

RMTTree Consultancy Ltd



BS5837:2012 Arboricultural Survey Implications Assessment & Arboricultural Method Statement

**Site Address:
Long Garden Cottage
Winchester Road
Boorley Green
SO32 2BX**

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HND Urban Forestry - ND Forestry - MArborA

Ref: RMT578
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PRO2239

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1. Direction

- 1.1** To undertake an inspection of trees that are on or adjacent to Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations.

Figure 1 – Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX shown by an indicative red line

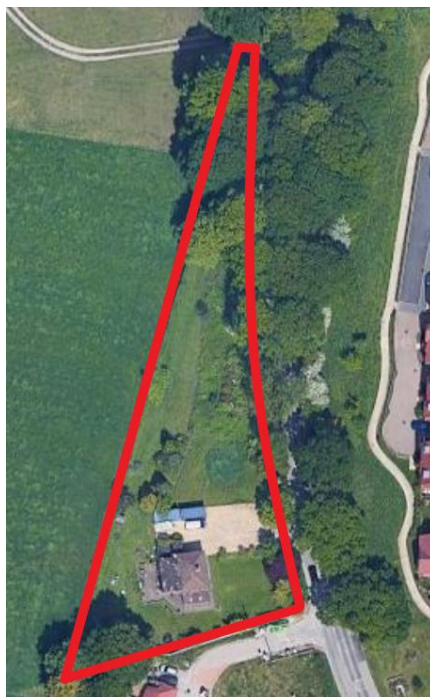


Image courtesy of Google Map Data © 2019

2. Purpose of this report

- 2.1** This report provides clarification of the above and below ground arboricultural constraints to inform the site layout design relating to the proposed development on land at Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX.

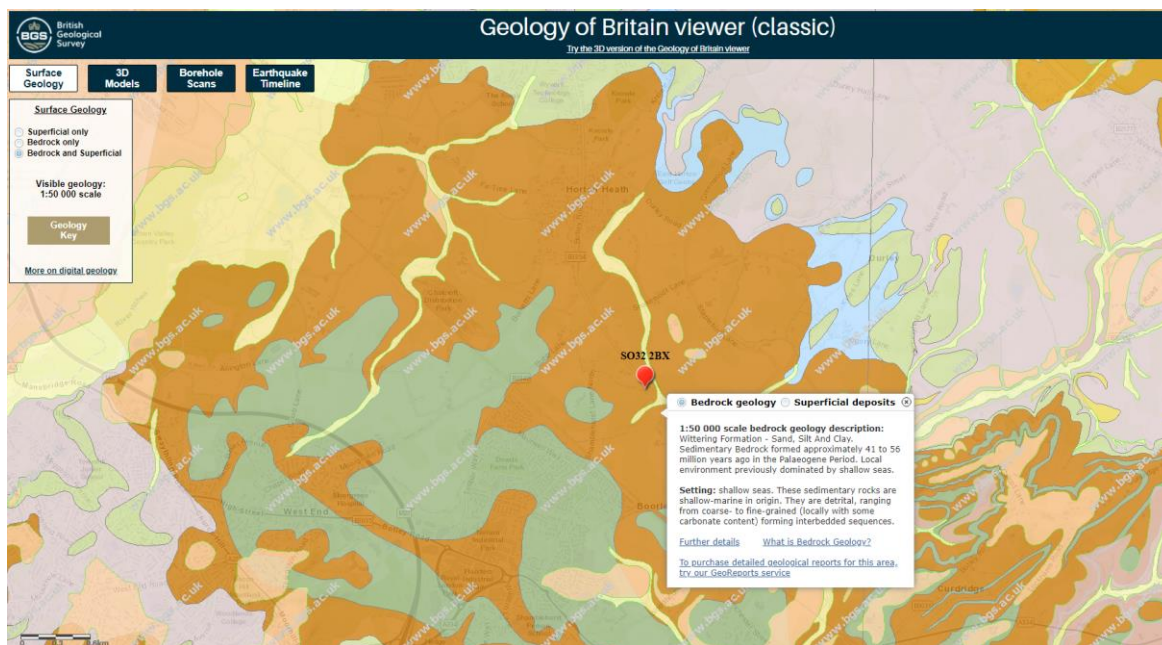
3 Limitations

- 3.1** The survey was carried out from ground level using my observations of the trees.
- 3.2** A topographical survey showing the locations of trees on or adjacent to the property was provided prior to my visit.
- 3.3** All measurements taken to calculate root protection areas and canopy spreads have been measured wherever possible. Where it has not been possible to access certain areas, dimensions have been estimated.
- 3.4** This report does not constitute a safety survey of the trees included within it. It is advised that if there are concerns regarding the risk posed by trees to persons and property then a tree condition survey should be commissioned.

4 Soil Assessment

- 4.1** No soil assessments have been undertaken however a check the British Geological Survey gives the soil type as Wittering Formation - Sand, Silt and Clay. This means that the underlying soil will be shrinkable and as such foundations will need to be deepened. If further assessments are undertaken that show that there is shrinkable clay, then foundations to must be designed in accordance with the guidance within the National House Building Council's Standards Chapter 4.2 Building near trees.

Figure 2 – The British Geological Survey indicates that the soil make-up at Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX is shrinkable Wittering Formation - Sand, Silt and Clay.



5 Site Description

- 5.1 The property is accessed from Winchester Road by a gravel driveway which enters along the eastern boundary, circa 15m from the southern boundary. In the south-western corner of the property is a house which consists of a dwelling in the south-western garden. To the west and north of the house is a garden. Along the central and eastern parts of the garden are overgrown with brambles, shrubs and small immature trees.

6 Legal Restrictions

- 6.1 The local planning authority (LPA) has not been contacted directly to ascertain whether the trees on or adjacent to the site are protected by Tree Preservation Orders (TPO) or if they are within a Conservation Order.
- 6.2 A check on the Eastleigh Borough Council online protected tree checking facility indicates that the trees growing at Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX are not under the protection of a TPO or Conservation Area.

7 Proposal

- 7.1 Construction of a two dwellings and associated parking and driveways.

8 Background

Tree categorisation

- 8.1 A total of eighteen trees and five groups have been surveyed. At the time of inspection five trees were considered to be category A and high value, and seven trees were considered to be category B and moderate value. The remaining trees and groups were considered to be category C and of low value.
- 8.2 All trees were categorised in accordance with British Standard 5837:2012 as shown at **Appendix 1**.
- 8.3 It was noted that there are other trees that are located on or adjacent to Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX but they have not been included within this report. This is because it is deemed that they are:
- far enough from the proposed development site that they will not be affected;
 - they will be adequately protected by the tree protection measures afforded to the surveyed trees;
 - they are specimens of limited significance;

Root protection area (RPA) definition

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

(British Standard 5837:2012 – Trees in relation to design, demolition and construction – Recommendations – The British Standard Institute 2012).

8.5 Section 4.6.2 of BS5837:2012 states the following:

The RPA of each tree should initially be plotted as a circle centred on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.

(British Standard 5837:2012 – Trees in relation to design, demolition and construction – Recommendations – The British Standard Institute 2012).

8.6 The RPA of trees T2, T4, T5, T6, T7, T8, T9 and T11 have been offset to demonstrate a more probable root morphology as shown at **Appendix 3**. This is because of the make-up of the highway (Winchester Road) is likely to be a constraint to significant root development.

Canopy spreads

8.7 The canopy spreads have been measured from ground level using a laser measure and visual assessment.

Measurements

8.8 Wherever possible all diameter at breast height measurements have been measured using a DBH tape. Where it has not been possible access the stems at 1.5m above ground level due such things as dense Ivy, trees being offsite or the tree being inaccessible, an estimated measurement has been taken. All estimated measurements include the word “estimated” or the abbreviation “est”.

10 Arboricultural Implications Assessment

Tree removal

- 10.1** To facilitate development, it will be necessary to remove tree T13 and groups G14 and G15 due to them being overlapped or near to plot one. In all three instances they are considered to constitute unremarkable and insignificant specimens of minimal landscape value. Taking this into account it is considered that these removals are acceptable on this occasion.

Figure 3 – Tree T13 is to be removed



Figure 4 – Group G14 is to be removed



Figure 5 – Group G15 is to be removed



- 10.2** Group G23 will require partial removal back towards the eastern fence line to provide adequate space for the development. This group is formed of young, poorly formed trees, shrubs and brambles.

Tree protection fencing

- 10.3** Tree protection barriers will be required throughout the construction process to restrict construction access within the RPAs of trees and groups T2 – T12, T16 and T17. The areas to be protected by the tree protection barriers can be seen as blue lines on the accompanying Tree Protection Plan at **Appendix 4**.
- 10.4** Tree protection fencing will consist of a scaffold framework, well braced to resist impacts, with vertical tubes spaced at a maximum intervals of 3m. Onto this, weld mesh panels or 2m high shuttering board will be securely fixed with wire or scaffold clamps.
- 10.5** Un-braced weld mesh panels on unsecured rubber or concrete feet will not be used as these are not resistant to impact and are too easily removed by site operatives. An alternative system of bracing which does not require a scaffold framework may be practical however this will need the written consent of the LPA. A notice will be attached to the fencing which says 'Tree Protection Area. Keep Out!'

Implications in relation to constructing hard surfacing close to trees (driveway)

- 10.6** Where the construction of a surface cannot be avoided within the fenced RPA of retained trees the soil substrate itself will form part of the construction profile (sub grade), a 'NO-DIG' approach is to be adopted.
- 10.7** The proposed surfacing to provide access to plot two will significantly overlap with the RPAs of trees T4 and T5. To minimise the impact on RPAs the surface (including any associated edge support) should be engineer designed to take account of site-specific data including soil type, current level if soil type and anticipated axle loads of vehicle using the new surface.

10.8 The surface must:

- Provide adequate resistance to applied loads and avoiding localised ground compaction by evenly distributing the carried weight over the track width and wheelbase of any vehicles that will use the access.
- Provide resistance to or tolerance of deformation by tree roots.
- Provide oxygen diffusion according to seasonal demand (gas porous).
- Provide water throughout to meet seasonal demand (permeable).
- Preserve the soil structure during installation to prevent lack of water, exclusion of oxygen, excessive resistance to penetration (density or soil strength) and or chemical toxicity.

10.9 Construction may (where appropriate) incorporate:

- The use of a three-dimensional Cellular Confinement System (CCS), such as Cellweb, as an integral component of the subbase, to act as a suspension layer by creating cells into which recommended material is contained. Here it is necessary to install a geotextile layer between the ground and the cells to prevent mixing and the cellular materials being pressed into the ground.
- Alternatively, where the use of a CCS is not appropriate due to the underlying soil (and/or other site factors) reinforced concrete slabs, supported and suspended on mini-piles and incorporating a designed system that allows for the passage of water and oxygen to the underlying soil maybe used.
- Other engineered-designed surfaces that address the requirements of the above performance specification may also be used.

10.10 Examples of acceptable hard surface include washed gravel (not binding gravel or hoggins as these are almost impermeable when consolidated); dry jointed paving slabs, pavers or bricks on a sharp sand foundation, permeable paving blocks or pre-made concrete slabs with 50mm diameter holes at regular spacing of 300-600mm (to be agreed) with a no-fines aggregate back filling of the openings.

10.11 Section 7.4.2.3 of British Standard 5837:2012 recommends that proposed new permanent hard standing should not exceed more than 20% of the total unsurfaced ground within RPAs. The table shown at Figure 6 provides a break-down of the total overlaps into the RPAs of trees T4 and T5.

Figure 6 – Table showing new surfacing overlap into RPAs of trees T4 and T5

Tree no.	RPA area	Existing surfacing within RPA	Unsurfaced areas within RPA	New overlap into unsurfaced RPA	Percentage of new overlap into unsurfaced RPA
T4	136.8m ²	0m ²	136.8m ²	10.6m ²	13.4%
T5	221.7 m ²	0m ²	221.7 m ²	66.6m ²	30%

- 10.12** On this occasion it has been demonstrated that the total overlap into the unsurfaced RPA of tree T4 does not exceed 20% however the overlap into the RPA of T5 does.
- 10.13** Taking these findings into account, new surfacing within the RPAs of trees T4 and T5 will need to be partially constructed using an engineered method (areas hatched yellow at **Appendix 4**) and partially using a no dig three-dimensional cellular confinement system with a minimum depth of 100mm areas hatched red at **Appendix 4**).

Suspended bar grate driveway surface suspended on mini piles within the RPA of T5

- 10.14** The suspended bar grate surface will be designed by a structural engineer, but it is intended to have minimal impact on the soil structure, so it does not count towards the 20% threshold detailed in BS5837:2012. The gaps in the grating will be fill with washed sharp sand which allows water to freely drain into the soil. The suspended nature of the surfaces means that there is no pressure on the soil so there is no risk compacting the soil. The excavations for mini piles are considered to be localised and their locations adjusted if roots over 25mm diameter are uncovered.

Figure 7 – Example of the finished bar grate surface



Figure 8 – Suspended structure prior to addition of bar grate



- 10.15** This engineered system does not impact on the soil structure and as such does not count towards the 20% calculation shown at Figure 5.
- 10.16** It has been demonstrated that by utilising the bar grate system in conjunction with a three-dimensional cellular confinement system (Cellweb) the new surfacing within the RPA of trees does not exceed the 20% threshold. Taking this into account this combined method of constructing the driveway will be acceptable.

Areas for site compounds, storage and mixing

- 10.17** Site compounds will be located away from trees wherever possible and ideally 2m from any protective barriers. If possible, they will not be sited under tree canopy spreads or within RPAs.
- 10.18** It is proposed that the area to the south of plot one will be utilised for site compounds, storage and mixing as shown at **Appendix 4**.

Services

- 10.19** The proposed layout of incoming services is not yet established but they should be installed outside root protection areas. If it is necessary for a trench to be dug through an RPA a specific method statement will be required which will need to specify that the trench will be hand dug and that care will be taken to preserve all roots encountered which are larger than 25 mm diameter.
- 10.20** It is recommended that if new service trenches need to be routed into the site then the excavations should proceed from the southern half of the existing access to avoid RPAs. There is then considered to be adequate space to route the services without needing to pass through RPAs. The recommended initial entry point for services is shown as an orange line at **Appendix 4**.

11 Arboricultural Method Statement

Access facilitation works

- 11.1** The agreed tree removals will be carried out as preliminary works as detailed at **Appendix 2**. These works will be carried out by suitably qualified arborists to the standards set out in BS3998: 2010 Tree works – recommendations. Heavy machinery must not be used on unprotected ground.

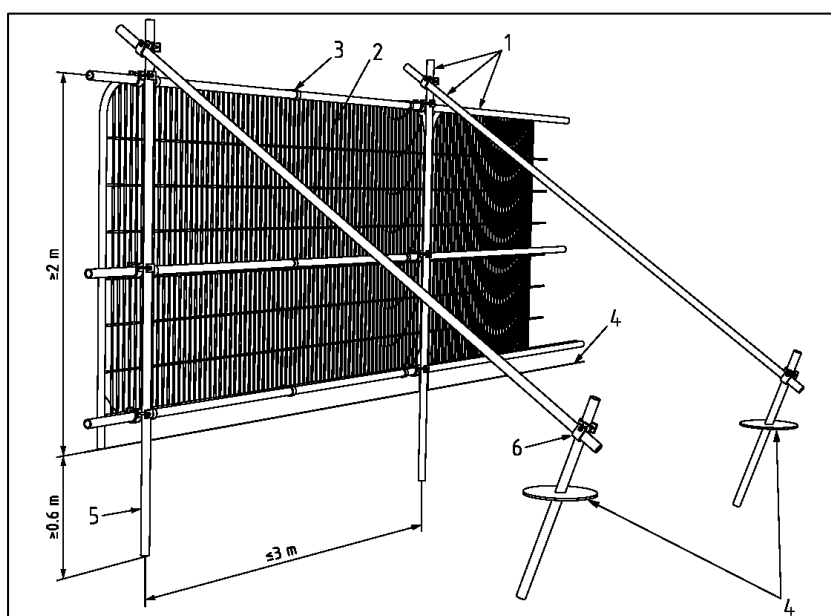
Pre-commencement meeting

- 11.2** Prior to the commencement of development all tree protection will be erected, and a site meeting will be held between the appointed building contractors, the appointed arboriculturalist and local authority Tree Officer as detailed at **Appendix 5**. This meeting will ensure that the position of the tree protection is correct and methods of protecting trees are understood.

Protective barriers/fencing

- 11.3** All tree protection barriers will be erected in the positions shown at **Appendix 4** and in accordance with the specifications detailed in Figures 9, 10 and 11.

Figure 9 – Default specification for protective barrier

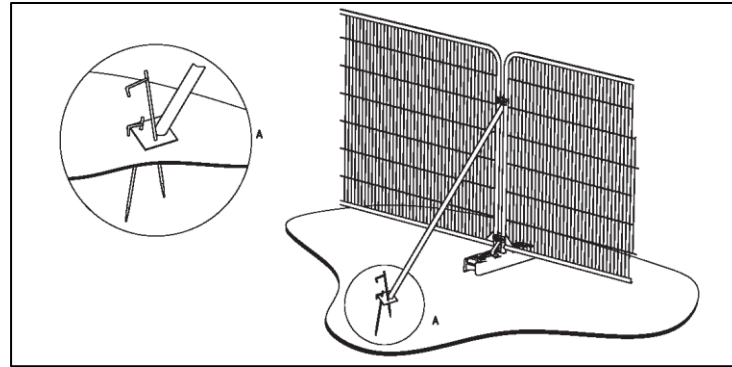


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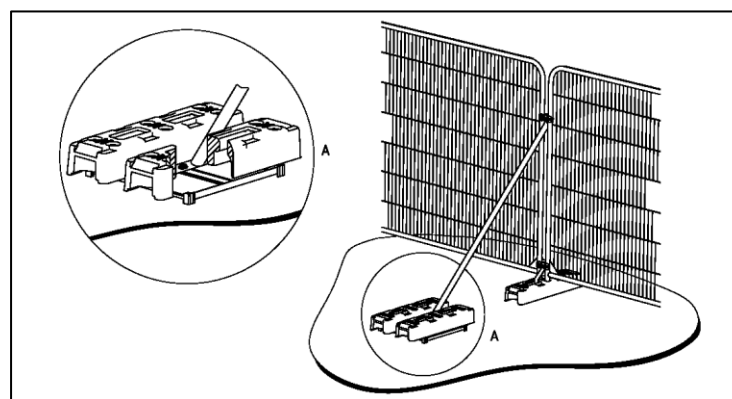
1. Standard scaffold poles
2. Heavy gauge 2m tall, galvanized tube and welded mesh infill panels
3. Panels secured to uprights and cross-members with wire ties
4. Ground level
5. Uprights driven into the ground until secure (minimum depth 0.6m)
6. Standard scaffold clamps

Image taken from British Standard 5837:2012 – Trees in relation to design, demolition and construction – Recommendations

Figure 10 and 11 – Examples of above-ground stabilizing systems



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Image taken from British Standard 5837:2012 – Trees in relation to design, demolition and construction – Recommendations.

Warning signs

11.4 All weather notices will be attached to the tree protection fencing.

Figure 12 – Examples of tree protection warning sign.



11.5 Development can commence in accordance with the planning consent.

Method of constructing no dig surfaces close to trees (Cellweb)

11.6 **The construction of the new surface must be carried out at the commencement of development.**

11.7 A cellular confinement system with a minimum depth of 100mm, or the minimum depth specified by an engineer to support cars, 4x4s and vans will be used in those areas shown as red hatching at **Appendix 4**.

11.8 The appointed arboriculturalist will be invited to site to supervise the installation. Prepare the site by carefully hand raking any excessive organic matter and removing all debris and significant protrusions such as rocks. Use ground protection system if vehicular movements are unavoidable.

11.9 Ensure that the prepared surface is reasonably even and fill any significant depressions with 40/20 granular material to achieve an even surface profile. Do not roll or consolidate the area.

11.10 Install tanalised timber edging boards to the perimeter of the construction zone as appropriate to the total layer profile thickness. Avoid damage to tree roots when placing posts and pegs.

11.11 Install a geotextile layer across the site (a possible suggestion is Treetex T-300 supplied by Geosynthetics). The adjacent roles of geotextile membrane should overlap by 150mm. It may be necessary to lightly pin the geotextile membrane in place until the overlying layers are installed.

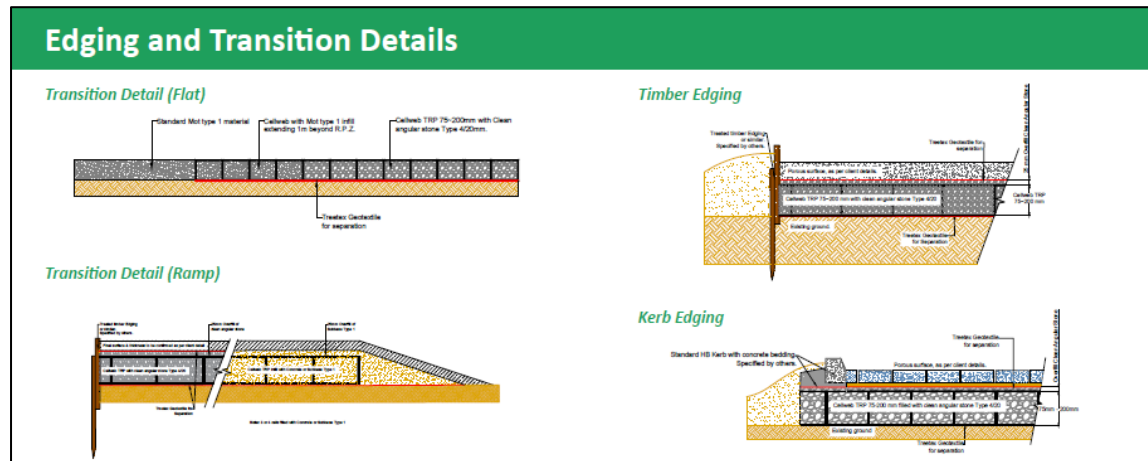
11.12 Place the Geogrid layer over the Geotextile Membrane layer and fix down using steel pins to hold flat. Overlap adjacent rolls by minimum 150mm. Avoid tree root damage and soil compaction by avoiding vehicular movements over the area.

11.13 Open out and lay the specified layer thickness of the Cellular Confinement System and pin in place between the edging boards. Pin the CCS in place using Steel Fixing Pins or similar and fully expanded position whilst the cells are being filled and to stop the structure from being pushed up by migrating aggregate during the filling process. Pin spacing will vary according to the site conditions but will generally be required at 1m - 2m centres on flat surfaces, mainly placed around the perimeter of the area and where adjacent sections of CCS about each, with less in the middle of the area. Drive the pins in so that they are just touching the top of the cells but do not compress the fabric. Avoid any obvious surface tree roots during the pinning process.

11.14 Fill the CCS, working toward the trees from the furthest point away and using the filled CCS as a platform. The Cells must be filled with clean, open graded angular aggregate, normally in the particle size range of 5mm - 45mm – not single sized or rounded aggregate. Do not roll the surfaces a light vibratory compaction plate (whacker) is permitted to settle the stone in to the cells. Do not contaminate the filled cells with site debris, soil or mud.

11.15 Install the final binder course and permeable surface courses as per the manufacturer's instructions.

Figure 13 – Cellweb edging and transition details



Preparation for the construction of a bar grate driveway suspended on mini piles

- 11.16** The bar grate surface will be designed by a structural engineer, but it is intended to minimise ground disturbance and root severance by avoiding extensive excavations. Mini piles will be installed by a piling rig and will not exceed 200 mm diameter. The surface (shown hatched yellow at **Appendix 4**) will be suspended on mini-piles at ground level and there will be no excavation except for the installation of mini-piles. The specific position of the mini piles will be determined by hand digging in the proposed pile location. If roots larger than 25 mm diameter are encountered the position of the pile will be adjusted.
- 11.17** All excavations for the ramp will be undertaken using hand tools or compressed air device and under the supervision of the project arboriculturalist. Any roots under smaller than 25 mm diameter will be severed using a pair of secateurs. If roots over 25 mm diameter are uncovered, the advice of the project arboriculturalist will be sought. If it is necessary to sever roots over 25mm diameter, this will be done using secateurs or a hand saw, and they must not be ripped or torn.

Burning of waste

- 11.18** No fires will be lit on site within 3m of root protection areas, due to the danger of scorching of leaves and branches of overhanging trees.

Space for machinery, parking of vehicles, storage of materials and site huts

- 11.19** All machinery required on site will operate outside of root protection areas or from existing hardstanding. Site huts and accommodation, if required, will be located outside root protection areas.

Arboricultural supervision

- 11.20** It is recommended that an appointed arboriculturalist is instructed to oversee tree protection for the duration of the construction/landscaping contract(s). Alternatively, a designated person (site foreman or site owner) should take on the responsibility of overseeing tree protection. If appointed, the appointed arboriculturalist will be consulted on any issues that may arise concerning trees and will visit the site as often as necessary to ensure that trees are protected and/or at the following key stages:

- Prior to contractors commencing works on site in order to meet with the supervising architect and/or the contractor's nominated site manager and Tree Officer to ensure that the principles of tree protection are understood and the procedure, timescale and materials for installation of tree protection are agreed;
- Following installation of tree protection but prior to any works commencing on site to confirm that it is fit for purpose;
- During setting out for the installation of the no dig surfacing;
- During preparation for the construction of the bar grate driveway surface;
- At any time that there are potential conflicts with tree protection;
- At the completion of construction works to confirm that tree protection may be removed to enable final landscaping;

11.21 A pre-start meeting should be held on site with the appointed arboriculturist and the contractor's representative(s) so that the precise details of the schedule of works together with details of installation of tree protection can be agreed and personnel induction carried out. The site manager/foreman will be fully briefed on tree protection measures and procedures before any workers or sub-contractors are permitted onto the site.

11.22 All contractors involved in the project have a duty to comply with all the specified tree protection measures and all workers will be provided with induction by the site manager/foreman and be required to sign an Induction Sheet confirming they have understood the protection measures. Signed sheets will be kept on site for inspection.

11.23 No enabling works will take place until after the meeting has been held and tree protection has been installed, inspected and approved as fit for purpose.

11.24 Fencing and ground protection will not be removed under any circumstances during construction unless with the express approval of the local planning authority

11.25 Following completion of all development the tree protection can be dismantled to allow landscaping works to take place.

12 Conclusions

- 12.1** A BS5837: 2012 survey of eighteen trees and five group has been carried out on or adjacent to Long Garden Cottage, Winchester Road, Boorley Green, SO32 2BX.
- 12.2** A total of eighteen trees and five groups have been surveyed. At the time of inspection five trees were considered to be category A and high value, and seven trees were considered to be category B and moderate value. The remaining trees and groups were considered to be category C and of low value.
- 12.3** The proposed development requires the removal of one category C tree T13 and two category C groups G14 and G15.
- 12.4** The trees to be retained will be protected during development and methods for ensuring their protection have been described.

Appendix 1 – British Standard 5837:2012 tree categorisation chart

TREES UNSUITABLE FOR RETENTION				
CATEGORY AND DEFINITIONS	CRITERIA			IDENTIFICATION ON PLAN
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning). • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality. <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5 of BS5837:2012</i>			RED  RGB 127.000.000
TREES TO BE CONSIDERED FOR RETENTION				
CATEGORY AND DEFINITIONS	CRITERIA - SUBCATEGORIES			IDENTIFICATION ON PLAN
	1 Mainly arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue).	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features.	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	LIGHT GREEN  RGB 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 are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation.	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees with material conservation or other cultural value	MID BLUE  RGB 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 below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.	GREY  RGB 091.091.091

Appendix 2 - Tree survey schedule

Tree No.	Species	Height (m)	Trunk dia. at 1.5m	Canopy Spread	Crown Height (m)	Age Class	Physiological Condition	Structural Condition	Comments/ Recommendations	Useful Life Expect	BS5837 grade	Root Protection Area	
												Radius	RPA Area
G1	Group of Purple Maple Purple Plum Campbells Magnolia Leyland Cypress	8m	Max 350mm est	N2m E5m S2m W5m	1.5m	Early mature	Good	Fair		20+	C	4.2m	55.4m ²
T2	Purple Maple (<i>Acer platanoides</i> 'Crimson King')	12m	395mm	N4m E5m S5m W5m	2m	Semi mature	Good	Good	Medium deadwood.	20+	C	4.7m	70.6m ²
G3	Group of Lawson Cypress	9m	Max 175mm est	N2m E2m S2m W2m	0m	Semi mature	Good	Fair	Tight compression forks.	10+	C	2.1m	13.9m ²
T4	Common Oak (<i>Quercus robur</i>)	16m	550mm est	N5m E6m S6m W2.5m	5m	Mature	Good	Fair	Unbalanced crown to east due to previous competition.	40+	B	6.6m	136.8m ²
T5	Common Oak (<i>Quercus robur</i>)	18m	700mm est	N8m E8m S8m W4m	6m	Mature	Fair	Good	Less than normal bud development at branch ends. Medium deadwood.	20+	B	8.4m	221.7m ²
T6	Common Oak (<i>Quercus robur</i>)	17m	375mm est	N3.5m E4m SE6m S3m W2.5m	5m	Mature	Fair	Fair	Less than normal bud density. Etiolated specimen.	20+	C	4.5m	63.6m ²
T7	Common Oak (<i>Quercus robur</i>)	18m	500mm est	N7m E7m S7m W4m	9m	Mature	Fair	Good	Less than normal bud density at branch ends. Medium deadwood.	20+	B	6.0m	113.1m ²
T8	Common Oak (<i>Quercus robur</i>)	19m	600mm est	N5m E6m S7m W7m	9m	Mature	Good	Good	Off-site tree. Medium deadwood.	40+	A	7.2m	162.9m ²

Tree No.	Species	Height (m)	Trunk dia. at 1.5m	Canopy Spread	Crown Height (m)	Age Class	Physiological Condition	Structural Condition	Comments/ Recommendations	Useful Life Expect	BS5837 grade	Root Protection Area	
												Radius	RPA Area
T9	Common Oak (<i>Quercus robur</i>)	22m	700mm est	N7m E7m S6m W5m	8m	Mature	Good	Good	Ivy restricts view of main unions and lower trunk. Medium deadwood.	40+	A	8.4m	221.7m²
T10	Common Oak (<i>Quercus robur</i>)	19m	855mm	N8m E7m S6m W7m	4m	Mature	Good	Good	Medium deadwood.	40+	A	10.3m	330.7m²
T11	Field Maple (<i>Acer campestre</i>)	8m	200mm	N3.5m E4m S3.5m W2.5m	3m	Semi mature	Good	Fair	Suppressed as overtopped by adjacent tree.	20+	C	2.4m	18.1m²
T12	Common Beech (<i>Fagus sylvatica</i>)	16m	600mm	N6m E5m S6.5m W6.5m	3m	Mature	Good	Fair	Ivy restricts view of main unions and trunk.	40+	B	7.2m	162.9m²
T13	Crab Apple (<i>Malus sp.</i>)	5m	283mm	N4.5m E2.5m S5m W5m	1m	Mature	Good	Fair	Works require for development: Remove tree.	20+	C	3.4m	36.2m²
G14	Group of Lawson Cypress Ellwoodii Common Ash	6m	Max 200mm est	N2m E2m S2m W2m	1.5m	Semi mature	Good	Good	Works require for development: Remove group.	20+	C	2.4m	18.1m²
G15	Group of Lawson Cypress Ellwoodii Leyland Cypress Blackthorn	6m	Max 200mm est	N3m E3m S3m W3m	0m	Semi mature	Good	Good	Works require for development: Remove group.	10+	C	2.4m	18.1m²
T16	Blue cedar (<i>Cedrus atlantica</i> 'Glauca')	3m	140mm	N2m E3m S3m W1.5m	1.5m	Young	Good	Fair		10+	C	1.7m	8.9m²
T17	Silver Birch (<i>Betula pendula</i>)	6m	230mm	N2m E3.5m S4m W3m	1.5m	Early mature	Good	Fair		20+	C	2.8m	23.9m²

Tree No.	Species	Height (m)	Trunk dia. at 1.5m	Canopy Spread	Crown Height (m)	Age Class	Physiological Condition	Structural Condition	Comments/ Recommendations	Useful Life Expect	BS5837 grade	Root Protection Area	
												Radius	RPA Area
T18	Common Oak (<i>Quercus robur</i>)	21m	900mm est	N7m E9m S5m W6m	2m	Mature	Good	Good	Ivy restricts view of main unions and trunk.	40+	A	10.8m	366.4m²
T19	Common Oak (<i>Quercus robur</i>)	17m	653mm	N3.5m E4m S6m W4m	8m	Mature	Good	Good	Medium deadwood.	40+	B	7.8m	192.9m²
T20	Common Oak (<i>Quercus robur</i>)	16m	600mm est	N1m E5m S4m W7m NW6m	7m	Mature	Good	Fair	Medium deadwood. One-sided crown as suppressed by adjacent tree.	20+	B	7.2m	162.9m²
T21	Leyland Cypress (<i>X Cupressocyparis leylandii</i>)	16m	600mm	N4m E4m S4m W4m	2m	Mature	Good	Good		20+	C	7.2m	162.9m²
T22	Sweet Chestnut (<i>Castanea sativa</i>)	16m	489mm	N7m E4m S2m W7m	2m	Early mature	Good	Fair	Unbalanced crown to north and west due to proximity of adjacent trees.	40+	B	5.9m	108.2m²
G23	Group of Common Holly Common Hazel Leyland Cypress English Elm	8m	-	-	1.5m	Semi mature	Good	Fair	-	20+	C	-	-

Appendix 3 – Tree Constraints Plan – RMT578 – TCP
Tree constraints plan (TCP) showing retained trees, tree numbers, root protection areas (magenta circles/polygons) and canopy spreads (green lines). The plan has been provided separately as a PDF at a scale of 1: 250 @ A2.

[illegible]

Appendix 4 – Tree Protection Plan – RMT578 – TPP

Tree protection plan (TPP) showing retained trees, tree numbers, root protection areas (magenta circles/polygons) and canopy spreads (green lines). The location of protective fencing is shown as blue lines, no dig surfacing as red hatching and special construction as yellow hatching. The plan has been provided separately as a PDF at a scale of 1: 250 @ A2.



Appendix 5 – Arboricultural site supervision schedule

Activity	Supervision Required
Pre-commencement meeting between the local authority arboricultural officer, the appointed arboricultural consultant and the appointed building contractor.	✓
During setting out for the installation of the no dig surfacing.	✓
During preparation for the construction of the suspended bar grate surface.	✓
At any time that there are conflict issues with the agreed tree protection.	✓

Following every visit the appointed arboriculturalist will fill out the site monitoring form which is shown at **Appendix 6** and this will be forwarded to the LPA.

Appendix 6 – Site monitoring form

RMTTree Consultancy Ltd 			
Site Monitoring Form			
Date of Visit		Site	
Consultant in Attendance			
Observations/Status of Tree Protection/Comments:			
Recommendations (if necessary):			
Date of Next Visit		Signature	

Cellweb® TRP Installation Guide



Step 1: Prepare Surface



Step 2: Lay out Treetex™



Step 3: Lay out Cellweb® TRP

- Cellweb® TRP is a NO DIG tree root protection measure and it is recommended that no excavation be performed without prior approval and guidance from the Local Authority Arboricultural Officer.
- Soil compaction from vehicles, machinery and materials is to be strictly prohibited during construction within Root Protection Areas (RPAs).
- Approval must be obtained from the Local Authority that the design and the method of construction is acceptable.
- Further information is available from the following two documents;
 - British Standard BS5837: 'Trees in Relation to Design, Demolition and Construction' (2012).
 - Arboricultural Advisory and Information Service: Practice note 12 – 'Through the Trees to Development' (APN12).

Installation Method

1. Prepare the Surface

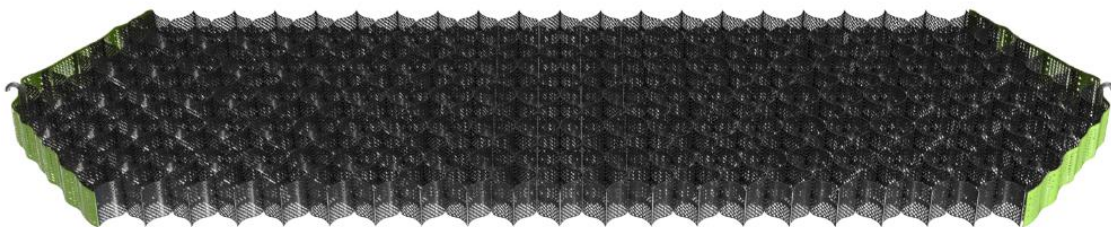
- Remove the surface vegetation using appropriate hand held tools or herbicide (see Note 1).
- Remove any surface rocks, debris and organic material.
- Create a level surface by filling any hollows with clean angular stone or sharp sand.
- Do not level off high spots or compact the soil through rolling.

2. Lay out the Treetex™ Non-Woven Geotextile

- Lay out the Treetex™ over the prepared area, overlaying the edges of the required area by 300mm.
- Overlap any joins by 300mm minimum or more, depending on soil structure (see Note 2).

3. Lay out the Cellweb® TRP Cellular Confinement System

- Lay out the collapsed Cellweb® TRP on-top of the Treetex™.
- Place one of the supplied J pins into the centre cell at the end of the panel and secure into the ground.



Cellweb® TRP - Installation Guide

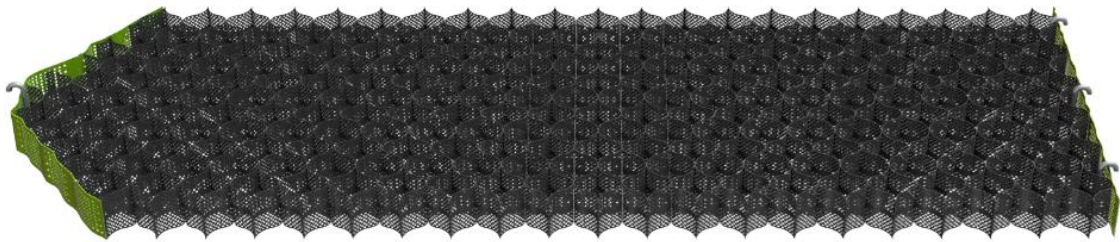


Step 3: Pinning Cellweb® TRP

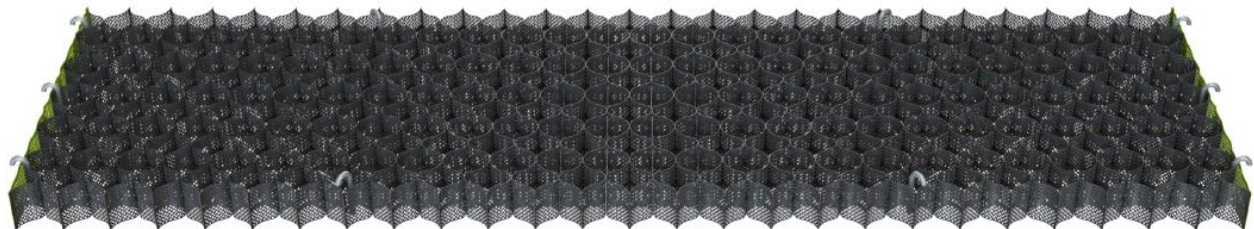


Step 3: Stapling Cellweb® TRP

- Pull out the Cellweb® TRP to its full 8.1m length and secure its length with another J pin.



- Now measure its width to 2.56m and secure in each of the corners with the J pins.
- Use 10 pins per panel to create a panel measuring 8.1m x 2.56m.



- This will produce a cell size of 259mm x 224mm which is the required cell diameter. Each cell must be fully extended and under tension.
- Staple adjacent panels together at each cell (see Note 3).
- If a curved path or shape is required, this should be cut when the Cellweb® TRP panel is pinned out to 8.1 x 2.56m, ensuring complete cells remain. Do not try to curve or bend the Cellweb® TRP panels into place.
- All cells must be fully opened to the required diameter.

Cellweb® TRP - Installation Guide



Step 4: Clean Angular Stone



Step 5: Edge Restraints



Step 6: Surface Options

4. Infill the Clean Angular Stone

- The infill material must be a clean angular stone, Type 4/20mm or Type 20/40mm (see Note 4).
- Do not use M.O.T type 1 or crushed stone with fines for tree root protection.
- Infill the Cellweb® TRP cells with the clean angular stone, working towards the tree and using the infilled panels as a platform.
- Minimum 25mm overfill of clean angular stone when used in conjunction with a hard surface.
- No compaction is required of the infill. Do not use a whacker plate or other means of compaction.
- Encourage settlement of the stone with the use of a light roller or with 2-3 passes of the construction plant used for installation.
- If the clean angular stone is being used as the final surface; regular maintenance will be required to ensure a minimum overfill of 50mm.

5. Edge restraints

- Excavations for kerbs and edgings should be avoided within the RPAs.
- Where edging is required for footpath and light structures, a peg and treated timber board edging is acceptable
- Other options include wooden sleepers, kerb edging constructed on-top of the Cellweb® TRP system, plastic and metal edging etc.

6. Surface options

- All surfaces in Root Protection Areas must be porous. Surfaces can include block paving, asphalt, loose gravel, grass and gravel retention systems (e.g Golpla), resin bound gravel, concrete etc.

NOTES

1. **Herbicide:** According to BS5837:2012 "The use of herbicides in the vicinity of existing trees should be appropriate for the type of vegetation to be killed, and all instructions, warnings and other relevant information from the manufacturers should be strictly observed and followed. Care should be taken to avoid any damaging effects upon existing plants and trees to be retained, species to be introduced, and existing sensitive habitats, particularly those associated with aquatic or drainage features."
2. **Geotextile:** We recommend the installation of a Treetex™ under the Cellweb® TRP, or under the sub-base, if installed. The overlapping between adjacent rolls of Geotextile should be: CBR > 3%: 300mm minimum, CBR between 1% and 3%: 500mm minimum. CBR ≤ 1%: 750mm minimum.
3. **Staples:** Number of staples per join: 200mm: 5 staples. 150mm: 4 staples. 100mm: 3 staples. 75mm: 3 staples.
4. **Granular Fill:** Open graded sub-base, clean angular stone Type 4/20 or Type 20/40. Please refer to BS7533-13:2009 and to the Design Manual for Roads and Bridges (DMRB), Volume 4 Geotechnics and Drainage, Section 1 Earthworks, HA44/91, Volume 7 – IAN 73/06 Design Guidance for road pavement foundations and Manual of Contract Documents for Highway Works (MCHW), Volume 1 Specification for Highway Works for the construction and maintenance of the fill material.

This information corresponds to our current knowledge on the subject. It is offered solely to provide possible suggestions for your own experimentation. It is not intended, however, to substitute for any testing you may need to conduct to determine for yourself the suitability of our products for your particular purposes. This information may be subject to revision as new knowledge becomes available. Since we cannot anticipate all variations in actual end use conditions, Geosynthetics Limited makes no warranties and assumes no liabilities in connection with this information. Nothing in this publication is to be considered as a licence to operate under or a recommendation to infringe any patent right.
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Appendix 8 – Qualifications and experience

Robert Toll has been working with trees since 2004 when he completed his studies.

In 2000 he began his studies at Riseholme College, Lincoln where achieved a pass with merit in Forestry at National Diploma level. In 2002 he attended Moulton College in Northampton where he gained a Level Five Higher National Diploma in Urban Forestry with merit.

In 2004 Robert began work as a temporary tree inspector at Northampton Borough Council, undertaking inspections of trees in response to enquiries from the public. After 4 months Robert took up a permanent tree inspector role at Coventry City Council which predominantly involved undertaking safety inspections of trees on school sites.

In 2006 Robert moved to Warwick District Council to take up a temporary post of Tree Protection Officer which involved reviewing old area tree preservation orders and identifying those trees which were considered worthy of protection under new specific orders. He also streamlined the council procedure for making new tree preservation orders, cutting the time from making to serving from up to 2 weeks to within 2 hours.

In 2008 Robert moved to Hart District Council, Hampshire to take up the role of Tree Officer within the planning department. This role included determining works trees applications, commenting on planning proposals, liaising with the public and providing arboricultural advice to other departments within the Council.

Between 2014 and 2016 Robert took up the role of Tree Officer at Elmbridge Borough Council, Surrey, once again carrying out tasks such as determining works trees applications, commenting on planning proposals and liaising with the public. While at Elmbridge Borough Council he passed the Arboricultural Association's Professional Tree Inspection course.

Since leaving local authority employment Robert has provided locum arboricultural assistance to several local authorities including Elmbridge Borough Council, Woking Borough Council, Test Valley Borough Council, Epsom and Ewell Borough Council and Rushmoor Borough Council.

Robert is a professional member of the Arboricultural Association.