35 Kentish Lane, Brookmans Park AL9 6NG

BS5837 TREE SURVEY, ARBORICULTURAL IMPACT ASSESSMENT

AND METHOD STATEMENT

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1.0 Introduction

1.1. Contacts

Client - Mr. and Mrs. Cooper, email ashlye.c@wms-uk.com

Architects- **PNA** 2 The Coach House, Corneybury Farm, Ermine Street, Buntingford, Herts SG9 9RS Tel: 01763 271292

Arboriculturalist and Landscape Architect- Elizabeth Greenwood

Council- Welwyn Hatfield Council

1.2. Instruction

Instruction was received from PNA to provide an arboricultural method statement to facilitate construction of new boundary wall and railings within the vicinity of mature trees.

It is intended to be a working document to be used by the contractor and local authority to ensure the retention of the trees and provide a means of construction for the implementation of this proposed development.

The trees were surveyed 3 October 2017. Plans showing the details as outlined in this method statement are included in the appendix to this report (Appendices F, G and H)

In the case of building within the vicinity of mature trees the owners must be made aware of their responsibility to maintain these trees in a safe condition. Their insurers should be made aware of the implications of the presence of these trees.

The survey is to take the form of a visual assessment of trees recording their measurement, describing their age, amenity, condition and recommending work. Trees have been plotted on plan and full details of survey work are included in the appendices.

Limitations of this tree survey would include the lack of visibility of every tree owing to dense undergrowth and the presence of climbing plants such as ivy. There may be restrictions to the access within the site or from neighbouring land, and, in the case of trees growing on the boundary of the site only one side of the tree may be visible.

1.3 Background

1.3.1 This detached property is set back from Kentish Lane, with the front road boundary defined by a conifer hedge.

1.3.2 According to the British Geological Survey the underlying geological formation is of London Clay - made up of clay, silt and sands. Superficial deposits have

been recorded as sand and gravel of uncertain age and origin. Sand and gravel soil may contribute to the surface rooting of the trees

1.3.3. A level survey has not been undertaken but from observation the front garden is relatively level. Within the vicinity of the house there are no water features or indication of poor drainage,

1.3.4 The front garden is surfaced with block paving and is enclosed by hedging. There are three trees present in corner beds on the southern side of the entrance hard surfaced area.

1.3.5 According to Welwyn Hatfield's website's interactive maps the trees are currently not protected by a Tree Preservation Order, they are not growing within a Conservation Area, and are not protected by any other Planning Legislation. This situation may change and the client is advised to make further inquiries prior to any tree work.

2.1 Tree Survey Criteria

2.1.1 Photographs of many of the trees and full details of this tree survey are included on tree survey sheets. (Appendices A and B) Information recorded complies with BS5837:2012, and is outlined as follows:-

- The species (English names), size and position of the trees within the site.
- The majority of large shrubs or trees with stem diameter of less than 150 mm have not been surveyed. According to the British Standard Recommendations these trees can be transplanted or replaced.
- The dimensions of the trees are the height, and the girth measured at 1.5 metre above ground level. The spread is measured at the four points of the compass, and this is represented on plan. The lowest branch on the trunk is measured from ground level and the crown height is measured from the lowest point of the foliage.
- The maturity is recorded and details of this classification are included on the tree survey sheets. (e.g. Y = young, SM = semi-mature, EM = early mature, M = mature, OM = over-mature);
- A description of the trees' condition includes any visual defects at the time of the survey. As this survey is conducted from ground level not all defects may be visible, and pathogens may not be apparent because of the season of inspection.
- General recommendations for each tree are outlined, which may need to be reviewed once development proposals are finalized.

- Estimated remaining contribution in years in view of the existing site conditions is classified as (less than 10 years; 10 to 20 years, 20 to 40 years or more than 40 years).

2.1.2 Site layout plan has been provided by PNA, Plan reference 813 / SP02. Tree survey information has been added to this plan and several other tree have been measured on site and plotted on this plan. All measurements should be checked on site (Appendix F)

2.1.3 It is important to note that the trees are surveyed and their condition evaluated in the current site conditions. If there is a change in the site conditions and within the root protection area the trees may need to be re-surveyed and their potential longevity re-evaluated. In the event of adverse weather conditions the survey should be repeated. Regardless of the development proposals there should be regular inspection and monitoring of trees at a frequency dependent on their condition and age: as such this tree survey is only valid for a 3 year period from the date of the survey.

2.2. BRITISH STANDARDS: Tree In relation to design, demolition and Construction- recommendations. 5837:2012

2.2.1 **Assessment of the trees' amenity values** The British Standard Recommendations provide an assessment of trees on development sites and outlines four categories in which trees should be placed for assessment purposes. These assessment categories are reproduced in Appendix C, Table 1, "Cascade Chart for Tree Quality Assessment", and simplified as:-

A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years

B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years

C **Trees of low quality,** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter of below 150mm

U **Trees which have limited prognosis.** Those in such a conditions that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

2.2.2 These categories are subdivided into three sub groups:-

1. Trees of arboricultural value, good examples of their species or unusual specimens
2. Mainly trees of landscape value, trees which are primarily of visual amenity
3. Trees with mainly conservational value for example veteran trees

2.2.3 The British Standard Recommendations 5837:2012 provide a formula for calculating the Root Protection Area (RPA) required to be protected for existing trees that area to be retained. For single stem trees, this should be

calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods below should be used. In all cases, the stem diameter(s) should be measured AT 1.5 metres above ground level or as indicated in Annex C of this standard. The calculated RPA for each tree should be capped to 707 m2.

(a) For trees with two to five stems, the combined stem diameter should be calculated as follows:-

Stem diameter 1)2 + (stem diameter 2)2 ... + (stem diameter 5)2

b) For trees with more than five stems (not illustrated in Annex C), the Combined stem diameter should be calculated as follows:

(Mean stem diameter) 2 × number of stems

2.2.4 Root protection areas are indicated as a radius on plan. In the event of root restrictions from for example deep foundations or a retaining wall, topography, drainage, soil type, soil structure, or soil disturbance the approximate area is represented by a polygon, as dictated by this British Standard. In this site an assumption would be that the trees may be able to root under a car park surface and footpath construction, but that a road would provide a barrier to root formation.

2.2.5 Within development sites the British Standard recommends that trees are fenced off to ensure the root protection area is not damaged by construction works. In compliance with the British Standards, protective fencing should be erected at the edge of the root protection area. If access is required within this area, then the ground should be protected. Construction techniques using geo-web and geo-textile, in accordance with BS recommendations might be used to minimize damage to trees and enable working space for demolition or construction within the root protection area of trees.

2.2.6 Drainage and service runs need to be identified at this stage to ensure that if new service runs are to be excavated they should be located outside the root protection zone of existing trees.

2.2.7 Building foundations can be specifically designed to reduce the impact of a building if there is a minor incursion into the root protection area of a tree.

2.2.8 **Other considerations**- In addition, the British Standard takes into account future growth of the crown of the tree, the spatial implications and its effects on light.

2.2.9 Existing levels within the root protection areas of trees should be retained.

2.2.10 Some tree work might be required to ensure that the crowns of trees are cut back from working space and to provide access for construction vehicles.

2.2.11 There are adequate areas within the site to ensure that handling and storage of materials can be accommodated well outside the root protection areas.

2.3 Tree Survey

2.3.1 Of most significance is the mature Oak tree (T3) 17 metres high with a stem girth of 720mm indicating that this tree is over one hundred years old. With compacted ground round the tree, there are exposed surface roots and there are branch stubs within the crown. The tree is classified as an 'A1' quality tree with a 9 metre radius root protection area.

2.3.2 With some limited tree surgery to address potential safety hazard, some remedial work is recommended to improve the rooting conditions of this tree. This would include relieving ground compaction and making up the soil with good quality compost and topsoil, and maintaining the area with bark mulch.

2.3.3 The other mature tree within this northern side of the drive is a Norway maple (T1), also with some surface roots and compacted soils. It has also incurred some damage to the branches from bark stripping probably from squirrel activity.

2.3.4 A mature and one sided crab apple tree (T2) is planted between the Norway maple and hedge and has a limited prognosis.

2.3.5 The side boundary with 33 Kentish Lane is formed of Leyland cypress hedging trees, overgrown and reduced with dead foliage forming the lower canopy. Under the ownership of the neighbouring property and at 6.5 metre high, their root protection areas are plotted on plan.

2.3.6 The details of the hedges are as follows

	Hedge Species	height	Spread	Stem girth at base	RPA	Management
H1	Leyland cypress	5-6	Up to 3metre	Up to 100mm	2metres from hedge base	To be removed as part of this application

3.0 Arboricultural Method Statement

3.1 Issues Considered

This method statement includes details on the following

Pre construction works and site clearance

- Tree protection
- Tree surgery
- Protective fencing
- Methods of ground protection construction during works

Construction works

- Hand dig,
- Foundation design of wall

- Hard surfacing within the root protection area
- Location of underground services
- Contingency plans
- Site supervision

Post- Construction works

- Removal of protective barrier etc.
- Remedial works
- Landscape works

3.2 Arboricultural Impact Assessment

3.2.1 The proposed site layout has been provided by PNA plan reference 774/SP5A The impact of these proposals is summarized in the following table:-

Tree number	SPECIES	EFFECT	Tree surgery	Protective barrier	MITIGATION			
					Ground protection	Construction for surfacing	Foundation design	Hand dig
T1	Crab apple	RPA within footprint of new wall	**Tree surgery**	**X**	**X**			
T3	Oak	RPA within footprint of new wall	**Tree Surgery**	**X**	**X**	**X**	**X**	**X**
T4-T6	Leyland cypresses	RPA within footprint of new wall	**Tree Surgery**	**X**	**X**	**X**	**X**	**X**
H 1	Leyland cypress hedge	RPA within footprint of new wall	**REMOVE**					

3.2.2 With some impact on the crab apple(T1), there proposed wall slices right through the root protection area of the oak (T3). A method of construction involving excavation could be detrimental to roots of this good quality oak.

3.2.3 Mitigation and details to address the incursion into these trees' root protection areas are outlined as follows:-.

- Construction method for the new wall which minimizes the excavation.
- Ground protection to enable construction works within the root protection areas.
- Construction methods for foundation of the plinth for example mini piles.
- Hand digging for foundations

4.0 Method of Operations- Pre Construction

4.1 Setting out

4.1.1 The site can be set out by the contractor in accordance with the Tree Protection Plan from measurements as outlined on the plan. Placing of any site accommodation and storage of materials will be set out with agreement by the arboriculturalist outside the root protection zone of any of the trees. There will not be any bonfires within the vicinity of the trees.

4.1.2 Storage of contaminants and mixing of concrete must be carried out outside the root protection areas of all trees. An indicative area for this usage is marked on the plan (See appendix H). The ground should be protected with heavy duty plastic sheeting, e.g. 1200 gauge DPM , with edges secured and raised to prevent spillage and with a raised lip along the access point.

4.2. Tree Works

4.2.1 As part of the application for planning permission the following tree surgery is outlined. All works will be carried out by a fully insured and competent tree surgeon in accordance with BS3889:2010 “Tree Work”. The timing of tree surgery should also be carried out in accordance with the Wildlife and Countryside Act and in view of the nesting season of birds within the sites.

Tag	Tree	Category	Recommendations
T1	Crab Apple	C2	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree
T2	Norway Maple	B2	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree
T3	Oak	A1	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree
T4	Leyland tree	U	Review long term retention- if within this ownership- recommend review and replace
T5	Leyland tree	U	
T6	Leyland tree	U	
T7	Leyland tree	U	
T8	Leyland tree	U	
T9	Leyland tree	U	

Tag	Tree	Category	Recommendations
H1	Leyland hedge		REMOVE

4.3 Protective Fencing/Protective Barrier

Details of the fencing are shown in the appendices to this report and comply with British Standard recommendations (See appendix D). All weather notices are to be affixed to this fencing with signage "**CONSTRUCTION EXCLUSION ZONE – NO ACCESS**".

4.4 Ground Protection

In the vicinity of the temporary unit working space will mainly be confined to existing hard surfacing. Where additional working space is required for construction within the root protection areas of retained trees, the British Standard specifies the following type of ground protection.

a) For pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geo-textile membrane;

b) For pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geo-textile membrane;

c) For wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

5.0 Methods of Construction for the Development

5.1.1 Hand dig

Hand digging will also be required for all works within root protection areas of trees, including removal of surfacing, trenches, excavation for fence post and for cultivation for soft landscape areas. All hand digging within the root protection areas of trees should be supervised by a competent arboriculturalist.

5.1.2 Within root protection areas all excavation should be hand dug. A trench should be hand dug near the trees to ascertain whether roots are present.

If roots over 50mm are found these should, where possible, be bridged, and surrounded by sand- roots under this dimension should be cut to a clean cut and surrounded by sand. No roots are to be left exposed but covered with damp sand or hessian. The surface level of the path may need to be adjusted to retain these roots.

5.1.3 If on investigation of the hand dug trench there are no roots present mechanical excavation may be possible if a banksman is supervising the excavation to ensure that if roots are unearthed they can be protected and clean cut and surrounded by sand. Hand digging may need to be resumed to complete the excavation.

5.1.4 This would include exploratory excavation by hand for the foundations of the paths and new hard surfacing within the root protection area of the trees.

5.2 Foundations design of the wall- recommendations

5.2.1 Strip excavations are likely to cause significant damage to the roots of the oak tree, as trees typically have the majority of their root structure within the top 600mm of soil. Alternative methods are recommended.

5.2.2 Brick plinth- the foundation for these should be minimised, either with a mini pile or ground anchor. All excavations should be hand dug to ensure that tree roots are not severed, and if roots over 50mm are encountered the position of the foundation moved.

5.2.3 It is recommended that a (steel) lintel to suit the 2.8 span is designed and manufactured to support this wall, for example an 'L' or 'H' shaped. This will be section 3 straight 2.8 metre sections and one curved section; a total length of 11.2 metres on the southern side of the entrance and within the RPA of the oak tree (T3) It is to be designed to sit above ground and form a ledge on which the wall is to be constructed.

5.3 Location of Underground Services

All drainage and below ground services will be designed to avoid tree protection zones. If there is no alternative but to site these within the root protection area of trees, then trenches excavation should be hand dug and comply with 'Hand dug ' as outlined in section 5.1 or the NJUG regulations.

5.4 Contingency Plans

If vehicular access is necessary within the root protection zone of any of the trees, in response to chemical spillage, collision or emergency access, the ground will be protected by geo-textile or boarding as outlined in the British Standard. Spillage and ground contamination will be prevented and preparation of material carried out outside the root protection areas of tree.

5.5 Site Supervision

There will be full supervision on site from the site foreman and tree protection methods will be strictly adhered to. An arboricultural supervision schedule, if required by the local authority, is included in the appendices to this report.

6.0 Post Construction and Landscaping near Trees.

6.1 Removal of fencing and ground protection

On completion of works, protective fencing and the ground protection for temporary working space will be removed.

6.2 Remedial works and soil improvement

6.2.1 Exposed soils are easily compacted resulting in loss of water and gaseous exchange and leading to root deaths. To relieve ground compaction, which may have resulted from the overrun of vehicles or by storage of materials, the clay soils should be broken up to allow air to penetrate and for the soil structure to be restored.

There are various methods to achieve this which are outlined in the appendices to this report.

- Auguring the soil by hand combined with soil improvements
- Pneumatic excavation for example air spade and soil improvements

6.2.2 Within the tree root protection area improve the soil structure by incorporating a compost or mulch within the topsoil, of 75-100mm in depth. This can be spread over the surface and gently forked into the soil. If bark chip is used as mulch NPK fertilizer should be added to counteract the nitrogen depletion of the soil. There are options for additives of microrryhizal fungal which may also improve root function. Ground compaction will be addressed by either lightly forking over the area or by other techniques; for example use of tree spade soil aeration.

6.3 New planting and soft landscape

New planting within the root protection areas of trees should be carried out to avoid mechanical cultivation and for plants to be notch planted. Shrub beds are to be mulched, which, in addition to reducing weed growth, will enhance soil conditions round trees. Within grass areas, the height of mower blades are to be set above the level of surface tree roots to avoid damage and soil level raised above surface roots with a sandy composition of topsoil

References

- British Standards 5837: 2012 Trees in relation to design, demolition and construction.
- British Standards 3998: 2010 Tree work
- Tree Preservation Orders - A Guide to Good Practice
- Diagnosis of ill health in trees - R G Sprouts and T G Winter - Forestry Commission Publication ISBN 0-11-753545-1
- Principles of tree hazard management - David Lonsdale - Forestry Commission Publication ISBN 0-11-753355-6
- The body language of trees - Claus Mattheck and Helge Breloer - Forestry Commission Publication ISBN 0-11-753067-0
- Arboriculture research and Information note 12 'Tree Root Systems'.
- Tree Roots and in the Built Environment John Roberts, Nick Jackson and Mark Smith. DCLG ISBN 13-978-0-11-753620-3
- Manual of Wood Decay Fungi- K. Weber and C. Mattheck - -The Arboricultural Association, ISBN 0- 900978
- Volume 4: NJUG Guidelines For The Planning, Installation And Maintenance Of Utility Apparatus In Proximity To Trees (Issue 2) – Operatives Handbook
- Estimating the age of large and veteran tree in Britain- The Forestry Commission. http://www.forestry.gov.uk

Appendix A

Photographs of the site and trees


Above left - the crab apple (T1). **Above right** - the Norway maple (T2) **Below**- the good quality oak. **Bottom** - ground compaction storage of materials and damage round the base of the tree- advise remedial works.



Appendix B

Tree Survey

Tag	Tree	Age	Stem Diameter	Stem	Height	Lowest branch	lower crown	Category	North	South	East	West	Structural	Physiological	Notes	Recommendations	life expectancy	RPA
T1	Crab Apple	M	190	1	8	2	1.5	C2	4	4	4	2.6	Fair	Good	Twisted trunk. Lean. Maternal, under RPA. Dead wood	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree	10 to 20	2.25
T2	Norway Maple	M	385	1	14	2.5	1	B2	6	5.7	4.5	5.7	Fair	Good	Surface roots. Squirrel damage.	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree	20 to 40	4.75
T3	Oak	M	720	1	17	3	3	A1	5.5	4.3	6	5.5	Good	Good	Brach stubs. Low vigour. Bat box. Soil tipped under base.	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree	40 +	9
T4	Overgrown Leyland Hedge x cupressocyparis leylandii	OM	410	1	6.5	2	2	U	1	1	2.5	2.5	Poor	Poor	Boundary trees- not under clients ownership-Reduced. Poor. Included bark. Tight fork; dead wood. Brown foliage on garden site	Review long term retention- if within this ownership- recommend review and replace	Less 10	

Tag	Tree	Age	Stem Diameter	Stem	Height	Lowest branch	lower crown	Category	North	South	East	West	Structural	Physiological	Notes	Recommendations	life expectancy	RPA
T5	Overgrown Leyland Hedge x cupressocyparis leylandii	OM	250	1	6.5	2	2	U	1	1	2.5	2.5	Poor	Poor	Boundary trees- not under clients ownership- Reduced. Poor. Included bark. Tight fork Dead wood. Brown foliage on garden site	Review long term retention- if within this ownership- recommend review and replace	less 10	3
T6		OM	195	1	6.5	2	2	U	1	1	2.5	2.5	Poor	Poor			less 10	2
T7		OM	380	1	6.5	2	2	U	1	1	2.5	2.5	Poor	Poor			less 10	4.75
T8		OM	80, 125	2	6.5	2	2	U	1	1	2.5	2.5	Poor	Poor			less 10	2
T9		OM	95, 240	2	6.5	2	2	U	1	1	2.5	2.5	Poor	Poor			less 10	4.5

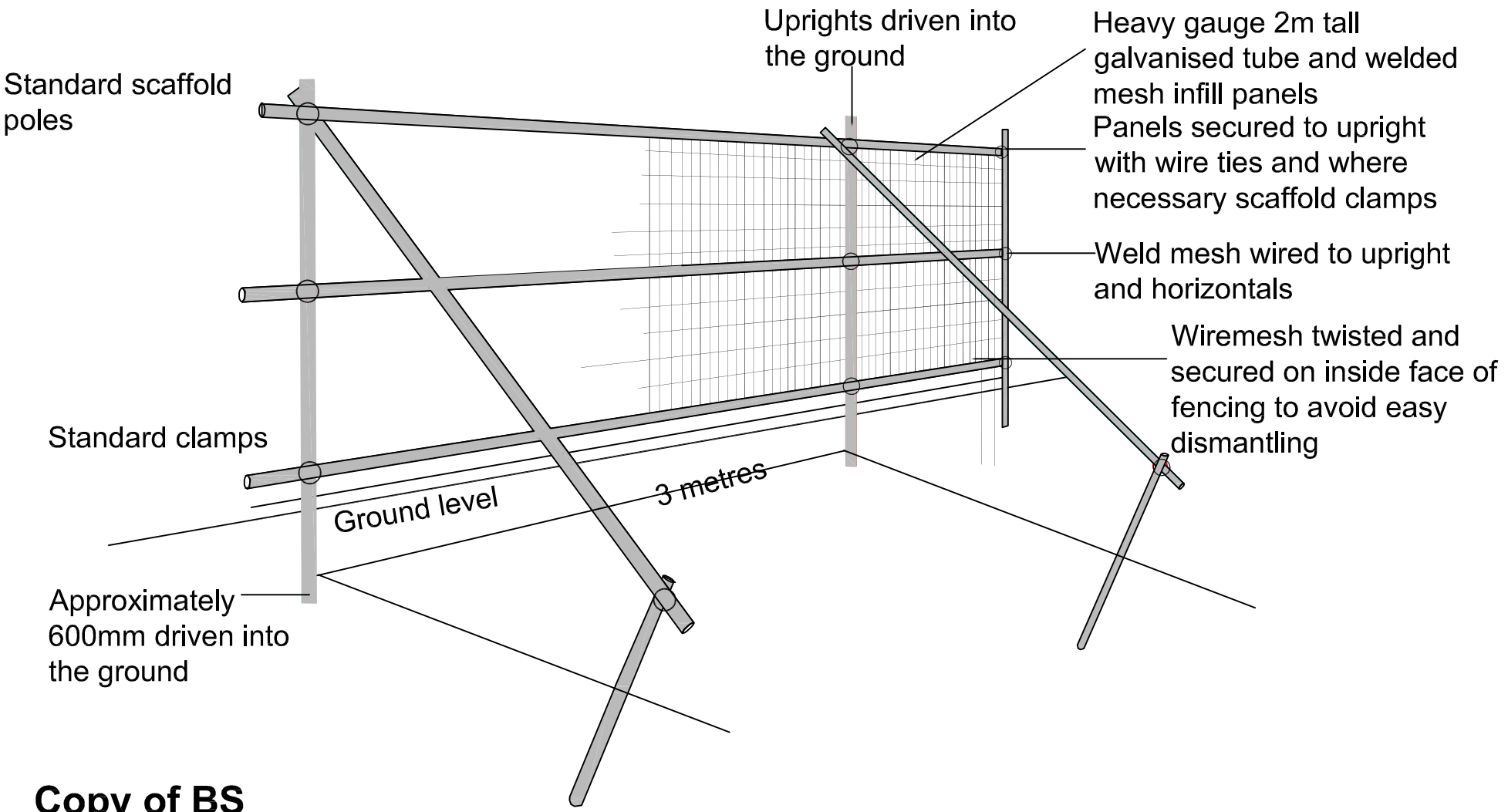
Appendix C

Copy of BS5837:2012 Table 1
"Cascade Chart for Tree Quality Assessment"

TABLE 1	Cascade Chart for Tree Quality Assessment- BS5837:2012 (copies of table1 and 2)			
Category	Criteria			Identification on plan (RAB subject to legiliblity of the plan)
Category U				
Those in such a conditions that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	Trees that have a serious, irremediable, structural defect, such a that their early loss is expected due to collapse including those that will become unviable after removal of other category U trees (e.g. Where for whatever reason, the loss of companion shelter cannot be mitigated by pruning.) Trees that are dead or are showing signs of significant, immediate and irreversible overall decline. Trees infected with pathogens of significance to the health and/or so safety p of other trees nearby, or very low quality trees suppressing adjacent trees of better quality NOTE Category U trees can have existing or potential conservation value which might be desirable to			Dark red (RAB 127-000-000)
Trees to consider for retention				
	1. Mainly arboricultural qualities	2. Mainly landscape qualities	3. Mainly Conservation qualities	
Category A				
Trees of high quality with an estimated remaining life expectancy of at least 40 years	**Trees that are particularly good examples** of their species, especially if rare or unusual; those that are essential components of groups or formal or semi formal arboricultural features (e.g. The dominant and/or principal trees within an e avenue	**Trees, groups or woodlands or particular visual importance** as arboricultural and /or landscape features	**Trees, group or woodlands of significant conservation,** commemorative or other value (/e.g. Veteran trees or wood pasture)	Light Green (RAB 000-255-000)
Category B				
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but downgraded because of impaired cons conditions (e.g. Presence of significant though remediable defects, including unsympathetic past management and storm damage) such as that they are unlikely to be suitable for retention beyond 40 years; or trees lacking the special quality necessary to merit category A designation	Tree present in numbers, usually growing in groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collections but situated a so as to make little visual contribution to the wider locality	Trees with materials conservation or other cultural c value	Mid blue (RAB -000-000-255)
Category C				
Trees of low quality, with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter of below 150mm	Unremarkable trees of limited merit such or such impaired condition that they do not qualify in higher categories.	Trees present in groups or woodlands but without this conferring on them significantly great collective landscape value; and/or tree offering low or only temporary/transient landscape benefits	Trees with no materials conservation or other cultural value	Grey (Rab 091-091-091)

Appendix D

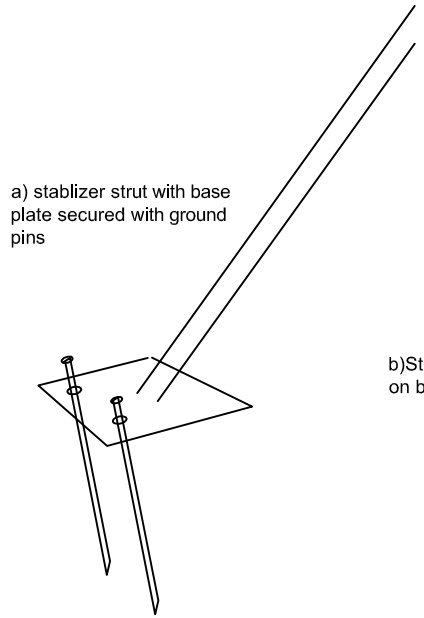
Protective Barrier/ Fencing



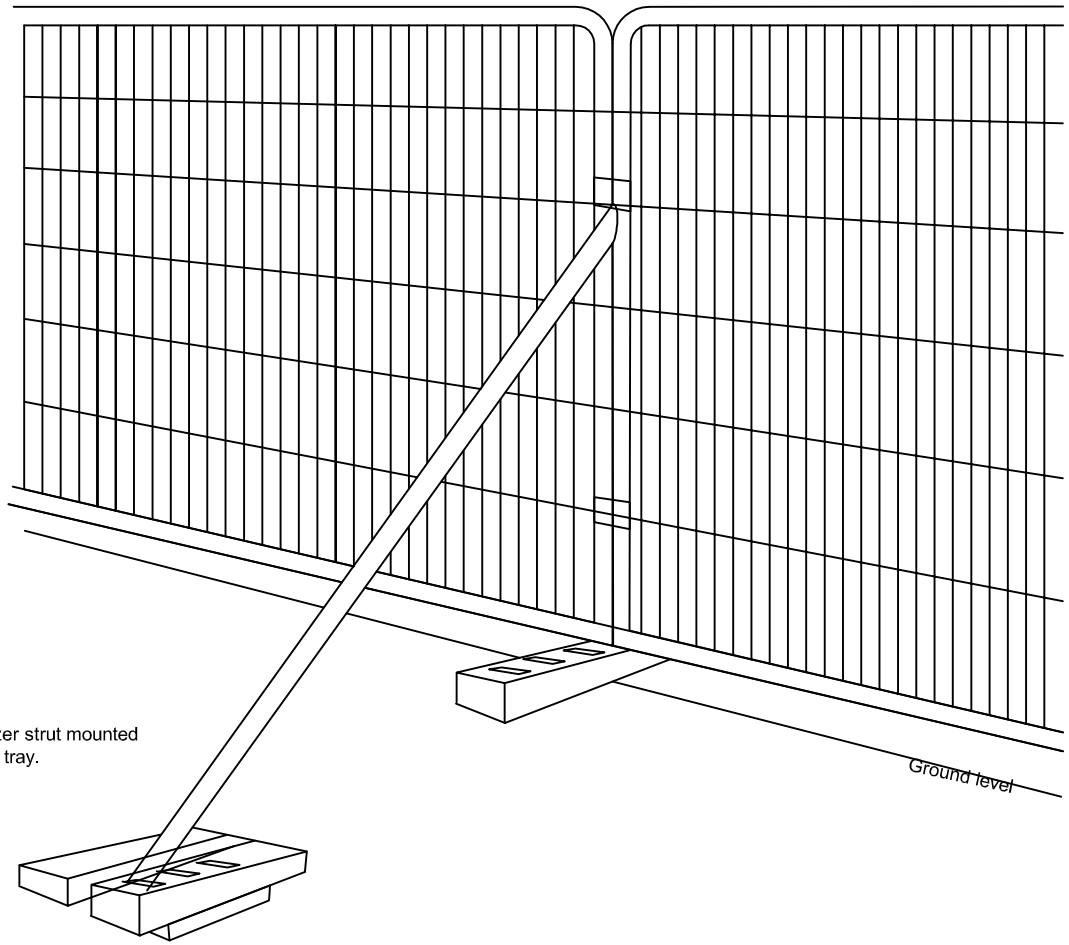
Copy of BS 5837:2012 Figure 2 Protective barrier

Scheme: *Copy of BS5837:2012 Tree Protection Details*	Date: *April 2012*
Title: *Protective Barrier*	Drawn by: *E.J.G*
Scale: *A4. Not to scale*	Project no
Elizabeth Greenwood C.M.L.I., F.Arbor.A. 10 Knight Street, Sawbridgeworth, Herts, CM21 9AT. Tel 01279 722381 mobile 07746867402, email ms.ejgreenwod@gmail.com	Drawing number

Copy of BS 5837:2012
Figure 3 Examples of above ground stabilizing systems (for Heras type fencing)
Total height 2.4metres



a) stablizer strut with base plate secured with ground pins



b)Stablizer strut mounted on block tray.

Scheme: *Copy of BS5837:2012 Tree Protection Details*	Date: *April 2012*
Title: *Protective Barrier -Above Gound Stablization* Scale: *A4. Not to scale*	Drawn by: *E.J.G* Project no
Elizabeth Greenwood C.M.L.I., F.Arbor.A. 10 Knight Street, Sawbridgeworth, Herts, CM21 9AT. Tel 01279 722381 mobile 07746867402, email ms.ejgreenwod@gmail.com	Drawing number

Appendix E

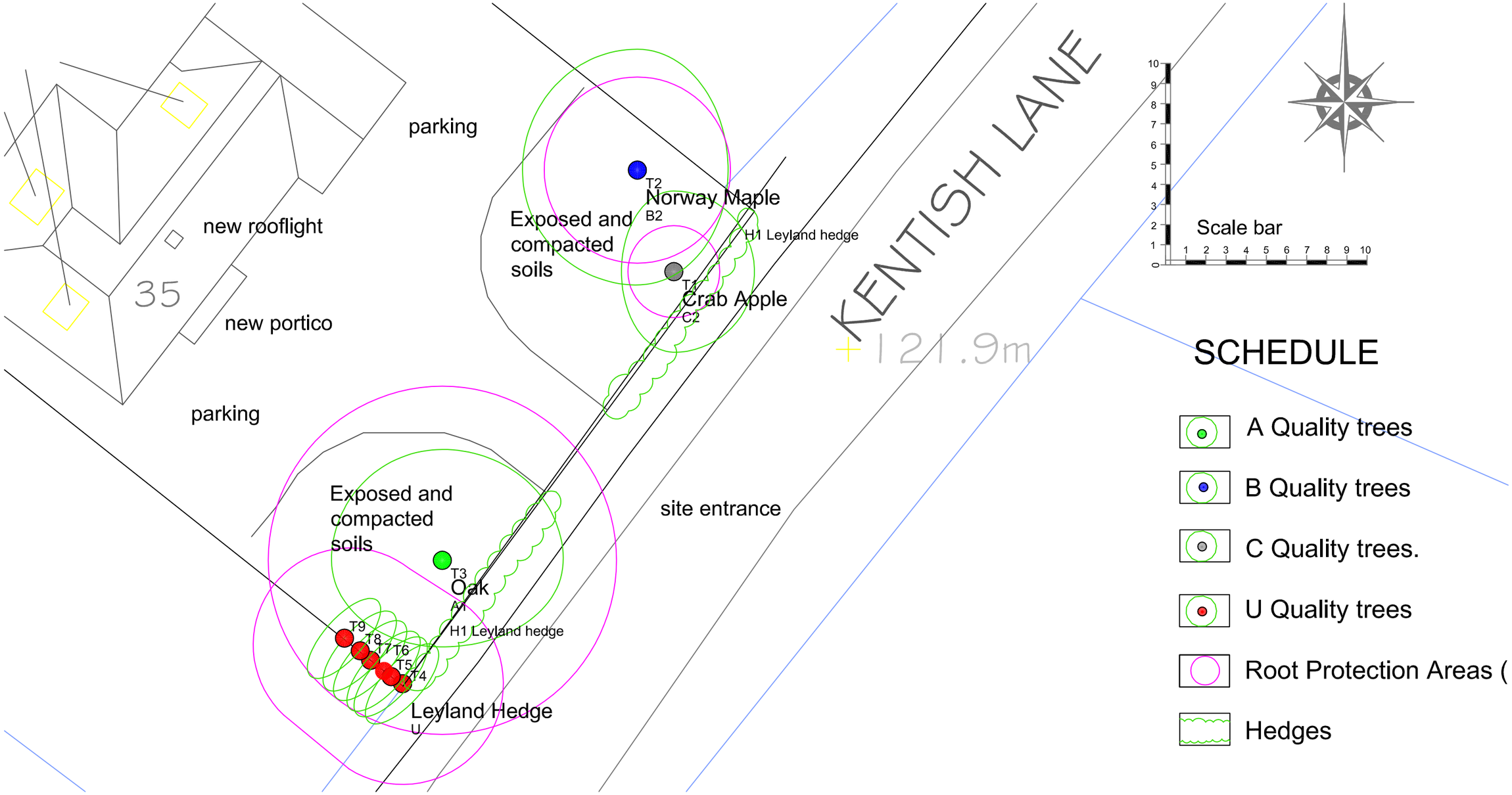
Indicative Arboricultural Supervision

Indicative Arboricultural Supervision

item	*Site supervision visit number	Method of working	Estimated timing	Date of visit
Meet site foremen and discuss works and program. Setting out site and protective fencing, ground protection- site organization, and hedge removal- Setting out wall	Visit 1	1. Carry out tree surgery as specified 2. Fence off as shown with approved fencing 3. Lay ground protection as specified	Prior to site clearance and demolition	
Excavations/ changes of soil levels— and foundation and positioning of pile drivers details- inspect	Visit 2	4. Excavate for the trial pits by hand dug in the position of brick plinths/piers. This is to ascertain whether roots are present. If roots over 50mm are found, where possible, this position of the mini piles or ground anchor should be moved. 5. Construct the pier/ plinths and insert the above ground lintels and lay the brick wall on the lintel.	During construction	
On completion- removal of tree protection, planting and remedial works- removal	Visit 3	6. On completion of construction Remove tree protection fencing and landscape area as agreed with the LPA. 7. Carry out remedial works with ground de-compaction and topsoil round the base of the tree as indicated.	Post completion	

Appendix F

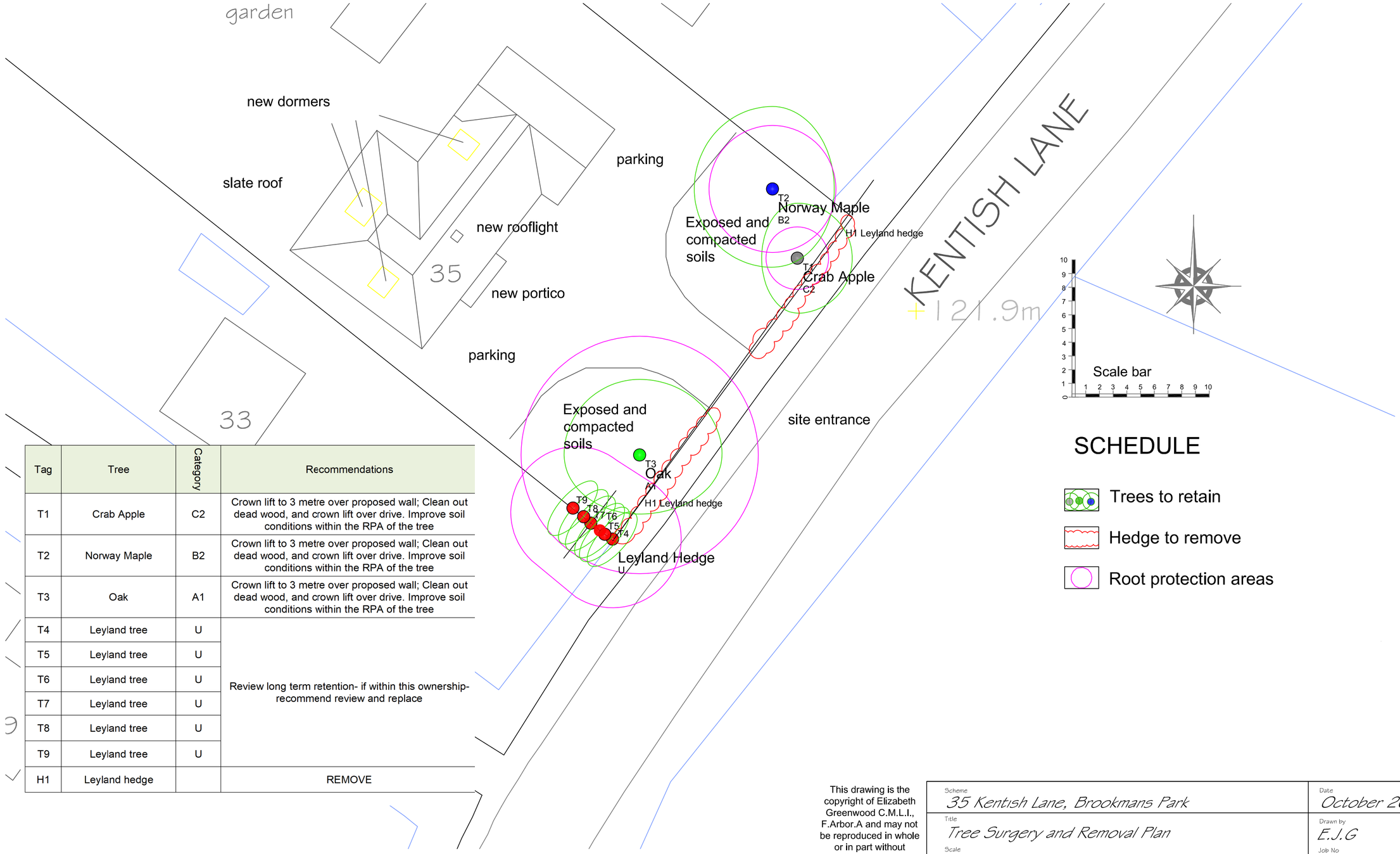
Plan759.17.1 Tree Constraints Plan



Scheme: *35 Kentish Lane, Brookmans Park*	Date: *October 2017*
Title: *Tree Constraints Plan*	Drawn by: *E.J.G*
Scale: *1:200 @ A3.*	Job No: *757.17*
Elizabeth Greenwood C.M.L.I., F.Arbor.A. 10 Knight Street, Sawbridgeworth, Herts, CM21 9AT. Tel 01279 722381 mobile 07746867402, email ms.ejgreenwood@gmail.com	Drg No: *757.17.1* *Appendix F*

Appendix G

Plan 759.17.2 Tree Surgery and Removal Plan



Tag	Tree	Category	Recommendations
T1	Crab Apple	C2	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree
T2	Norway Maple	B2	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree
T3	Oak	A1	Crown lift to 3 metre over proposed wall; Clean out dead wood, and crown lift over drive. Improve soil conditions within the RPA of the tree
T4	Leyland tree	U	Review long term retention- if within this ownership- recommend review and replace
T5	Leyland tree	U	
T6	Leyland tree	U	
T7	Leyland tree	U	
T8	Leyland tree	U	
T9	Leyland tree	U	
H1	Leyland hedge		REMOVE

Landscape Institute Registered Practice

Arboricultural Association Fellow Member

Scheme: 35 Kentish Lane, Brookmans Park	Date: October 2017
Title: Tree Surgery and Removal Plan	Drawn by: E.J.G
Scale: 1:200 @ A2.	Job No: 757.17
Elizabeth Greenwood C.M.L.I., F.Arbor.A. 10 Knight Street, Sawbridgeworth, Herts, CM21 9AT. Tel 01279 722381 mobile 07746867402, email ms.ejgreenwood@gmail.com	Drg No: 757.17.2 Appendix G

AppendixH

Plan 759.17.3 Tree Protection Plan

Ground protection

In the vicinity of the temporary unit working space will mainly be confined to existing hard surfacing. Where additional working space is required for construction within the root protection areas of retained trees, the British Standard specifies the following type of ground protection.

a) For pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geo-textile membrane;

b) For pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geo-textile membrane;

Foundation design of the wall- recommendations

Brick plinth/ piers- the foundation for these should be minimized, either with a mini pile of ground anchor. All excavations should be hand dug to ensure that tree roots are not severed, and if roots over 50mm are encountered the position of the foundation moved.

It is recommended that a (steel) lintel to suit the 2.8 span is designed and manufactured to support this wall, for example an 'L' or 'H' shaped . This will be section 3 straight 2.8 metre sections and one curved section; a total length of 11.2 metres on the southern side of the entrance and within the RPA of the oak tree (T3) It is to be designed to sit above ground and form a ledge on which the wall is to be constructed.

Remedial works and soil improvement

Exposed soils are easily compacted resulting in loss of water and gaseous exchange and leading to root deaths. To relieve ground compaction, which may have resulted from the overrun of vehicles or by storage of materials, the clay soils should be broken up to allow air to penetrate and for the soil structure to be restored.

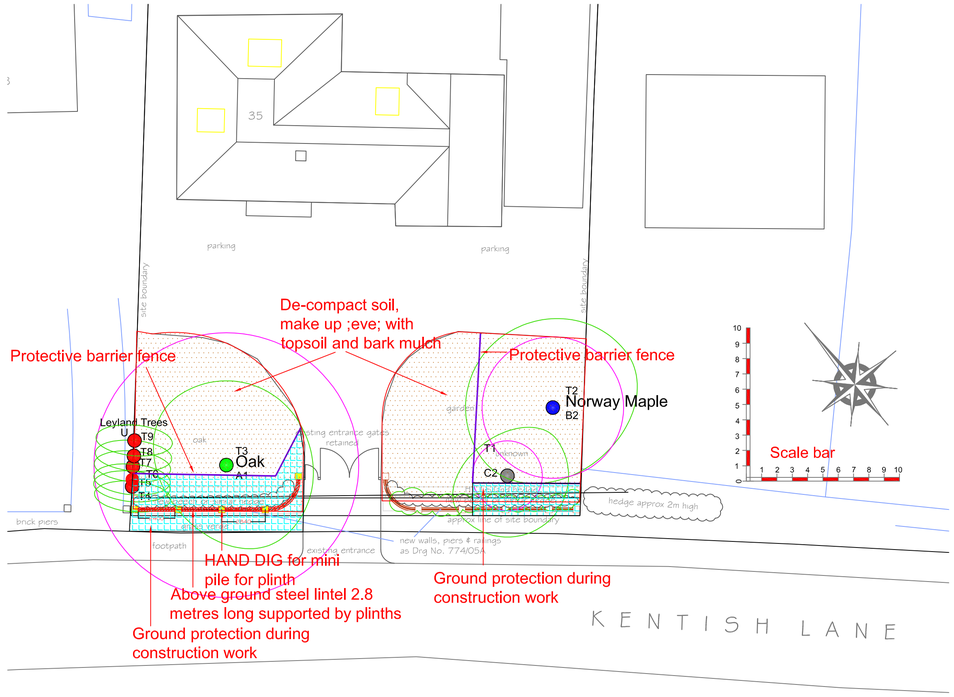
There are various methods to achieve this which are outlined in the appendices to this report.

- Auguring the soil by hand combined with soil improvements
- Pneumatic excavation for example air spade and soil improvements

Within the tree root protection area improve the soil structure by incorporating a compost or mulch within the topsoil, of 75-100mm in depth. This can be spread over the surface and gently forked into the soil. If bark chip is used as a mulch NPK fertilizer should be added to counteract the nitrogen depletion of the soil. There are options for additives of microrryhizal fungal which may also improve root function. Ground compaction will be addressed by either lightly forking over the area or by other techniques; for example use of tree spade soil aeration.

SCHEDULE

- Trees to retain
- Hedge to remove
- Root protection areas
- Protective /barrier fencing
- Ground protection
- Remedial works round tree de-compact soil and topsoil with bark mulch
- Hand dig for mini pile (or ground anchor) for plinth for wall
- Brick walls
- Steel lintel for wall
- Concrete mixing and storage of contaminants

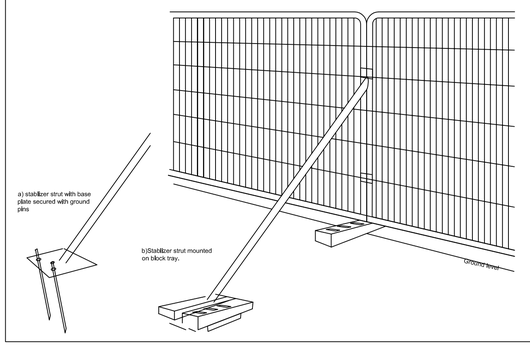


Method of working

1. Carry out tree surgery as specified
2. Fence off as shown with approved fencing
3. Lay ground protection as specified
4. Excavate for the trial pits by hand dug in the position of brick plinths/peiers. This is to ascertain whether roots are present. If roots over 50mm are found, where possible, this position of the mini piles or ground anchor should be moved.
5. Construct the pier/ plinths and insert the above ground lintels and lay the brick wall on the lintel.
6. On completion of construction Remove tree protection fencing and landscape area as agreed with the LPA.
7. Carry out remedial works with ground de-compaction and topsoil round the base of the tree as indicated.

Protective barrier/fencing

Copy of BS 5837:2012 Figure 3 Examples of above ground stabilizing systems (for Heras type fencing) Total height 2.4metres. Not to Scale



Scheme: 35 Kentish Lane, Brookmans Park	Date: October 2017
Title: Tree Protection Plan	Drawn by: E.J.G
Scale: 1:200 @ A1.	Job No: 757.17
Elizabeth Greenwood C.M.L.I., F.Arbor.A. 10 Knight Street, Sawbridgeworth, Herts, CM21 9AT. Tel 01279 722381 mobile 07746867402, email ms.ejgreenwood@gmail.com	Drg No: 757.17.3 Appendix H