

**Solar Park and Battery Storage Facility at
Land to the North of Maelor Gas Works, Marchwiell,
Wrexham, LL13 0UN**

Tree Survey, Arboricultural Impact Assessment, Tree Protection Plan
and Arboricultural Method Statement

February 2021



Contents

- 1 Introduction
- 2 Survey Terminology
- 3 Tree Survey - Summary
- 4 Arboricultural Impact Assessment
- 5 Summary
- 6 Arboricultural Method Statement
- 7 References

Appendices

- A Tree Survey (Table)
- B Tree Protection Plan
- C Site Images
- D Cascade Table
- E Survey Terminology

Issue	Date
V1	16/02/21

1 Introduction

- 1.1 This report has been prepared to support a planning application seeking permission for the construction of a solar park with battery storage facility on land to the north of Maleor Gas Works and to the south of Wrexham Industrial Estate.
- 1.2 The site is approximately 13 hectares in area and comprises of grazed pasture land. Hedgerows and mature trees enclose the site on its boundaries whilst a number of mature and veteran specimens are spread throughout the core of the site. There are not believed to be any trees covered by a TPO or other designation on site. A request for further information was submitted to Wrexham Borough Council but confirmation is yet to be received.
- 1.3 The fieldwork for this survey was undertaken in November 2020. Details of the proposed scheme are provided within the supplementary planning documents submitted with the application.

1.4 Limitations:

Trees have been visually assessed from ground level only. No further detailed investigation of any structural or physiological defects has yet been undertaken. It should be stressed that although the health and safety of the trees is an aspect of the assessment methodology used, this report is intended for planning purposes only. It should not be used as an assessment of tree safety and Corylus Planning and Environmental Ltd can accept no liability for any damage or injury sustained in future as a result of the failure of any tree or its parts. It will remain the present and future tree owner's responsibility to consider the health of the trees and take appropriate management action to discharge the owner's duty of care.

1.5 Disclaimers:

This report is intended to support an imminent planning application. Should the planning and development process extend beyond a year of the date of this report, or actions occur on or near the site that could undermine the health, condition and / or stability of surveyed trees, it is recommended that the tree retention categories are reviewed prior to site works commencing.

2 Survey Terminology (See also Appendix E)

- 2.1 The criteria and terms in the report are drawn from BS5837:2012 – 'Trees in relation to design, demolition and construction – recommendations. The British Standard (BS) aims to assist tree retention in the vicinity of new construction where the objective should be to achieve a harmonious and sustainable relationship between trees and structures. The survey work includes a standardised set of measurements, an assessment of the trees' age and general condition and an estimate of the trees likely remaining contribution (in years) to the site. All assessments are based upon

the site conditions as they existed at the time of the inspection. On the basis of the findings, each tree is allocated one of four categories ('A', 'B', 'C' and 'U') based on quality and value (in a non-fiscal sense). This provides a guide as to its general suitability for retention within the site where development is proposed.

Categorisation is defined using a 'cascade chart' (refer to Appendix D) and includes sub-categorisation to define whether a tree has particular *arboricultural* values, *landscape* values and cultural *and conservation* values.

- 2.2 The RPA (Root Protection Area) is defined as a "*layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.*" The RPA is generally shown as a circle. In reality the distribution of roots around a tree will frequently prove to be asymmetrical due to the presence of physical constraints or a variety of conditions that may affect root development. Where it is considered likely that root growth has been restricted in one direction and favoured in another the arboriculturist may propose to modify the RPA shape to better protect the tree's viability.
- 2.4 The tree survey and constraints information is applied to the design plan to prepare an *Arboricultural Impact Assessment (AIA)* and a *Tree Protection Plan (TPP)*. For the AIA, an indicative scale of *negligible, slight, moderate to major* is used to identify the anticipated significance of potential impacts (adverse or beneficial) to trees in construction or operational stages of development. This assessment is used to inform detailed design development – including the positioning of buildings, hard surfacing, retaining structures, services (above and below ground), finished site levels and landscaping works (including new tree planting). The AIA report and preliminary TPP plan helps to define a sustainable design outcome for existing and future tree planting.
- 2.5 Once a site plan has been finalised the TPP can be agreed and an *Arboricultural Method Statement (AMS)* is prepared detailing how trees selected for retention will be protected throughout the construction period. This defines *Construction Exclusion Zones (CEZ's)*, recommendations for construction site arrangements and temporary infrastructure, construction details that allow trees to be safeguarded, details of any preparatory tree works and, if required, a schedule of those works for tendering purposes.

3 Tree Survey – Summary

- 3.1 Nineteen individual trees and one group of vegetation has been recorded in this survey. Hedgerows and clusters of scrubby vegetation have been identified on the TPP and will be adequately protected, but are not recorded in the survey.
- 3.2 A considerable number of the surveyed trees are recognised as veterans or are approaching veteran status. In these cases, their RPA's have been calculated using the x15 multiplier to afford them and their root structures additional protection.

4 Arboricultural Impact Assessment

- 4.1 The AIA identifies the likely significance of impacts to trees from the construction and operational activities expected from the proposed development. A sliding scale of *negligible*, *slight*, *moderate* and *major* has been applied to indicate the anticipated significance of impacts where *major* is likely to lead to decline and death of the tree and *negligible* is damage that the tree is likely to recover from. (See Table 1 below for impact summary).
- 4.2 T1 and T2 are mature Oak trees either side of the construction access track. The existing track runs partially through their root protection areas (RPAs) over which appropriate ground protection will be used during the construction phase. A trench is to be hand dug through the edge of their RPA's to facilitate the installation of a cable route, this will be done with the appointed arboriculturist in attendance to advise in the event that any significant roots are found that may require severance. Although it is not currently anticipated, limited pre-emptive pruning of limbs from T1 and T2 may be required to allow smooth access of construction traffic into the site. In this event, the arboricultural contractor will remove the minimum amount of material from the trees to achieve the objective. It is anticipated that T1 and T2 will face a *slight* to *moderate* impact on their long term health, depending on the presence of roots found when installing the cable.
- 4.3 T3 is a semi-mature Ash specimen outside of the site area. A 2m high deer fence is to be installed to secure the site on the edge of the tree's RPA. Trial pits will be hand dug prior to the fence being installed to check for the presence of significant (larger than 25mm in diameter) roots. The position of the fence posts will be changed to avoid contact with or damage to significant root structures. Their impact will be limited as only a small number of pile driven stakes supporting the fence will be within the RPA and they will be carefully positioned to avoid any visibly significant roots. As a result, it is likely to face *no* or a *negligible* impact on its long term health.
- 4.4 T4 and G2 are mature and semi-mature trees that form part of the site's eastern boundary. A 2m high deer fence is to be installed to secure the site on the edge of the tree's RPA. Trial pits will be hand dug prior to the fence being installed to check for the presence of significant (larger than 25mm in diameter) roots. The position of the fence posts will be changed to avoid contact with or damage to significant root structures. Their impact will be limited as only a small number of pile driven stakes supporting the fence will be within the RPA and they will be carefully positioned to avoid any visibly significant roots. It is anticipated that the rest of their RPA's can be protected within the CEZ. As a result, they are likely to face *no* or a *negligible* impact on their long term health.
- 4.5 T5 and T6 are , located towards the centre of the site, are both mature Oak trees approaching veteran status Their RPAs have been calculated using the x15 multiplier due to the likelihood of them having developed larger root structures that will require protection to ensure their long term health. It is anticipated that the

entirety of their RPAs can be protected within the construction exclusion zone (CEZ), meaning they are likely to face *no* or a *negligible* impact on their long term health.

- 4.6 T7-T9 are veteran oak specimens forming part of the eastern boundary. Their RPAs have been calculated using the x15 multiplier due to the likelihood of them having developed larger root structures that will require protection to ensure their long term health. A 2m high deer fence is to be installed to secure the site on the edge of the tree's RPA. Trial pits will be hand dug prior to the fence being installed to check for the presence of significant (larger than 25mm in diameter) roots. The position of the fence posts will be changed to avoid contact with or damage to significant root structures. Their impact will be limited as only a small number of pile driven stakes supporting the fence will be within the RPA and they will be carefully positioned to avoid any visibly significant roots. It is anticipated that the rest of their RPAs can be protected within the CEZ. As a result, it is likely to face *no* or a *negligible* impact on its long term health.
- 4.7 T10 is a veteran Oak within the core of the site, its RPA has been calculated using the x15 multiplier due to the likelihood of it having developed a larger root structure that will require protection to ensure its long term health. A 1.7m section of a 30cm deep swale is sited within the fringe of the RPA, it will be hand dug with the appointed arboriculturist in attendance. If the excavation unearths any substantial roots, provisions can be made to move the swale elsewhere on site so that the severance of the root is avoided. Aside from this, the rest of the RPA can be protected adequately within the CEZ, resulting in it facing *no* or a *negligible* impact on its long-term health.
- 4.8 T11-T14 are all veteran Oaks within the core of the site, their RPAs have been calculated using the x15 multiplier due to the likelihood of them having developed larger root structures that will require protection to ensure their long term health. It is anticipated that the entirety of their RPAs can be protected within the construction exclusion zone (CEZ), although a small number of individual panels of the heras fencing may have to be removed temporarily to allow above ground clearance for some of the PV panels. It is not anticipated that any of the proposed PV panels have their foundations sited within the RPAs of the retained trees. As a result, they are likely to face *no* or a *negligible* impact on their long term health.
- 4.7 T15-T17 are veteran Oaks sited in the southern corner, and form part of the site's boundary. Their RPAs have been calculated using the x15 multiplier due to the likelihood of them having developed larger root structures that will require protection to ensure their long term health. A 2m high deer fence is to be installed to secure the site on the edge of the tree's RPA. Trial pits will be hand dug prior to the fence being installed to check for the presence of significant (larger than 25mm in diameter) roots. The position of the fence posts will be changed to avoid contact with or damage to significant root structures. Their impact will be limited as only a small number of pile driven stakes supporting the fence will be within the RPA and they will be carefully positioned to avoid any visibly significant roots. It is anticipated

that the rest of their RPAs can be protected within the CEZ. As a result, they are likely to face *no* or a *negligible* impact on their long term health.

- 4.8 T18 and T19 are mature oaks in the centre of the site. A 2m high deer fence is to be installed to secure the site on the edge of the tree's RPA. Trial pits will be hand dug prior to the fence being installed to check for the presence of significant (larger than 25mm in diameter) roots. The position of the fence posts will be changed to avoid contact with or damage to significant root structures. Their impact will be limited as only a small number of pile driven stakes supporting the fence will be within the RPA and they will be carefully positioned to avoid any visibly significant roots. A small portion of their RPA's is devoted to new planting, it is not proposed within a 5m radius from their stems. All new transplants will be planted using hand tools and will seek to minimise disturbance to significant roots. It is anticipated that the rest of their RPA's can be protected within the CEZ. As a result, they are likely to face *no* or a *negligible* impact on their long term health.

5 Summary

Table 1 – Impact Summary

Tree Number	Category	Arboricultural Impact
T1	B2	Slight / Moderate
T2	B2	Slight / Moderate
T3	C2	None / Negligible
T4	B2	None / Negligible
G1	B2	None / Negligible
T5	B2	None / Negligible
T6	B2	None / Negligible
T7	A/B 1	None / Negligible
T8	A/B 1	None / Negligible
T9	A/B 1	None / Negligible
T10	A/B 1	None / Negligible
T11	A/B 1	None / Negligible
T12	B2	None / Negligible
T13	A/B 1	None / Negligible
T14	A/B 1	None / Negligible
T15	A/B 1	None / Negligible
T16	A/B 1	None / Negligible
T17	A/B 1	None / Negligible
T18	B2	None / Negligible
T19	B2	None / Negligible

- 5.1 All nineteen trees and the one group that was surveyed on site have been identified for retention.

- 5.2 It is anticipated that all nineteen trees and the one group can be retained practicably and only two are likely to incur a negligible to slight impact on their long-term health and viability.
- 5.3 Adhering to the principles detailed in the '*Arboricultural Method Statement*' will mitigate against any stresses placed on the retained trees during the construction phases.
- 5.4 Soft landscaping proposals included in this application will add close to 0.1Ha of woodland planting to the site as well as other ecological enhancements, increasing the quantity and quality of the tree stock on site.

6 Arboricultural Method Statement

6.1 General

The Arboricultural Method Statement, (AMS) provides an overview of advised best practice methods and should not be used as a reference when on site. All tree preparation works shall be undertaken by a competent and certificated arboricultural contractor conforming at all times to BS 3998:2010, BS 5837:2012 and recognised best practice standards. The contractor will submit a detailed method statement for approval by the contract manager before commencing any site works.

6.2 Site Supervision

The appointed Arboriculturist will attend site to supervise and approve works that are outlined in the AMS, this includes but may not be limited to the following:

- Implementation of CEZ and Ground Protection (after implementation of the whole site security fence but prior to any construction works taking place).
- Installation of the cable route adjacent to T1 and T2 and the hand digging of the shallow swale on the edge of the RPA for T10.
- Completion of construction works enabling the removal of CEZ and Ground Protection.

Additional unforeseen works that are not covered within this AMS will require supervision from the appointed arboriculturist who will prepare a detailed working method to submit to the LPA's Tree Officer for their agreement prior to any works taking place.

6.3 Record of Works

At each key stage outlined above, the appointed arboriculturist will attend site and prepare a written and photographic record of the completed works. This will be

submitted to the LPA's Tree Officer at the earliest opportunity to demonstrate compliance with the AMS and TPP as approved.

6.4 Construction Exclusion Zone

A construction exclusion zone (CEZ) will be established around retained trees to the extent of their RPAs wherever possible. This will restrict access to retained trees and their RPAs from unauthorised individuals and vehicles. It will also prevent the storage of materials, site fires, mixing of materials and other ground works.

In addition to the construction exclusion zone, a 2m high deer fence is proposed around the entire perimeter of the development to provide continuous security for the duration of the site's lifetime. The alignment of this will provide protection to the majority of the RPAs and can act as a permanent CEZ. *See Figure 1 for an example.*

Construction of the security fence will be done in a way that minimises disturbance to retained tree roots. Trial pits will be hand dug prior to the fence being installed to check for the presence of significant (larger than 25mm in diameter) roots. The position of the fence posts will be changed to avoid contact with or damage to significant root structures. Their impact will be limited as only a small number of pile driven stakes supporting the fence will be within the RPA and they will be carefully positioned to avoid any visibly significant roots.



Figure 1 – Example of c.2m high deer fencing.

6.5 Ground Protection

Ground protection is an effective means of preventing damage to RPAs of retained trees leaving them undisturbed during development activity. Ground protection has been specified for a small portion of T1 and T2's RPA to cover the existing construction access track where a construction exclusion zone (CEZ) cannot reasonably be established. Ground protection will be implemented before any construction work starts on site and will remain in situ until the risk of harm from the development activity has been removed, this will require approval from the supervising arboriculturist.

The ground protection will be constructed to provide a surface that can robustly withstand the forces of anticipated worker movements and construction traffic, this can be achieved in a number of ways. The following examples illustrate methods that use common construction materials and are relatively cheap to acquire and build.

i) Scaffold Boards/Heavy-duty Plywood

A platform of scaffold boards or heavy-duty plywood suspended above the ground by a 100mm depth of woodchip laid upon a breathable geotextile membrane will produce an acceptable level of compression resistant protection for pedestrian movements.



Figure 1: Plywood boards atop a layer of woodchip and a breathable geotextile membrane.

ii) Steel Plates

Similarly, a platform of large steel plates suspended above a layer of 150-200mm of woodchip and a breathable geotextile membrane will provide compression resistant protection for vehicle movements.



Figure 2: Steel plates atop a layer of woodchip and a breathable geotextile membrane.

iii) Cellular system

A cellular system such as ArborRaft 150, is an interlocking framework of 'crates' that can withstand bigger loads than scaffold boards or steel plates and do not require a fill material.



Figure 3: ArborRaft system in use outside a CEZ.

6.6 Fencing

Heras fencing should be used to demarcate the extent of the CEZ and create a barrier that prevents unauthorised access to it. BS 5837:2012 provides details of the best practice construction method to build effective fencing. The fencing should be mounted to the ground with securely driven scaffolding poles that avoid contact with structural roots.

Secure fencing will be implemented before any construction work starts on site and will remain in situ until the risk of harm from the development activity has been removed, this will require approval from a supervising arboriculturist. It will accord with the alignment shown on the TPP.

T11 to T13 have PV panels sited where the above ground element may clash with the heras fencing, despite the foundations of the structure supporting the PV panels being sited outside of their RPA's. This may require individual fence panels to be temporarily removed to facilitate the implementation of PV panels that are sited on the end of rows. This will only be done at the last possible moment once the rest of the row has been constructed. The minimum number of fence panels will be removed to achieve the objective and the rest of the CEZ will remain intact.

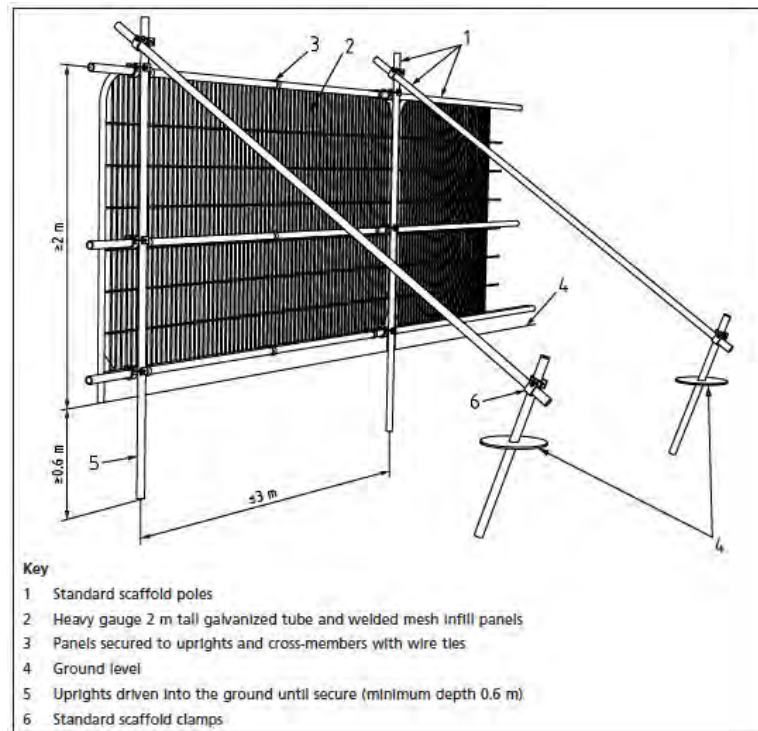


Figure 2 – Specification of protective barrier as prescribed in BS 5837:2012.

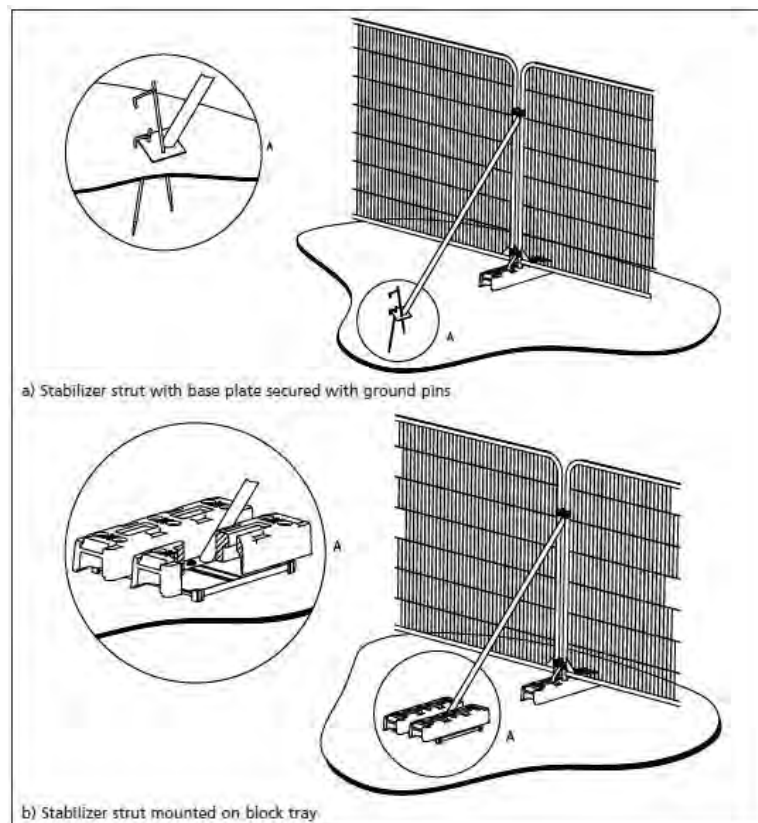


Figure 3 – Specification of above-ground stabilising systems

6.7 Excavation in RPA's and Root Severance

It is anticipated that excavation works within RPA's will only be required for T2, T3 and T10 as outlined in the impact assessment above.

Excavation inside RPA's will be strictly limited and will be minimised when setting out to achieve the objective. Where practicable, excavation will be undertaken manually using hand-held tools and compressed air soil displacement.

Retained roots that are temporarily exposed during excavation should be covered with damp hessian sacking (or similar) to prevent desiccation. During extended periods of hot or windy weather, the sacking will be sprayed regularly to prevent it from drying out. The wrapping will be removed prior to backfilling.

In some cases, roots will need to be severed and removed from site in order to facilitate the proposed development. Roots smaller than 25mm in diameter will be severed using a suitable sharp tool that produces a clean cut. Cuts will occur c.150mm from the edge of the excavated area. Roots larger than 25mm in diameter and roots occurring in large clumps will only be severed and removed from site following consultation with the site arboriculturist.

Excavated areas will be carefully backfilled with the previously removed material to avoid compaction. Some of the extracted top soil will be placed around the retained roots before adding inert granular fill and the top soil. This material will be free of contaminants and other foreign objects. Top soil or material imported from off the site will be tested and approved by a competent and certified individual prior to its use on site.

6.8 Landscaping

Please see the proposed landscape plan for details about the proposed planting works on site (Dwg. WR/EX/258/07D)

7 **References**

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

BS 3998:2010 Tree Work - Recommendations, British Standards Institution, 2010

Conservation of Habitats and Species Regulations 2010

Site Guidance Note 2: Fencing protected trees, Barrell Tree Consultancy, 2018

Site Guidance Note 3: Ground protection, Barrell Tree Consultancy, 2018

Site Guidance Note 7: Excavation in root protection areas, Barrell Tree Consultancy, 2018

Site Guidance Note 8: Removing surfacing and structures in root protection areas, Barrell Tree Consultancy, 2018

Site Guidance Note 10: Installing structures in root protection areas, Barrell Tree Consultancy, 2018

Appendix A: Tree Survey (Table)

No	Species	Height (m)	Stem Diameter (mm)	Branch Spread (m)				Height of Crown Clearance (m)	Age Class	Physiological Condition	Structural Condition	Estimated Remaining Contribution (Years)	Category Grading	Notes and Preliminary Management Recommendations	Root Protection Area m ²
				N	S	E	W								
T1	<i>Quercus robur</i>	12	550	5	7	6	4	6	M	Fair	Fair	20-40	B2	Generally good specimen. Can be retained with some appropriate ground protection required over the access track during construction phase. Some selective pruning may be required to allow for construction traffic to pass freely.	137m ²
T2	<i>Quercus robur</i>	12	800	7	5	5	5	5	M	Fair	Fair	20-40	B2	Generally good specimen, raised on verge away from track. Can be retained with some appropriate ground protection over the access track required during construction phase. Some selective pruning may be required to allow for construction traffic to pass freely.	290m ²
T3	<i>Fraxinus excelsior</i>	18m	400 (Access restricted)	5	5	5	5	7	SM	Fair	Fair	10-20	C2	Inaccessible and out of site area. Reasonable specimen with no signs of <i>Hymenoscyphus fraxineus</i> at present, inspect annually as a minimum to monitor for signs of infection. Can be retained without adverse impact.	73m ²
T4	<i>Quercus robur</i>	12	750	6	6	6	6	6	M	Fair	Fair	40+	B2	Inaccessible and forms part of site boundary. Generally good specimen with no visible defects. Can be retained without adverse impact.	254m ²
G1	3x <i>Fraxinus excelsior</i> , 2x <i>Acer sp.</i>	8	<800 (Access restricted)	N/A	N/A	N/A	N/A	N/A	J / M	Fair	Fair	20-40	B2	Group of mature Ash trees and juvenile Sycamores outside of the site boundary. Although there is no visible presence, Ash specimens should be inspected annually as a minimum to monitor for signs of <i>Hymenoscyphus fraxineus</i> . Generally good condition and can be retained without adverse impact.	-

No	Species	Height (m)	Stem Diameter (mm)	Branch Spread (m)				Height of Crown Clearance (m)	Age Class	Physiological Condition	Structural Condition	Estimated Remaining Contribution (Years)	Category Grading	Notes and Preliminary Management Recommendations	Root Protection Area m ²
				N	S	E	W								
T5	<i>Quercus robur</i>	14	850	6	7	7	6	6	M	Fair	Fair	20-40	B2	Generally good mature Oak approaching veteran status. Some epicormic growth around base and deadwood in crown. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	510m ²
T6	<i>Quercus robur</i>	14	900	6	7	7	6	6	M	Fair	Fair	20-40	B2	Generally good mature Oak approaching veteran status. Some epicormic growth around base and deadwood in crown. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	572m ²
T7	<i>Quercus robur</i>	12	700 (Access restricted)	4	4	4	4	6	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Generally good mature Oak veteran on site boundary. Some occlusions in crown, dead wood and stags heading. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	346m ²
T8	<i>Quercus robur</i>	15	700 (Access restricted)	6	6	6	6	4	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Good mature Oak veteran on site boundary. Some occlusions in crown, dead wood and stags heading. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	346m ²
T9	<i>Quercus robur</i>	12	550 (Access restricted)	5	5	5	5	4	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Good mature Oak veteran just outside site boundary. Some occlusions in crown, dead wood and stags heading. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	214m ²
T10	<i>Quercus robur</i>	14	840	7	7	6	6	6	M / V	Fair	Fair	40+	A/B 1	Generally good mature Oak approaching veteran status. Some deadwood in the crown. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	499m ²

No	Species	Height (m)	Stem Diameter (mm)	Branch Spread (m)				Height of Crown Clearance (m)	Age Class	Physiological Condition	Structural Condition	Estimated Remaining Contribution (Years)	Category Grading	Notes and Preliminary Management Recommendations	Root Protection Area m ²
				N	S	E	W								
T11	<i>Quercus robur</i>	14	1000	9	8	9	8	7	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Generally good mature Oak veteran. Some deadwood in the crown. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	707m ²
T12	<i>Quercus robur</i>	12	580	7	6	6	6	5	M / V	Fair/poor	Fair/poor	20-40	B2	Generally good mature Oak approaching veteran status. Some deadwood in the crown. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	237m ²
T13	<i>Quercus robur</i>	16	1330	12	12	9	9	5	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Generally good mature Oak veteran. Some deadwood in the crown. Visible waterlogging around base of stem, seek to improve drainage throughout wider RPA. Apply x15 multiplier to calculate RPA. Small number of panels to be installed on very fringe of RPA, impact anticipated to be negligible.	1250m ²
T14	<i>Quercus robur</i>	11	900	6	6	6	6	5	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Generally good mature Oak veteran. Some occlusions in crown, dead wood and stags heading. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	572m ²
T15	<i>Quercus robur</i>	13	750	7	6	7	6	3	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Generally good mature Oak veteran. Co-dominant from 3m. Some occlusions in crown, dead wood and recent limb shedding. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	398m ²
T16	<i>Quercus robur</i>	13	730	7	7	6	6	3	M / V	Fair/poor	Fair/poor	20-40	A/B1	Generally good mature Oak veteran. Some occlusions in crown, dead wood and recent limb shedding. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	373m ²

No	Species	Height (m)	Stem Diameter (mm)	Branch Spread (m)				Height of Crown Clearance (m)	Age Class	Physiological Condition	Structural Condition	Estimated Remaining Contribution (Years)	Category Grading	Notes and Preliminary Management Recommendations	Root Protection Area m ²
				N	S	E	W								
T17	<i>Quercus robur</i>	13	1020	8	8	7	7	5	M / V	Fair/poor	Fair/poor	20-40	A/B 1	Generally good mature Oak veteran. Some occlusions in crown, dead wood and recent limb shedding. Apply x15 multiplier to calculate RPA. Can be retained without adverse impact.	735m ²
T18	<i>Quercus robur</i>	17	970	8	9	8	8	4	M	Fair	Fair	40+	B2	Generally good mature Oak. Can be retained without adverse impact.	422m ²
T19	<i>Quercus robur</i>	13	800 (Access restricted)	5	5	5	5	4	M	Fair	Fair	40+	B2	Generally good mature Oak. Can be retained without adverse impact.	327m ²

Appendix B: Tree Protection Plan

- Key:

Planning Application Boundary

Soil Storage area

Existing Building

Cable route

Shallow ditch

Soil Bund

Existing Vegetation

Proposed Planting

Public Right of Way

Deer fencing

CCTV

Attenuation Swale

Battery store

Proposed Access Road

Existing site roads

Palisade fence

TPP Key:

Retained Tree "A"

Retained Tree "B"

Retained Tree "C"

Root Protection Area (x12 & x15)

Construction Exclusion Zone (Heras Fencing)

Ground Protection
-
- Reproduced by permission of Ordnance Survey on behalf of HM/SO, © Crown Copyright.
All rights reserved. Licence No: 100045777. All levels above Ordnance Datum.
- | | | | |
|---|---------------------------|---|-------------------|
| corylus | | The Old Dairy
Yarworth
Chatterton
Gloucestershire
GL34 3JG
tel: 01285 721072 | |
| client:
Novus R S Ltd | | | |
| project:
Solar Park to the north
of Maelor Gasworks | | | |
| title:
Tree Protection Plan | | | |
| scale:
1:1000 | date:
04/02/21 | drawn by:
WP | checked by:
PD |
| project ref:
258 | drawn by:
WR-EX-258-12 | date:
- | |

Appendix C: Site Images



Image 1 - T1 & T2.



Image 2 - T4 & G1.



Image 3 - G2, T5 & T6.



Image 4 - T5 & T6.



Image 5 - T7, T8 & T9.



Image 6 - T10.



Image 8 - T11.



Image 7 - T12 & T13.



Image 9 - T14, T15 & T17.



Image 10 - T15, T16 & T17.



Image 11 - T18 & T19.

Appendix D: Cascade Table

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those 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 that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) - Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline - Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	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	Trees with material conservation or other cultural value	See Table 2
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 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix E: Survey Terminology

1 Scope

This British Standard gives recommendations and guidance on the relationship between trees and design, demolition and construction processes.

It sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures.

The standard is applicable whether or not planning permission is required.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

BS 3998:2010, *Tree work – Recommendations*

Other publications

[N1] NATIONAL JOINT UTILITIES GROUP (NJUG). *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*. Volume 4, issue 2. London: NJUG, 2007.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 access facilitation pruning

one-off tree pruning operation, the nature and effects of which are without significant adverse impact on tree physiology or amenity value, which is directly necessary to provide access for operations on site

3.2 arboricultural method statement

methodology for the implementation of any aspect of development that is within the root protection area (3.7), or has the potential to result in loss of or damage to a tree to be retained

3.3 arboriculturist

person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction

3.4 competent person

person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached

NOTE A competent person is expected to be able to advise on the best means by which the recommendations of this British Standard may be implemented.

3.5 construction

site-based operations with the potential to affect existing trees

3.6 construction exclusion zone

area based on the root protection area (3.7) from which access is prohibited for the duration of a project

3.7 root protection area (RPA)

layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority

3.8 service

any above- or below-ground structure or apparatus required for utility provision

NOTE Examples include drainage, gas supplies, ground source heat pumps, CCTV and satellite communications.

3.9 stem

principal above-ground structural component(s) of a tree that supports its branches

3.10 structure

manufactured object, such as a building, carriageway, path, wall, service run, and built or excavated earthwork

3.11 tree protection plan

scale drawing, informed by descriptive text where necessary, based upon the finalized proposals, showing trees for retention and illustrating the tree and landscape protection measures

3.12 veteran tree

tree that, by recognized criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned

NOTE These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem.

[BS 3998:2010]

4 Feasibility: surveys and preliminary constraints

4.1 General

All plans should be to scale and should state to which ISO A paper size the scale relates, as well as showing a scale bar and a north point. When plans are drawn in colour, they should carry the following statement (or similar): "The original of this drawing was produced in colour – a monochrome copy should not be relied upon".

4.2 Topographical survey

4.2.1 An accurately measured topographical survey should be undertaken showing all relevant features.

NOTE 1 A method of carrying out topographical surveys is given in RICS specification Surveys of land buildings and utility services at scales of 1:500 and larger [1].

NOTE 2 Prior to commencing the topographical survey, it might be appropriate to seek the advice of an arboriculturist on its scope, particularly where there are woodlands or substantial tree groups present.

4.2.2 Where clearance of undergrowth is essential to facilitate the survey process, it is important that this is undertaken in consultation with relevant professionals, in order to avoid damage to, for example, arboricultural, archaeological or ecological features. Where appropriate, this should include expert attendance on site during the works.

