

B. J. UNWIN FORESTRY CONSULTANCY

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Ref: 10th July 2018 - BJU/mmi

To: **Caring Homes**

fao Nicola Thornton

Colchester Head Office
Bradbury House
830 The Crescent
Colchester
Essex CO4 8YQ



Dear Nicola,

Waterbury House, Ford, Arundel, BN18 0BH – BS5837 Tree Constraints, Impact Assessment & Tree Protection Method Statement, for new care home development.

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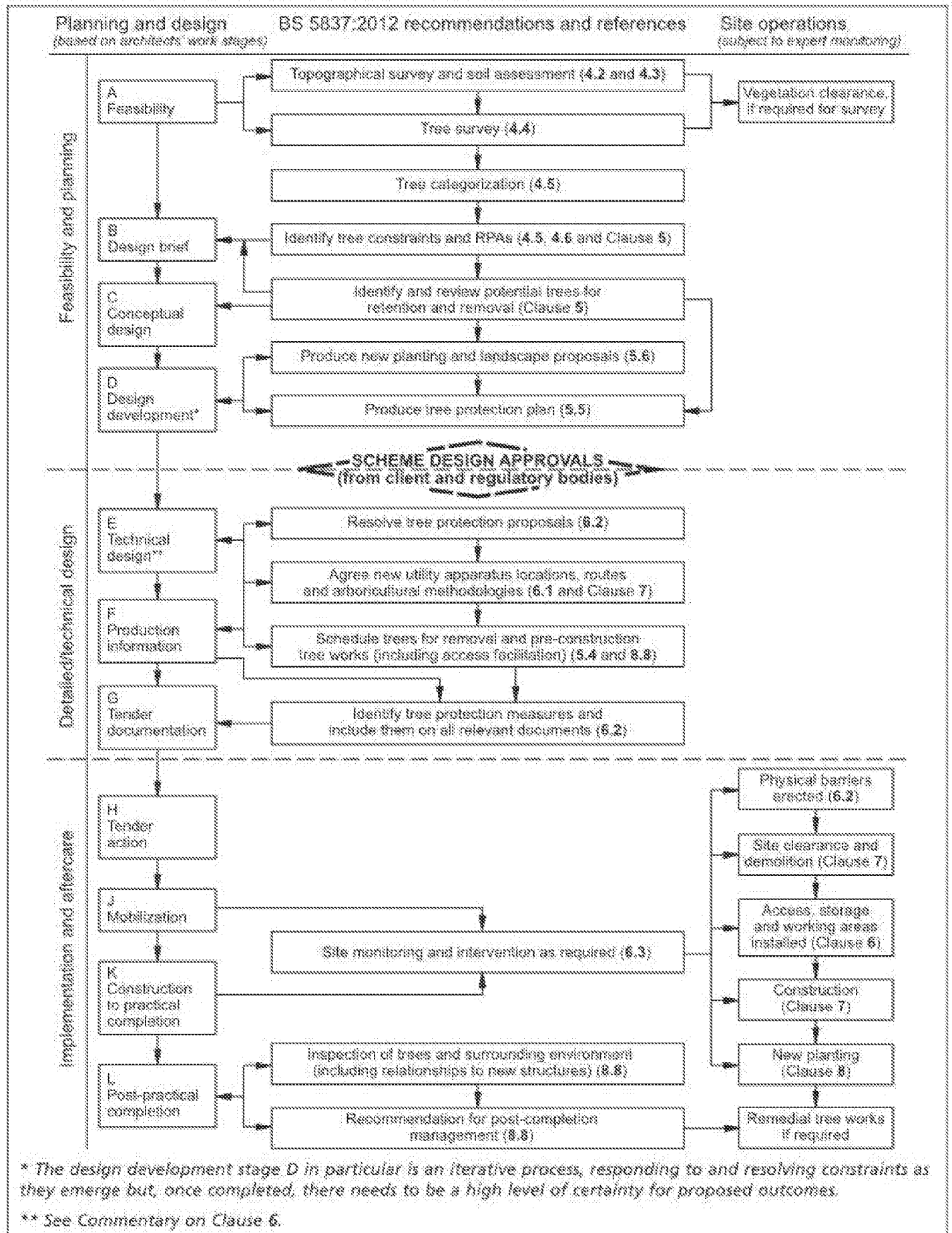
Limitation of Report: The statements made in this Report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire. BJUFC cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in 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.

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Figure 1 The design and construction process and tree care



1. Instruction.

- 1.1 Nicola Thornton has asked B J Unwin Forestry Consultancy to advise on trees at or near Waterbury House for planning application purposes, subject to quote.
- 1.2 The local authority (Arun District Council) require a tree impact assessment and tree protection method statement for the proposal F/10/18/PL. The local authority may require mitigation by new planting for any trees lost as part of any re-development.
- 1.3 We have used an **OS Mastermap base plan** for constraints plans. We added all trees as appropriate. We use **Proposed Site Plan by ADG Architects H-17-37 / 9-4 Rev B of 24/4/18**, which are shown in section 5, to guide our tree retention & protection method statement & Tree Retention & Protection Plan, which will be section 6 of our tree-protection report.
- 1.4 Therefore methodology of the report below follows *BS5837:2012 Trees in Relation to Design, Demolition & Construction*.
- 1.5 BS5837 flowchart previous page. Appendices follow signature page.

2. Inspection.

- 2.1 Jim Unwin visited the property on 27th June 2018, met manager Paul Locking, and made an un-accompanied inspection.
- 2.2 The survey was from ground level, involving visual observation (Visual Tree Assessment: Mattheck and Breloer, 1994 and Lonsdale, 1999). Trees were located by tape or laser from known points. They were measured or estimated for dbh and other dimensions.
- 2.3 The survey and report for this project are by Jim Unwin, who has > 40 years' experience working with trees, (professional-CV attached).

3. The Site.

- 3.1 The site inspected comprises the southern half of the Waterbury site. It is about 86m long by 23m wide. The western end is asphalt parking/yarding. The rest is very-overgrown and scrubby garden land.
- 3.2 The site surveyed is approximately flat with a very slight fall to south east. It is low-lying at 2-3m aod. Boundaries are good timber fence to the north and west, collapsed chainlink to the east, and good but overgrown chainlink to the south.
- 3.3 Solid geology (from BGS data) for the site is:- Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations - Chalk. Sedimentary bedrock formed between 93.9 and 72.1 million years ago during the Cretaceous period.
Superficial deposits: Raised Beach Deposits, 1 - Sand and gravel. Sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period. Therefore, subsoil texture will be free-draining, with no volume-change potential.
- 3.4 To the west is Ford Road and a level crossing. To the south is a thin strip of scrub edging a railway line. To the east are gardens of The Willows mobile home park.

4. The Trees.

- 4.1 Trees on site:-
 - A row of eight multi-stem sycamores grow just north of the railway fence. Some stems grow through the fence (see photos).
 - East of the sycamores are three large Leylandii and a smaller Lawson cypress.
 - At the eastern end is a golden Leyland cypress hedge, topped but sides inadequately trimmed.

4.2 Off-site trees:-

- The locality is very open.
- A good walnut T17 fills the centre of Waterebury House's rear lawn to the north.

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

- The sycamores, Leylandii and Lawson cypress provide visual screening between railway and Waterbury House.
- The sycamores present a large local landscape feature.

4.4 Photos below:



4.4.1 View north east to sycamore clump. Sycamores on right are a long way off-site.



4.4.2 View east to eastern-boundary golden Leyland cypress hedge.



4.4.3 View west to base of sycamore T4 showing railway fence to the south of the tree.



4.4.4 View west to small Lawson T14 left, then three Leylandii and sycamores behind.



4.4.5 View west to T17 walnut.

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 many years of safe life).
- Vet: Veteran: usually very old; of significant historic, habitat or cultural value.

Condition / Health:- Self-explanatory:- **Good, Fair, Poor or Dead.**

Remaining Safe Useful Life

Prediction of safe life in its location, estimated as:-

<5 years, <10 years, 10-20 years, 20-40 years, >40 years.

Retention categories, based on BS 5837 Section 4.5, are:-

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 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 volume of soil 1m deep required to sustain the tree, usually expressed as a disc 1m deep, 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.

Calculated as:-

Single-stem tree, radial distance = $12 \times \text{stem diameter at } 1.5\text{m ht.}$

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).

4.5.2 **Waterbury House - BS5837 Inspection - BJUFC – 27th June 2018**

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								
SG1	Buddleia and sycamore	50	2-3.5	0	2-5	1.25	1.25	1.25	1.25 ext	Y	F	F	>10	Self-sown buddleia and a few elder and self-sown sycamore saplings.	C2/U	0.6	Remove as required.
H2	Cherry laurel	8 stems x 60	4	0	4	3.5	3	0.5	2.5	M	F	F	10- 20	Large shrubs, planted near boundary, and sprawling to the north.	C2	2.0	Trim as required.
T3 - T10	Sycamores	3 stems avg. 300	15-17	1.5	17-18	7.5	5	4	6 ext	Em	F	F	20- 40	Big canopy. Self-sown just north side or growing in railway chain-link fence. Multi-stem. Unsure how they originated.	B2	6.2	
T11 - T13	Leyland cypress	Avg. 550 basal	16	1	17	5	4	4	3 ext	Em	F	F	10- 20	Planted 0.9m north of chain-link fence.	C2	5.5	

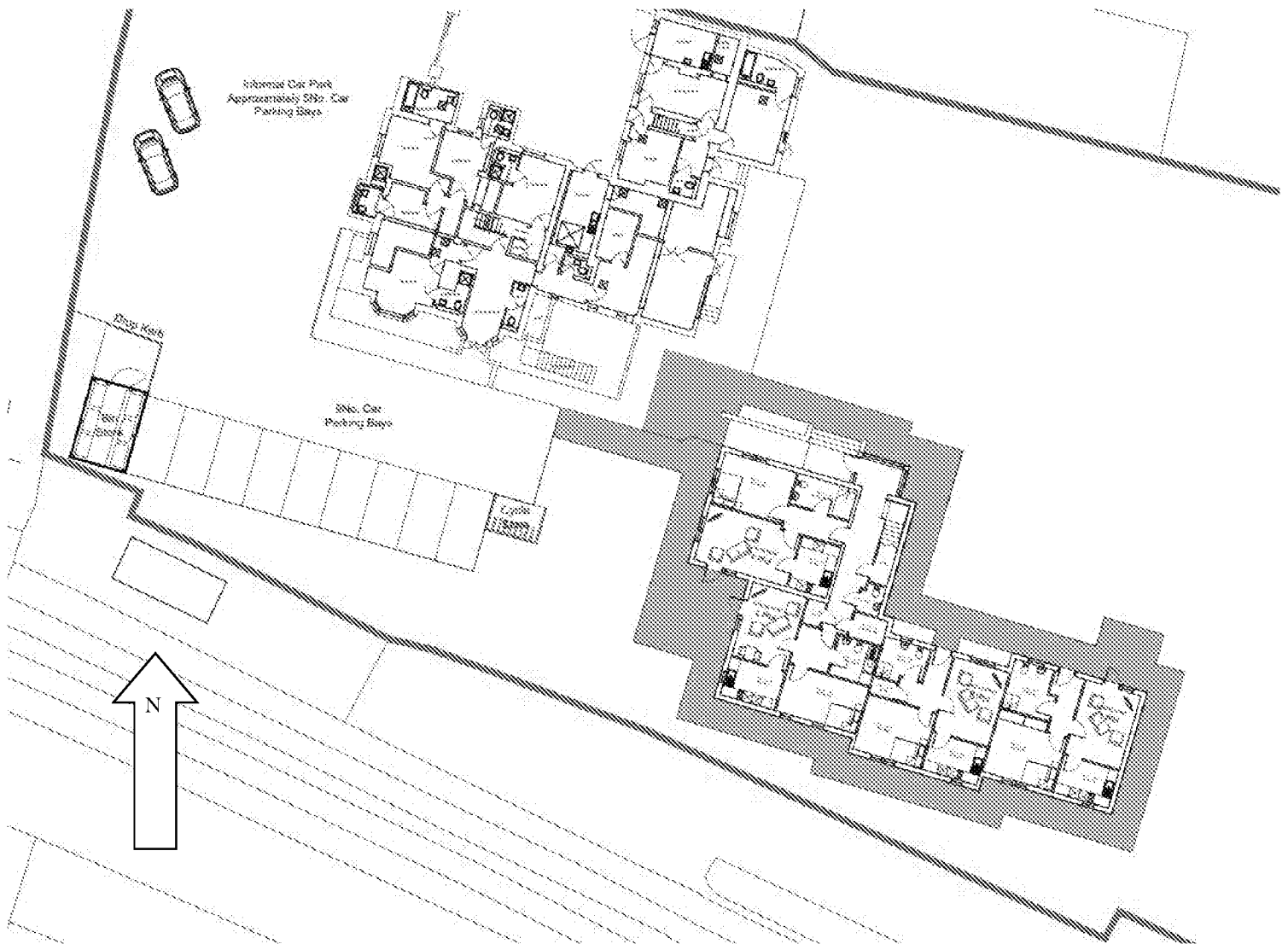
T14	Lawson cypress	400 basal	7	0.5	9	4	3	2	2	Em	F	F	>40	Planted 0.9m north of chain-link fence.	B2	4.0	
H15	Golden Leyland cypress	300	5	1	7	2.5	2.5	2.5	2.5 ext	Em	F	P/ F	10-20	Wide-spaced "hedge". Topped but sides not trimmed, so broad. Ugly, but screens mobile homes.	C2	3.6	Trim sides and tops to improve shape.
H16	Golden Leyland cypress	100	2.1	0	2.1	0.7	0.7	0.7	0.7	Em	F	F	20+	Off-site trimmed hedge.	C2	1.2	Trim all to 'A' shape profile.
T17	Walnut	460	9	2	11	5	5	5	5	Em	F	F	>40	In rear garden. Broad and good.	A1	5.5	

End of table.

5. Proposed Development & Tree Impacts.

5.1 The proposal.

- 5.1.1 The **Proposed Site Plan by ADG Architects H-17-37 / 9-4 Rev B of 24/4/18**, extract below, shows the proposal.
- 5.1.2 The development comprises five new flats, and parking. An acoustic fence may be needed.
- 5.1.3 Access uses the existing road entrance.



5.2 Tree Constraints and Impacts (considered below).

- 5.2.1 There are six potential arboricultural constraints to the development of the site:
- **physical contact of above-ground** parts of the tree,
 - **below-ground** parts,
 - **shading,**
 - **over-bearing, and falling material,**
 - **subsidence/heave, and root growth**
 - **impact on amenity value.**

5.3 Physical contact of above-ground parts of trees.

5.3.1 General:-

Tree Plans in Appendices shows tree locations and crown spreads. Crown dimensions: spread in four directions, base of crown and tree height, are given in Table 4.5.2.

5.3.2 Specific above-ground impacts:-

- Sycamores T3-T6 will need minor crown lifting to clear the new parking.
- Scrub SG1 is all replaced by development.

5.4 Below-ground root spread.

5.4.1 General:-

BS5837 defines a tree's Root Protection Area as a disc of soil 1m deep required to maintain long-term health a full-canopied tree, of a given stem size, usually 12 x stem diameter. We show it as an idealised circle. Rooting areas are never symmetrical, but ideally there should be no ground disturbance within the RPA zone. At the discretion of an arboriculturalist, the RPA can be offset if work is proposed on one side only, and the tree can root in the opposite direction. It is not appropriate to rely on the reduced RPA where potential disturbance extends halfway or more around the tree. Typically the structural rootplate of a tree to resist windthrow is much smaller than the RPA. Therefore tree stability should not be affected by some disturbance within the RPA.

5.4.2 Specific Rootzone Impacts:-

- Sycamore T3-T6 RPAs are slightly within new parking. This is not significant intrusion.
- Sycamore T10 has minor intrusion of RPA into corner of new building and paths. Minimal-dig needed for paths. See 6.9 below.
- Leylandii T11-T13 have severe RPA intrusion into path and new building. Recommend removal.
- An acoustic fence (about 2m high) would require hand-digging of post holes within RPAs. See 6.6 of method statement below.

5.5 Light Interception & Shading.

5.5.1 General:-

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).

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

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.*

5.5.2 Specific Shading Impacts:-

- The three Leylandii T11-T13 would cast year-round shade onto the building. Remove.
- The eight sycamores will cast summer shade. Crown lifting needed.

5.6 Over-bearing and Falling material.

5.6.1 General:-

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.

5.6.2 Specific Impacts:-

- The trees on the southern edge of the site will dominate the carpark and new building. HOWEVER, screening is desirable against the railway line. So only remove the overgrown Leylandii T11-T13. Prune others.

5.7 Subsidence/heave & root growth.

5.7.1 To be assessed by an engineer referring to NHBC 4.2: 2018.

Subsoil soil texture may be coarse-textured = non-shrinkable. Therefore, only direct root pressure on adjacent structures (eg carpark) needs considering.

5.8 Amenity impact.

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

- Development requires pruning, but this is all on the northern side of the trees.
- We do recommend the leylandii are removed, opening a gap in the upper canopy.

6. Arboricultural Method Statement in sequential order for proposed development at Waterbury site.

6.1 Supervision

6.1.1 We would recommend a pre-start site meeting between building contractor, Council Tree Officer and retained arboriculturalist to agree feasibility of tree retention, tree protection and working methods.

6.1.2 **Further** inspection (or done at same time) to check:

- **Installation of protection fencing and Temporary Ground Protection.**

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:-

No	Species	RPA radius m.	Work for landscape / tree health.	<u>ADDITIONAL WORK FOR DEVELOPMENT</u>
SG1	Buddleia and sycamore	0.6	Remove as required.	<u>REMOVE ALL.</u>
H2	Cherry laurel	2.0	Trim as required.	<u>TRIM BACK HARD.</u>
T3 - T10	Sycamores	6.2		<u>CROWN LIFT TO 6M GROUND CLEARANCE AT BRANCH TIPS ON NORTH SIDE.</u> <u>IF REQUIRED: ADDITIONAL PRUNING NE SIDE OF T10 TO GIVE 2M CLEARANCE FROM CORNER OF BUILDING.</u>
T11 - T13	Leyland cypress	5.5		<u>REMOVE.</u>
T14	Lawson cypress	4.0		<u>TRIM SOUTHERN SIDE IF AN ACOUSTIC FENCE IS REQUIRED.</u>
H15	Golden Leyland cypress	3.6	Trim sides and tops to improve shape.	
H16	Golden Leyland cypress	1.2	Trim all to 'A' shape profile.	
T17	Walnut	5.5		

End of table.

(Treework following development see 6.10 below)

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 Habitat Directive 1992, CROW Act 2000 & Protection of Badgers Act. The Habitat Regulations were amended in August 2007 to include as an offence **any** damage or destruction of a breeding site or resting place of European Protected species: mainly bats in a tree context.

In general, autumn tree work: **September, October and November** is least disruptive to bats and birds.

6.2.2.2 Permission

Trees may be protected by a TPO, and could lie within a Conservation Area (unlikely).

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.

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 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.)

6.3 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 Fencing.

6.3.2.1 Tree Protection fencing **locations** are shown on Tree Protection Plan in Appendices.

6.3.2.2 Two **specifications** for suitable protective fencing are given in Appendix II, depending on time in situ: > or < than 3 months.

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 needed here to allow construction access past T9/T10.

6.3.3.2 Three 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, shown in Appendix III.
- A layer of woven geo-textile under minimum 250mm depth of graded aggregate (eg recycled 6F5) 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:-

- Access within the site is good.
- All nearby 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:-

See 6.9 below for path close to T9/T10.

6.6 Foundations within RPAs:-

6.6.1 No special measures for building and paths needed to protect trees.

6.6.2 Acoustic fence: if an acoustic fence is needed, build as follows:-

- No machinery within RPAs. Pedestrian access only.
- Dig post holes (assuming between 1.5m and 2m centres) by hand or hand-operated power auger.
- Sever any roots as they are found using sharp saw or loppers.
- Line post holes with plastic bags to prevent alkaline concrete leaching out to scorch roots.
- Install posts.
- All other parts of fence to be at or above ground level.

6.7 Drainage.

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. We suggest direct roof water into rear garden. Direct carpark drainage into sycamore rootzones.

6.7.2 Foul Drainage: keep away from trees. Link to existing if possible.

6.7.3 Sustainable Urban Drainage System: Any SUDS scheme, to reduce the load on local mains drainage, must not significantly add to the soil water in trees' root zones. We suggest direct roof water into rear garden. Direct carpark

drainage into sycamore rootzones.

6.8 Service Trenches within RPAs.

- 6.8.1 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. Use existing runs to the north-west wherever possible.**
- 6.8.3 Otherwise use this onerous, generalised, work method:-
- Hand digging* or trench-less systems must be used.
*Use an air-spade to reveal roots (Appendix V).
 - 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 & 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.

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 New path on corner of building by T9 & T10:
- Lift temporary ground protection and protection fencing.
 - Use small digger to scrape off maximum 100mm depth soil.
 - Banksman to sever any roots as they are exposed with loppers.
 - **Cover ground immediately** with geotextile and thin layer of aggregate to level, and prevent root desiccation.
 - Install timber edging no deeper, with timber pegs.
 - Create path with conventional construction using type-1 and asphalt or slabs.
- 6.9.3 If larger areas of paving were needed then Appendix IV shows gravel trays and Cellweb for creating stronger, porous, roadways within RPAs, which could be filled with angular clean gravel, allowed to grass naturally, or topped with hard surfacing.

6.10 Tree work following construction.

- 6.10.1 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: POSSIBLE ON THIS SITE.
 - or complete tree removal if trees were considered too close for safe

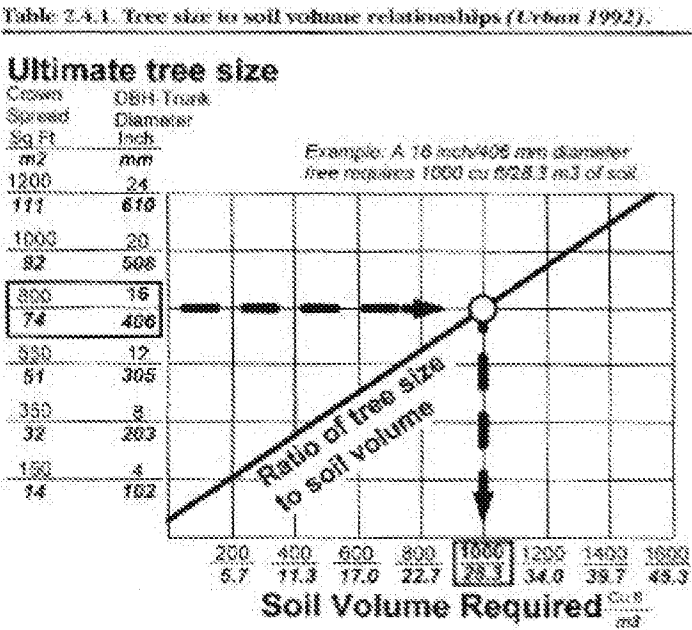
retention.

6.10.2 All additional work subject to further local authority agreement if trees are protected by TPO or planning conditions, or stand within a Conservation Area.

6.11 New Planting.

6.11.1 The proposal plan shows no new planting. This could be conditioned as part of a permission, to screen the railway line and for garden creation.

6.11.2 Any planting must provide adequate long-term soil-moisture availability: graph from James Urban (Up by Roots, ISA, 2008), to remind designers:



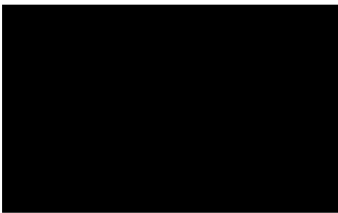
6.11.3 Any planting and maintenance to comply with: BS 8545 “Trees: from nursery to independence in the landscape – Recommendations”. BSI 2014.

7.0 Conclusions

- 7.1 Proposed residential development and parking at Waterbury House requires no tree removal, but we recommend three Leylandii are removed, plus pruning of sycamores.
- 7.2 Protection fencing, and some sensitive construction by T9/T18, will be sufficient to protect trees and hedges.
- 7.3 New trees and other soft landscape is desirable to settle the site into the landscape, and to improve railway screening.

Please contact us for further information.

Yours sincerely,



B J Unwin Forestry Consultancy.

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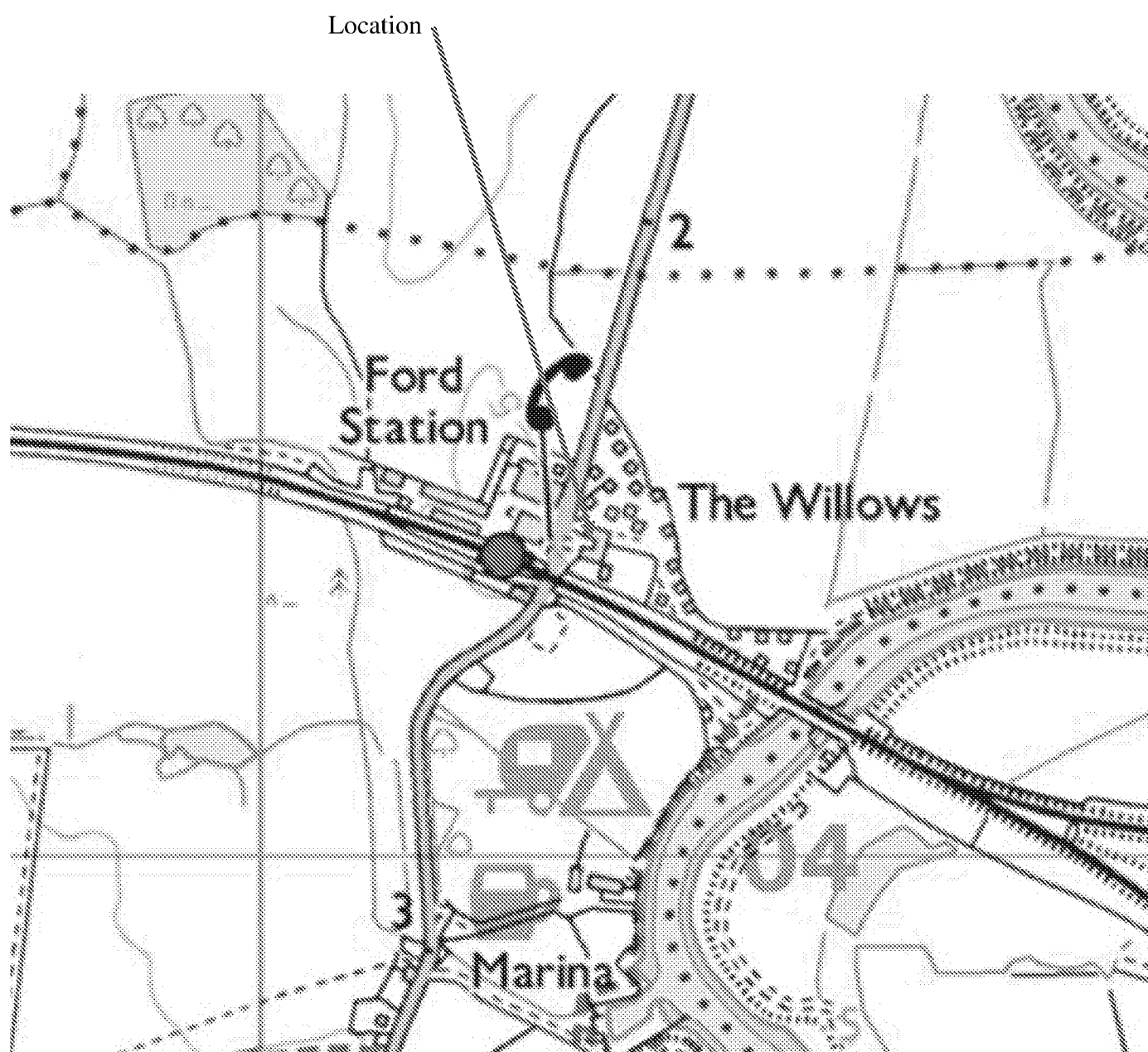
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Appendix I



Google Earth aerial.
Taken April 2017.



Appendix II

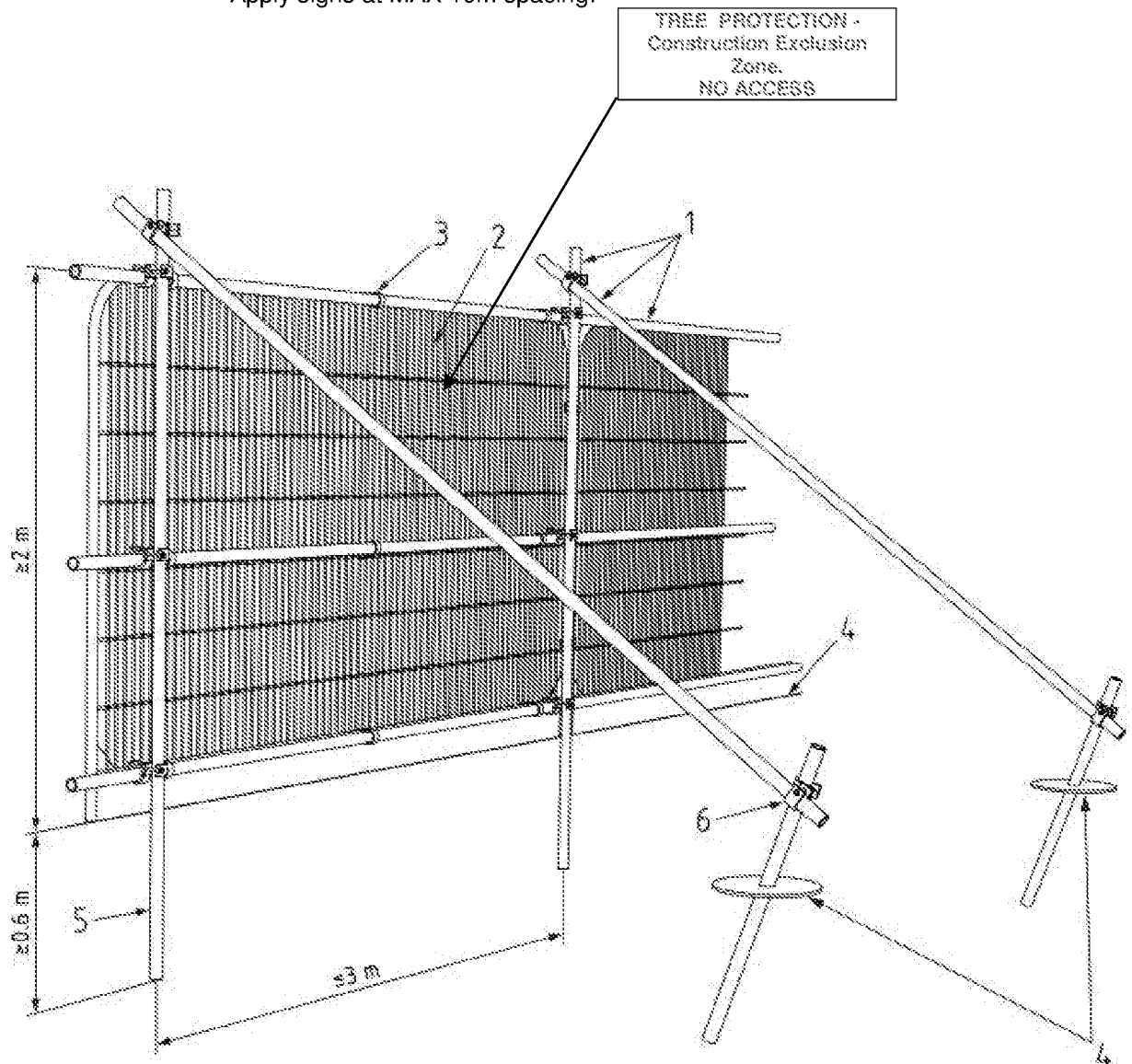
Vertical Tree Protection Fencing, from BS5837.

Heras panels on rubber feet, pinned braces.

Vertical protective fence:

Default in situ > 3 months:-

Apply signs at MAX 10m spacing:



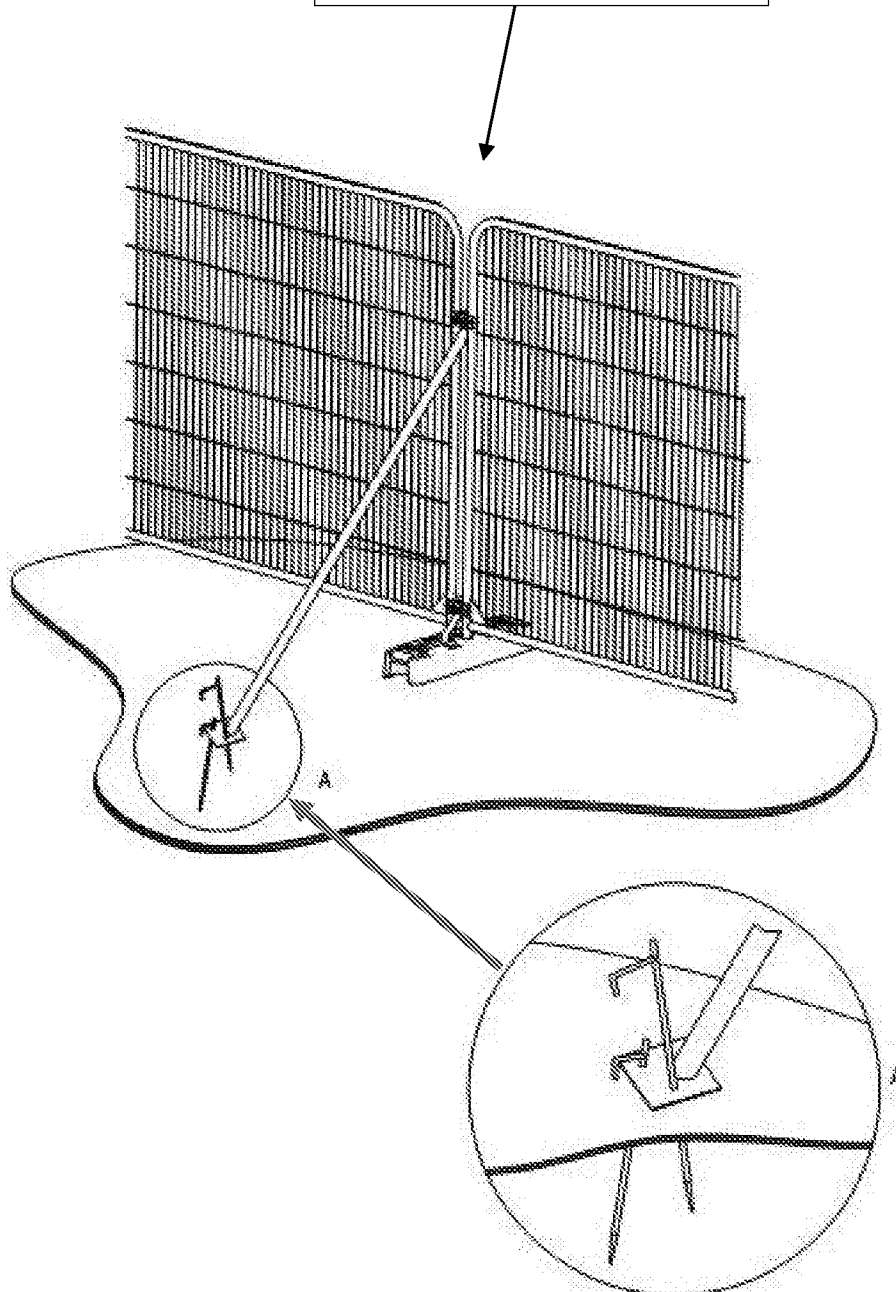
Key

- 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

Lightweight: in situ for < 3 months-

Apply signs at maxm 20m spacing:

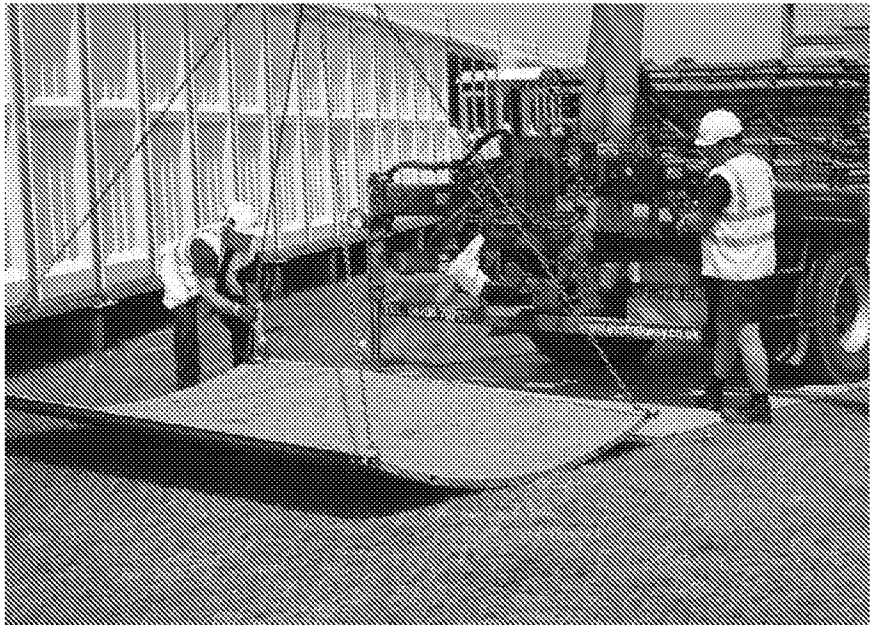
**TREE PROTECTION -
Construction Exclusion
Zone.
NO ACCESS**



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.

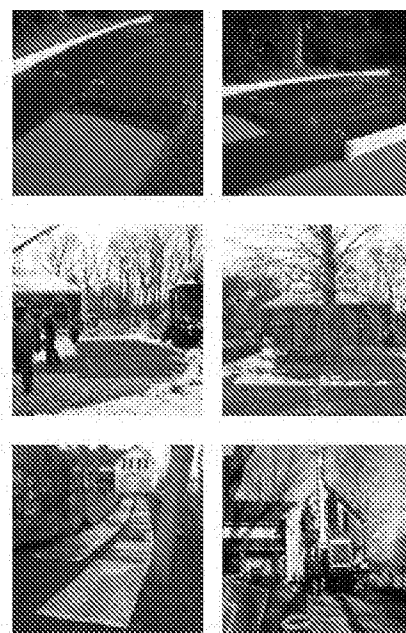
Ground-Guards Tree Root Protection

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 [REDACTED] for friendly advice on any difficult site conditions that you need assistance with.

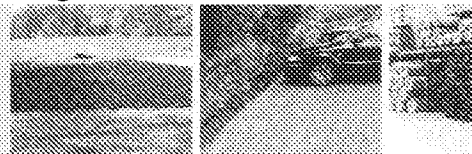


Appendix IV

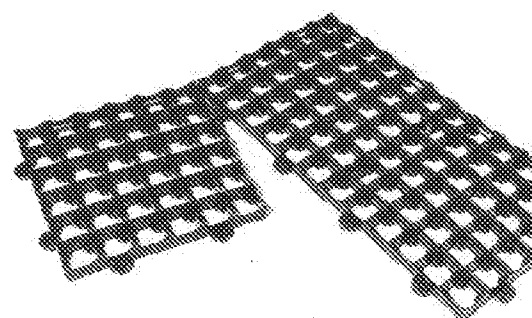
Trays for strengthening gravelled or grassed areas. (50mm or 80mm trays for strengthening gravelled or grassed areas.

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:

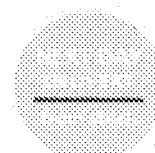
Applications:

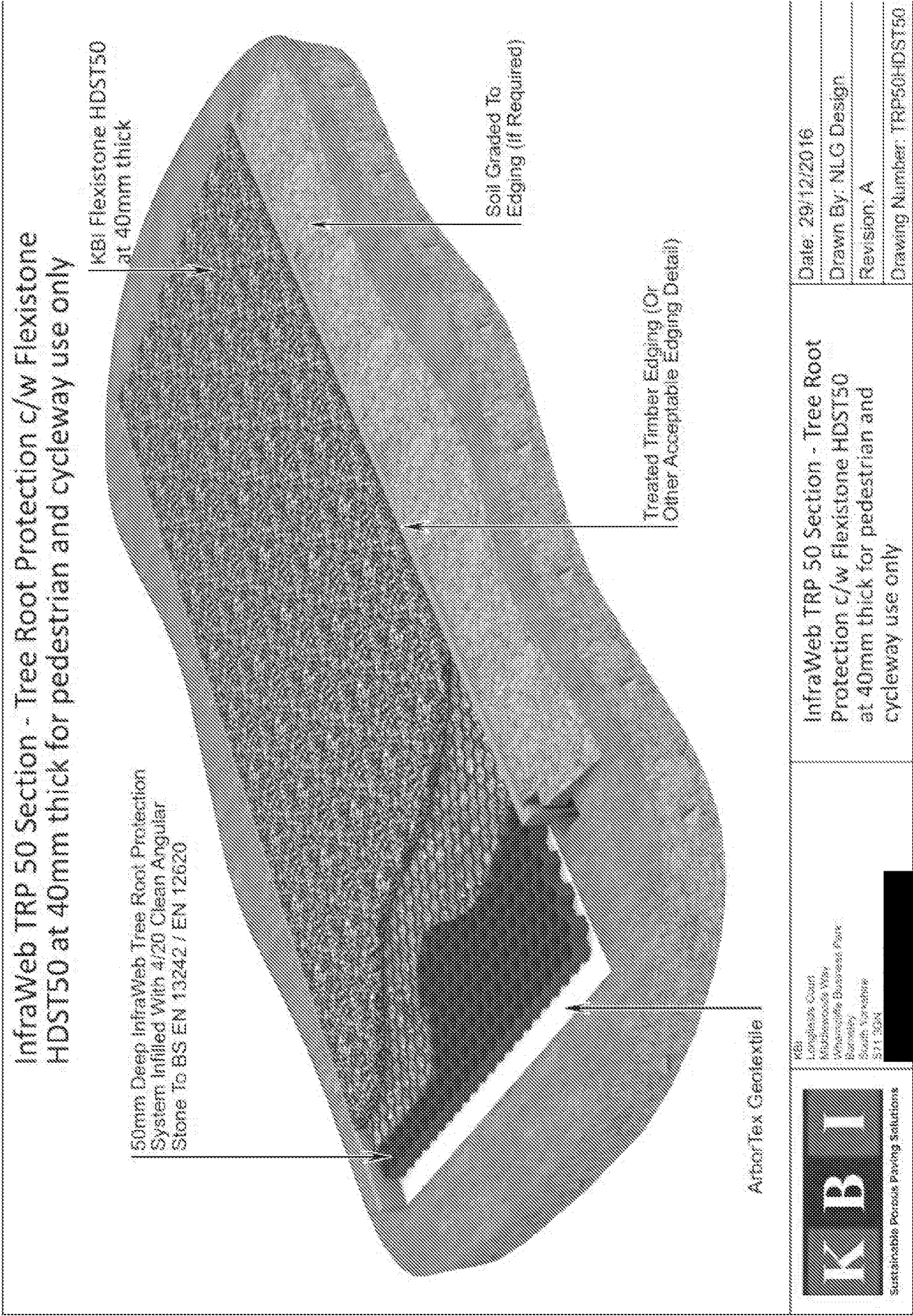
- Overspill car parking
- Emergency access and service roads
- Caravan hardstanding
- Verge hardening
- Service Roads
- Pedestrian walkways and towpaths
- Bridle ways
- Helipads
- Golf course pathways / Tee reinforcement

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





Deeper Cellweb 3-D grid for strengthening tracks.

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.

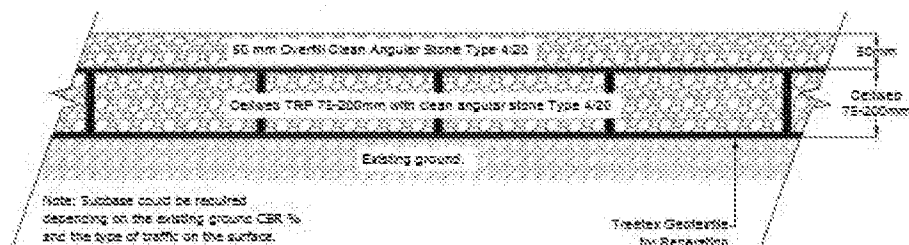
Cellweb® 3D Cellular Confinement. The Cellweb® is installed on top of the Treetex™ layer. This is fixed to the ground using ten steel I pins per panel. The panels can be cut to the required shape and adjoining panels can be connected using heavy duty staples or cell ties.

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 or the full installation guide can be found on our website www.geosyn.co.uk.

Indicative Cellweb with overfill



Web: www.geosyn.co.uk



Geosynthetics
Engineered Solutions

Appendix V

Example of Air-spade.

HANDLE VIBRATION TEST

Product type – MBW Soil Pick SP1.25

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.

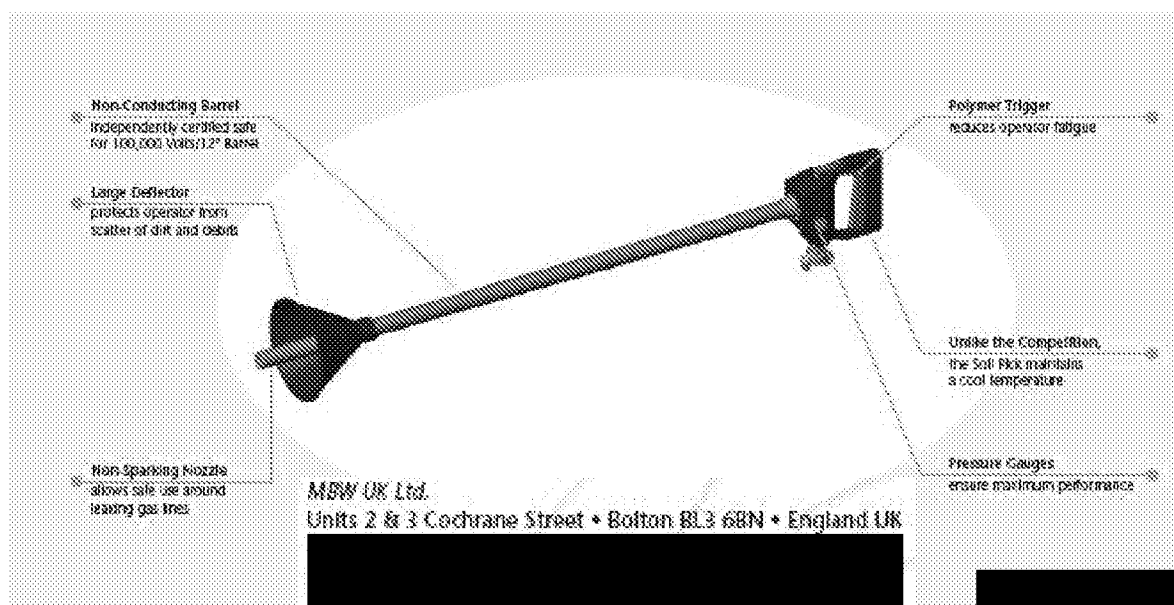
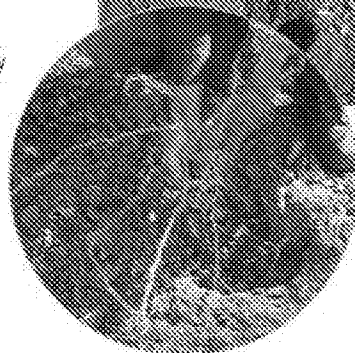
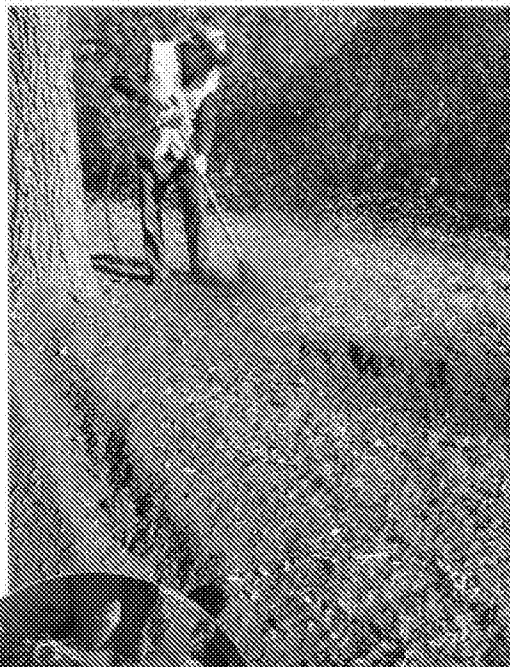
Aeration & Excavation

Root Locating for Utility Line Installation or Pruning

Investigating Root Structure and Damage

Transplanting or Bare Rooting

Reducing Soil Compaction



Appendix VI

- B J UNWIN FORESTRY CONSULTANCY -

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

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

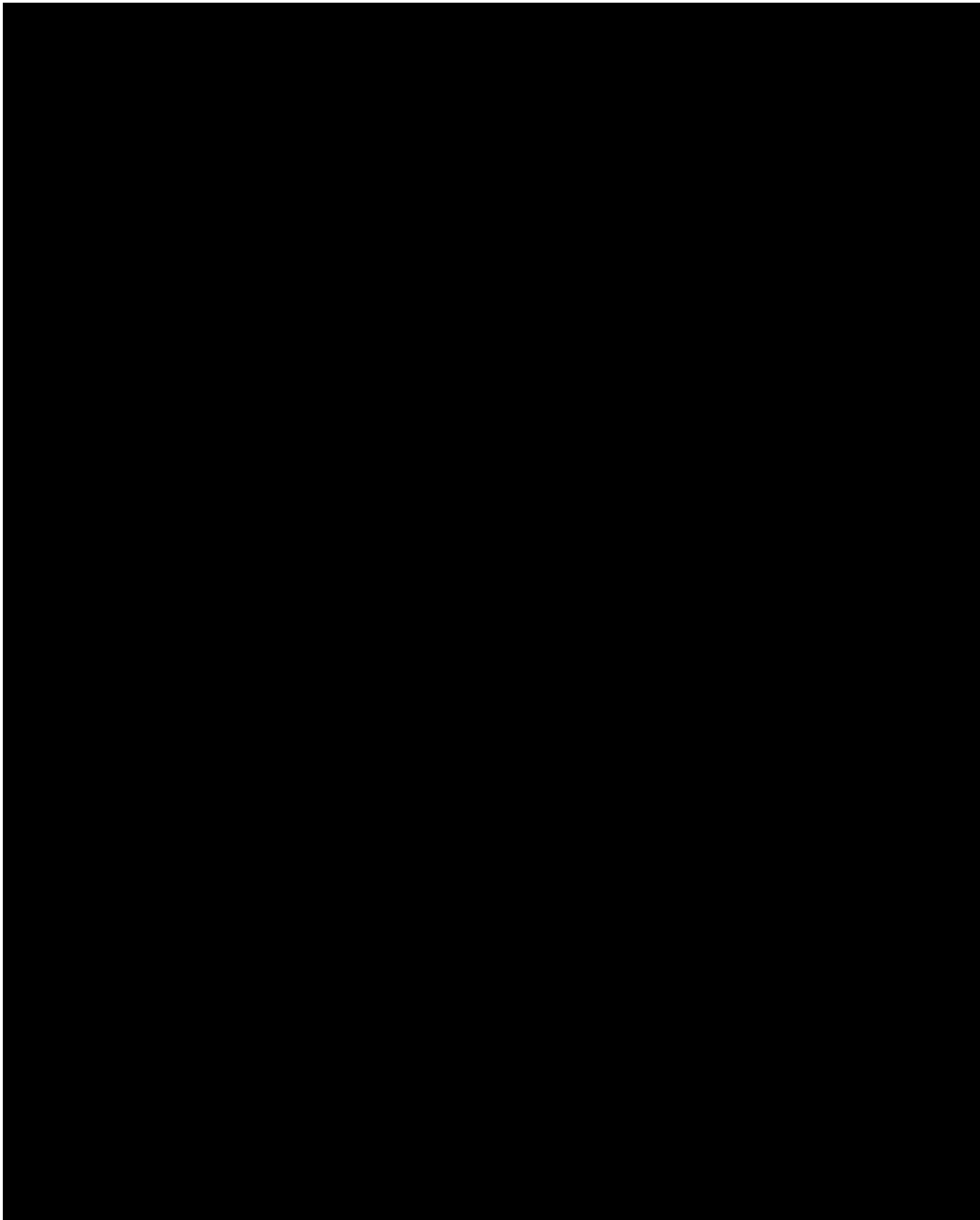
-105 Charfield Court, 2 Shirland Road, **London**, W9 2JR.

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

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

Chartered Forester - ICF Registered Consultant - Fellow of the Arboricultural Association -

Arboricultural Association Registered Consultant - Chartered Environmentalist.



Appendix VII

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.

Plans are not included in pdf format of report.

Insert plans here in paper copy of report:-

Appendix VIII

Tree retention and Tree Protection Plan

Plans are not included in pdf format of report.

Insert plans here in paper copy of report:-

END.