



Technical Appendix 10: Arboricultural Assessment

Derril Water Solar Farm

01/03/2021



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INTRODUCTION

Background

- 10.1. BJ Unwin Forestry has been appointed by Neo Environmental Ltd on behalf of Renewable Energy Systems (RES) Ltd (the “Applicant”) to complete an Arboricultural Assessment for a proposed 42MW solar farm and associated infrastructure (the “Proposed Development”) on lands circa 1.2km southwest of the village of Pyworthy, Devon (the “Application Site”).
- 10.2. Please see **Figure 4 of Volume 2: Planning Application Drawings** for the layout of the Proposed Development.
- 10.3. BJ Unwin have used a topographic survey provided by Benchmark Surveys to produce a series of constraints plans (See **Figures 10.1 – 10.3 within Appendix 10A**) which have informed the design of the Proposed Development. The infrastructure layout of the Proposed Development (**Figure 4: Volume 2**) guides the tree impact assessment and tree protection method statement. See Tree Protection Plan in **Figure 10.4 in Appendix 10A**.
- 10.4. The methodology of this report follows BS5837:2012 Trees in Relation to Design, Demolition & Construction.

Development Description

- 10.5. The Proposed Development will consist of the construction of bi-facial solar photovoltaic (PV) panels mounted on metal frames, new access tracks, underground cabling, perimeter fencing with CCTV cameras and access gates, a temporary construction compound, substation and all ancillary grid infrastructure and associated works. The Proposed Development will result in the production of clean energy from a renewable energy resource (daylight) and will also involve additional landscaping including hedgerow planting and improved biodiversity management.

Site Description

- 10.6. The Application Site is located on lands circa 1.2km southwest of the village of Pyworthy and c. 1.8km southeast of Bridgerule in Torrridge, Devon; the approximate centre point of which is Grid Reference E229936, N101914. Comprising 28 agricultural fields, the Application Site measures 66.33 hectares (ha) in total. See **Figure 1 of Volume 2: Planning Application Drawings** for details.
- 10.7. Land within the Application Site itself is gently undulating, ranging between 95 - 125m AOD and consists of fields typically of medium scale and generally well enclosed by a mixture of dense treelines, hedgerows and woodland shelter belt, limiting visibility for local settlements and receptors (See **Figure 3 of Volume 2: Planning Application Drawings** for field numbers).



10.8. The Application Site is in an area with existing electricity infrastructure, with a solar farm present c. 0.3km southeast and another c. 1.2km to the southwest. Additionally, the electrical Pyworthy Substation is located c. 75m from the northern parcel's eastern boundary, adjacent to Field 16, where the Proposed Development will connect.

10.9. The local area is generally agricultural in nature, punctuated by individual properties and farmsteads; the nearest residential areas are Hopworthy and Yeomadon, located 0.7km northeast and southeast respectively. Recreational Routes include two Public Rights of Way (PRoW); one which passes the southeastern boundary of the Application Site (linking Crinacott Farm and Northmoor Farm, both outside the Application Site) and another which passes east of the adjacent substation.

10.10. While there are a number of drains and water courses throughout the Application Site, it is mostly contained within Flood Zone 1, an area described as having a "*Low probability*" of flooding. The exception to this is a small part of the Application Site within Flood Zone 2 and 3, towards the eastern boundary of Field 16. These areas have been avoided within the Proposed Development footprint.

10.11. The Application Site will be accessed from four existing entrance points on the unnamed minor road which splits the site into northern and southern parcels. From the western boundary of the site, the road runs in a southwestern direction for c. 0.5km before turning in a general east-northeast direction through the eastern section of the Application Site.

Statement of Authority

10.12. B J Unwin started his forestry career as a tree surgeon and landscape contractor in 1975. He studied forestry at Aberdeen University and worked for Unilever as a Forestry Manager in the Solomon Islands from 1981 to 1983. Since then, he has been based in Gloucestershire assisting clients to manage their woodland, trees and vegetation throughout Southern Britain, and occasionally in northern England, Scotland and Northern Ireland.

10.13. In the mid-1980s to mid-1990s for a period of about ten years he taught chainsaw, tree felling and tree surgery courses at Worcestershire Agricultural College on a part-time basis. He was assessed and passed as a LANTRA assessor in these skills, and held NPTC certificates of competence in chainsaw use on the ground and up trees.

10.14. He now works as a tree consultant / manager / contract manager to a range of clients.

10.15. Qualifications include:

- BSc Forestry Hons 1st Class, Aberdeen 1981.
- Chartered Forester No. 0330064, 1986.
- Fellow of the Arboricultural Association, 1995.



- Arboricultural Association Registered Consultant No. 42, 2004.
- LANTRA certificate for Arboriculture and Bats, BJU in 2005.
- Chartered Environmentalist April 2008.

Inspection

- 10.16. Jim Unwin of BJ Unwin Forestry visited the Application Site for inspection on 2nd & 3rd January 2021.
- 10.17. The survey was from ground level, involving visual observation (Visual Tree Assessment: Mattheck and Breloer, 1994 and Lonsdale, 1999). Some Diameter at Breast Heights (dbhs) were measured (most were estimated, rounding up in 50mm bands) and paced or estimated crown spread and height.
- 10.18. The survey and report for the Proposed Development have been undertaken by Jim Unwin who has >40 years' experience working with trees.

Limitations of this report

- 10.19. The statements made in this Report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire. BJUFC cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this Report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change, or pruning or other works unspecified in the Report are carried out to, or affecting, the Subject Tree(s), whichever is the sooner.

THE SITE

- 10.20. The Application Site inspected is a large 'H'-shaped area of improved grassland fields, divided by an east-west minor road, extending about 1540m north-south by 1250m east-west. The fields vary in size from small to medium-sized, but all are bounded by high and wide Devon hedgebanks, edged by deep ditches and back fences. Field access is good via roads, hard tracks, and stoned gateways.
- 10.21. The Application Site is undulating between 103m Above Ordnance Datum (AOD) and 123m AOD. The Derril Water flows in a valley outside the eastern boundary, and a tributary rises west through a valley; dividing the southern half of the Application Site. Given the elevation and proximity to the coast (10km to the west with no intervening higher ground) higher parts of the Application Site are exposed to constant on-shore westerly winds (see photo register below).
- 10.22. A feature of the Application Site is impeded soil drainage, probably due to clay subsoil, plus compaction due to poaching by cattle and a plough pan. The fields north of the road were particularly boggy.
- 10.23. Geology from BGS website:-

Superficial deposits: No superficial deposits recorded

Bedrock geology: Alternating beds of Bude Formation – Sandstone and Bude Formation – Mudstone and siltstone. Sedimentary bedrock formed between 319 and 309.5 million years ago during the Carboniferous period. See **Technical Appendix 11: Geo-environmental Report of Volume 3** for further information.

- 10.24. The Application Site is very rural, edged by agricultural land on all sides, with punctuated farmsteads including Trelena and Monks Farm and two houses (Westlake Cottage & New Park) located in the surrounding area. Additionally there is one dwelling, Bounds Farm on the western edge of the Application Site. No public rights of way traverse the site, except the public road.

THE TREES

On-site Trees

- Earth and stone hedgebanks about 1.5m tall by 2m wide are typically edged by hazel, blackthorn, ash, oak, shrub willow, and hawthorn hedges. Some have been allowed to grow up as lines of trees (oak mainly).
- Most of the hedgebanks are trimmed very hard, which in places has created gaps, now grass and gorse.
- Most trees adjacent to fields have been crown lifted to allow foraging etc machinery below. Hedges are not severely shaded by individual trees, but whole sections of hedges are suppressed where hedgerow trees' canopy is continuous.
- If the Proposed Development is consented; the hedges can be trimmed but less severely.
- Oak is the dominant tree species, featuring as hedgerow trees: low and windswept in higher places (see photo register below), but taller and well-shaped in sheltered areas.
- No trees are particularly old, but some of the oaks are large, the biggest being T196. Height is controlled by wind, as shown on T196 (see Photo 5 below)
- The Application Site contains linear copses running west and northwest along the stream valley from Derril Water. These contain dense mixed trees from half-grown to late-mature, including beech, oak, alder, ash, willow.
- W219 and adjacent tree belts located in a dingle southwest of Trelena farmstead contain a concentration of large and good trees: G217 to T230.

Off-site Trees

- Oak woodland bounds the Application Site to the north (shading is therefore not an issue).
- The surrounding agricultural land has similar arboreal features.

Amenity

10.25. This could describe an attractive tree, a screening function, habitat potential, or historic/veteran tree.

- Hedges and trees along the lane splitting the Application Site provide a very attractive landscape feature.
- Trees and hedges away from the road do not provide public amenity (see photo register below).
- All hedges: most with associated deep ditches, and the tree belts provide wildlife corridors.
- Ash dieback is present throughout the Application Site but will not have a significant impact, because oak is the dominant landscape tree.
- The presence of TPOs was not checked.

10.26. The photo register below shows examples of the trees identified on the Application Site.

1. View west past transformer station on right, to copse W149 on right, and roadside oak, beech and ash T141-T148 on left.



2. View west from Trelena Farm. Note well-trimmed hedges and small hedgerow trees.



3. Oak T17 exposed to wind.



4. Typical hedgebanks, here in northern part of site, with small hedgerow oaks. Cut away for gateway shows construction with clay centre edges by hard-trimmed hedges (trimmed too hard for health of hedge plants).



5. View north to largest tree on site, windswept T196, west of Westlake Cottage.



6. View north to more good oaks, T288 on right and row T289-T293 beyond.



7. T270 ash in foreground with dieback disease. Elm, ash and beech hedgerow trees beyond.



DETAILED TREE DESCRIPTIONS

10.27. Trees on, or potentially influencing the Application Site are individually described in **Table 10-3** below, and shown on the plans in **Appendix 10A**.

10.28. **Age class** is described as in **Table 10-1** below:

Table 10-1: Age Class

Age Class	Description
Sap	Very young tree, or sapling, one-five years old.
Y (Young)	Young tree less than fifteen years old and <1/3 fully grown.
Sm (Semi Mature)	Semi-mature tree having attained 1/3 to 2/3 full stature and 1/3 to 1/2 estimated lifespan.
Em (Early Mature)	Tree at 2/3 to virtually full size, and halfway through its safe life.
M (Mature)	Fully-grown tree with useful life expectancy.
Lm (Late-mature)	Fully grown, of declining vigour, but still healthy.
Om (Over-mature)	Fully grown and starting to decline in health (but may still have years of safe life).
Vet (Veteran)	Usually very old; of significant historic, habitat or cultural value.

10.29. The health and structural condition of the tree will be described as **Good, Fair, Poor** or **Dead**.

10.30. The “Remaining Safe Useful Life” which is the prediction of safe life in its location, will be described and estimated as:

- < 5 years;
- < 10 years;
- 10-20 years;
- 20-40 years; or

- > 40 years.

10.31. Retention categories, based on BS 5837 Section 4.5 are as follows:

Retain:

A = High quality or value >40yrs safe life: Light Green*

B = Moderate quality or value >20yrs safe life: Mid Blue*

C = Low quality or value >10yrs safe life or young trees

<150mm stem diameter: Grey*

Remove:

U = <10yrs safe life or should be removed for sound arboricultural reasons:

Dark Red*

(*Colour marking on *Tree Constraint Plans: Appendix 10A*)

10.32. Sub-category for retention:-

1 = Arboricultural Value

2 = Landscape Value

3 = Cultural and/or Habitat Conservation Value

10.33. BS 5837:2012 Root Protection Area (RPA): The estimated volume of soil 1m deep required to sustain the tree, usually expressed as a disc 1m deep, centred on the tree's trunk.

10.34. The RPA can be a varied shape enclosing the correct rootable area, however this is shown as a circle on **Appendix 10A** for convenience.

10.35. The RPA is calculated as:

- **Single-stem** tree: radial distance = 12 x stem diameter at 1.5m ht.
- **Multi-stem** tree:
 - 1-5 stems = Square root of (sum of individual stem diameters squared).
 - > 5 stems = Square root of (average dbh squared x number of stems).

- Denotes estimated DBH.

Table 10-2: Inspection Notes

Derril Water Solar Farm - BS5837 Inspection - BJUFC – 2 nd & 3 rd January 2021.																
No. T=tree S=shrub H=hedge G=group	Species	Dbh (stem diam @ 1.5m ht) mm.	Total height. Ht to base of crown. Est Ht in 10 yrs. m.		Crown radii m.				Age class	Health	Structural Condition	SULE	Comment (All are in average to good health and condition, unless stated otherwise.)	Retention category A (best) to C; U = (remove) Sub-category 1, 2 or 3	BS 5837 Root Protection Area Radius. m.	Recommended work excluding development.
					N	E	S	W								
T1	Crab apple	300 basal	5	5	1	4	3	4	M	F	F	>40	In hedge.	C2	3.0	
T2 - T4	Oak	350	9	10	2	4	4	2 ext.	Sm	F	F	>40	On bank.	B2	4.2	
T5	Sycamore	250, 250	10	11	3.5	3.5	3.5	3.5	Sm	F	F	>40		B2	4.2	
T6	Oak	450	10	11	5.5	5.5	5.5	5.5	Em	F	F	>40		B1	5.4	
T7	Oak	550	11	11	6	4.5	5	5	M/ Lm	F	F/ P	>40	Storm damage.	B2	6.6	



T8	Oak	500	10	4	11	0	7	7	3	Em	F	P	10	Severe lean southeast.	C2	6.0
T9	Oak	400	10	3	11	4.5	4.5	4.5	4.5	Sm	F	F	>40		A2	4.8
T10	Ash	450	12	4	12	4	4	4	4	Em	F	F	10-20		C2	5.4
G11	Mixed trees	200-600	10-15	2-5	10-15	5	5	5	5 ext.	Sm / Em	F	F	>40	Mixed-age copse. Beech, oak, and ash.	A2	7.2
T12	Oak	180	8	3	10	2	2	2	0.5	Sm	F	F	>40		B2	2.2
T13	Sycamore	250	10	3	12	2.5	2.5	2.5	2.5	Sm	F	F	>20		B2	3.0
T14 - T16	Oak	300	7.5	3	9	4	4	2	2	Sm	F	F	>40	Stunted by wind.	B2	3.6
T17	Oak	250	6.5	3	6.5	3	6	2	0	Sm	F	P/F	>40	Bent by wind.	B2	3.0
T18	Oak	250	6	3	6	4	4	2	0	Sm	F	F	>40		B2	3.0

T19	Oak	260	8	4	9	4	4	3	2.5	Sm	F	F	>40		B1	3.1	
T20	Oak	250	8	3	9	3.5	4.5	4	3.5	Sm	F	F	>40		A2	3.0	
T21 - T25	Silver birch	150-200	5.5-7	3	6-8	1.5-2.5	1.5-2.5	1.5-2.5	1.5-2.5	Sm	F	F	>20		C2	2.4	
T26	Oak	260	6	2.5	8	3	3	3.5	3.5	Sm	F	F	>40	Low crown.	B2	3.1	
T27	Holly	250	7.5	2	8	1.5	3	1.5	1.5	Em	F	F	>40		B2	3.0	
T28	Oak	250	5	3	5.5	1.5	2	1.5	1	Sm	P	P	10-20	Small crown.	C2	3.0	
T29	Oak	200	9	3.5	10	3	3	2.5	3.5	Sm	F	F	>40		B2	2.4	
T30	Oak	300	9	3.5	10	3	3	2.5	2.5	Sm	F	F	>40		B2	3.6	
T31, T32	Holly	350	9	3	9	3	3	3	3 ext.	M	F	F	20-40		B2	4.2	

G33	Mixed	200-400	8-12	3	8-12	4	4	4	4 ext.	Em	F	F	10- >40	Triangular group: 1 oak, 1 ash, and 3 goat willows.	B2	4.8	
T34	Oak	550	11	4	12	6	7	5	4	Em	F	F	>40		A1	6.6	
G35	Mixed	200-350	9-10	1-2	9-12	4	4	4	4 ext.	Sm	F	F	>40	Five young oaks, ash, hazel, and goat willow.	B2	4.2	
T36	Sycamore	300	9	2.5	11	3	3	3	3	Sm	F	F	>40	Grown up by phone pole and ash stems.	C1	3.6	Crown lift off pole and coppice ash stems.
H37, H38	Mixed	150	2	0	2	1-2	1-2	1-2	1-2*	M	F	F	>40	*see plan. Trimmed hedges. Hazel, blackthorn, hawthorn, ash, holly, elder, beech, and ivy.	B2	1.8	Trim annually to 'A'-shaped profile.
T39 - T41	Holly	250	6	2	6	1.5	1.5	1.5	1.5	M	F	F	>20		C2	3.0	
T42 - T49	Oak	350-500	9-12	5	9-13	6	6	6	6 ext.	Em	F	F	>40	Woodland edge.	A1 (T46) B2 (the Rest)	6.0	
WG50	Oak & silver birch	300-650	12-16	4	12-17	3-7	3-7	3-7	3-7 ext.	Em / M	F	F	>40	Oaks well-spaced along woodland edge with silver birch and ash between.	A2	7.8	

H51, H52	Mixed	150	2	0	2	1-2	1-2	1-2	1-2*	M	F	F	>40	*see plan. Trimmed hedges. Hazel, blackthorn, hawthorn, ash, holly, elder, beech, and ivy.	B2	1.8	Trim annually to 'A'-shaped profile.
H53	Mixed	100-350	8	2	8	2-3	2-3	2-3	2-3 ext.	Sm - Em	F	F	>40	Goat willow, oak, and hazel. Hedge bank and deep ditches. Occasional beech.	B2	4.2	
T54	Oak	350	8	2	9	3.5	4	4	4	Sm	F	F	>40		A1	4.2	
T55, T56	Oak	200	6	2.5	7	1	2	2	2	Sm	F	F	>40		C2	2.4	
T57	Oak	250	7	3	8	2.5	2.5	2.5	2.5	Sm	F	F	>40		B1	3.0	
T58	Oak	200	6	2	7	1.5	2.5	2	1.5	Sm	F	P/F	>40		C1	2.4	
H59 - H61	Gorse & hazel	100	1.5	0	1.5	1.5	1.5	1.5	1.5	Sm	F	F	>40	Tall bank with trimmed hedge either side.	C2	1.2	
T62	Sycamore	250	6.5	2	7.5	2.5	2.5	2.5	2.5	Sm	F	F	>40		B2	3.0	
T63	Sycamore	7 stems x 100	7	2	8	2.5	2.5	2.5	2.5	Sm	F	F	>40		C2	3.2	

H64 - H71	Gorse & hazel	100	1.5	0	1.5	1.5	1.5	1.5	1.5	Sm	F	F	>40	Tall bank with trimmed hedge either side.	C2	1.2	
T72, T73	Oak	350	14	5	15	3.5	3.5	3.5	3.5	Sm	F	F	>40		A2	4.2	
T74 - T76	Oak	500	13	4	14	5	5	5	5	Em	F	F	>40		A1	6.0	
T77 - T80	Oak	250	7	2	7.5	3	3	3	3	Sm	F	F	>40		B2	3.0	
T81	Oak	250	9	3	10	3	3	3	3	Sm	F	F	>40		A1	3.0	
T82	Oak	300	7	3	7.5	2	3	4	2.5	Sm	F	P/ F	>40		B2	3.6	
T83 T84 T85, T87 - T90	Oak	200	5-6	3	6-7	2	2	2	2	Sm	F	F	>40		C2	2.4	
T86	Silver birch	200	5-6	3	6-7	2	2	2	2	Sm	F	F	>40		C2	2.4	

T91 - T93	Oak	350	9	3	10	3.5	3.5	3.5	3.5	Sm	F	F	>40		A2	4.2	
G94	Oak x 4	200	7	2.5	8	1	2	3	3.5	Sm	F	F	>40		C2	2.4	
T95	Oak	150	6	3	7	1.75	1.75	1.75	1.75	Y	F	F	>40		C2	1.8	
T96, T97	Oak	300	8	4	9	3.5	3.5	3.5	3.5	Sm	F	F	>40		B1	3.6	
T98	Oak	70, 80	4.5	2	6	1.5	1.5	1.5	1.5	Y	F	F	>40		C2	1.3	
G99	Goat willow & oak	100-150	5	1	6	2.5	2.5	2.5	2.5 ext.	Y-Sm	P-F	P-F	10->40	Scrubby group.	C2	1.8	
T100, T101	Oak x 2	250	7	3	8	4	4	4	3 ext.	Sm	F	F	>40		B2	3.0	
T102	Ash	6 stems avg. 100	9	3	9	3	4	3	3	Sm	F	F	10-20		C2	2.9	
G103	Oak & goat willow	150-250	7	3	8	2.5	2.5	2.5	2.5 ext.	Sm - M	F	F	10->40		C2	3.0	

T104, T105	Oak	250	6	2.5	7	2.75	2.75	2.75	2.75	Sm	F	F	>40		C2	3.0	
T106	Ash	5 stems avg. 150	10	4	11	3	4	3	3	Sm / Em	F	F	10- 20		B2	4.0	
H107, H108	Gorse & hazel	100	1.5	0	1.5	1.5	1.5	1.5	1.5	Sm	F	F	>40	Tall bank with trimmed hedge either side.	C2	1.2	
T109	Oak	150	5	2	6	1	2	1.5	1	Sm	F	P/ F	>40		C2	1.8	
T110	Ash	250	9	4	10	2.5	2.5	2.5	2.5	Sm	F	F	10- 20		C2	3.0	
T111	Oak	500	10	4	10	2	3	8	2	Em	F	P/ F	>40	Extreme growth to southeast.	B2	6.0	
T112 - T116	Oak	250- 300	6-7	2-3	7-8	2-3	2-3	2-3	2-3	Sm	F	F	>40		B2	3.6	
T117	Oak	300	9	3.5	10	3.75	3.75	3.75	3.75	Sm	F	F	>40		A1	3.6	
T118 - T122	Beech	200	9.5	2	11	2.5	2.5	2.5	2.5 ext.	Y/ Sm	F	F	>40		C2	2.4	

T123	Ash	250	11	5	12	2	4	3	1	Sm	F	F	10-20		C2	3.0	
T124	Ash	300	9	3	10	2.5	3.5	3	2	Sm	F	F	10-20		C1	3.6	
H125, H126	Mixed	100-150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>20	Hedge bank with plants either side, tight trimmed. Hazel, holly, and blackthorn. In places tight trimmed to stumps.	C2	1.8	
T127	Ash	330	9	4	10	4	4	4	4	Sm	F	F	10-20		C1	4.0	
T128 - T131	Oak	200	5-7	2-3	6-8	1.5-3	1.5-3	1.5-3	1.5-3	Sm	F	F	>40	In hedge.	C2	2.4	
G132	Ash x 1, sycamore x 3	250-350	8-10	4	8-11	4	4	4	4 ext.	Sm	F	P-F	>20	Self-sown.	C2	4.2	
G133	Mixed	100-350	7-13	1-4	7-14	4	4	4	4 ext.	Sm - M	F	F	>40	Oak, beech, ash, silver birch, and willow on hedge bank.	B2	4.2	
G134	Oak x 5	300-400	11-14	4	12-15	5	5	5	5 ext.	Sm - Em	F	F	>40	Good group.	A2	4.8	
G135	Mixed	100-150	4-5	0	4-5	3.5	3.5	3.5	3.5	Y-Sm	F	F	>20	Overgrown hedge under overhead powerlines. Beech, hazel, oak, and goat willow.	C2	1.8	

T136 - T148	Mixed	350-800	12-18	5	12-19	8	8	8	8	8 ext.	Em / M	F	F	>40	Trees on banks either side of road: 4 x beech, 7 x oak, 1 x silver birch, and 1 x ash.	A2	9.0	
W149	Mixed broadleaves	300-700	16-20	6	16-20	5	5	5	5	5 ext.	Em - M	F	F	>40	Copse in valley bottom. Oak, beech, ash, silver birch, and goat willow.	A2	8.4	
G150	Mixed	200-600	6-15	1-5	6-16	5	5	5	5	5 ext.	Sm - M	F	P/F	>40	Riparian strip of trees and scrub, mostly on north-east side of stream. Goat willow, ash, and occasional oak.	C3 Habitat	7.2	
G151	Oak & silver birch x many	200-700	12	4	12			6			Sm - Em	F	F	>40	Woodland edge.	A2	8.4	
H152, H153	Mixed	100-150	2	0	2	1.5	1.5	1.5	1.5	1.5	M	F	F	>20	Hedge bank with plants either side, tight trimmed. Hazel, holly, and blackthorn. In places tight trimmed to stumps.	C2	1.8	Trim less severely!
T154	Oak	250	9	5	10	0	3	4	2	2	Sm	F	P/F	>40	Pushed by ash.	B2	3.0	
T155	Ash	200, 200, 250, 250	14	5	14	4	4	6	5	5	Em	F	F	10-20		C1	5.4	
T156 - T162	Oak	450	10	3	10.5	3-6	3-6	3-6	3-6	3-6	Em	F	F	>40	Ivy.	B2	5.4	Sever ivy on T162.

T163	Ash	250	8	4	8	1	3	3	3	Sm	P/ F	F	10		C2	3.0	
H164	Hazel & blackthorn	100	4	0	4	2.5	2.5	0.2	0.2	M	F	F	>20	Northeast side not trimmed.	C2	1.2	
H165	Mixed	100-150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>20	Hedge bank with plants either side, tight trimmed. Hazel, holly, and blackthorn. In places tight trimmed to stumps.	C2	1.8	
T166	Sycamore	7 stems avg. 120	11	3	12	3.5	3.5	3.5	3.5	Sm	F	F	>40		B2	3.8	
G167	Oak x 2	400 basal	9	2.5	10	3.5	3.5	4	3 ext.	Sm / Em	F	F	>40		B2	4.0	
G168	Sycamore and hawthorn	150	5.5	2	6	1.5	2	1.5	1.5	Y/ Sm	F	F	>20	Scrubby on hedge bank.	C2	1.8	
T169	Hawthorn	100, 100	5	1.5	6	1.2	1.2	1.2	1.2	Em	F	F	>20		C2	1.7	
T170	Silver birch	5 stems x 150	8.5	4.5	9	2	4	4	2	Em	F	F	>20		C2	4.0	
H171	Hazel etc.	150	2	0	2	1.25	1.25	1.25	1.25	M	F	F	>40	Trimmed.	B2	1.8	

T172	Oak	250, 450	12	3	13	4	4	6	5	Em	F	F	>40		A2	6.2	
T173	Ash	500	15	5	0 or 15	4	4	4	4	M	P	P	<5	Severe bacterial canker and dieback. On boundary.	C2/U	6.0	Recommend fell.
G174	Red-stemmed willows & beech	200	3-16	1-3	5-16	1.5-3	1.5-3	1.5-3	1.5-3 ext.	Sm	F	P/F	10- >20	Row of willows and two beech. Some willows coppiced. Off-site at Westlake Cottage.	C2	2.4	
T175	Beech	600	12	4	12.5	5	6	8	5	Em	F	F	>40	Low.	A1	7.2	
T176, T177	Beech	500	10	4	11	4	4	5	4	Em	F	F	>40		A2	6.0	
H178A	Mixed	100-300	7-9	0	7-9	2	4	4	2	Em	F	F	>40	Tall.	B2	3.6	
H178B	Mixed	150	2	0	2	1.25	1.25	1.25	1.25	Em	F	F	>40	Trimmed.	B2	1.8	
H179	Mixed	100-300	5-8	0	5-9	2	2	2	2	Em - M	F	F	>40	Hazel, blackthorn, oak, and ash. Side-trimmed only.	B2	3.6	
T180	Oak	200, 200	6.5	2.5	7	2	5	2	2	Sm	F	F	>40	Low.	C2	3.4	

G181	Mixed	250	8	2.5	9	4	4	3	2	Sm	F	F	>40	Oak, holly, and beech.	B2	3.0	
H182	Hazel and blackthorn	150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>40	Trimmed east side.	B2	1.8	
H183	Mixed	100-350	7-9	0	7-9	3	3	3	3	Em / M	F	F	>40	Not trimmed.	B2	4.2	
H184	Hazel etc.	150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>40	Hard trimmed.	C2	1.8	
T185 - T187	Oak	600	16	4	16	7	7	7	7 ext.	Em / M	F	F	>40		A2	7.2	
T188	Beech	600	20	4	20	7	7	7	4	Em / M	F	F	>40		A2	7.2	
T189	Ash	550	20	5	20	7	7	7	4	Em / M	F	F	10-20		C2	6.6	
T190	Oak	550	11	4	12	5	5	5	4	Em	F	F	>40		B1	6.6	
G191	Oak x 2	250	7	3	8	1	4	4	2	Sm	F	P/F	>40		C2	3.0	

G192	Oak	450	12	4	13	4	7	7	4	Em	F	F	>40		B2	5.4	
G193	Oak	450	11	4	12	3	7	6	2	Em	F	F	>40		B2	5.4	
T194	Oak	400	11	4	12	4	5	5	4	Em	F	F	>40		A2	4.8	
T195	Holly	400 basal	6	1	6	2.5	2.5	2.5	2.5	M	P/F	F	>40	Old.	C2	4.0	
T196	Oak	1100	17	3	17	6	12	10	8	M	F	F	>40	Big and broad.	A1 / A2	13.2	
G197	Mixed	150-200	10-12	4	10-14	3	3	3	3 ext.	Sm	P/F	P/F	10-20	Dense stems in hedge opposite Westlake Cottage.	C2	2.4	
T198, T199	Oak	550	12	4	13	5.5	5.5	5.5	5.5	Em	F	F	>40		A1	6.6	
T200	Oak	400, 600	14	3	14	6	9	7	5	Em / M	F	F	>40	Was on hedge bank, now demolished.	A1	8.7	
G201	Mixed	100-500	8-15	2-5	8-16	5				Sm - M	P-F	P-F	>40	Dense hedge/belt on bank with ditch to north and stream to south.	A2	6.0	

H202	Hazel etc.	150	2	0	2	1	1	1	1	M	F	F	>40	On ridge between ditches.	C2	1.8	
G203	Oak x 2	350, 450	12	5	13	4	5	6	4 ext.	Em	F	F	>40		B2	6.8	
T204	Oak	500	12	3	13	4	6	5	4	Em / M	F	F	>40	Beech underneath.	A2	6.0	
G205	Oak and beech	250	14	3	16	4	5	5	4	Sm	F	F	>40		A2	3.0	
G206	Mixed x 12	200-400	11	2	12	3-4	3-4	3-4	3-4 ext.	Sm - Em	F	F	20- >40	Oak, alder, silver birch, and beech.	B2	4.8	
T207	Oak	700	16	4	16	6	8	7	8	M	F	F	>40		A2	8.4	
T208, T211	Oak	550	12	4	13	5	6	6	5	Em / M	F	F	>40		A1/A2	6.6	
T209	Oak	400	14	4	14	4	4	5	4	Em	P	F	10-20	Thin crown.	C1	4.8	
T210	Silver birch	380	14	3	16	3.5	3.5	3.5	3.5	Em / M	F	F	>40		B2	4.6	

H212	Mixed	100-500	8-15*	4	8-15*	3-5	3-5	3-5	3-5 ext.	Sm / Em	F	F	>40	*see plan. Really a line of trees. Mostly beech and oak. Hazel, blackthorn, and holly understorey.	A2	6.0	
H213	Hazel etc.	150	2.5	0	2.5	1.5	1.5	1.5	1.5	M	F	F	>40		B2	1.8	
T214 - T216	Oak	160	7	3	9	2.5	2.5	2.5	2.5	Sm	F	F	>40		B2	1.9	
G217	Mixed	200-750	16-20	4	16-20	6	6	6	6 ext.	Sm - M	P-F	P-F	>40	Belt either side of gully ditch. Oak, ash, and beech with holly, hawthorn etc. understorey.	A2	9.0	
T218	Beech	750	20	6	0	7	5	5	5	M	P	P	0	80% dead.	U		Fell.
W219	Mixed	100-800	20-22	5	20-22	4-7	4-7	4-7	4-7 ext.	Em / M	F	F	>40	Mature, dense copse in dingle. Oak, ash, and beech.	A2	9.6	
T220	Ash	850	22	5	22	7	8	9	7	M	F	F	10-20	Big.	B2	10.2	
T221	Beech	900	22	4	22	9	8	7	6	M	F	F	>40	Big.	A1	10.8	
T222, T223	Oak	500	14	4	15	7	7	8	6 ext.	Em	F	F	>40		A2	6.0	

T224	Oak	450	18	4	18	5	5	7	6	Em	F	F	>40		A2	5.4	
T225	Oak	900	17	2	18	6	8	8	6	Em / M	F	P/F	>40	Lean south.	A2	10.8	
T226	Oak	800	17	4	18	8	7	6	6	Em / M	F	F	>40	Ivy.	A2	9.6	Remove ring of ivy from ground level up to head height.
T227	Oak	650	16	4	17	6	8	9	6	Em / M	F	F	>40		A2	7.8	
T228	Oak	600	14	5	14	4	7	6	2	Em	P	P/F	>40	Ivy.	B2	7.2	Remove ring of ivy from ground level up to head height.
T229, T230	Oak	700	17	5	17	6	11	11	6 ext.	Em / M	F	F	>40		A2	8.4	
H231	Hazel etc.	200	2-4	0	2-4	1.5-2	1.5-2	1.5-2	1.5-2	M	F	F	>40	Trimmed in open areas, but taller under trees.	B2	2.4	
H232	Hazel etc.	150	2.5	0	2.5	1.5	1.5	1.5	1.5	M	F	F	>40		B2	1.8	
G233	Oak x 4	250-600	9-14	4	9-15	4	7	8	7 ext.	Sm - Em	F	F	>40		A2	7.2	

H234	Beech	150	2	0	2	0.6	0.6	0.6	0.6	Sm	F	F	>40	Trimmed hedge.	C2	1.8
T235	Oak	650	11	4	11	5	6	7	5	Em / M	F	F	>40	Isolated.	A1	7.8
T236	Ash	500	10	4	10	3	4	4	2	M	P	P	<10	Stem decay and dieback.	C3 Habitat	6.0
T237	Oak	550	9	2	9	5	5	2	2	M	P/ F	F	>40	Dieback. Potential veteran.	B3 Veteran	6.6
T238	Oak	600	13	3	13	4	7	9	4	Em / M	F	F	>40		A2	7.2
T239	Oak	350	14	6	15	2.5	2.5	2.5	2.5	Sm	F	F	>40		A1	4.2
T240	Oak	600	12	3	12	4	4	8	8	Em	P/ F	P/ F	>40	Minor dieback.	A2	7.2
H241	Hazel etc.	150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>40	Hedge bank. Trimmed.	B2	1.8
H242	Hazel etc.	150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>40	Hedge bank. Trimmed.	B2	1.8

G243	Mixed	450 basal	14	2	14	3-5	3-5	3-5	3-5 ext.	Em / M	F	F	>20	Untrimmed hedge now ash, birch, and hazel. Tall.	C2	4.5
T244	Beech	250, 350, 350, 450	16	3	16	6	5	8	7	M	F	P/F	10-20	Off-site in field. East side decayed.	B3 Veteran	8.6
HG245 A	Oaks x many	300-600	13	4	13		7-9		6	Em / M	F	F	>40	Oaks suppressing hazel etc. hedge underneath.	A2	7.2
HG245 B	Mixed	200-300	8-9	3	8-9		6		4	Sm / Em	F	F	>20	Oak, silver birch, and goat willow. Trees suppressing hazel etc. hedge underneath.	A2	3.6
HG245 C	Mixed	100-150	5	1	5	2	2	2	2	Em	F	F	>40	Oak, goat willow, blackthorn, hazel, and holly.	B2	1.8
HG246 A	Oak and hazel	100-450	9	2	10	4	4	4	4 ext.	Sm	F	F	>40	Good oaks over hazel hedge.	A2	5.4
HG246 B	Oak x 3, ash x 3	200-650	14	5	14	6	6	6	6 ext.	Em / M	F	F	>40	Oaks have tree house. Hedge under trees.	A2	7.8
HG246 C	Ash x 5	350-700	18	5	18	6	10	7	6 ext.	M	P-F	P-F	10-20	Big ash have suppressed hedge. Some exhibit Ash dieback disease. Close to off-site house.	C2	8.4

T247	Oak	250, 250	8	3	10	3	3	3	2	Sm	F	F	>40		B1	4.2	
T248	Oak	300	11	5	11	0	5	4	1	Sm / Em	F	P	>40	Lopsided.	C2	3.6	
HG249	Mixed	300-650	12	4	12	5	5	5	5	Em / M	F	F	>40	Oak, beech, and ash. Suppressing hedge underneath.	A2	7.8	
T250	Oak	450, 500	13	2	13	3	5	8	6	Em	F	F	>40		A2	8.1	
T251	Oak	400	10	2	10	2	2	4	2	M	P/ F	P/ F	>20	Stunted.	C2	4.8	
T252	Oak	500	11	3	11.5	4	5	8	5	Em	F	F	>40		A1	6.0	
H253	Hazel etc.	150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>40	Hedge bank. Trimmed.	B2	1.8	
T254	Oak	200	6	2.5	7	2	4	2	1	Sm	F	F	>40		C1	2.4	
H255	Hazel and blackthorn	150	2	0	2	2	2	2	2	M	F	F	>40	Trimmed.	C2	1.8	

H256	Mixed	150	2	0	2	1.75	1.75	1.75	1.75	M	F	F	>40	Trimmed. Hazel, hawthorn, holly, blackthorn, elder, and ash.	B2	1.8	
T257, T258	Oak	200	6	3	8	2	4	2	2 ext.	Sm	F	F	>40		B2	2.4	
H259	Mixed	150	2	0	2	1.75	1.75	1.75	1.75	M	F	F	>40	Trimmed. Hazel, hawthorn, holly, blackthorn, elder, and ash.	B2	1.8	
T260	Oak	600	17	4	18	6	7	9	7	Em	F	F	>40	Good.	A1/A2	7.2	
T261	Ash	5 stem s x 200	19	6	19	6	5	4	4	Em	F	F	10- 20		C2	5.4	
T262	Oak	700	16	3	16	6	6	8	6	Em	F	F	>40		A1/A2	8.4	
WG 263	Mixed broadleaves	100- 700	6-12	0	6-12	2-4	2-4	2-4	2-4 into site	Em / M	F	F	>40	Edge of riparian woodland. Scrubby. Medium-sized oaks, hazel, beech, ash, and hawthorn.	C3 habitat.	8.4	
T264 - T266	Beech	200	7	3	9	2	2	2	2	Sm	F	F	>40		B2	2.4	

T267, T268	Ash	300	9	2	9	2.5	2.5	2.5	2.5	Sm	F	F	10		C2	3.6	
T269	Elm	200	9	4	9	1.5	1.5	1.5	1.5	Sm	F/P	F	<10	Will die of Dutch Elm Disease.	C2	2.4	
T270	Ash	250	5.5	2	5.5	1.25	1.25	1.25	1.25	Sm	P	P	<5	Severe Ash Dieback Disease.	C2	3.0	
T271 - T274	Ash	200	6.5	2.5	7	1	3	2	1	Y/Sm	F	F	10-20		C2	2.4	
G275	Hawthorn and oak	150	4	2	5	1	2	1	1 ext.	Y	F	F	>40	In hedge.	C2	1.8	
H276, H277	Mixed	150	2	0	2	1.75	1.75	1.75	1.75	M	F	F	>40	Trimmed. Hazel, hawthorn, holly, blackthorn, elder, and ash.	B2	1.8	
WG 278	Mixed	400-900	20	4	20	6-8	6-8	6-8	6-8 into site	M	F	F	>40	Edge of copse. Oak, ash, and alder.	A2	10.8	
WG 279	Mixed	200-400	10	4	11	2.5	2.5	2.5	2.5	Sm · M	P-F	P-F	>20	Silver birch and goat willow. Scruffy woodland edge.	C2	4.8	
T280	Beech	650 basal	11.5	4	12.5	4.5	5.5	4.5	4.5	Em	F	F	>40		A1	6.5	

H281	Mixed	150	2	0	2	1.75	1.75	1.75	1.75	M	F	F	>40	Trimmed. Hazel, hawthorn, holly, blackthorn, elder, and ash.	B2	1.8	
HG 282 A	Mixed	200-500	9	3	10		4			Sm / Em	F	F	>40	Riparian strip. Oak, goat willow, beech, and ash.	A2	6.0	
HG 282 B	Mixed	200-600	14	3	16		6			Em	F	F	>40	Riparian strip. Oak, goat willow, beech, and ash.	A2	7.2	
G283	Mixed	150	6	2	7	2	2	2	2 ext.	Y/ Sm	F	F	10-20	Comprising three oaks, three ash, two silver birch, and four goat willows. Three oaks and one ash under overhead powerlines.	C2	1.8	Coppice under overhead powerlines.
H284 A	Hazel, ash etc.	150-200	6-8	0	6-8	1.5	1.5	1.5	1.5 ext.	Sm - M	F	F	>40	North side of hedge trimmed. Young trees growing up from south side.	B2	2.4	
H284 B	Mixed	150	7-8	0	7-8	1-3				Sm - M	F	F	>40	Hazel, ash, and goat willow. Hedge grown out with ash.	C2	1.8	
H284 C	Mixed	150	12	0	12	4				Em	F	F	10-40	Hazel, ash, and goat willow. Taller ash in hedge.	C2	1.8	
T285	Beech	550	15	4	16	6	5	4	4	Em	F	F	>40		A2	6.6	
T286	Oak	900	17	4	17	1	7	8	6	M	F	F	>40		A1	10.8	

H287	Mixed	100-200	2-5	0	2-6		3		1.5	Sm · M	F	F	>40	Hazel, blackthorn, goat willow, hawthorn, and oak. West side trimmed.	B2	2.4	
T288	Oak	450	9	3	10	4	4	4	3	Em	F	F	>40	Ivy.	A2	5.4	Remove ring of ivy from ground level up to head height.
T289 - T293	Oak	500-700	16	5	17	7	7	7	7 ext.	M	F	F	>40	Row of good trees.	A1/A2	8.4	
WG 294	Mixed	100-600	5-18	1-6	5-20	5		2.5	2.5	Y- M	F	F	>40	Alder, goat willow, ash, and silver birch. Riparian woodland.	A2	7.2	
WG 295	Mixed	400-900	20	4	20	6-8	6-8	6-8	6-8 into site.	M	F	F	>40	Edge of copse. Oak, ash, and alder.	A2	10.8	
T296	Oak	700	12	3	12	5	9	5	3	M	F	F	>40	Lean east. Veteran potential.	A3 Veteran	8.4	
T297 - T300	Ash	700	22	5	22	8	8	8	8 ext.	M	F	F	>20	Big trees east of stream.	B2	8.4	
G301	Goat willow & ash	200-400	8	1	9				4-5	Sm · M	F	F	>20	Riparian scrub willow with occasional ash. Most east of stream.	B2	4.8	

T302	Oak	700	11	3	11	5	5	6	4	M	F	F	>40	On previous hedge bank, now gone.	A2	8.4	
HG 303 A	Ash and goat willow	300	9	1	10	4.5	4.5	4.5	4.5 ext.	Sm - Em	F	F	>40		B2	3.6	
HG 303 B	Oak and goat willow	100-550	14	4	15	6	6	6	6 ext.	Em	F	F	>40		A2	6.6	
T304	Ash	250	9	3	10	3	3	3	3	Sm	F	F	10-20		C1	3.0	
H305 - H310	Mixed	150	2	0	2	1.5	1.5	1.5	1.5	M	F	F	>40	Hazel, ash, blackthorn, oak, and beech.	B2	1.8	
T311	Oak	200	5	1.5	6	1.75	1.75	1.75	1.75	Sm	F	F	>40	Small.	C1	2.4	
T312	Oak	250, 300, 300, 400	9	3	10	4.5	4.5	4.5	4.5	Em	F	F	>40		A1	7.6	
T313	Oak	200	6	3	6	1.5	1	0	1	Sm	F/P	F	>20	Suppressed.	C2	2.4	
T314	Oak	250	5.5	2	5.5	1	3	3	1	Sm	F	P/F	10-20	Under overhead powerlines.	C2	3.0	

T315	Holly	200	5	0	5	1.25	1.25	1.25	1.25	Em	F	F	>40		C2	2.4	
T316, T317	Oak	250	6	2.5	8	2.5	2.5	2.5	2.5	Sm	F	F	>40		B2	3.0	
T318	Oak	500	12	3.5	13	4	5	7	5	Em	F	F	>40		A2	6.0	
T319	Oak	450	10	3	11	4	5	6	4	Em	F	F	>40		B1	5.4	
T320	Oak	250	12	7	13	2	2	2	2	Sm	F	F	>40		A1	3.0	
T321	Beech	800	15	3	15	8	8	8	8 ext.	M	F	F	>40		A2	9.6	
T322	Beech	750	15	4	15	8	8	8	8 ext.	M	F	F	>40		A2	9.0	
HG 323 & HG 324	Ash and hazel	100- 200	7	0	8	2.5	2.5	2.5	2.5 ext.	Sm · M	F	F	>40		C2	2.4	

PROPOSED DEVELOPMENT AND TREE IMPACTS.

The Proposed Development

- 10.36. The indicative infrastructure layout presented in **Figure 4 of Volume 2: Planning Application Drawings** shows the proposed solar farm infrastructure with proposed access points, fencing etc.
- 10.37. Solar arrays are set well inside fields, away from trees and hedges.

Tree Constraints and Impacts

- 10.38. There are six potential arboricultural constraints to the development of the Application Site:
- Physical contact of above-ground parts of the tree;
 - Below-ground parts;
 - Shading;
 - Over-bearing, and falling material;
 - Subsidence/heave, and root growth; and
 - Impact on amenity value.
- 10.39. Trees are listed in table, and coloured on the Tree Plans, to indicate their retention categories A,B,C,U: with the colours explained in the keys of the table & plan (A = best to U = remove). This allowed the site designer to plan around important trees, and ignore lesser trees.

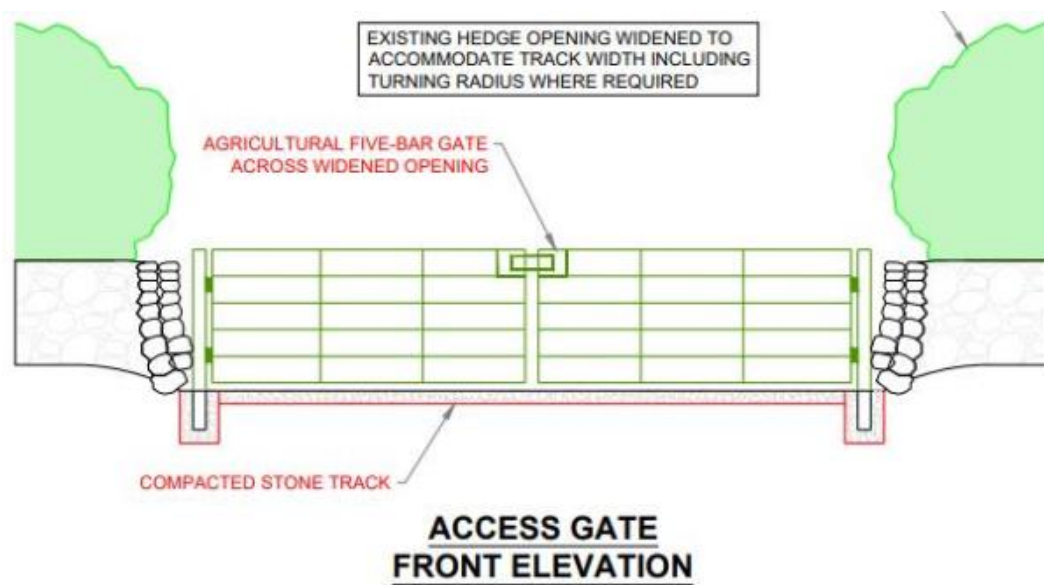
Physical contact of above-ground parts of trees.

- 10.40. Tree Constraint Plans found in **Appendix 10A** shows tree locations and crown spreads. Crown dimensions: spread in four directions, base of crown and tree height, are given in **Table 10-2** above.

Specific above-ground impacts

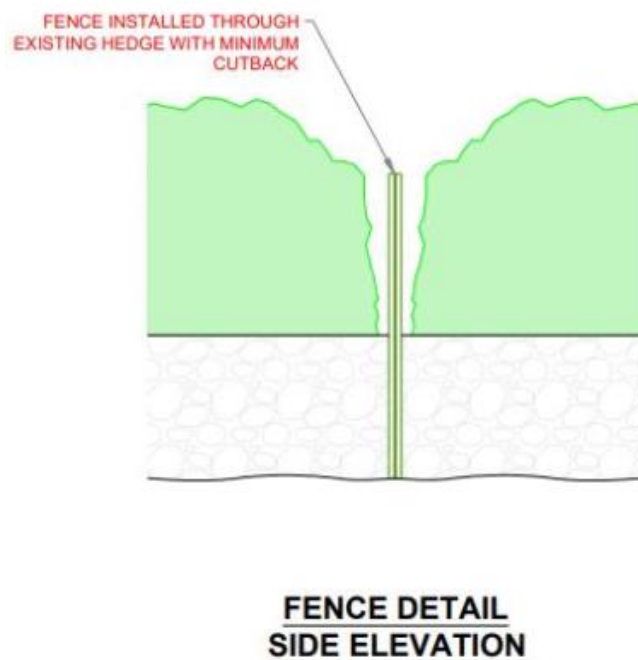
- 10.41. New access roads pass through four hedges. Depending on the angle of the road, between 8m to 15m is lost each time. Some existing gateways might need widening. See **Figure 10-1** below.

Figure 10-1: Example of hedge opening to accommodate access track width.



10.42. New deer fences breach hedges about 24 times. The excavation and hedge loss are the minimal to pass through the fence (less than 2m gap).

Figure 10-2: Example of deer fencing breaching hedgerows.



10.43. These gateways and hedge crossings are shown on the Tree Retention and Protection Plan in Figure 10.4 of Appendix 10A.

- 10.44. Some hedge removal and trimming is required to achieve visibility at the Application Sites entrance points along the unnamed road which dissects the site (See **Figures 5.5 – 5.8 of Technical Appendix 5: CTMP in Volume 3**). For the entrance at Route Analysis point 4, 40.5m of H126 will need to be removed and realigned to create adequate sightlines and achieve the required visibility.

Below-ground root spread

- 10.45. BS5837 defines a tree's RPA as a circular area of 12 x stem diameter; required to maintain long-term health of a full-canopied tree. **Appendix 10A** presents the RPA as an idealised circle. This should be thought of as a disc of untouched ground circa 1m deep.
- 10.46. Rooting areas are never symmetrical, but ideally there should be no ground disturbance within the RPA zone. At the discretion of an arboriculturalist, where rooting is restricted on one side, the RPA can be offset to provide the same protection area. This is shown on the RPA plan in **Appendix 10A**.
- 10.47. Typically, the structural rootplate of a tree to resist windthrow is much smaller than the RPA and therefore, tree stability is unlikely to be affected by some disturbance within the RPA.

Specific Rootzone Impacts

- 10.48. The new fence passes through tree belts HG249 and past T252, and through a copse past WG295, WG294 and T289. Hand digging will be required here to minimise disturbance. T236, a poor ash, is tight to one of the access roads and therefore its RPA will be disturbed. As a result, it is proposed to pollard the ash and retain it as a 'hulk' for habitat.

Light Interception and Shading.

- 10.49. The sun rises to 60° at mid-day in mid-Summer when trees are in leaf (ratio of 16m vertical height to 10m horizontal distance).
- 10.50. The sun only rises to 12° in mid-Winter. However, in winter deciduous trees are leafless so shading is reduced.
- 10.51. Theoretical shadows of arcs equal to estimated tree height in ten-years' time is recommended in BS5837. This is the shadow pattern for a period from May to September inclusive, from 10.00hrs to 18.00hrs daily.

Specific Shading Impacts

- 10.52. Shading impacts are crucial for the development and design of a solar farm and have therefore been accommodated in the positioning of the solar panels. See **Figure 4 of Volume 2: Planning Application Drawings** for the infrastructure layout.

Over-bearing and Falling material.

10.53. All trees drop flower parts, leaves, twigs and fruits throughout the year. These can create a mulch layer on roads. Bird droppings and honeydew can spoil car paintwork. Big trees make adjacent dwellers nervous.

Specific Impacts

10.54. The Proposed Development has been designed in such a way to keep panels at a distance from nearby trees.

Subsidence/heave & root growth.

10.55. Subsoil and drift geology suggest some shrinkable geology, therefore subsidence needs consideration, as does heave if trees are removed in the future.

Amenity impact.

10.56. Amenity can be visual landscape, habitat or heritage/historic.

- The Proposed Development does not require any tree removal; just some short sections of hedge.
- The Proposed Development will have minimal impact on the local soft landscape.

ARBORICULTURAL METHOD STATEMENT IN SEQUENTIAL ORDER FOR THE PROPOSED DERRIL WATER SOLAR FARM.

Supervision

10.57. We would recommend the following arboricultural supervision:

- **Pre-start site meeting** between the groundwork contractor, Council Tree/Landscape Officer and retained arboriculturalist to agree feasibility of tree retention, tree protection and working methods including agreeing gaps in hedges etc; and
- **Installation of protective fencing.**

10.58. All inspections to be followed within three working days with emailed supervision log with action points and photos, copied to client and tree/landscape officer.

Tree Management

Tree Work prior to ground work

Disturbance to Wildlife

10.59. It is essential to check for nesting birds, bat roosts, badgers and hibernating animals such as hedgehogs under trees, before pruning or removing trees, as negligent disturbance is an offence under the EC Habitats Directive 92/43/EEC, Countryside and Rights of Way Act 2000, Protection of Badgers Act 1992. The Conservation (Natural Habitats, & C) (Amendment) Regulations 2007 make **any** damage or destruction of a breeding site or resting place of a European Protected species (mainly bats in a tree context) an offence.

10.60. In general, autumn tree work is least disruptive to bats and birds in **September, October and November**. Work on very ivy-clad trees may need a formal pre-start bat assessment by a trained bat worker.

Permission

10.61. The relevant contractor must satisfy himself that all necessary permissions from the local planning authority or tree owners are in place before touching trees because:

- Trees may be protected by a TPO, or could lie within a Conservation Area.
- Trees may be owned by third-parties.

- Trees may be protected by planning conditions
- A Felling Licence may be needed to clear non-domestic areas.

Quality of Tree Work

- 10.62. All off-ground tree work should be done by insured tree surgeon with certificates in aerial chainsaw use (new designations:- NPTC 020-04, 0020-05, 0020-07, 0021-01, 0021-07; LANTRA 600/5703/8, 600/5717/8, 600/5715/5, 600/5704/X, 600/5714/2), and working to BS3998:2010, and *"Treework at Height"*, the Arboricultural Association's ICoP.
- 10.63. Stumps can be left to shoot again, ground out, or grubbed out, or poisoned, depending on location.
- 10.64. See **Table 10-3** for specific tree work to be carried out for the Proposed Development.

Table 10-3: Tree Work

No	Species	RPA radius m.	Work for landscape / tree health.	Additional Work	
				Specification.	Reason for additional work for development.
T1	Crab apple	3.0			
T2-T4	Oak	4.2			
T5	Sycamore	4.2			
T6	Oak	5.4			
T7	Oak	6.6			
T8	Oak	6.0			
T9	Oak	4.8			
T10	Ash	5.4			
G11	Mixed trees	7.2			
T12	Oak	2.2			
T13	Sycamore	3.0			
T14 - T16	Oak	3.6			
T17	Oak	3.0			

T18	Oak	3.0			
T19	Oak	3.1			
T20	Oak	3.0			
T21 - T25	Silver birch	2.4			
T26	Oak	3.1			
T27	Holly	3.0			
T28	Oak	3.0			
T29	Oak	2.4			
T30	Oak	3.6			
T31, T32	Holly	4.2			
G33	Mixed	4.8			
T34	Oak	6.6			
G35	Mixed	4.2			
T36	Sycamore	3.6	Crown lift off pole and coppice ash stems.		
H37, H38	Mixed	1.8	Trim annually to 'A'-shaped profile.		
T39 - T41	Holly	3.0			
T42 - T49	Oak	6.0			
WG50	Oak & silver birch	7.8			
H51, H52	Mixed	1.8	Trim annually to 'A'-shaped profile.		

H53	Mixed	4.2		Make two gaps.	One for fence, one for road.
T54	Oak	4.2			
T55, T56	Oak	2.4			
T57	Oak	3.0			
T58	Oak	2.4			
H59 - H61	Gorse & hazel	1.2			
T62	Sycamore	3.0			
T63	Sycamore	3.2			
H64 - H71	Gorse & hazel	1.2		H66 & H70 make one gap.	For road.
T72, T73	Oak	4.2			
T74 - T76	Oak	6.0			
T77 - T80	Oak	3.0			
T81	Oak	3.0			
T82	Oak	3.6			
T83 T84 T85, T87 -T90	Oak	2.4			
T86	Silver birch	2.4			
T91 - T93	Oak	4.2			
G94	Oak x 4	2.4			

T95	Oak	1.8			
T96, T97	Oak	3.6			
T98	Oak	1.3			
G99	Goat willow & oak	1.8			
T100, T101	Oak x 2	3.0			
T102	Ash	2.9			
G103	Oak & goat willow	3.0			
T104, T105	Oak	3.0			
T106	Ash	4.0			
H107, H108	Gorse & hazel	1.2			
T109	Oak	1.8			
T110	Ash	3.0			
T111	Oak	6.0			
T112 - T116	Oak	3.6			
T117	Oak	3.6			
T118 - T122	Beech	2.4			
T123	Ash	3.0			
T124	Ash	3.6			
H125, H126	Mixed	1.8		Remove 40.5m section opposite entrance 4.	To create visibility splay 4.

T127	Ash	4.0			
T128 - T131	Oak	2.4			
G132	Ash x 1, sycamore x 3	4.2			
G133	Mixed	4.2		Make one gap.	For fence.
G134	Oak x 5	4.8			
G135	Mixed	1.8			
T136 - T148	Mixed	9.0			
W149	Mixed broadleaves	8.4			
G150	Mixed	7.2			
G151	Oak & silver birch x many	8.4			
H152, H153	Mixed	1.8	Trim less severely	H152 make two gaps.	For fence.
T154	Oak	3.0			
T155	Ash	5.4			
T156 - T162	Oak	5.4	Sever ivy on T162.		
T163	Ash	3.0			
H164	Hazel & blackthorn	1.2			
H165	Mixed	1.8			
T166	Sycamore	3.8			
G167	Oak x 2	4.0			

G168	Sycamore and hawthorn	1.8			
T169	Hawthorn	1.7			
T170	Silver birch	4.0			
H171	Hazel etc.	1.8			
T172	Oak	6.2			
T173	Ash	6.0	Recommend fell.		
G174	Red-stemmed willows & beech	2.4			
T175	Beech	7.2			
T176, T177	Beech	6.0		H177 make two gaps.	Both for fences.
H178A	Mixed	3.6			
H178B	Mixed	1.8			
H179	Mixed	3.6			
T180	Oak	3.4			
G181	Mixed	3.0			
H182	Hazel and blackthorn	1.8			
H183	Mixed	4.2			
H184	Hazel etc.	1.8		Make one gap.	For road.
T185 - T187	Oak	7.2			

T188	Beech	7.2			
T189	Ash	6.6			
T190	Oak	6.6			
G191	Oak x 2	3.0			
G192	Oak	5.4			
G193	Oak	5.4			
T194	Oak	4.8			
T195	Holly	4.0			
T196	Oak	13.2			
G197	Mixed	2.4			
T198, T199	Oak	6.6			
T200	Oak	8.7			
G201	Mixed	6.0		Make gap under trees.	For fence.
H202	Hazel etc.	1.8		Make one gap.	For fence.
G203	Oak x 2	6.8			
T204	Oak	6.0			
G205	Oak and beech	3.0			
G206	Mixed x 12	4.8			
T207	Oak	8.4			

T208, T211	Oak	6.6			
T209	Oak	4.8			
T210	Silver birch	4.6			
H212	Mixed	6.0			
H213	Hazel etc.	1.8		Make one gap.	For fence.
T214 - T216	Oak	1.9			
G217	Mixed	9.0			
T218	Beech		Fell.		
W219	Mixed	9.6			
T220	Ash	10.2			
T221	Beech	10.8			
T222, T223	Oak	6.0			
T224	Oak	5.4			
T225	Oak	10.8			
T226	Oak	9.6	Remove ring of ivy from ground level up to head height.		
T227	Oak	7.8			
T228	Oak	7.2	Remove ring of ivy from ground level up to head height.		
T229, T230	Oak	8.4			
H231	Hazel etc.	2.4		Make one gap.	For fence.

H232	Hazel etc.	1.8			
G233	Oak x 4	7.2			
H234	Beech	1.8			
T235	Oak	7.8			
T236	Ash	6.0		<u>Pollard at first forks. Retain as 'hulk'.</u>	<u>Road close to east side.</u>
T237	Oak	6.6			
T238	Oak	7.2			
T239	Oak	4.2			
T240	Oak	7.2			
H241	Hazel etc.	1.8		Make one gap.	For fence.
H242	Hazel etc.	1.8		Widen existing gap	For road.
G243	Mixed	4.5			
T244	Beech	8.6			
HG245A	Oaks x many	7.2			
HG245B	Mixed	3.6			
HG245C	Mixed	1.8			
HG246A	Oak and hazel	5.4			
HG246B	Oak x 3, ash x 3	7.8			
HG246C	Ash x 5	8.4			

T247	Oak	4.2			
T248	Oak	3.6			
HG249	Mixed	7.8		Make gap.	For fence & road.
T250	Oak	8.1			
T251	Oak	4.8			
T252	Oak	6.0			
H253	Hazel etc.	1.8			
T254	Oak	2.4			
H255	Hazel and blackthorn	1.8			
H256	Mixed	1.8		Make one gap.	For fence.
T257, T258	Oak	2.4			
H259	Mixed	1.8			
T260	Oak	7.2			
T261	Ash	5.4			
T262	Oak	8.4			
WG263	Mixed broadleaves	8.4			
T264 - T266	Beech	2.4			
T267, T268	Ash	3.6			
T269	Elm	2.4			

T270	Ash	3.0			
T271 - T274	Ash	2.4			
G275	Hawthorn and oak	1.8			
H276, H277	Mixed	1.8			
WG278	Mixed	10.8			
WG279	Mixed	4.8			
T280	Beech	6.5			
H281	Mixed	1.8		Make one gap.	For fence.
HG282A	Mixed	6.0			
HG282B	Mixed	7.2			
G283	Mixed	1.8	Coppice under overhead powerlines.		
H284A	Hazel, ash etc.	2.4			
H284B	Mixed	1.8			
H284C	Mixed	1.8			
T285	Beech	6.6			
T286	Oak	10.8			
H287	Mixed	2.4			
T288	Oak	5.4	Remove ring of ivy from ground level up to head height.		
T289 - T293	Oak	8.4			

WG294	Mixed	7.2		Clear understorey as required.	For fence.
WG295	Mixed	10.8		Clear understorey as required.	For fence.
T296	Oak	8.4			
T297 - T300	Ash	8.4			
G301	Goat willow & ash	4.8			
T302	Oak	8.4			
HG303A	Ash and goat willow	3.6		Make one gap.	For fence.
HG303B	Oak and goat willow	6.6			
T304	Ash	3.0			
H305 - H310	Mixed	1.8		H306 make gap. H309 make one gap.	For fences.
T311	Oak	2.4			
T312	Oak	7.6			
T313	Oak	2.4			
T314	Oak	3.0			
T315	Holly	2.4			
T316, T317	Oak	3.0			
T318	Oak	6.0			
T319	Oak	5.4			
T320	Oak	3.0			

T321	Beech	9.6			
T322	Beech	9.0			
HG323 & HG324	Ash and hazel	2.4			

TREE PROTECTION

Requirement

- 10.65. The most important tree-protection measure is effective protective fencing, erected as close as possible to the Root Protection Area (RPA) boundary before any other work starts on site including demolition in the vicinity of trees. It must be maintained until all work is completed, except final soft landscaping.
- 10.66. Tree protection is proposed for retained trees, and for areas of possible new planting where this is feasible, called **landscape protection zones**.

Vertical Tree Protection

- 10.67. Tree protection fencing locations are shown on the Tree Protection Plan in **Appendix 10A**.
- 10.68. Two specifications for suitable protective fencing are given in **Appendix 10B**. Lightweight fencing will suffice on this site.
- 10.69. Within the fenced off Construction Exclusion Zone (CEZ) there must be:
- No construction access;
 - No storage of materials, including soil; and
 - No ground disturbance.
- 10.70. Fencing to remain until all demolition, construction and hard landscaping work is completed, and removed only for final soft landscaping.

Temporary Ground Protection (TGP) within RPAs

- 10.71. If work is required to be closer than the all-round protection zone, then the fenced off zone can be made smaller on that side, or entered temporarily, subject to permission from a retained arboriculturalist.
- 10.72. Within such zones, temporary horizontal ground protection plus temporary fencing would be essential. TGP is not required for the Proposed Development, however may be needed if construction access were to change.
- 10.73. Options for temporary ground protection would be:

- Temporary ground protection plates such as aluminium “Eve Trakway” or plastic interlocking-plate ground protection, both on 150mm depth of woodchip or bark, shown in **Appendix 10C**.
- A layer of woven geo-textile under minimum 250mm depth of graded aggregate which is lifted after work.
- Butted scaffold boards or 22mm plyboard laid on bearers on 150mm depth woodchip or bark mulch (pedestrian access only).

Construction Access.

10.74. General points:

- Most accesses use existing tracks and gateways;
- All retained trees and hedges will require protection.

10.75. No pedestrian, vehicle, plant or machinery should enter RPAs without temporary ground protection as detailed above.

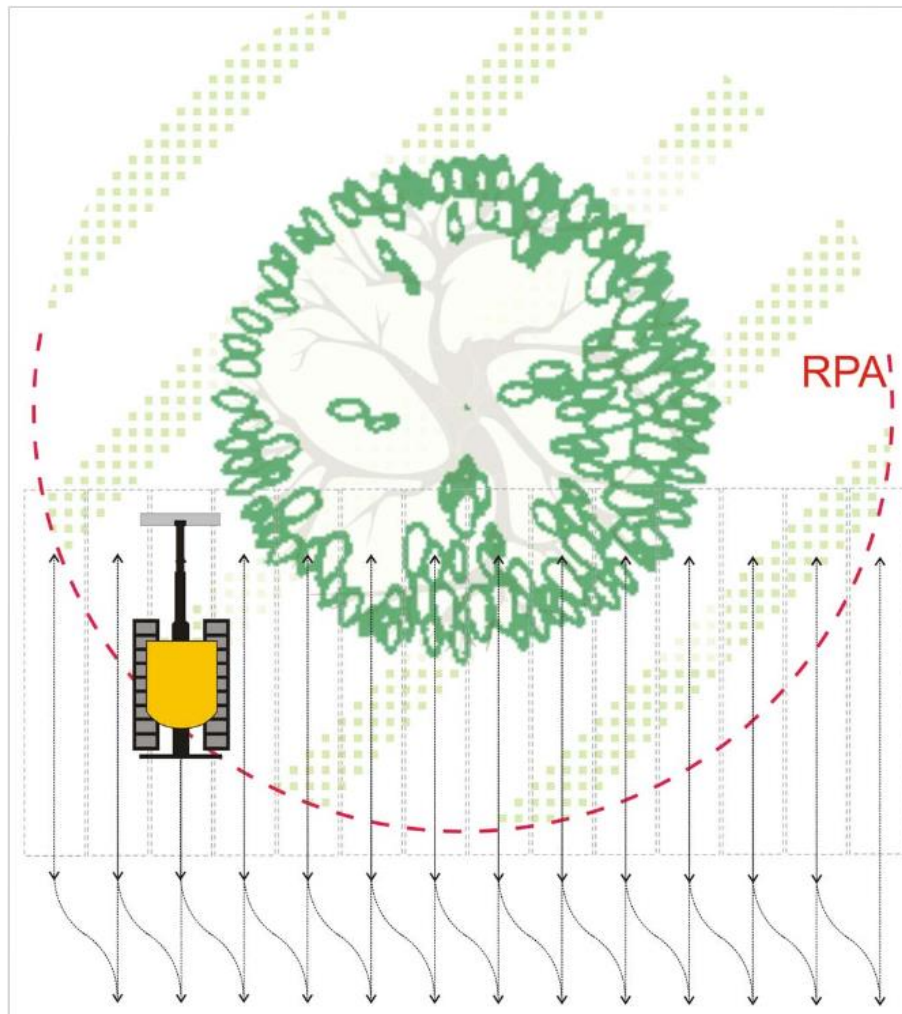
10.76. No excavation is required for temporary services, and pedestrian and vehicle access should be ground protected as detailed above.

Demolition / Excavation within RPAs

10.77. General specification for clearance:

- Parallel tracking with slewing outside the RPA Sketch plan (**Figure 10-2** below)
- 1.5-tonne rubber-tracked mini-digger with toothless grading bucket.
- Scrape off only loose material to 50mm depth.
- Slew outside RPA.
- Heap spoil outside RPA, for dumper to collect and run outside RPA.

Figure 10-2: Example of excavation within an RPA.



Foundations within RPAs

10.78. No buildings are proposed within RPAs.

10.79. Sections of fencing pass through tree areas: T289, WG294, WG295 and T252/HG249.

- See Blue zig-zag sections on Tree Retention and Protection Plan in **Appendix 10A**.
- Within these areas, no vehicle access, pedestrians only.
- Hand dig holes or drive posts.

Drainage

- 10.80. **Foul Drainage:** None required.
- 10.81. **Sustainable Urban Drainage System:** Any SUDS scheme, to reduce the load on local mains drainage, must not significantly add to, or reduce, the soil water in trees' root zones. Store for greywater re-use or allow percolation into ground.

Service Trenches within RPAs.

- 10.82. Service trenches (electric lights, utilities, telecoms, drains etc) must be designed to run as far from trees as possible.
- 10.83. Trenches within RPAs must be avoided. We are unaware of any conflicts.
- 10.84. Otherwise use this onerous work method:
- Hand digging* or trench-less systems must be used.
 - *Use an air-spade to reveal roots (**Appendix 10E**).
 - Retain roots >15mm diameter within service trenches. Thread service pipe underneath.
 - No roots >25mm diameter must be exposed or severed without express written permission of local authority tree officer or retained arboriculturalist.
 - Any excavation within the RPA of a tree must be covered immediately after digging with damp hessian, topped by tarpaulin and plyboard, to prevent root desiccation.
 - Hole must be backfilled within five days of opening.
 - Wrap exposed roots >20mm with hessian, and surround by 50mm depth sand, as part of backfill medium.
 - Tamp backfill material by hand thumper or whacker plate only

Minimal-dig construction for new access drives, parking and paths.

- 10.85. If roads, footpaths, cycle-ways, yards or parking are required near trees, they can be constructed in two ways:-
- Conventional construction if outside a tree's RPA; or
 - Minimal-dig construction if within a tree's RPA.
- 10.86. Tracks near trees are mostly using existing stoned gateways.

Tree work following construction

10.87. Trees should be re-inspected. This inspection would reveal the need for remedial tree work for the following reasons:

- To rectify damage occurring during construction (regrettable but possible),
- To allow additional clearance; or
- Complete tree removal if trees were considered too close for safe retention.

10.88. All additional work following construction is subject to requests or planning conditions from Torridge District Council.

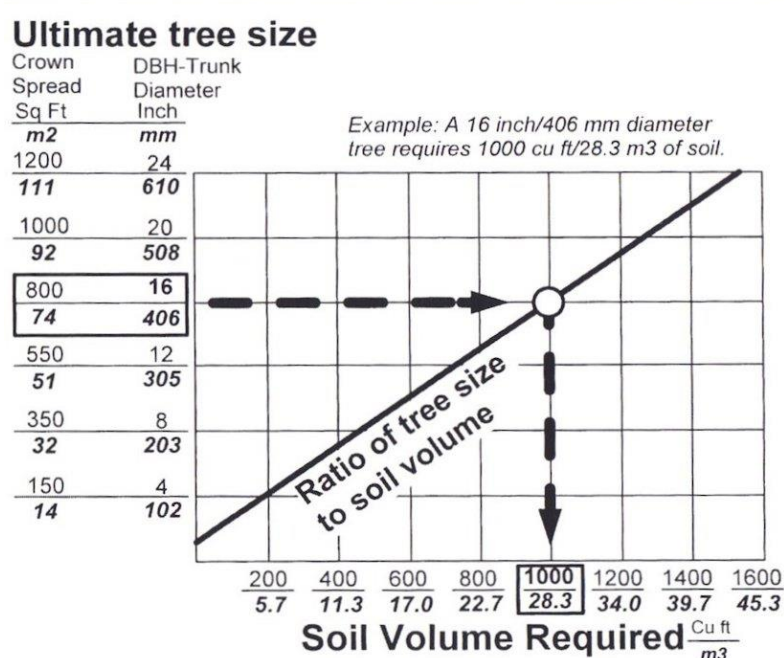
New planting

10.89. New planting of trees, shrubs and hedges is not necessarily required as the Application Site is already well-stocked with trees and hedges, however additional mitigation planting has been proposed in **Figure 1.12 of Technical Appendix 1: Landscape and Visual Assessment of Volume 3** in order for the Proposed Development to integrate more sympathetically with its surroundings and to increase habitat diversity across the Application Site.

10.90. Any planting must be provided with adequate long-term soil-moisture availability. The graph below from James Urban shows rootable area related to tree size (Up by Roots, ISA, 2008).

Figure 10-3: Graph to show rootable area in relation to tree size

Table 2.4.1. Tree size to soil volume relationships (Urban 1992).



10.91. Any planting and maintenance is to comply with: BS 8545 "Trees: from nursery to independence in the landscape – Recommendations".

CONCLUSIONS

- 10.92. The Application Site on lands circa 1.2km southwest of the village of Pyworthy, Devon is divided by large and good Devon hedgebanks, dominated by hazel. Hedges contain many hedgerow trees and belts of trees.
- 10.93. Oak is the dominant local trees species, and many good examples grow on the Application Site.
- 10.94. There is ample space within the fields to establish the Proposed Derril Water Solar Farm without interfering with trees and hedges.
- 10.95. The existing trees and hedgerows around the Application Site will be retained as far as is practicable. No trees are to be removed from the Application Site to accommodate the construction of the Proposed Development; however some hedge removal and trimming will be required to achieve visibility at the Application Sites entrance points along the unnamed road which dissects the site. For the entrance at Route Analysis point 4, 40.5m of H126 will need to be removed and realigned to create adequate sightlines and achieve the required visibility.
- 10.96. Additional and compensatory mitigation hedgerow and tree planting will be introduced along sections of the eastern and southern western boundaries of the Proposed Development and existing hedgerows will be allowed to mature as part of the development. The mitigation measures and landscape management will help to improve the condition of existing hedgerows over the lifespan of the Proposed Development and will provide additional biodiversity opportunities. See **Figure 1.15 of Technical Appendix 1: LVA of Volume 3** for the Landscape and Ecology Management Plan (LEMP) which details these proposals further.
- 10.97. It is considered that following recommendations in *British Standard 5837:2012 Trees in relation to Design, Demolition and Construction*, the Proposed Development can be undertaken without detriment to the health and longevity of the retained trees and hedges, or to the amenity of the area.

REFERENCES

"The Body Language of Trees". Claus Mattheck and Helge Breloer. HMSO 1994.

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APPENDICES

Appendix 10A – Figures

Appendix 10B – Vertical Tree Protection Fencing

Appendix 10C – Horizontal Ground Protection

Appendix 10D – Trays for Strengthening Grassed or Gravelled Areas

Appendix 10E - Example of Air Spade



Appendix 10A – Tree Constraints Plans and Tree Protection Plan (with key)



APPENDIX 10A – Key

Tree Crowns:

Retention categories, based on BS 5837 Table 1 :-

A = High quality & Value (>40yrs life) : Green.

B = Moderate quality & Value (>20yrs life) : Blue.

****C = Low quality & Value (>10yrs life) : Grey.**

U = Trees to be removed (<10yrs life) : Red.

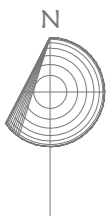
****PLEASE NOTE. FOR CLARITY, C-CATEGORY TREES MAY NOT BE COLOURED.**

Root Protection Areas

Outlined in circles.

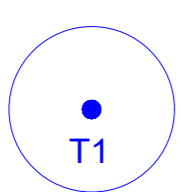
Theoretical Shading

Equals the quadrant of tree height in ten years' time from north west (mid-morning) to due east (evening). This is a shadow pattern for 1 x tree height from 10.00-18.00hrs from May to September.



Key

Tree trunk, number and Root Protection Areas (RPA)



Retention categories, based on BS 5837 Table 1:-

- A** = High quality & Value (>40yrs life): Green
- B** = Moderate quality & Value (>20yrs life): Blue
- C** = Low quality & Value (>10yrs life): Grey
- U** = Trees to be removed (<10yrs life): Red

Hedge stems are continuous but shown widely spread indicative only.

Rev	Date	Comments
A	05/02/2021	

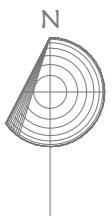
Project: Derril Water Solar Farm
Client: RES
Drawing: Root Protection Areas Plan

Project No.: NEO00738
Drawing No.: NEO00778_0731_A Figure 10.1
Drawn: JM **Checked:** NB **Approved:** PN
Scale: 1:3,000 @ A1 **Revision:** A
Date: 05 February 2021



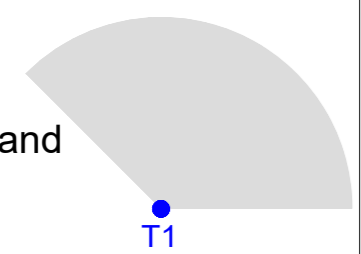
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Key

Key:



Tree trunk, number and Theoretical shading

 Theoretical shading = for estimated tree height in 10 years time from mid morning to early evening at May and September.

Hedge stems are continuous but shown widely spread indicative only.

Rev	Date	Comments
A	05/02/2021	

Project: Derril Water Solar Farm
Client: RES
Drawing: Theoretical Shading Plan

Project No.: NEO00738
Drawing No.: NEO00778_074L_A Figure 10.2
Drawn: JM **Checked:** NB **Approved:** PN
Scale: 1:3,000 @ A1 **Revision:**
Date: 05 February 2021 **A**

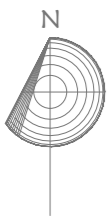


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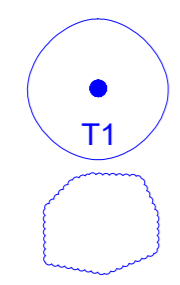
B. J. Umlin Forestry Consultancy

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Key

Tree trunk, number and Tree Crown Spread



Retention categories, based on BS 5837 Table 1:-

A = High quality & Value (>40yrs life): **Green**

B = Moderate quality & Value (>20yrs life): **Blue**

C = Low quality & Value (>10yrs life): **Grey**

U = Trees to be removed (<10yrs life): **Red**

Hedge stems are continuous but shown widely spread indicative only.

Rev	Date	Comments
A	05/02/2021	

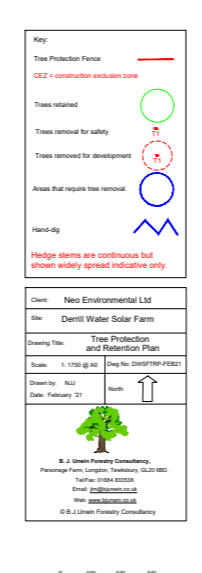
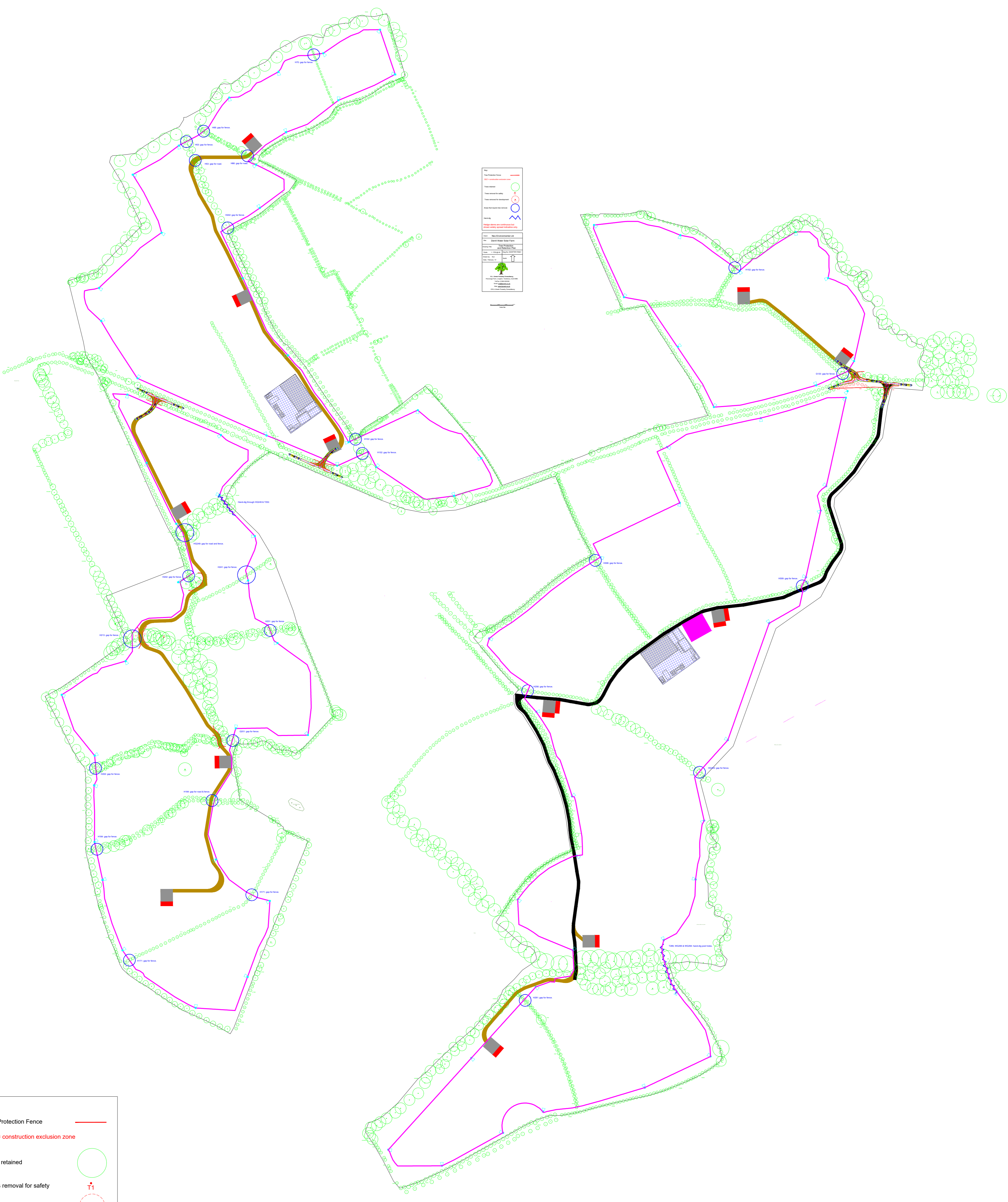
Project: Derril Water Solar Farm
Client: RES
Drawing: Tree Crowns Plan

Project No.: NEO00738
Drawing No.: NEO00778_075L_A Figure 10.3
Drawn: JM **Checked:** NB **Approved:**PN
Scale: 1:3,000 @ A1 **Revision:**
Date: 05 February 2021 **A**

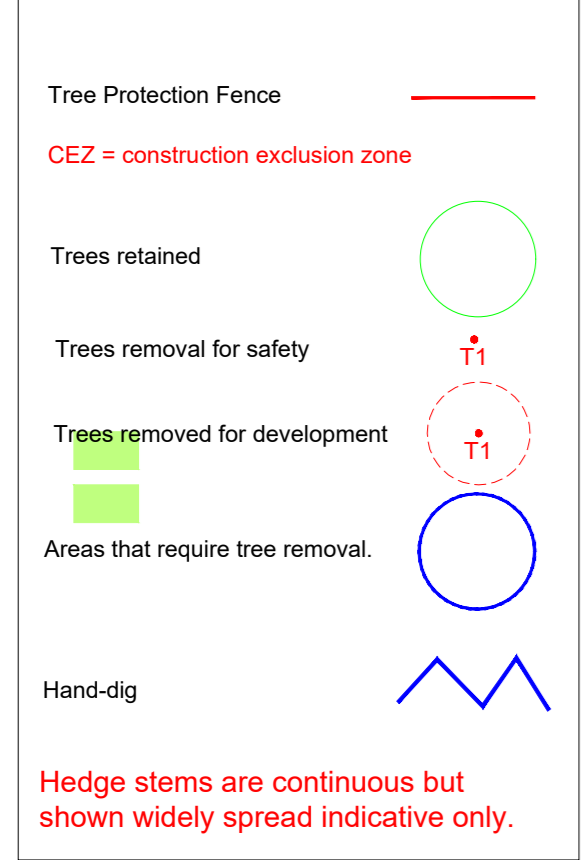


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Key



Rev	Date	Comments
A	05/02/2021	

Project: Derril Water Solar Farm
Client: RES
Drawing: Tree Protection & Retention Plan

Project No.: NEO00738
Drawing No.: NEO00778_076L_A Figure 10.4
Drawn: JM **Checked:** NB **Approved:** PN
Scale: 1:3,000 @ A1 **Revision:**
Date: 05 February 2021 **A**

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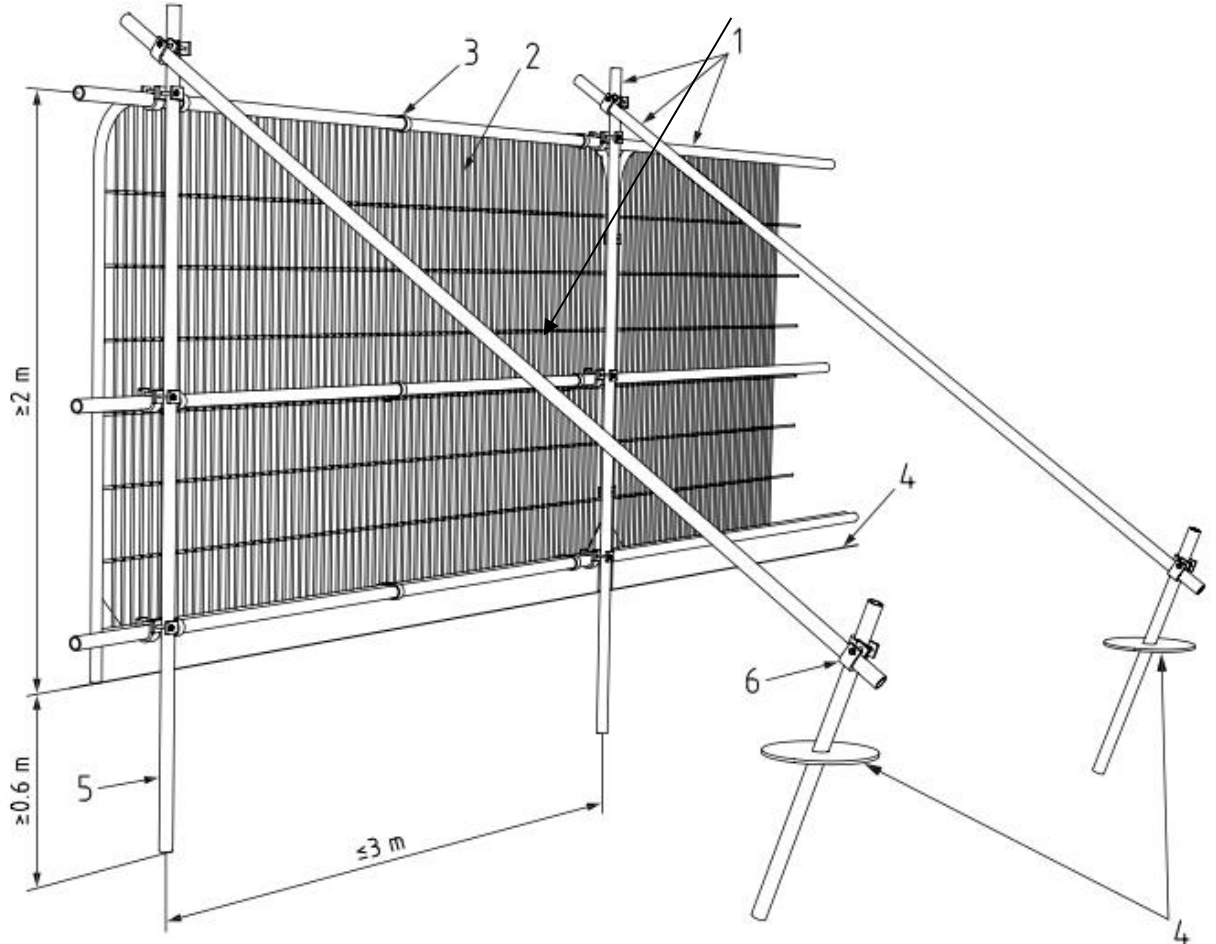


Appendix 10B – Appendix 10E



APPENDIX 10B – VERTICAL TREE PROTECTION FENCING (BS5837)

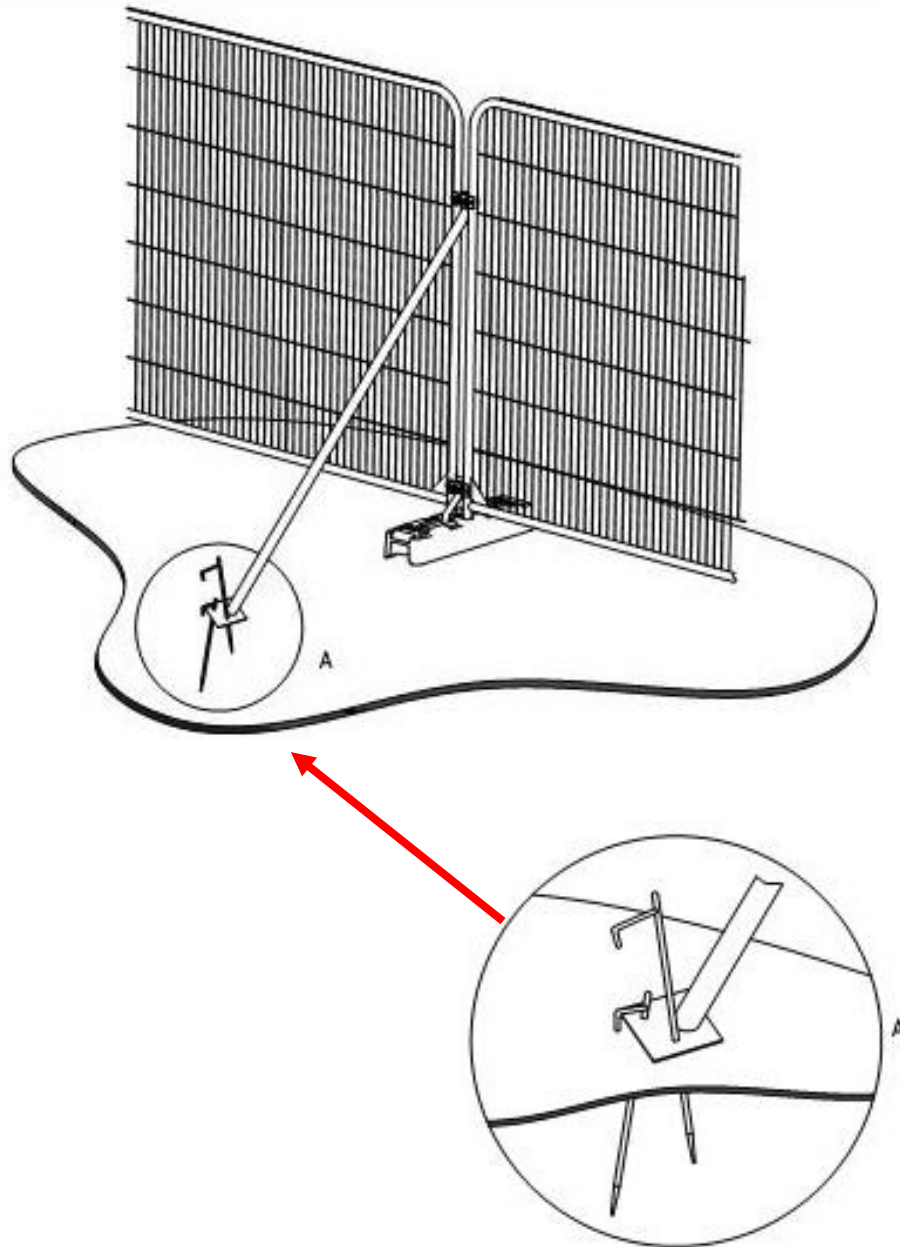
- 1.1. **Default (In situ >3 months):** Heras panels on driven poles, with driven braces. Apply no access signs at 10m intervals.



Key

- 1 Standard scaffold poles
- 2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
- 3 Panels secured to uprights and cross-members with wire ties
- 4 Ground level
- 5 Uprights driven into the ground until secure (minimum depth 0.6 m)
- 6 Standard scaffold clamps

- 1.2. **Lightweight (In situ for < 3 months):** Heras panels on feet, each panel braced with pins. Apply signs at 20m spacing.



APPENDIX 10C – HORIZONTAL GROUND PROTECTION

1.3. Example of aluminium temporary ground protection – Eve Trakway.



1.4. The Medium Duty Trakpanel, or ‘Box’ panel, is ideal for where both pedestrian and vehicle access is required. This versatile panel can be laid with either a smooth or corrugated surface uppermost. The smoother surface finish provides excellent support underfoot, whilst the construction of the panel maintains a high load bearing capacity. Due to the way these panels fit together, a smooth joint is created therefore reducing trip hazards.

1.5. The Benefits:-

- Pedestrian friendly upper surface
- Suitable for heavy vehicles Ideal for where both pedestrians and vehicles require safe passage.

Technical Specifications	
Dimensions	2.5 x 3m (when installed 2.44m x 3m due to overlap)
Weight	274.7 kg
Carrying Capacity	A more pedestrian friendly roadway, this system is capable of taking any road going loads.

1.6. Example of plastic temporary ground protection.

Ground-Guards Tree Root Protection
Tree root protection for construction projects

Planning Departments may often need to stipulate that site access roads will not involve any excavation because of the proximity of tree roots on the site. Furthermore, that they will also provide additional ground cushioning when passing over the immediate areas where there are tree roots beneath. This is very important to prevent compaction of the ground, and long-term damage to the soil structure, the tree roots, and ultimately, to the health of the trees themselves.

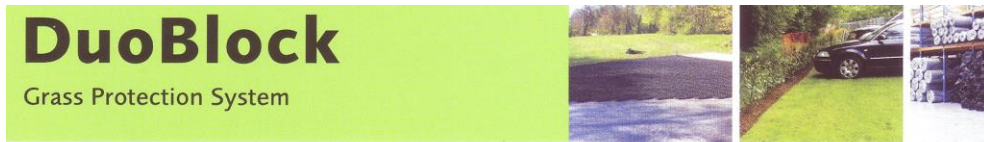
An effective means of protecting tree roots is to use a double layer of Ground-Guards. Panels with 150mm of wood chips sandwiched in-between which creates a suitably cushioned roadway for this purpose.

The Ground-Guards system is so durable and versatile that whatever your need, the team will be delighted to work with you to provide an effective solution. Please just call our team on 0113 267 6000 for friendly advice on any difficult site conditions that you need assistance with.

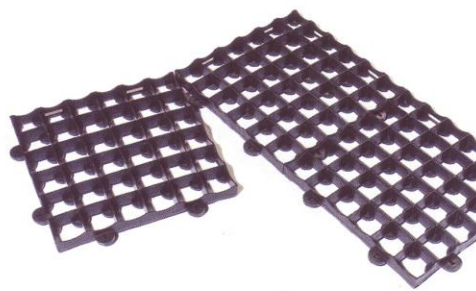


APPENDIX 10D – TRAYS FOR STRENGTHENING GRASSED OR GRAVELLED AREAS.

Figure 10E-1: Example of grass protection system.



Using grass or gravel infill, DuoBlock 750 and 500 give architects, consulting engineers, landscape contractors and developers the ultimate in load-bearing performance combined with aesthetic appearance.



Porous paving systems have been available since the early 1990's and provide a durable yet aesthetically pleasing alternative to traditional surfacing solutions. Increased awareness of the need to manage storm water runoff in new developments and the advent of Sustainable Urban Drainage Systems (SUDS) has led to an increase in popularity.

DuoBlock is a permanent grass protection / gravel retention porous paving system. It is extremely versatile and may be used in a wide range of applications including:

Applications:

- Overspill car parking
- Emergency access and service roads
- Caravan hardstanding
- Verge hardening
- Service Roads
- Pedestrian walkways and towpaths
- Bridle ways
- Helipads
- Golf course pathways / Tee reinforcement

DuoBlock systems are uniquely designed to ensure the ultimate in load bearing performance and aesthetic appearance and have numerous benefits over traditional and first generation plastic systems such as:

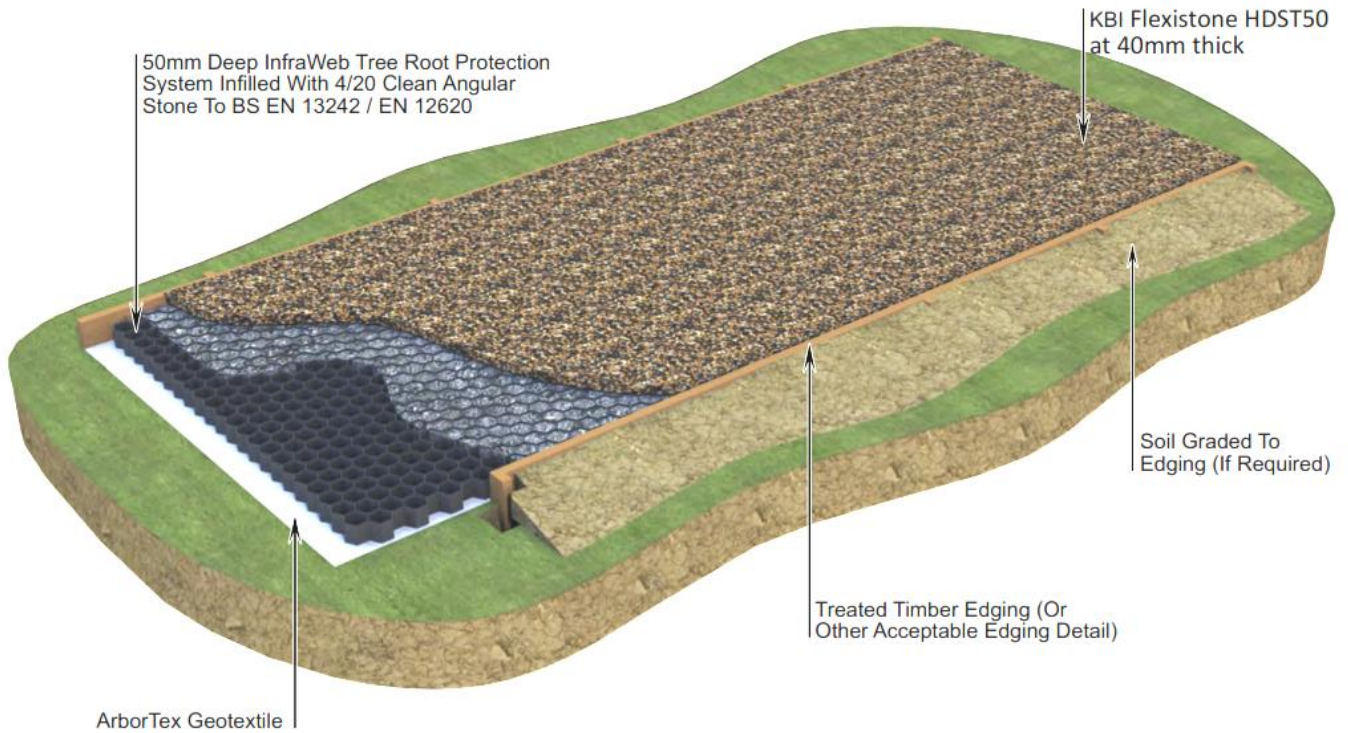
Benefits:

- 90% surface area available for infill
- Reduces surface water runoff
- Increases water Filtration
- Interconnecting cell walls
- High Load Performance
- Unique surface design for greater aesthetic appeal
- Positive interlock System



Figure 10E-2: Cross section of grass / tree root protection system

InfraWeb TRP 50 Section - Tree Root Protection c/w Flexistone HDST50 at 40mm thick for pedestrian and cycleway use only



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 +44 (0) 1422 242880
<http://www.kbiuk.co.uk>

InfraWeb TRP 50 Section - Tree Root Protection c/w Flexistone HDST50 at 40mm thick for pedestrian and cycleway use only

Date: 29/12/2016
Drawn By: NLG Design
Revision: A
Drawing Number: TRP50HDST50

APPENDIX 10E – EXAMPLE OF AIR SPADE

Figure 10F-1: Example of air spade.

HANDLE VIBRATION TEST

Product type – MBW Soil Pick SP125

Manufacturer of testing apparatus – Castle

Accelerometer was affixed to the rear of the handle on the Soil Pick and all three axes were tested.

Accelerometer position:

X axis = 0.0M/S²

Y axis = 0.0M/S²

Z axis = 0.0M/S²

Hand/arm vibration = 0.0M/S²

TREE CARE

MBW's Soil Pick provides a multi-functional air tool for a variety of applications in the tree care industry including:

Radial Trenching

Radial trenching is a process which involves aerating the soils around a tree root in a pattern resembling a wagon wheel. The Soil Pick provides a safe and damage free means of utilizing a high air pressure to loosen tightly compacted soils.

Aeration & Excavation

Root Locating for Utility Line Installation or Pruning

Investigating Root Structure and Damage

Transplanting or Bare Rooting

Reducing Soil Compaction





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