>Betula pubescens</i> Rowan <i>Sorbus aucuparia</i> Sessile Oak <i>Quercus petraea</i>	5	est 150	3	EM	P	Unremarkable self seeded trees following edge of track and marking field boundaries.	10	1.8	C (iii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G5	Elder Sambucus nigra Goat Willow Salix caprea Hawthorn Crataegus monogyna Crab Apple Malus sylvestris Downy Birch Betula pubescens Rowan Sorbus aucuparia Sessile Oak Quercus petraea	5	est 250 250	2	M	F	Unmanaged sporadic linear group follows ditch line.	57	4.2	C (iii)
G6	Ash Fraxinus excelsior Elder Sambucus nigra Hawthorn Crataegus monogyna Hazel Corylus avellana Holly Ilex aquifolium	5	est 200	3	EM / M	P	Unmanaged linear group. Dense bramble and gorse at base. Dead trees noted.	18	2.4	C (iii)

Wood No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
WOODLANDS										
W1	Ash Fraxinus excelsior Beech Fagus sylvatica Blackthorn Prunus spinosa English Oak Quercus robur Hawthorn Crataegus monogyna Silver Birch Betula pendula Sycamore Acer pseudoplatanus Alder Alnus glutinosa Holly Ilex aquifolium Rowan Sorbus aucuparia Sessile Oak Quercus petraea Guilder rose Viburnum opulus	15	est 500	5	M	G	Stem diameter estimated based on average stem of canopy trees. Broadleaved woodland with generally good vertical structure. Canopy is largely oak dominated. Structure and ground flora indicate that sections of the woodland are Ancient. Overall has high value as habitat.	113	6.0	A (iii)

Wood No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
W2	Ash Fraxinus excelsior Beech Fagus sylvatica English Oak Quercus robur Goat Willow Salix caprea Silver Birch Betula pendula Sycamore Acer pseudoplatanus Holly Ilex aquifolium Rowan Sorbus aucuparia Sessile Oak Quercus petraea Common Larch Larix decidua Pinus nigra	15	est 400	5	M	G	Stem diameter estimated based on average stem of canopy trees. Recorded from main plateau. Mix of plantation woodland interspersed with natives. Forms northern boundary of the site. Highly visible in the landscape and good overall habitat value.	72	4.8	A (iii)

Appendix B - Tree Schedule

Measurements	Age Classes	Quality Assessment of BS Category	ULE (relates to BS Category)
Height - Measured using a digital laser clinometer (m)	YNG: Establishing, typically with good vigour and fast growth rates and strong apical dominance; c. less than 1/3 life expectancy	Category U - Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.	<10 years
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.	40+ years
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Established, typically vigorous and increasing in apical height and lateral spread; 1/3 - 2/3 life expectancy. Offers landscape significance	Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	20-40 years
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group LC - Lowest crown height	M: Fully established over 2/3 life expectancy, generally good vigour and achieving full height potential with crown still spreading	Category C - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.	10-20 years
	OM: Fully mature, at the extremes of expected life expectancy, vigour decreasing, declining or moribund	Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value	
	V: biological, cultural or aesthetic value comprising niche saproxylic habitat. Individuals of large proportions (stem girth) in comparison to trees of the same species/surviving beyond the typical age range for their species.	The BS category particular consideration has been given to the following: • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy	

Structural Condition	Physiological Condition
Good - No significant structural defects	Good - No significant health problems
Fair - Structural defects that can be remediated	Fair - Symptoms of ill-health that can be remediated
Poor - Significant defects beyond remediation, present a risk of failure in the foreseeable future	Poor - Significant ill-health. Unlikely the tree will recover in the long term
Dead - Dead tree with structural integrity of tree severely compromised	Advanced Decline / Dead - Advanced state of decline and unlikely to recover or Dead

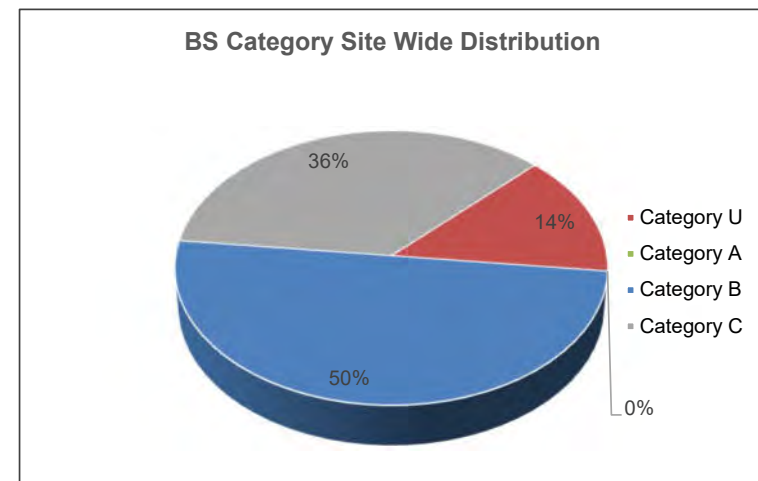
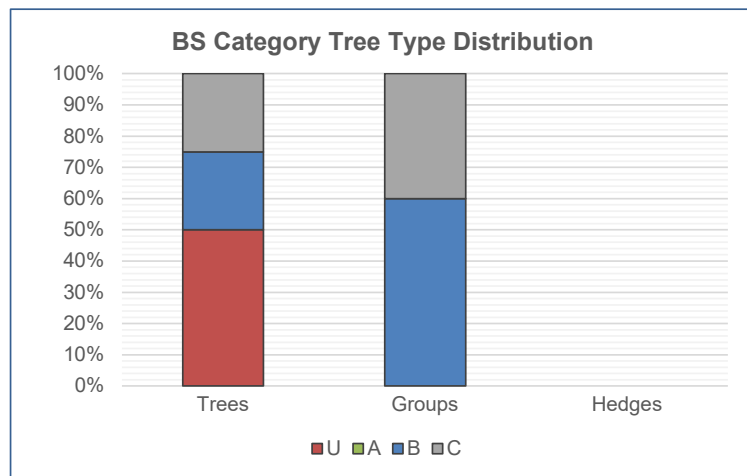
Root Protection Area (RPA)
• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully retained. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped.

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U	T102, T103	2		0
Category A		0		0
Category B	T101	1	G101, G103, G104, G105, G108, G109	6
Category C	T100	1	G100, G102, G106, G107	4
	Total	4	Total	10

BS Category Tree Type Distribution displays the proportion of trees assessed in each type to enable a better understanding of the category distribution.

BS Category Site Wide Distribution shows the proportion of trees assessed in each category across the whole site which allows an interpretation of the site's overall quality.



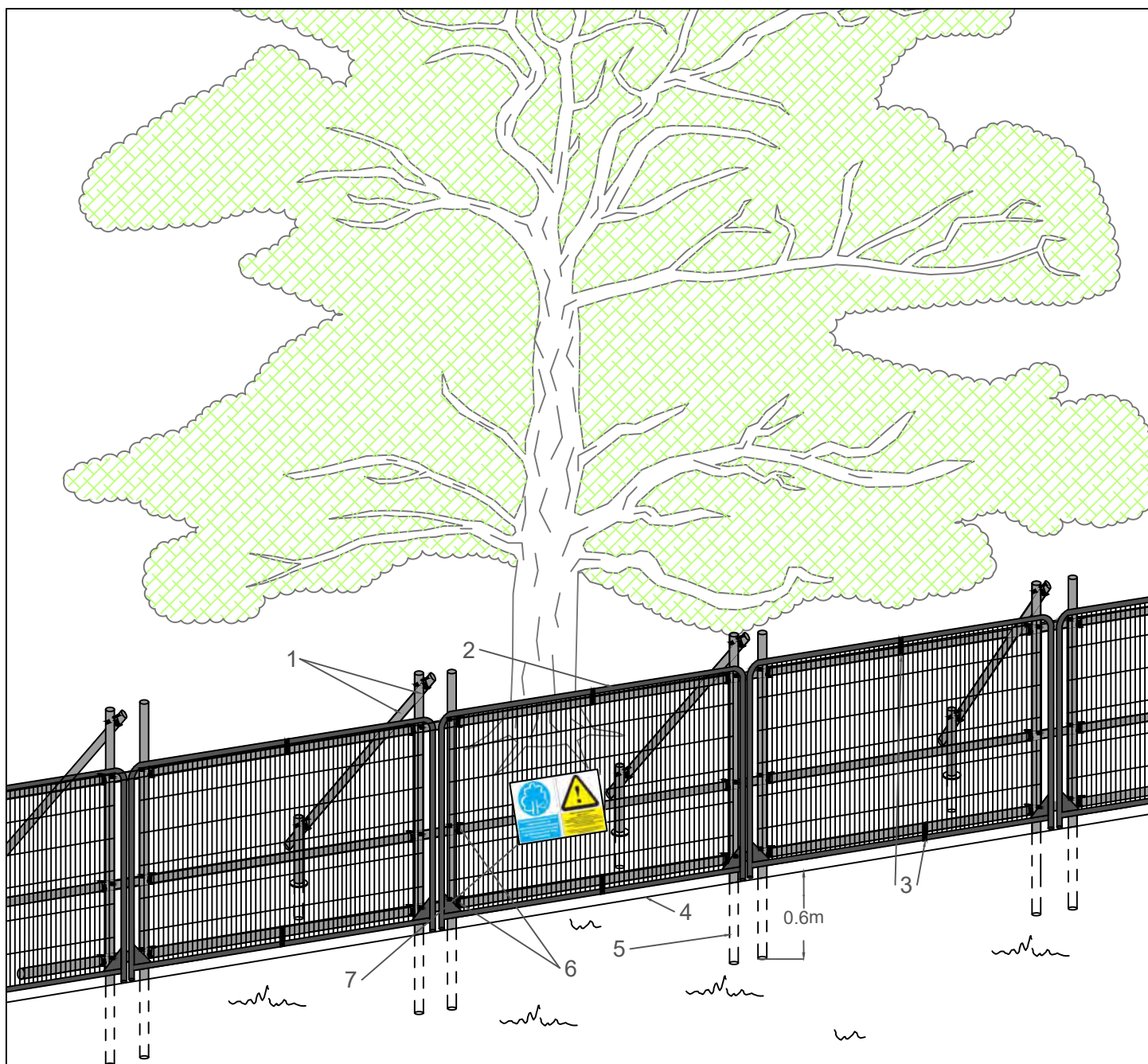
Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T100	English Oak Quercus robur	5	est 200	3	EM	F	Unremarkable tree. Lower 2m obscured by Japanese knotweed. Does not overhang path. Base c.4m N of edge of path.	18	2.4	C (iii)
T101	English Oak Quercus robur	13	est 550	7	M	F	Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Wide open crown form. Multiple leaders from c. 1.8m agl. Established ivy has been managed historically. Tree c.1m E of E edge of path on bank c.0.5m above path level. Does not have quality to warrant Cat A	137	6.6	B (ii)
T102	Goat Willow Salix caprea	10	est 450 200 300	1	M	D	Tree in extensive decline. Largest stem leans W c.20degrees from vertical. Smallest leader has failed E at 2.5m and is suspended above path in tree on E side of path. Middle sized leader is sparse c.50% defoliated and has a large split with internal decay from ground level to 1.5m agl. Opening of split at its widest 100mm. Coppice Middle and smallest stem to above ground level and remove suspended aerial deadwood.	N/A	N/A	U
T103	Goat Willow Salix caprea	12	est 400 350 150 500	1	M	P	Coppice all stems to ground level. Multiple stems from base significant volumes of decay observed on all but on stem. Fracture points at base indicate historic failures.	N/A	N/A	U

Group No	Appendix B - Tree Schedule	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G100	English Oak Quercus robur Goat Willow Salix caprea Sycamore Acer pseudoplatanus Downy Birch Betula pubescens	7	est 250	4	EM	P / F	Unremarkable self seeded group present on both sides of path. Have lacked any targeted management.	28	3.0	C (iii)
G101	English Oak Quercus robur Goat Willow Salix caprea Sycamore Acer pseudoplatanus Downy Birch Betula pubescens	9	est 220 370 290 440	5	EM	P / F	Oak dominant with less established species forming understory. Present on both sides of path. LC 2.5m	209	8.2	B (iii)
G102	Goat Willow Salix caprea	8	est 10x 200	4	M	P / F	Three willow on S edge of path. N tree is c.200m S of edge of footway and is showing signs of declining vitality. Crown sparse for species c.15% defoliated. Multiple leaders some of which are dead/broken. LC 3m.	181	7.6	C (ii)
G103	Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group LC - Lowest crown height	12	est 14x 200	5	EM	F	Dense Japanese knotweed at base. Two trees one oak one sycamore. Oak single stemmed. Sycamore multitemmed from base. Bases obscured by dense vegetation. Oak has a good balanced crown. Situating c.3m N of N edge of path. LC2m.	253	9.0	B (iii)

Group No	Appendix B - Tree Schedule	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G104	English Oak Quercus robur Goat Willow Salix caprea	8	est 450 500	5	M	F	Stem estimated on largest tree twin stemmed oak bifurcation at ground level. Group on S edge of path. Oak is c.2m S of path edge. LC2m	205	8.1	B (iii)
G105	English Oak Quercus robur Downy Birch Betula pubescens Rowan Sorbus aucuparia	10	est 500	5	SM / EM	F	Mixed group of mostly oak adjacent to both edges of path. Trees on S edge on c.0.5m high bank. Overhangs path. LC3m.	113	6.0	B (iii)
G106	English Oak Quercus robur Goat Willow Salix caprea Hawthorn Crataegus monogyna	6	est 400 400	4	EM	P / F	Densely arranged oak dominant group. Unremarkable. One individual on S edge of path. All the rest on N edge.	145	6.8	C (iii)
G107	English Oak Quercus robur Goat Willow Salix caprea Hawthorn Crataegus monogyna Downy Birch Betula pubescens Holly Ilex aquifolium Rowan Sorbus aucuparia	7	est 300	4	SM / EM	F	Group present on both edges of path. Unremarkable relatively young trees. Crowns occasionally hang over path LC2.5m. S edge of path in NW of group is on a bank to c.1.5m above path height.	41	3.6	C (iii)

Group No	Appendix B - Tree Schedule	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G108	English Oak Quercus robur Goat Willow Salix caprea Downy Birch Betula pubescens Rowan Sorbus aucuparia	15	est 600	5	EM / M	D / P / F	Mix of trees forming an avenue along path. Banks are present on both edges of the path. Trees individually unremarkable but value collectively for amenity and habitat.	163	7.2	B (ii)
G109	English Oak Quercus robur Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus Holly Ilex aquifolium	15	est 500	5	EM / M	F	Group located on both sides of path forming avenue. Trees are etiolated and bases located on banks above the height of the path. Unremarkable individually but value collectively.	113	6.0	B (ii)

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Standard Specification for Tree Protective Fencing

1. Standard scaffold poles
2. Heavy gauge 2m tall galvanized tube and welded mesh infill panels
3. Panels secured to scaffold frame with wire ties
4. Ground level
5. Uprights driven into the ground until secure (min depth of 0.6m)
6. Standard scaffold clamps
7. Construction Exclusion Zone signs

NOTES

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masterplanning ■
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 ecology ■ Lockington Hall
 architecture ■ Lockington
 arboriculture ■ Derby DE74 2RH

t: 01509 672772
 f: 01509 674565
 e: mail@fpcr.co.uk
 w: www.fpcr.co.uk

drawing title

APPENDIX C PROTECTIVE FENCING SPECIFICATIONS

CAD file: S:\Arb resources\Basic Templates\Tree Protection\Appendix B - Protective Fencing A4.dwg

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