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Site: Calthorpe Street, Banbury, OX16 5EX.



Subject: **BS5837 Tree Constraints, Tree Impacts and draft Tree Protection Method Statement for residential development.**

Surveyor: Jim Unwin.  
Report: Jim Unwin. (professional-CV in Appendix VI).  
Dates: Inspection 8<sup>th</sup> Sept 2021. Report: Stage 1: 20<sup>th</sup> 2021 & Stage 2: 9<sup>th</sup> May 2023

### **Summary:**

- The Calthorpe Centre in the middle of Banbury contains many trees, with much footfall and vehicles on site, or around it.
- Unfortunately a high proportion of trees are 'Raywood' ash, which have long branches prone to splitting off, and many have grown over steel grills around their bases. There is also dieback in these trees.
- Off-site to the south are many mixed trees with preservation orders (011/94) and a lime T37 off-site to the east is also protected.
- The proposal completely re-models the triangular site, so all internal trees are removed. At the same time the opportunity is taken to remove most poor ash street trees to west and east.
- Retained trees can be protected following methods detailed in section 6 of this report.

Tree and Woodland Consultancy  
Woodland Valuation and Timber Sales  
Landscape Management

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Visual Tree  
Assessment

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**Notes:**

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## 1. Instruction.

- 1.1 Corstorphine-wright is assisting the site's owner to re-develop the Calthorpe Centre and surroundings.
- 1.2 The local authority (Cherwell District Council) will require a tree impact assessment and tree protection method statement for any proposal. The local authority may require mitigation by new planting for any trees lost as part of any development. Therefore, Holly Sissons has asked B J Unwin Forestry Consultancy Ltd to advise on trees for planning application purposes, including advice on improving the site's existing soft landscape.
- 1.3 I have used a **topo survey by Greenhatch Group 36919-T of 09/06/2020** as the base for our tree plans. The Proposal: **LA5592-000 Landscape GA**, extract in section 5, shows the proposal, and guides our tree impact and tree protection sections 5 & 6 of this report.
- 1.4 Therefore methodology of the report below follows *BS5837:2012 Trees in Relation to Design, Demolition & Construction*.

## 2. Inspection.

- 2.1 Jim Unwin visited the property on 8<sup>th</sup> Sept 2021, and made an un-accompanied inspection in good light conditions. Access was gained to the rears of shops via TK Maxx shop manager.
- 2.2 The survey was from ground level, involving visual observation (Visual Tree Assessment: Mattheck and Breloer, 1994 and Lonsdale, 1999). I measured dbh, (estimated for off-site and inaccessible trees) measured or estimated height, and measured or paced crown spread. I added a few trees and shrubs, with positions estimated by me.

## 3. The Site.

- 3.1 The site inspected is a roughly-triangular, about 210m north-south by 160m across its southern side. It comprises a large carpark for TK Maxx & Farm Foods, a smaller carpark by Calthorpe Manor, and their surrounds.
- 3.2 The site is at various levels: retained by wall, between 104m, on the south-west corner, dropping to 97m on the north-east corner. The site is sheltered from winds.
- 3.3 British Geological Survey website suggests geology is:  
**Superficial deposits:** No superficial deposits recorded  
**Bedrock geology:** Charmouth Mudstone Formation - Mudstone. Sedimentary bedrock formed between 199.3 and 182.7 million years ago during the Jurassic period. Therefore, the site could have fine-textured subsoil and upper geology with volume-change potential. But this town-centre site will be much man-modified. This needs confirmation by ground investigation.
- 3.4 The site is edged by public footways on several sides, by domestic plots to south and east, by a new block of flats to the west, by Calthorpe Manor to the south west, and by Marlborough Road Church to the north east.

## 4. The Trees.

- 4.1 Trees on site:-
  - The main carpark was landscaped with the 'raywood' variety of Caucasian ash (*Fraxinus angustifolia* subsp. *Oxycarpa*). Many of its cultivars have long limbs and stems prone to breaking off, and it is susceptible to ash dieback disease.
  - Many of the ash have been poorly lopped, some have dieback (from dieback disease and/or rootzone limitations), and many have grown over steel grills covering planting pits (which grills should have been removed years ago).

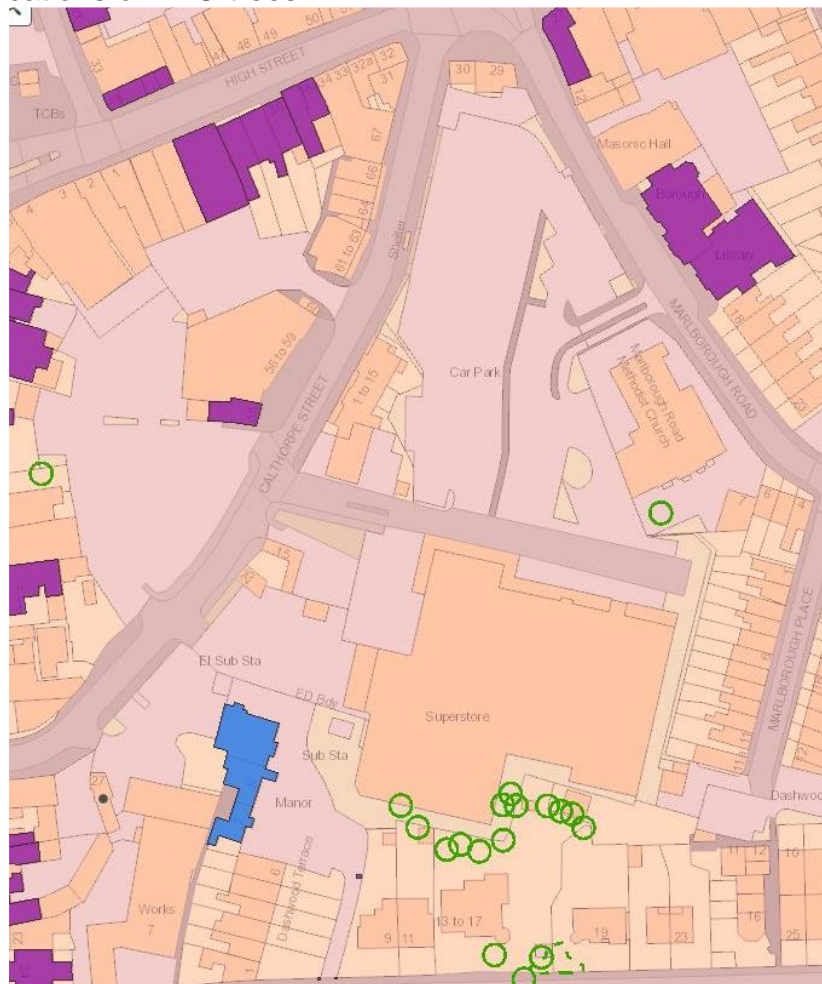
- Overall, most ash trees on site are an unsuitable variety, and have been poorly maintained.
- Other trees on site include two good limes T28 & T29, big ivy-covered silver maples T35 & T36 and several young Kashmir birches planted in shrub beds.
- A group of cherries and a hawthorn T23-T27 in front of Calthorpe Manor are outgrowing their location.
- A close-spaced group, G33, of three holm oaks, sycamores, and ash lines the carpark entrance. They have been recently crown lifted, but are too dense to grow to full size, so some tree removal is desirable.

#### 4.2 Off-site trees:-

- To the south of Farm Foods and TK Maxx on higher ground are some large trees G10 to T22, including a Wellingtonia, several yews, ash, sycamore, and holly.
- Big lime T37 stands below retaining walls just off the eastern boundary.
- Raywood ash trees T47-T51 and T71 to T78 are planted in small pits along footways of Calthorpe Street and Marlborough Road. The same comments apply as for ash trees on site. Several have dieback and T73 is dying.

#### 4.3 Amenity: This could describe an attractive tree, a screening function, habitat potential, or historic/veteran tree.

- The site lies within a Conservation Area. Tree Preservation Orders constrain off-site lime T37, and several off-site trees to the south. Extract from Council constraints plan below. Rings = indicative locations of TPO trees.





4.4 Photos below:



4.4.1 View north to good limes T28 & T29.



4.4.2 View south east to cherry clump by Calthorpe Manor. Clearance pruning needed.





**4.4.3 Example of lopped ash tree in carpark: ugly and poor practice.**



**4.4.4 Base of carpark ash tree growing over steel grill, stopping sap flow.**





**4.4.5 View east to roadside ash trees. T73 central with severe dieback.**



**4.4.6 View south along Marlborough Road showing ash trees: too broad for street use.**

## **4.5 Detailed Tree Descriptions**

4.5.1 Trees **on, or potentially influencing** the site, are individually described in the table below, and shown on the plans in Appendices.

**Age class** is described as:-

- Sap: Very young tree, or sapling, one-five years old.  
Y: Young tree less than fifteen years old and <1/3 fully grown.  
Sm: 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: Overmature tree: 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.

**Health & Structural condition:-** Self-explanatory:- **Good, Fair, Poor or Dead.**

**Remaining Contribution, in years**

Prediction of safe useful life in its location, estimated as:-  
<10 years, >10 years, >20 years, >40 years.

**Retention categories, based on BS 5837 Section 4.5, and shown in Appendix I, are:-**

**Retain:**

- A =** High quality or value >40yrs safe life:  
**B =** Moderate quality or value >20yrs safe life:  
**C =** Low quality or value >10yrs safe life  
or young trees <150mm stem diameter.

Light Green\*

Mid Blue\*

Grey\*

**Remove:**

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

Dark Red\*

(\*Colour marking on relevant Tree plan).

**Sub-category for retention:-**

- 1 = Arboricultural Value  
2 = Landscape Value  
3 = Cultural and/or Habitat Conservation Value

**BS 5837:2012 Root Protection Area:**

The estimated area rootable soil required to sustain the tree, centred on the tree's trunk. The RPA can be a varied shape enclosing the correct rootable area: but usually shown as a circle for convenience, unless obvious constraints stop rooting.

**Radius calculated as:-**

**Single-stem** tree, radial distance = 12 x stem diameter at 1.5m ht.

**Multi-stem** trees 1-5 stems = Square root of (sum of individual stem diameters squared).

> 5 stems = Square root of (average dbh squared x number of stems).

(Area can be calculated by  $\pi \times r^2$ .)

# - Denotes estimated stem diameter in mm at 1.5m height where measurement was not possible.

T = tree S = shrub H = hedge G = group HG = hedge group.



4.5.2 **Calthorpe Centre - BS5837 Inspection - BJUFC – 8<sup>th</sup> September 2021**

No.	Species	Dbh (stem diam @ 1.5m ht) mm.	-Total height. - Ht of lowest branch & direction. - Est Ht in 10 yrs. m.			Crown radii m.				Age class	Health	Structural Condition	Remaining contribution Years.	Comment (All are in average to good health and condition, unless stated otherwise.)	BS5837 Retention category	BS 5837 Root Protection Area Radius. m.	Recommended WORK excluding development.
						N	E	S	W								
SG1	Cherry laurels and viburnums	200 basal	4-5	0	2	2	2	2	2 ext.	M	F	P/F	>40	Overgrown shrubbery.	C2	2.0	Prune hard.
T2	Kashmir birch	300	13	5	15	4	4	4	3 ext.	Em	F	F	>40	Ivy.	B1	3.6	Remove ring of ivy from ground level up to head height. Prune off building every 3 years.
T3	Kashmir birch	290	15	4	16	4	3	0	3	Em	F	F	>40	Ivy.	B2	3.5	Remove ring of ivy from ground level up to head height. Prune off building every 3 years.
T4	Kashmir birch	250	15	4	16	3	5	3	1	Em	F	F	>40	Ivy. Tag 1502.	B2	3.0	Remove ring of ivy from ground level up to head height. Prune off building every 3 years.
T5	Ash	350	13	4	14	2	4	3	2	Sm	F	F	>10	Ivy.	C1	4.2	Prune off building every 3 years.

T6	Ash	150	9	3	11	1.5	1.5	1.5	1.5	Y	F	F	>10		C1	1.8	Prune off building every 3 years.
T7 - T9	Field maple	200	6-9	3	6-10	4	2	2	2 ext.	Sm	F	F	>20	T8 good shape. T7 and T9 poor.	C2	2.4	
G10	Sycamore and ash x 10	250-400	18	4	18	3-5	3-5	3-5	3-5 ext.	Em	F	F	>10	Off-site close-spaced row of self-sown trees. Ivy and some touching branches.	B2	4.8	Prune off building every 3 years.
T11	Yew	600	14	3	14	5	7	4	3	M	F	F	>20	Off-site.	B1	7.2	
T12	Holly	300	12	2	12	4	3	1.5	2.5	M	F	F	>40	Off-site.	B2	3.6	
T13	Wellingtonia	1300	26	5	26	4	4	4	4	Em	F	F	>40	Off-site.	A1	15.0	
T14	Holly	350	12	3	12	5	4	4	4	M	F	F	>40	Off-site.	B1	4.2	
T15	Leyland cypress	300	10	3	13	2.5	2.5	2.5	2.5	Sm	F	F	>20	Off-site.	C1	3.6	
G16	Mixed	550-650	12-22	2-6	12-22	5	5	5	5 ext.	Em/M	F	F	>20	Three off-site sycamores, an ash, and a slender yew.	B2	7.8	



SG17	Cherry laurel	200 basal	5	0	2	3	3	3	3 ext.	M	F	P	>10	Overgrown shrubs.	C2	2.0	Prune hard.
G18 - T19	Golden yews	300-400	7-12	2	7-12	4	4	4	4 ext.	M	F	F	>40	Off-site. Dense ivy on T19.	B2	4.8	Recommend remove ring of ivy from ground level up to head height on T19.
SG20	Mixed shrubs	100	3	0	2	2	2	2	2 ext.	Y/Sm	F	F	>20	Mixed planting and self-sown laurel, field maple, ash, and hazel.	C2	1.2	Prune.
T21	Sycamore	350	12	6	14	4	4	2	2	Sm/Em	F	F	>10	Near top of retaining wall.	C1	4.2	
T22	Leyland cypress	700 basal	14	2	16	4	3	4	4	M	F	P	10	Off-site on top of wall. Topped.	C2/U	7.0	Suggest remove soon.
T23	Hawthorn	220	7	2	7	2	2.5	2	1.5	M	F	F	>10	Shaded by building.	C1	2.6	
T24	Wild cherry	560	15	7	15	6	6	6	6 ext.	M	F	F	>10	Very close to buildings.	C2	6.7	
T25	Wild cherry	400	15	6	15	6	6	6	6 ext.	M	F	F	>10	Very close to buildings.	C2	4.8	
T26	Wild cherry	370	14	5	14	6	6	6	6 ext.	M	F	F	>10	Very close to buildings.	C2	4.4	

T27	Wild cherry	350	14	5	14	6	6	6	6 ext.	M	F	F	>10	Very close to buildings.	C2	4.2	
T28	Lime	380	11	2	13	4	4	4	4	Sm/Em	F	F	>40		A2	4.6	Prune off basal shoots annually.
T29	Lime	370	11	2	13	4.25	4.25	4.25	4.25	Sm/Em	F	F	>40		A2	4.4	Prune off basal shoots annually.
T30 - T32	Evergreen oaks x 3	600 basal	14	4	16	4-6	4-6	4-6	4-6*	Sm	F	P-F	>20	*see plan. In planted strip.	B2	6.0	Remove two leaning stems off T32.
G33	Mixed	250-400	12	4	13	4	4	4	4 ext.	Sm-Em	F	P/F	10-20	Clump in verge. Sycamore x 3, ash x 2, and silver maple x 1. Crown lifted to 4m.	B2	4.8	May be too many trees to reach bigger size, consider thinning out ash.
T34	Sycamore	350	12	5	15	3	3	3	3	Sm	F	F	>40	Off-site.	B1	4.2	
T35	Silver maple	700	18	3	18	5	6	6	6 ext.	M	F	F	>20	Dense ivy. 'Leggy' form with long arcing limbs.	B2	8.4	If they start shedding branches, crown reduce.
T36	Silver maple	400	18	4	18	5	6	6	6 ext.	M	F	F	>20	Dense ivy. 'Leggy' form with long arcing limbs.	B2	4.8	If they start shedding branches, crown reduce.
T37	Lime	900	17	2	17	6	5	6	6	M	F	F	>40	Off-site. Set 1.5m below carpark.	A1	10.8	



SG38	Mixed woody shrubs	100	1.5	0	1.5	0.5	0.5	0.5	0.5	0.5	M	F	F	10-20	Laurel, cotoneaster, St John's Wort, and ash saplings.	C2	1.2	Trim annually. Fell and herbicide-treat stump to kill ash and bramble.
T39	Raywood ash	450	12	2.5	13	6	6	6	6	Em	F	P/F	>10	Broad.	B2	5.4		
T40	Rowan	240	6	2	6	1	2	2	2	Em	P/F	P/F	>10	Ivy-smothered.	C1	2.9	Remove ring of ivy from ground level up to head height ASAP!	
T41	Silver maple	220	12	4	13	0	2	4	4	Sm	F	F	20-40		B2	2.6		
T42	Silver maple	300	12	5	13	4	4	3	4	Sm	F	F	20-40		B2	3.6		
SG43	Mixed woody shrubs	100	4	0	4	1	1	1	1	M	P/F	P/F	10-20	Mahonia etc.	C2	1.2		
T44, T45	Kashmir birch	150	8	2	10	2.5	2.5	2.5	2.5	Sm	F	F	>40		B2	1.8		
S46	Tree cotoneaster basal	300	6	0	6	2	4	4	4	M	F	P	>20	Overgrown.	C2	3.0	Prune hard.	
T47, T48	Raywood ash	300	14	5	15	3	4.5	4.5	4.5	Sm	P/F	P/F	10	Growing over iron grills. T48 has dieback.	C2	3.6	Remove basal grills.	

T49	Raywood ash	200	6	2	6	1.5	1.5	1.5	1.5	Sm	P	F	10	Dieback.	C2	2.4	
T50	Raywood ash	200	8	4	9	2.5	2.5	2.5	2.5	Sm	F	F	>10		C1	2.4	
T51	Raywood ash	370	9	3	10	6	4	4	4	Sm	F	F	>10	Low crown.	C1	4.4	Crown lift above footway and road.
T52	Kashmir birch	250	9	2.5	11	3	4	4	4	Y/ Sm	F	F	>10		B1	3.0	
SG53	Mixed wood shrubs	100	1.5-2	0	1-2	1	1	1	1 ext.	Em	F	F	>10	Laurel, buddleia, mahonia, sycamore, and ash saplings.	C2	1.2	Fell and herbicide-treat stump to kill buddleia and tree saplings.
T54 - T65	Raywood ash (=RA)					Crowns shown on plan.				Sm	P-F	P-P/F	<10- >10	Row of ash along centre of carpark. Bigger trees ring barked by basal grills. Poor pruning. Crowns splaying out. Only T64 is in shrub border, without a grill.	C2		Prune off ugly stubs and any deadwood. Remove all metal grills. Replace by cobbles or resin-bound rubber chips.
T54	RA	260	9	2.5	9											3.1	
T55	RA	180	7	2.5	7											2.2	
T56	RA	350	11	2.5	11											4.2	
T57	RA	180	8	2.5	8											2.2	
T58	RA	300	10	2.5	10											3.6	



T59	RA	250	9	2.5	9												3.0	
T60	RA	240	9	2.5	9												2.9	
T61	RA	370	10	2.5	10												4.4	
T62	RA	380	11	2.5	11												4.6	
T63	RA	320	11	2.5	11												3.8	
T64	RA	400	13	2.5	13												4.8	
T65	RA	440	12	2.5	12												5.3	
T66, T67	Sycamore	150	8	2	9	2	2	2	2	Y/ Sm	F	F	>10	Suppressed under ash trees.	C2		1.8	
SG68	Mixed shrubs	50	1.1	0	1.1	0.3	0.3	0.3	0.3 ext.	Em	F	F	>10	St. John's Wort etc.	C2		0.6	Trim annually.
G69	Mixed	100- 200	8- 12	3	8	3	4	3	3	Y/ Sm	F	P-F	0- >20	Planted rowans and self-sown ash and sycamores. No space for ash and sycamores.	C2		2.4	Fell and herbicide- treat stump to kill all ash and sycamores. Cut ivy off rowans.
SG70	Mixed shrubs	100	1	0	2	0.2	0.2	0.2	0.2	Em	F	F	>10	Laurel and mixed shrubs. Just "copparded" at 0.5m height.	C2		1.2	
T71	Raywood ash	240	11	2.5	11	3	2	3	4	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2		2.9	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.

T72	Raywood ash	290	11	2.5	11	2	2	3	4	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2	3.5	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.
T73	Raywood ash	460	12	2.5	12	4	4	4	4	Sm	P	P	0	Street trees. Constrained by steel basal grill. 60% dieback: Ash Dieback Disease.	C2/U	5.5	Heavily prune to remove dead, or fell and replant whitebeam.
T74	Raywood ash	200	11	2.5	11	3	2	0	2	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2	2.4	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.
T75	Raywood ash	310	11	2.5	11	2	4	4	4	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2	3.7	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.
T76	Raywood ash	390	11	2.5	11	4	3	4	4	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2	4.7	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.

T77	Raywood ash	300	11	2.5	11	4	4	4	4	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2	3.6	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.
T78	Raywood ash	360	12	2.5	12	4	4	4	4	Sm	F	F	>10	Street trees. Constrained by steel basal grill.	C2	4.3	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.

End of table.

- 4.5.3 Trees are listed in the table above, and coloured on the Tree Constraints Plans, to indicate their retention categories A,B,C,U: with the colours explained in the keys of the table (4.5.1) & plan, and Appendix I (A = best to U = remove). This allows the site designer to plan around important trees, and ignore lesser trees.





## **5.2 Potential Tree Impacts (considered below).**

5.2.1 There are six potential arboricultural impacts caused by re-development of the site:

- **physical contact above-ground,**
- **below-ground conflicts (roots),**
- **shading,**
- **over-bearing, and falling material,**
- **subsidence/heave, and damage from root growth,**
- **impact on amenity value.**

These are assessed below:

## **5.3 Physical contact with above-ground parts of trees.**

5.3.1 General:-

Buildings, roads, paths and associated structures can replace trees or intrude into canopy zones. Tree removal and pruning is listed in table 6.2.3 below.

5.3.2 Specific above-ground impacts:-

- Almost all internal site trees are replaced by development.

## **5.4 Below-ground root spread.**

5.4.1 General:-

BS5837 defines a tree's Root Protection Area as a circular area of 12 x stem diameter: required to maintain long-term health of a full-canopied tree. We show it as an idealised circle. Rooting areas are never symmetrical. At the discretion of an arboriculturist, 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.

Ground disturbance within the RPA zone should be avoided. But, the structural rootplate of a tree to resist windthrow is usually smaller than the RPA. Therefore tree stability should not be affected by some planned disturbance within the RPA.

5.4.2 Specific Rootzone Impacts:-

- Off-site Churchyard lime T37 has had roots covered by the existing carpark development. Protection of its rootzone and maple T36 need minimal change of levels around them. See 6.5 below.
- I recommend arboriculturist oversight of demolition around T36 & T37.
- Young trees G69 on the western edge will not tolerate rootzone impact and drainage changes. Remove and replant.
- Maple etc group T40-SG43 will have a closer footway. Root pruning needed, see 6.9 below for working method.
- Trees off the southern boundary G10 to T22 are less impacted than might be anticipated, because existing retaining walls hinder or halt root growth into site.

## **5.5 Light Interception & Shading.**

### **5.5.1 General:-**

The sun rises to about 60° at mid-day in mid-Summer when trees are in leaf (ratio of 16m vertical height to 10m horizontal distance).

The sun only rises to 12° in mid-Winter. However, in winter deciduous trees are leafless, so light interception is much reduced.

Theoretical shadows of arcs equal to estimated tree height in ten-years' time are illustrated on our Shading Plan. This is the shadow pattern for the period from May to September inclusive, from 10.00hrs to 18.00hrs daily.

### **5.5.2 Specific Shading Impacts:-**

- Off-site self-sown ash and sycamore row G10 will shade Calthorpe Gardens' southern flats. Conversely, they provide screening, so maybe crown reduction is appropriate? But technically they are off-site, but rather in no-man's land.

## **5.6 Over-bearing and Falling material.**

### **5.6.1 General:-**

Trees drop detritus in the form of flower parts, leaves, twigs, fruits or needles throughout the year. These can be an annoyance to persons living nearby. Bird droppings and honeydew from aphids can be difficult to clean off, or can spoil car paintwork. Big trees make adjacent dwellers nervous.

### **5.6.2 Specific Impacts:-**

- Roadside trees, mainly ornamental Raywood ash, T47 to T51 and T73 to T78, will dominate fronts of Marlborough Square flats. They are generally poor, so I recommend removing, creating bigger planting pits or strips, and new trees planted.
- Silver maple T35 is too large to safely retain over new footway and close to new flats.

## **5.7 Subsidence/heave & root growth.**

5.7.1 Subsoil and upper geology are most-likely fine-textured with volume-change potential. But upper layers are likely to be man-modified or fill.

5.7.2 These must be assessed by an engineer. Structures near trees will need foundations designing according to NHBC Chapter 4.2, or equivalent guidance.

## **5.8 Amenity impact.**

5.8.1 Amenity can be *visual landscape, functional landscape, habitat or heritage/historic.*

- The proposed development completely re-models the site.
- But the majority of site trees are Raywood ash, which seldom survive to maturity: typically splitting apart, or succumbing to ash dieback disease.
- Extensive new tree planting and soft landscape is desirable to enhance the town-centre location.

## **6. Arboricultural Method Statement in sequential order for proposed re-development at Calthorpe Street site.**

### **6.1 Supervision**

6.1.1 We would recommend the following arboriculturist supervision on this site:-

- A **pre-start site meeting** between architect, building / groundwork contractor, Council Tree/Landscape Officer, and retained arboriculturist to agree tree protection and working methods.
- **Check that site management has approved tree protection report and plans, and copies are available on site.**
- **Check installation of protection fencing.**
- **Check installation of temporary ground protection.**
- **Direct arboricultural supervision of all demolition and hard landscaping within 11m of lime T37 and maple T36.**
- **Direct arboricultural supervision of root severing by T36 & T37, and by group T40-SG43.**

6.1.2 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.

### **6.2 Tree Management**

6.2.1 Tree Work prior to ground work:-

Table overleaf.....

6.2.2 Treework informatives, included for general information:-

#### 6.2.2.1 Disturbance to wildlife.

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.

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

#### 6.2.2.2 Permission

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.

Therefore, a contractor must satisfy himself that all necessary permissions from the local planning authority or tree owners are in place before touching trees.

A Felling Licence may be needed to clear non-domestic areas.

#### 6.2.2.3 Quality of Tree Work

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.

(Stumps can be left to shoot again, ground out, or grubbed out, or poisoned, depending on location.)

6.2.3 Treework for development at Calthorpe Street site:-

No	Species	RPA radius m.	Work for landscape / tree health.	<u>ADDITIONAL WORK FOR DEVELOPMENT</u>	
				<u>Specification.</u>	<u>Reason for additional work for development.</u>
SG1	Cherry laurels & viburnums	2.0	Prune hard.	<u>Prune back hard. Remove central section as required.</u>	<u>Tight to new footway.</u>
T2	Kashmir birch	3.6	Remove ring of ivy from ground level up to head height. Prune off building every 3 years.		
T3	Kashmir birch	3.5	Remove ring of ivy from ground level up to head height. Prune off building every 3 years.		
T4	Kashmir birch	3.0	Remove ring of ivy from ground level up to head height. Prune off building every 3 years.		
T5	Ash	4.2	Prune off building every 3 years.		
T6	Ash	1.8	Prune off building every 3 years.		
T7-T9	Field maple	2.4			
G10	Sycamore and ash x 10	4.8	Prune off building every 3 years.	<u>Crown reduce down to 12m and shape in sides. Repeat five yearly. **</u>	<u>To reduce shading of new flats.  **Needs owner's permission.</u>
T11	Yew	7.2			
T12	Holly	3.6			
T13	Wellingtonia	15.0			
T14	Holly	4.2			



T15	Leyland cypress	3.6			
G16	Mixed	7.8			
SG17	Cherry laurel	2.0	Prune hard.	<u>Remove.</u>	<u>Not needed in new rear gardens.</u>
G18 - T19	Golden yews	4.8	Recommend remove ring of ivy from ground level up to head height on T19.		
SG20	Mixed shrubs	1.2	Prune.	<u>Remove.</u>	<u>Not needed in new rear gardens.</u>
T21	Sycamore	4.2			
T22	Leyland cypress	7.0	Suggest remove soon.		
T23	Hawthorn	2.6			
T24	Wild cherry	6.7			
T25	Wild cherry	4.8			
T26	Wild cherry	4.4			
T27	Wild cherry	4.2			
T28	Lime	4.6	Prune off basal shoots annually.		
T29	Lime	4.4	Prune off basal shoots annually.		
T30 - T32	Evergreen oaks x 3	6.0	Remove two leaning stems off T32.	<u>Remove.</u>	<u>New access road.</u>
G33	Mixed	4.8	May be too many trees to reach bigger size, consider thinning out ash.	<u>Remove.</u>	<u>New access road.</u>
T34	Sycamore	4.2			

T35	Silver maple	8.4	If they start shedding branches, crown reduce.	<u>Remove.</u>	<u>Close to new path.</u>
T36	Silver maple	4.8	If they start shedding branches, crown reduce.		
T37	Lime	10.8		<u>Possible crown reduction to be agreed. **</u>	<u>If rootzone impact is significant. ** Needs owner's permission.</u>
SG38	Mixed woody shrubs	1.2	Trim annually. Fell and herbicide-treat stump to kill ash and bramble.	<u>Remove.</u>	<u>In development.</u>
T39	Raywood ash	5.4		<u>Remove.</u>	<u>In development.</u>
T40	Rowan	2.9	Remove ring of ivy from ground level up to head height ASAP!		
T41	Silver maple	2.6		<u>Prune back / crown lift as required over new footway.</u>	<u>New footway.</u>
T42	Silver maple	3.6		<u>Prune back / crown lift as required over new footway.</u>	<u>New footway.</u>
SG43	Mixed woody shrubs	1.2		<u>Prune back / crown lift as required over new footway.</u>	<u>New footway.</u>
T44, T45	Kashmir birch	1.8		<u>Remove.</u>	<u>In development.</u>
S46	Tree cotoneaster	3.0	Prune hard.	<u>Remove.</u>	<u>In development.</u>
T47, T48	Raywood ash	3.6	Remove basal grills.	<u>Remove.</u>	<u>Too close to development.</u>
T49	Raywood ash	2.4		<u>Remove.</u>	<u>Too close to development.</u>

T50	Raywood ash	2.4		<u>Remove.</u>	<u>Too close to development.</u>
T51	Raywood ash	4.4	Crown lift above footway and road.	<u>Remove.</u>	<u>Too close to development.</u>
T52	Kashmir birch	3.0		<u>Remove.</u>	<u>In development.</u>
SG53	Mixed wood shrubs	1.2	Fell and herbicide-treat stump to kill buddleia and tree saplings.	<u>Remove.</u>	<u>In development.</u>
T54 - T65	Raywood ash (RA)		Prune off ugly stubs and any deadwood. Remove all metal grills. Replace by cobbles or resin-bound rubber chips.	<u>Remove.</u>	<u>In development.</u>
T54	RA	3.1		<u>Remove.</u>	<u>In development.</u>
T55	RA	2.2		<u>Remove.</u>	<u>In development.</u>
T56	RA	4.2		<u>Remove.</u>	<u>In development.</u>
T57	RA	2.2		<u>Remove.</u>	<u>In development.</u>
T58	RA	3.6		<u>Remove.</u>	<u>In development.</u>
T59	RA	3.0		<u>Remove.</u>	<u>In development.</u>
T60	RA	2.9		<u>Remove.</u>	<u>In development.</u>
T61	RA	4.4		<u>Remove.</u>	<u>In development.</u>
T62	RA	4.6		<u>Remove.</u>	<u>In development.</u>
T63	RA	3.8		<u>Remove.</u>	<u>In development.</u>
T64	RA	4.8		<u>Remove.</u>	<u>In development.</u>
T65	RA	5.3		<u>Remove.</u>	<u>In development.</u>
T66, T67	Sycamore	1.8		<u>Remove.</u>	<u>In development.</u>

SG68	Mixed shrubs	0.6	Trim annually.	<u>Remove.</u>	<u>In development.</u>
G69	Mixed	2.4	Fell and herbicide-treat stump to kill all ash and sycamores. Cut ivy off rowans.	<u>Remove.</u>	<u>In development.</u>
SG70	Mixed shrubs	1.2			
T71	Raywood ash	2.9	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>
T72	Raywood ash	3.5	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>
T73	Raywood ash	5.5	Heavily prune to remove dead, or fell and replant whitebeam.	<u>Remove.</u>	<u>Too close to development.</u>
T74	Raywood ash	2.4	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>
T75	Raywood ash	3.7	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>
T76	Raywood ash	4.7	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>
T77	Raywood ash	3.6	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>
T78	Raywood ash	4.3	Remove grill. Replace by bonded rubber crumb. Crown lift above double-decker buses.	<u>Remove.</u>	<u>Too close to development.</u>

End of table.

(Treework following development see 6.10 below.)



## **6.3 Tree Protection**

### **6.3.1 Requirement**

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. Here tree protection is proposed for retained trees, and for areas of possible new planting where this is feasible: called **landscape protection zones**.

### **6.3.2 Vertical Tree Protection**

6.3.2.1 Tree Protection fencing **locations** are shown on Tree Retention & Protection Plan (TRP) in Appendices.

6.3.2.2 Two **specifications** for suitable protective fencing are suggested in BS5837. **Standard fencing is required on this site. Specification is given in Appendix III.**

6.3.2.3 Within the fenced off **CEZ** Construction Exclusion Zone: there must be:-

- no construction access,
- no storage of materials, including soil,
- no ground disturbance.

6.3.2.4 Fencing to remain until all demolition, construction and hard landscaping work is completed, and removed only for final soft landscaping.

### **6.3.3 Temporary Ground Protection (TGP) within RPAs:-**

6.3.3.1 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 retained arboriculturalist.

Within such zones, temporary horizontal ground protection plus temporary fencing would be essential.

**TGP is needed on current proposal north of T11-G16.**

Obvious 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 mulch, as shown in Appendix IV.

-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).

## **6.4 Construction Access.**

### **6.4.1 General points:-**

- No restrictions once demolition starts.
- All retained trees and hedges need protection.
- No pedestrian, vehicle, plant or machinery to enter RPAs without temporary ground protection, as detailed in para 6.3.3 above.

6.4.2 Site huts could be placed within RPA of trees and hedges; provided they stand elevated on stilt feet, no excavation is required for temporary services, and pedestrian and vehicle access is ground protected as detailed in 6.3.3 above.

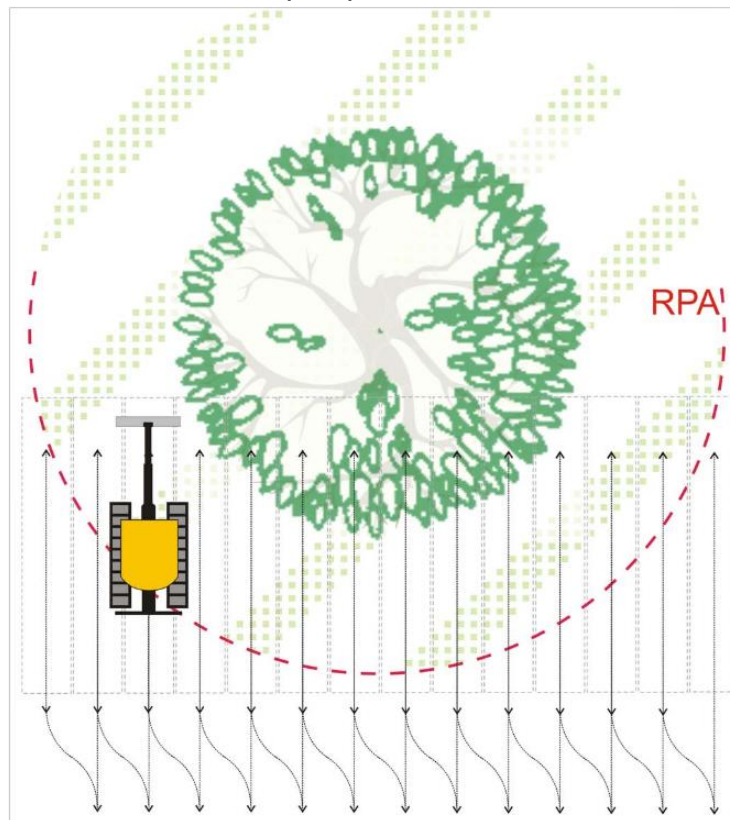
## **6.5 Demolition / Excavation within RPAs:-**

6.5.1 Specification to demolish existing surfacing anywhere near trees.

Definitely required by T36 & T37, and possibly other locations.

Method below....

- Parallel tracking with slewing outside the RPA:-
- Use maximum 3-tonne rubber-tracked mini-digger with toothed bucket.
- **Stand machine on existing hard surfacing.**
- **Scrape off only asphalt, turf or loose layer to 100mm max. depth.**
- **Retain deeper hardcore because it may contain roots.**
- **If underlying hardcore is compacted, spike and agitate at 0.5m intervals to aerate.**
- Slew outside RPA.
- Heap spoil outside RPA, for dumper to collect and run outside RPA.
- Replace with new soil to landscape specification or new hard surfacing.



## **6.6 Foundations within RPAs:-**

6.6.1 No special measures needed to protect trees.

## **6.7 Drainage.**

We are unaware of a drainage design, and assume existing drainage will be connected, but general tree protection principles must be followed:

- 6.7.1 Storm-water drainage: Any soak-away system must be designed to avoid significant increase and no decrease of ground water in trees' rooting zones. Divert into soakaways outside RPAs, or store for greywater recycling.
- 6.7.2 Foul Drainage: Keep out of RPAs. Link to existing wherever possible.
- 6.7.3 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 landscaped or parking areas.

## **6.8 Service Trenches within RPAs.**

- 6.8.1 We are unaware of proposed services, but service trenches (electric lights, utilities, telecoms, drains etc) must be **designed** to run as far from trees as possible.
- 6.8.2 Trenches **within RPAs should be avoided**. But if there is no other option:-
- 6.8.3 Any trenching within an RPA ideally uses a **trenchless boring** system.
- 6.8.4 Otherwise use onerous **hand digging** method:-
- If soil is coarse-textured and friable use an air-spade to reveal roots (Appendix VI).
  - No roots >25mm diameter or bundles of smaller roots must be exposed or severed without express written permission of local authority tree officer or retained arboriculturist.
  - Retain roots >25mm diameter or bundles of smaller roots within service trenches. Thread service pipe underneath.
  - Any root pruning must use a sharp saw or loppers, and not ripped by digger bucket.
  - Any excavation within the RPA of a tree must be covered immediately after digging with damp hessian, topped by tarpaulin & plyboard, to prevent root desiccation.
  - Hole must be backfilled within five days of opening.
  - Wrap exposed roots >20mm or bundles of smaller roots with hessian, and surround by 50mm depth sand, as part of backfill medium.
  - Tamp backfill material by hand thumper or whacker plate only.

## **6.9 Minimal-dig construction for new access drives, parking & paths**

- 6.9.1 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.  
Minimal-dig construction:- If within a tree's RPA.
- 6.9.2 Kerbing for footways by T36 & T37 and T40-SG43:
- Work under direct arboriculturist supervision.
  - Dig towards kerblines.
  - Dig last 0.3m horizontal by machine & by hand, severing all roots >10mm diam. by handsaw or loppers as they are exposed, to avoid ripping.
  - Cover tree side of trench immediately with damp hessian and sheet material to prevent desiccation and slumping.
  - Install kerbing and backfill on tree side with soil within two weeks of opening ground within RPA.
- 6.9.3 Appendix V gives examples of materials for minimal-dig, porous, build-up. I cannot identify any areas where it is needed on this project.

## 6.10 Tree work following construction.

- 6.10.1 Trees should be re-inspected at completion of construction and hard landscaping. 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.
- 6.10.2 All additional work subject to further local authority agreement if trees are protected by planning conditions, TPO, or location within a Conservation Area.

## 6.11 New Planting.

- 6.11.1 The site contains some trees retained on or outside perimeter boundaries.  
**Extensive new planting is needed: see landscaping proposals.**
- 6.11.2 A useful web-based guide: *Tree Species Selection for Green Infrastructure – A guide for specifiers by Dr Andrew Hiron & Dr Henrik Sjomon Issue 1.3 of 2019*, advises on tree selection and size.  
 Any planting and maintenance must comply with: **BS 8545 “Trees: from nursery to independence in the landscape – Recommendations”**. BSI 2014.
- 6.11.3 Any planting must be provided with adequate long-term soil-moisture.  
 To remind architects and engineers, we reproduce below, Stockholm Tree Pits’ ([www.stockholmtreepits.co.uk](http://www.stockholmtreepits.co.uk)) table of root volumes for a given final size of tree:

Table 1: Minimum requirements for tree pit specifications.

	Mature Size of Tree**				
	Very Small (<5m)	Small (5-10m)	Medium (10-15m)	Large (15-25m)	Massive (>25m)
Recommended minimum volume of uncompacted loam soil	<b>6m<sup>3</sup></b> (5m <sup>3</sup> if shared)	<b>12m<sup>3</sup></b> (9.5m <sup>3</sup> if shared)	<b>20m<sup>3</sup></b> (16m <sup>3</sup> if shared)	<b>28m<sup>3</sup></b> (24m <sup>3</sup> if shared)	<b>36m<sup>3</sup></b> (30m <sup>3</sup> if shared)
Recommended minimum volume of stone-based structural soil	<b>8m<sup>3</sup></b> (6m <sup>3</sup> if shared)	<b>15m<sup>3</sup></b> (12m <sup>3</sup> if shared)	<b>26m<sup>3</sup></b> (20m <sup>3</sup> if shared)	<b>36m<sup>3</sup></b> (28m <sup>3</sup> if shared)	<b>45m<sup>3</sup></b> (35m <sup>3</sup> if shared)
Recommended number of air/water inlets†	<b>1</b> (0.5 if shared)	<b>1</b> (0.5 if shared)	<b>1</b>	<b>2</b> (1.5 if shared)	<b>2</b>

*\*Fastigate trees will require less rooting space than trees with wide canopy shapes. As a rule of thumb, one should assume that a tree with a narrow and columnar crown form would require half as much soil volume as a tree of the same height that has a wide crown.*

*†Ideally the surface of the tree pit should be open, rough in texture, and protected from compaction. If there is hard surfacing above the tree pit designers must provide pathways for water ingress and gaseous exchange. This could be provided by a permeable surface over the whole of the tree pit or by using a non-permeable surface with specially designed inlets. Suitable inlets would be substantially larger than an irrigation tube and service the whole of the tree pit.*

Author:



**B J Unwin Forestry Consultancy.**

**References:**

- "The Body Language of Trees"*. Claus Mattheck and Helge Breloer. HMSO 1994.
- "Principles of Tree Hazard Assessment and Management"*. David Lonsdale. HMSO 1999.
- BS 3998: 2010 *"British Standard Recommendations for Treework"*.
- BS 5837: 2012 *"Trees in Relation to Design, Demolition & Construction"*.
- BS 8545 *"Trees: from nursery to independence in the landscape – Recommendations"*. BSI 2014.
- NJUG Volume 4 2007 *"Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees"*. NJUG, 30 Millbank, London, SW1P 4RD.
- "Trees and Development"*. Nelda Matheny and James R Clark. ISA. 1998.
- BS 8206:1992 *"Lighting for buildings"*.
- BRE guide 209 (2002) *"Site Layout planning for daylight and sunlight"*.
- NHBC Chapter 4.2, *Building Near Trees*. National House Building Council, 2021.
- "Tree Roots in the Built Environment"*. J Roberts, N Jackson & M Smith. R.A.T.8, TSO (The Stationary Office), London, 2006.
- "Tree Species Selection for Green Infrastructure – A guide for specifiers"* Dr Andrew Hirons & Dr Henrik Sjomann Issue 1.3 2019.
- "Treework at Height"* Industry Code of Practice. Arboricultural Association. 2020.
- "The use of Cellular Confinement Systems near Trees"*. Practice Guidance Note 12. Arb Association. Sept 2020.

**Appendix I**

**BS 5837 section 4.5 Tree Categorisation Method.**

**Table 1 overleaf:**



Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)	Identification on plan			
<b>Trees unsuitable for retention</b> (see Note)					
<p><b>Category U</b> 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</p>	<ul style="list-style-type: none"> <li>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)</li> <li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li> <li>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</li> </ul>	See Table 2			
<i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="566 1330 595 1731" style="width: 33%;">1 Mainly arboricultural qualities</th> <th data-bbox="566 853 595 1211">2 Mainly landscape qualities</th> <th data-bbox="566 320 627 651">3 Mainly cultural values, including conservation</th> </tr> </thead> </table>			1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation
1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation			
<b>Trees to be considered for retention</b>					
<p><b>Category A</b> <b>Trees of high quality</b> with an estimated remaining life expectancy of at least 40 years</p>	<p>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)</p>	<p>Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)</p>			
<p><b>Category B</b> <b>Trees of moderate quality</b> with an estimated remaining life expectancy of at least 20 years</p>	<p>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</p>	<p>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</p>			
<p><b>Category C</b> <b>Trees of low quality</b> with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm</p>	<p>Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories</p>	<p>Trees with material conservation or other cultural value</p>			
See Table 2					



## Appendix II

Site location.







Google Earth aerial.  
Taken 2021.



Imagery Date: 4/22/2021 52°03'31.30" N 1°20'07"

Appendix III

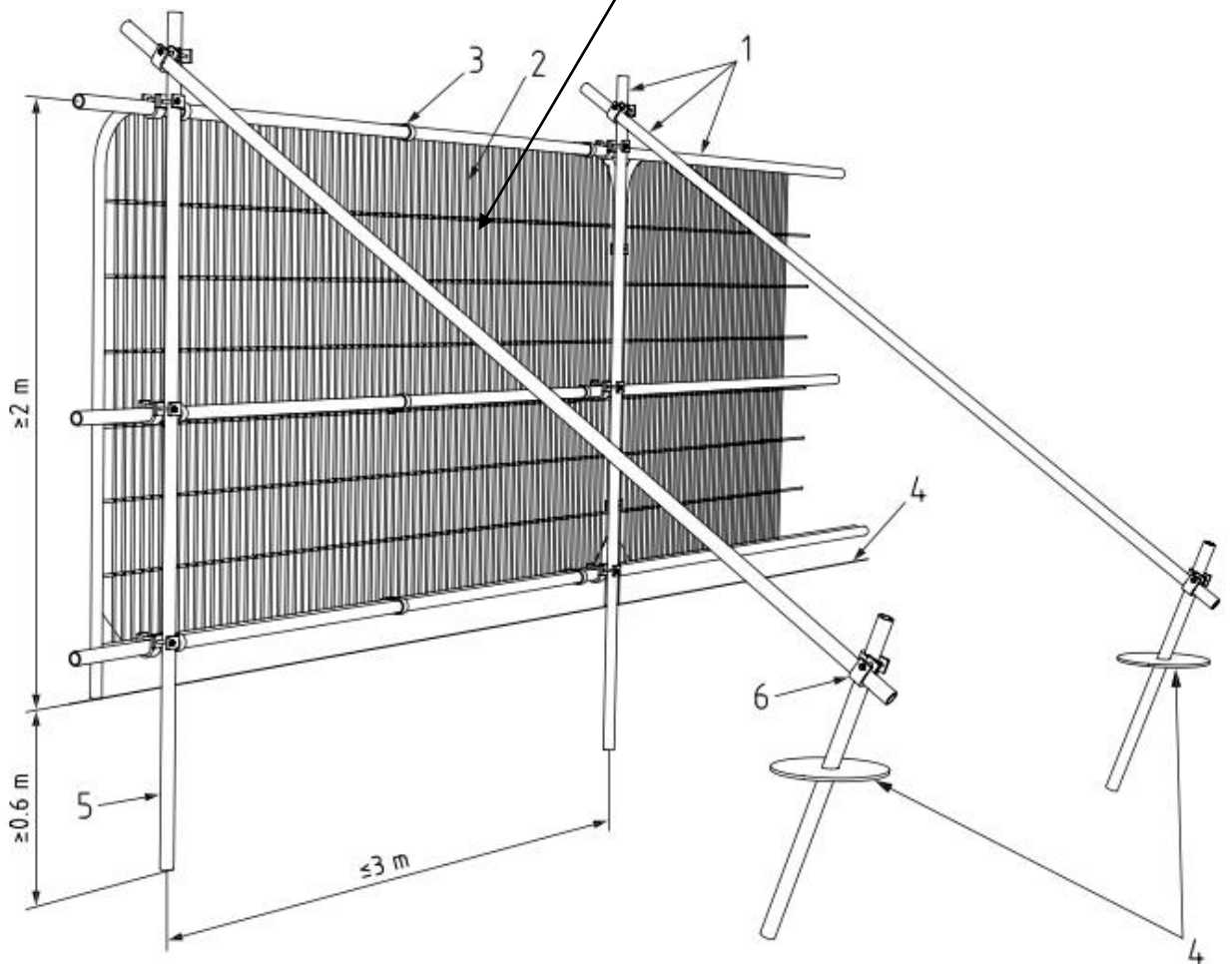
**Vertical Tree Protection Fencing, from BS5837.**

**Vertical protective fence: location on plan:**

**Default in situ > 3 months:-**

Apply signs at MAX 20m spacing:

**TREE PROTECTION -  
Construction Exclusion  
Zone.  
NO ACCESS**



**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



## Appendix IV

# Horizontal Ground Protection x 2 examples

Example of aluminium temporary ground protection.

### EVE TRAKWAY



#### Roadways - Medium Duty Trakpanel

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.

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.

The following Roadways are available.

Please select an item to view more information:

**Other Roadways products:-**

Heavy Duty Trakpanel-  
LD20-

Roadway Ramps-

Multi-Directional Trakpanel



## 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 V

### Two Examples of 3-dimensional cellular confinement build up for minimal-dig roading or parking.

Cellweb® TRP is a 3D cellular confinement tree root protection system. The system provides a ‘no dig’ solution for the construction of new hard surfaces within root protection areas (RPAs). Cellweb® TRP has been designed and independently tested to comply with recommendations made in Arboricultural Practice Note 12 and BS 5837 2012 – Trees in relation to design, demolition and construction.



#### Cellweb® TRP Key Functions

Cellweb® is a ‘no dig’ solution which is constructed directly on the existing ground surface. This eliminates the requirement for excavation, preventing root severance.

Cellweb® is a completely porous system allowing continued water permeation and gas exchange between the rooting environment and atmosphere.

Cellweb® spreads point loads, minimising increases in soil compaction within the rooting environment. This maintains an open graded soil structure allowing continued root growth, water, gas and nutrient migration.

#### The Cellweb® TRP system comprises the following three components

**Treetex™ Geotextile.** Following minimal ground preparation the Treetex™ is laid onto the existing ground and top soil. This acts as a separation layer, separating the system above from the soil and rooting environment below. Treetex™ performs as a hydrocarbon pollution control measure in accordance with BS5837, holding 1.7lt of oil per square meter.

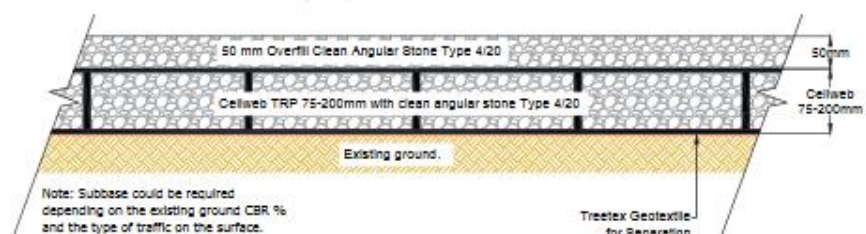
**Cellweb® 3D Cellular Confinement.** The Cellweb® is installed on top of the Treetex™ layer. This is fixed to the ground using ten steel J pins per panel. The panels can be cut to the required shape and adjoining panels can be connected using heavy duty staples or cell ties.

**4-20mm Clean Angular Stone.** The expanded Cellweb® is infilled with a 4-20mm clean angular stone. The confined angular stone locks together to produce a rigid stone mattress, while maintaining air pockets for continued water permeation and gas exchange. The low fines content of the stone prevents the Treetex™ layer from becoming blocked over time.

#### Which depth of Cellweb® TRP?

The Cellweb® System is provided in four different depths; 200mm, 150mm, 100mm and 75mm. The depth required is determined by the proposed traffic loadings and the site ground conditions. Geosynthetics in house engineering department can provide a free site specific technical recommendation. For free technical and engineering support please contact Geosynthetics Ltd 01455 617139 or the full installation guide can be found on our website [www.geosyn.co.uk](http://www.geosyn.co.uk).

#### Indicative Cellweb with overfill



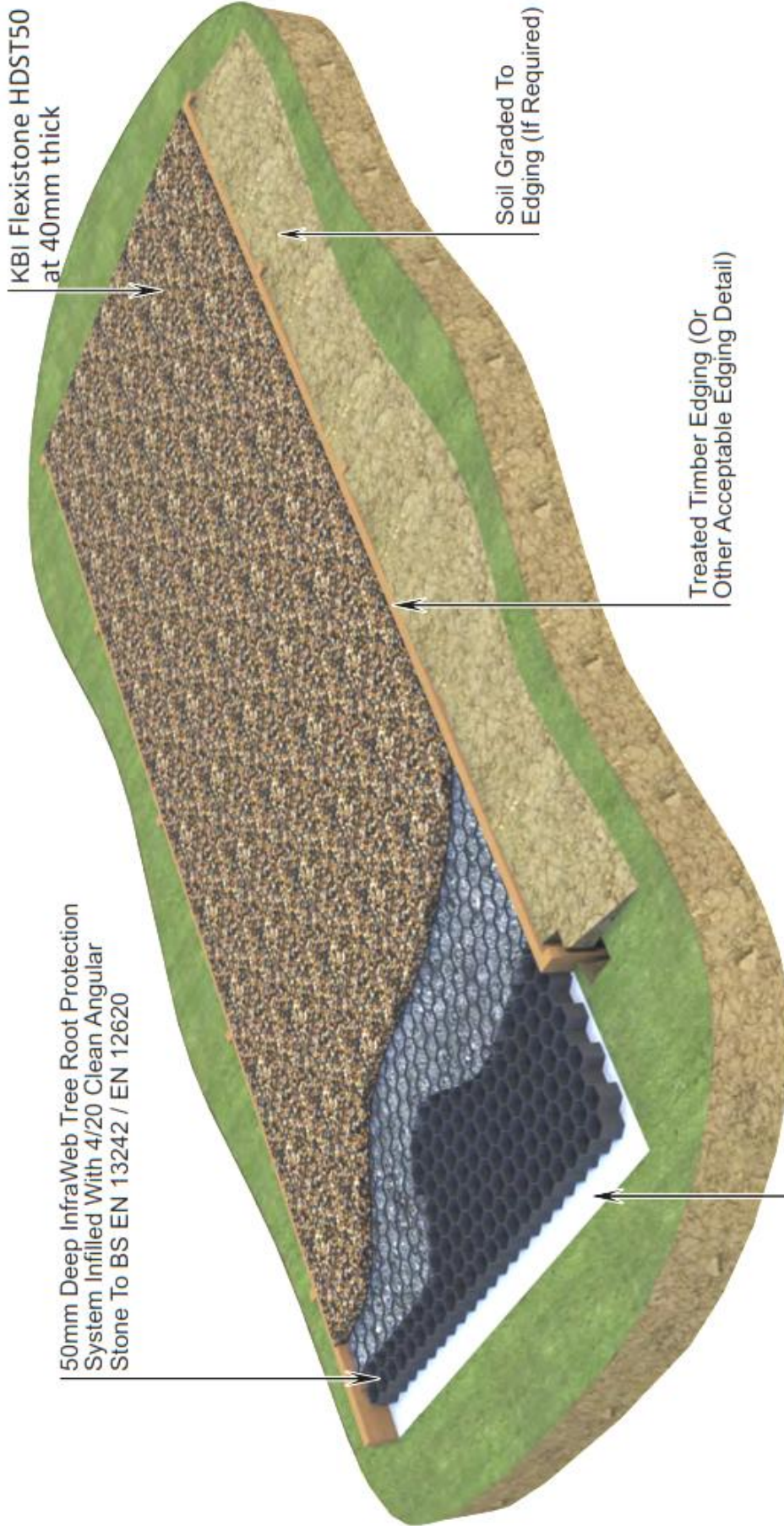
Web: [www.geosyn.co.uk](http://www.geosyn.co.uk) | Tel: 01455 617139  
 Fax: 01455 617140 | Email: [Sales@geosyn.co.uk](mailto:Sales@geosyn.co.uk)



**Geosynthetics**  
 Engineered Solutions



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



50mm Deep InfraWeb Tree Root Protection System Infiltrated With 4/20 Clean Angular Stone To BS EN 13242 / EN 12620

KBI Flexistone HDST50 at 40mm thick

Soil Graded To Edging (If Required)

Treated Timber Edging (Or Other Acceptable Edging Detail)

ArborTex Geotextile



KBI  
Longfields Court  
Middlewoods Way  
Wharfedale Business Park  
Barnsley  
South Yorkshire  
S71 3GN  
+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

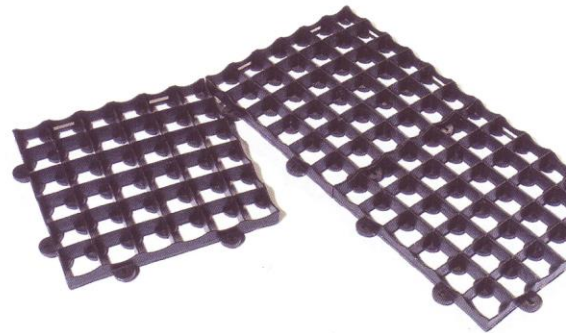
**Trays for strengthening gravelled or grassed areas.  
Or for surfacing porous, minimal-dig, build-up.**

# DuoBlock

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

**NEXT DAY  
DELIVERY**  
from stock



## Appendix VI

# 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/S<sup>2</sup>

Y axis = 0.0M/S<sup>2</sup>

Z axis = 0.0M/S<sup>2</sup>

*Hand/arm vibration* = 0.0M/S<sup>2</sup>

### 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*



- Non-Conducting Barrel**  
Independently certified safe for 100,000 Volts/12" Barrel
- Large Deflector**  
protects operator from scatter of dirt and debris
- Non-Sparking Nozzle**  
allows safe use around leaking gas lines
- Polymer Trigger**  
reduces operator fatigue
- Unlike the Competition,**  
the Soil Pick maintains a cool temperature
- Pressure Gauges**  
ensure maximum performance

**MBW UK Ltd.**  
Units 2 & 3 Cochrane Street • Bolton BL3 6BN • England UK  
Ph: 44 (0) 1204 387784 • Fax: 44 (0) 1204 387797  
E-mail: mbwuk@btinternet.com • Website: www.mbw.com

 1-800-878-5287



## Appendix VII

### - B J UNWIN FORESTRY CONSULTANCY Ltd. -

Head office: **Parsonage Farm, Longdon, Tewkesbury, Gloucestershire. GL20 6BD.**

Tel / Fax: 01684 833538. Home Tel: 01684 833795. Mob: 07860376527. E-mail: [Jim@bjunwin.co.uk](mailto:Jim@bjunwin.co.uk)

Satellite Offices: - Haley Ridge, Highcliffe, **Nr. Wadebridge, Cornwall**, PL27 6TN.

-105 Charfield Court, 2 Shirland Road, **London**, W9 2JR.

Associate office: - 1 Market Place Mews, **Henley-on-Thames, Oxfordshire**, RG9 2AH.

Principal: **Jim Unwin BScFor, MICFor, FArborA, CEnv.**

**Chartered Forester - ICF Registered Consultant - Fellow of the Arboricultural Association - Chartered Environmentalist.**

<b>From:</b>	<b>Jim Unwin</b>	<b>To:</b>	<b>Prospective Client</b>
<b>Date:</b>	<b>April 23</b>	<b>No. of pages:</b>	<b>2</b>
<b>Subject:</b>	<b>Professional CV</b>		

Below are set out **B J Unwin Forestry Consultancy's** competences and experience.

**Insurance:-**

**£5m Public Liability & £2m Professional Indemnity (renewed June).**

**Personnel:-**

B J Unwin (born 1956) started his forestry career as a tree surgeon and landscape contractor in 1975. He studied forestry at Aberdeen University from 1977 to 1981, 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.

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.

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

For tree decay testing we have a **PICUS II ULTRASOUND** tomograph with electronic callipers and **RESISTOGRAPH-R400** micro-drill.

He works with two self-employed arboriculturalists of >40 years' combined experience:-

**Jasper Fulford-Dobson** Arboricultural Association Registered Consultant - Associate Member of the Institute of Chartered Foresters - Professional member of the International Society of Arboriculture - Technicians Certificate (ArborA) 2005, now regarded as NQF "level 4" - Professional Tree Inspection Certificate (LANTRA) 2013,

**Owen Hutchison** BSc(Hons) Agriculture & Estate Management, Level 4 Diploma Arboriculture, LANTRA Professional Tree Inspection & working with trees since 2007.

Plus a secretary/ plan technician; calling in extra help as required (eg ecologist or arboricultural assistant). On bigger projects he regularly works as a part of a multi-disciplinary team.

Current BJUFC qualifications are:-

BSc Forestry Hons 1<sup>st</sup> Class, Aberdeen 1981.

**Chartered Forester No. 0330064, 1986.**

**Fellow of the Arboricultural Association, 1995.**

Licensed Subsidence Risk Assessor, 1997-2001 (scheme closed in 2001).

Completed Training in September 2002 to Prepare Native Woodland Plans for CCW and FC in Wales.

**Arboricultural Association Registered Consultant No. 42, from 2004 to May 2021.**

LANTRA certificate for Arboriculture and Bats, BJU in 2005.

Examined and approved to submit Welsh WGS as Management Planner and PAWS Assessor, 2006.

Joined Utilities Vendor DataBase, Supplier No: 88101 in Feb 2006 (left 2010).

Training and Certification in basic CAD operation 2006.

**Chartered Environmentalist April 2008.**

Woodfuel Production and Supply : LANTRA Certificate of Training Dec 2008.

Training in CAVAT amenity tree asset valuation October 2010.

**Company Safety Policy:-** We were successfully assessed by Safety Management Advisory Services (SMAS) for many years as meeting CDM Regs 2015 Core Criteria Stage 1, as a **Worksafe Consultant No. 75950.** expired 09/2020. Not renewed.

CITB *Health, Safety & Environment Test for Managers & Professionals* passed 22/01/2015.

First-aid at work June 2013.

DBS Basic Certificate P0003GX9B7C dated 28<sup>th</sup> Nov 2022 Certificate 001100238741.

ROSPA Routine Playground Inspection Certificate valid from 20/10/2022 to 20/10/2025.

Current clients and typical work include:-

English Heritage	Tree safety inspection contract 2007-2013 for East Midlands, East Anglia, London and SE England. Tree safety inspection contract for West of England & Midlands 2008 - 2021.
Planning Inspectorate (PINS) & Dept for Communities and Local Government. 2000-2017.	<b>Arboricultural Inspecting Officer</b> in South-West England, South East England, West Midlands and East Midlands; advising the First Secretary of State on TPO appeals since 2000. Contract with DCLG expired April 2008 when transferred to PINS. Contract continued with PINS, as Non-Salaried <b>Arboricultural Inspector, determining TPO appeals and High Hedge appeals.</b> <b>All non-salaried inspectors released in 2017.</b>
Architects / Developers / Planning Appeals	Complete Tree Constraints, Impact Assessment & Tree Protection advice for planning, working with other professionals to input arboriculture into more complex development schemes. Recent assignments in Liverpool to Cornwall, Kent, Norfolk & London. All using BS5837:2012. FULL CAD CAPABILITY.
Amey Mouchel Ltd	Overseeing Amey Tree Officer on motorway and trunkroad tree inspections throughout Midlands and Marches to 2012. Amey Mouchel are agents for Highways Agency.
CRH Tarmac Ltd, + Midland Quarry Products + Quarryplan (in Northern Ireland).	Since 1990 working with Estates staff, quarry managers and Landscape / ecological consultancies organising and managing contracts for tree and woodland planting both pre- and post- quarrying. Also preparing landscape restoration schemes for straightforward sites plus landscape management on sites throughout southern England, East Anglia and south and south-west Wales. (Commendations for Land Restoration and Environmental improvements from Spelthorne Borough Council 2003.) Also in England & Northern Ireland ongoing tree consultancy for Quarryplan.
Land Agents	Assisting Bruton Knowles clients' with woodland management and other tree issues since 1984. We also assist clients of Fisher German and Savills on a regular basis.
Tarmac Central now CRH Tarmac Ltd.	1988-2018 woodland management of Hopwas Hays Wood, Tamworth.
Rural estates in Herefordshire, Worcestershire and Gloucestershire, plus private woodland owners in southern England and Wales.	Since 1983 woodland management, tree management, hedgerow management. Many are Ancient woodlands and SSSI's requiring detailed ecological management plans produced in consultation with ecologists. About forty Farm Woodland Premium Schemes and about twenty Native Woodland Plans prepared to date in England and Wales. On-going EWGS grant applications. Input into Tir Gofal (and its successor) and Stewardship schemes. Better Woods for Wales (BWW) applications.
British Waterways	Ten-year Tree and Vegetation Management Plans along canals and around reservoirs in London, Hertfordshire, Berkshire, Birmingham, Staffordshire, Worcestershire, Gloucestershire, Shropshire, Llangollen Canal, etc: plus help in dispute with riparian owners. This work ceased around 2011.
Stroud District Council	Management of 49Ha woodland since 1989 on FC schemes plus grassland on DEFRA Stewardship Schemes, including HLS. Retired Nov07.
One-off clients	Since 1983 assisting tree owners, developers, lawyers etc throughout southern or midland Britain, including Wales, on a wide range of tree-related issues including planning, planning appeals, subsidence, health & safety, disputes, vegetation control, expert witness, valuation of woodlands, standing and felled timber, Christmas trees etc, and tree and landscape planting schemes. Recently High Hedge issues and BS5837 are hot topics.
Malvern Hills District Council. South Oxfordshire District Council	BJU Stand-in part-time Consultant Tree Officer Summer 2003. JF-D stand in Consultant Tree Officer summer 2009 to spring 2010.
Golf course & leisure facilities	Assistance with development of Carden Park golf course in Cheshire. Management advice for trees on other golf courses: Eg Ross Golf Club, Swindon Golf Club .
Farm management	Management of own 95Ha farmland since 1985.

Please do not hesitate to ask for further information. B J Unwin END.

## Appendix VIII

Constraints plans :-

- **Tree Plan**

**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.**

and

- **Root Protection Areas Plan**

**RPA = circles.**

**See Tree Table for dimensions.**

and

- **Theoretical Shading Plan**

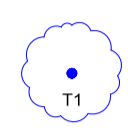
= quadrant of tree height in ten years' time from north west  
(mid-morning) to due east (evening).

This is a shadow pattern for 1 x tree height  
from 10.00-18.00hrs from May to September.

***Insert plans here in paper copy of report:-***




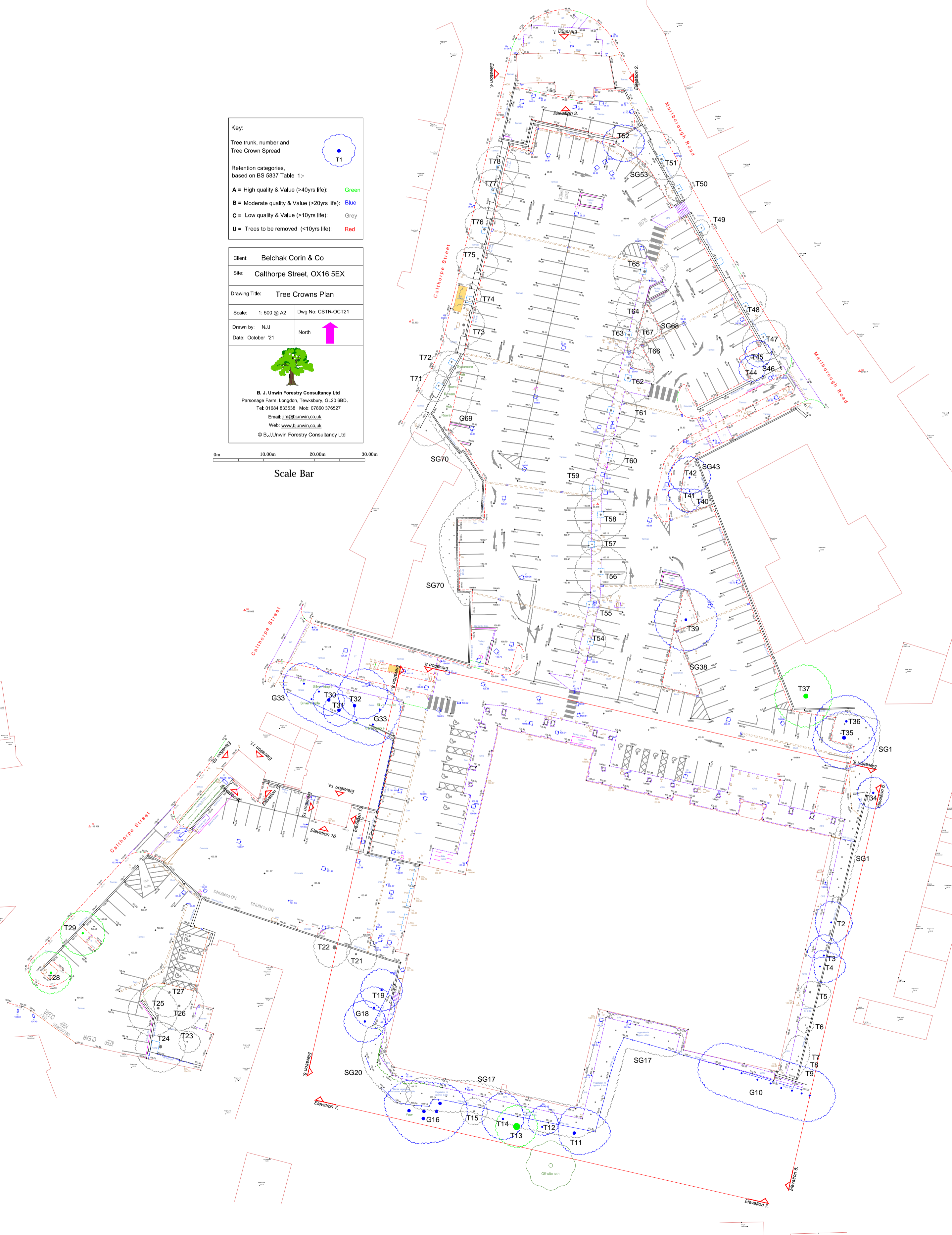
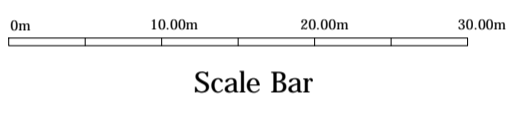
Key:  
 Tree trunk, number and Tree Crown Spread



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

Client:	Belchak Corin & Co
Site:	Calthorpe Street, OX16 5EX
Drawing Title:	Tree Crowns Plan
Scale:	1: 500 @ A2
Dwg No:	CSTR-OCT21
Drawn by:	NJJ
Date:	October '21
	North 
 <b>B. J. Unwin Forestry Consultancy Ltd</b> Parsonage Farm, Longdon, Tewksbury, GL20 6BD. Tel: 01684 833538 Mob: 07860 376527 Email: jim@bjunwin.co.uk Web: www.bjunwin.co.uk © B.J.Unwin Forestry Consultancy Ltd	





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

Client: Belchak Corin & Co


Site: Calthorpe Street, OX16 5EX

Drawing Title: Root Protection Areas Plan

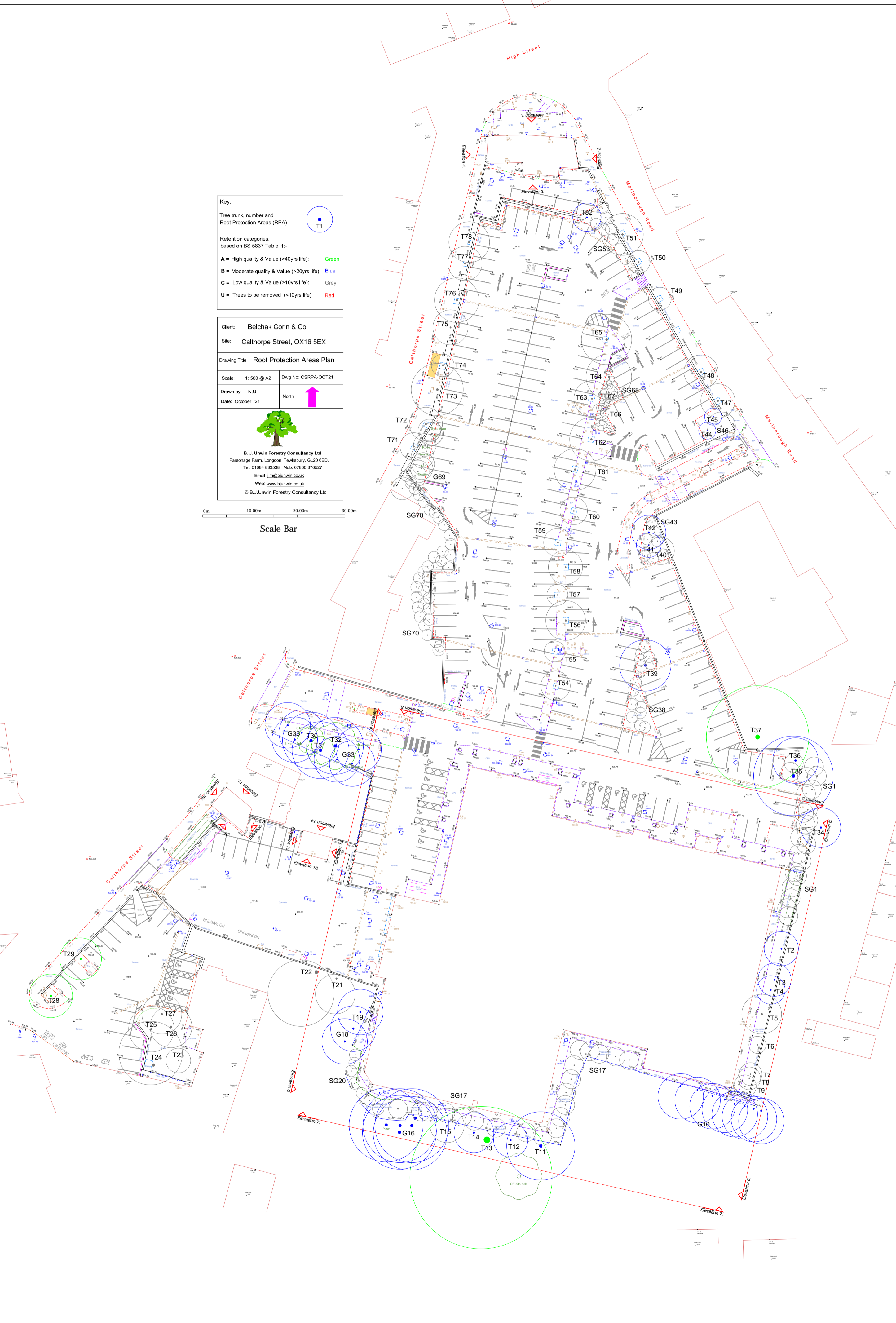
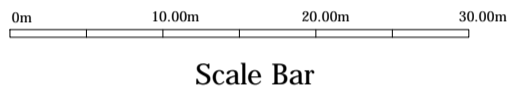
Scale: 1: 500 @ A2 Dwg No: CSRPA-OCT21

Drawn by: NJJ North 

Date: October '21



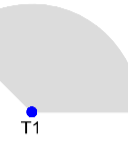
B. J. Unwin Forestry Consultancy Ltd  
Parsonage Farm, Longdon, Tewksbury, GL20 6BD.  
Tel: 01684 833538 Mob: 07860 376527  
Email: jim@bjunwin.co.uk  
Web: www.bjunwin.co.uk  
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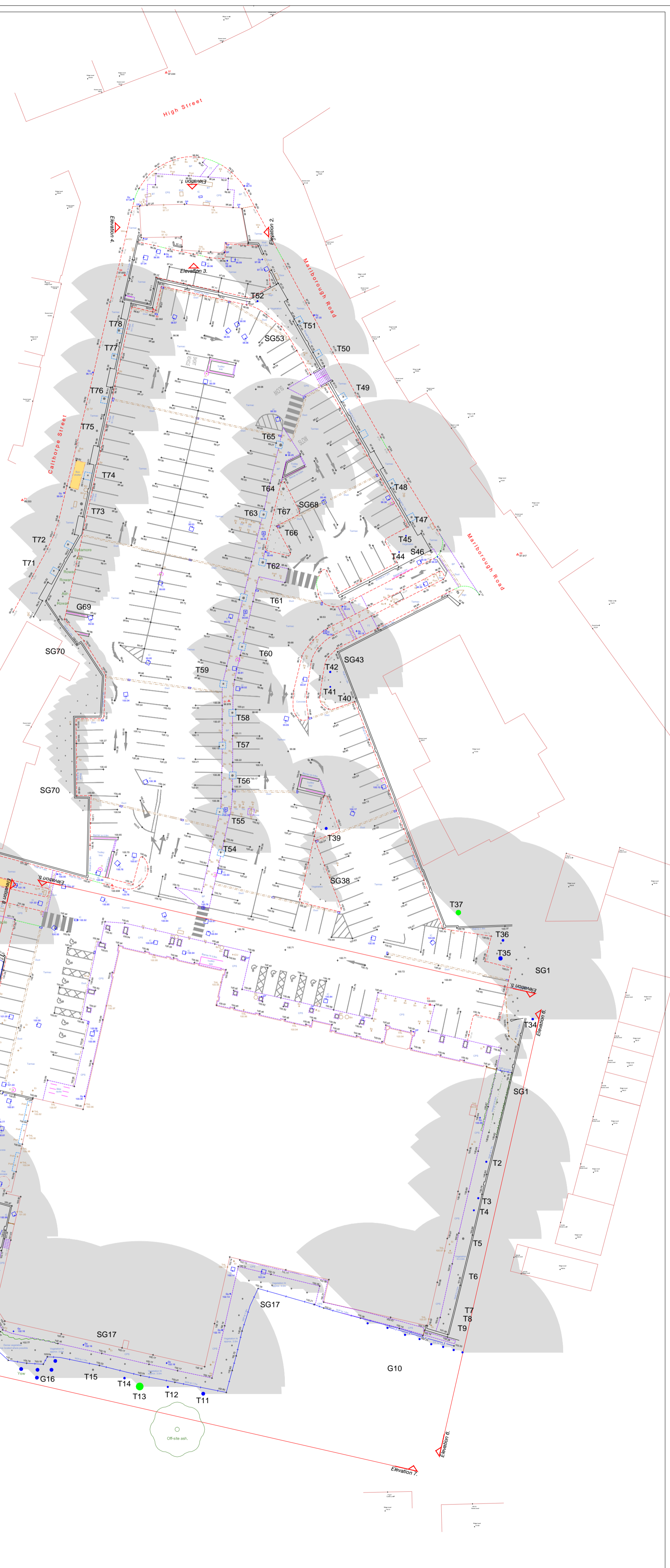
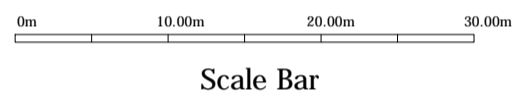
Key:

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.

Client:	Belchak Corin & Co
Site:	Calthorpe Street, OX16 5EX
Drawing Title:	Theoretical Shading Plan
Scale:	1:500 @ A2
Dwg No:	CSSH-OCT21
Drawn by:	NJJ
Date:	October '21
	North 
	
<p>B. J. Unwin Forestry Consultancy Ltd          Parsonage Farm, Longdon, Tewksbury, GL20 6BD.          Tel: 01684 833538 Mob: 07860 376527          Email: jim@bjunwin.co.uk          Web: www.bjunwin.co.uk          © B.J. Unwin Forestry Consultancy Ltd</p>	





## Appendix IX

### Tree retention and Tree Protection Plan.


*Insert plans here in paper copy of report:-*

**Key:**

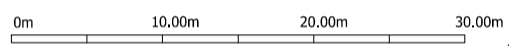
- Tree Protection Fence —
- CEZ = construction exclusion zone —
- Root Protection Areas ○
- Trees removal for safety †
- Trees removed for development †
- Hand sever roots —
- Minimal dig
- Temporary ground protection

Note: New underground services may require changes to this tree retention & protection plan.

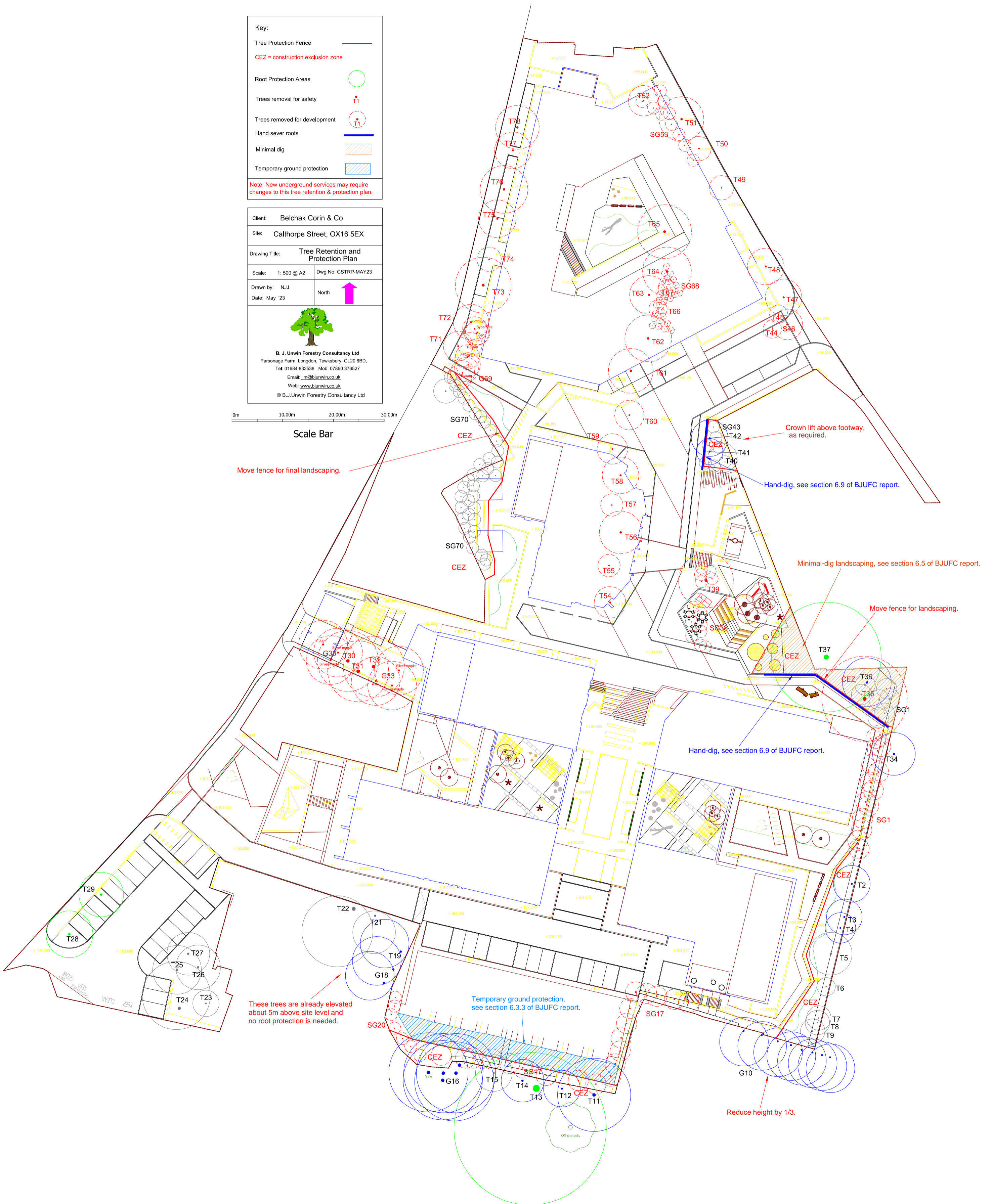
Client: Belchak Corin & Co  
 Site: Calthorpe Street, OX16 5EX  
 Drawing Title: Tree Retention and Protection Plan  
 Scale: 1: 500 @ A2 Dwg No: CSTRP-MAY23  
 Drawn by: NJJ North ↑  
 Date: May '23



B. J. Unwin Forestry Consultancy Ltd  
 Parsonage Farm, Longdon, Tewksbury, GL20 6BD.  
 Tel: 01684 833538 Mob: 07860 376527  
 Email: [jim@bjunwin.co.uk](mailto:jim@bjunwin.co.uk)  
 Web: [www.bjunwin.co.uk](http://www.bjunwin.co.uk)  
 © B.J. Unwin Forestry Consultancy Ltd



Scale Bar



END.