

TREE SURVEY, ARBORICULTURAL IMPACT ASSESSMENT AND TREE PROTECTION PLAN

Report to accompany a planning application for the demolition of a single-storey side extension, creation of an access drive and construction of a new three-bedroom bungalow on land to the rear garden of 198 London Road, Waterloooville, PO7 7AN.

Report by

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On the instructions of Amy Duff

13th August 2018

MDA reference K18



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1. Introduction

- 1.1 Martin Dobson Associates Ltd were instructed by Amy Duff on 6th August 2018 to carry out a survey of trees on or immediately adjacent to land at 198 London Road, Waterlooville, PO7 7AN. The purpose of the survey was to inform architects of potential tree-related constraints on the site and to provide advice on tree protection during the demolition of a single storey side extension, creation of an access drive and construction of a new three-bedroom bungalow on land at the rear of the property.
- 1.2 The British Standard 5837: 2012 *Trees in relation to design, demolition and construction – Recommendations* provides a framework for considering trees in the planning process. It gives guidance on categorising the qualities of trees in order to enable decisions to be made as to which trees are appropriate for retention within a development. It then advises on options for protecting trees to be retained during the development (at all stages including demolition, construction and hard landscaping), and the means of incorporating trees into the developed landscape.
- 1.3 The property is not within a Conservation Area and no trees on the site are protected by a Tree Preservation Order. Two trees in the rear garden of 200 London Road are protected by a Tree Preservation Order (named in the Order as T1 yew and T2 oak). The trees are in the south eastern corner of the rear garden and are remote from the proposed development at No. 198 and therefore have not been included in the survey reported here.
- 1.4 Ten trees and two groups of trees were surveyed; one of these is considered to be category A and of high value (T5 oak) and one is considered to be category B and of moderate value (T4 oak). The remainder are category C and are of low value. N.B. A third oak in the neighbouring garden at No. 200 was not included in the survey as it was too far away from the property.
- 1.5 In general category C trees should not be considered a material constraint to development. The proposed development requires the removal of three category C trees (T2 pittosporum, T3 damson and T6 pittosporum) and one group (G2 cypress). A category U willow (T1) needs to be removed on the grounds that it is unsafe.
- 1.6 The retained trees will be protected during development. Details of tree protection are contained in this report.

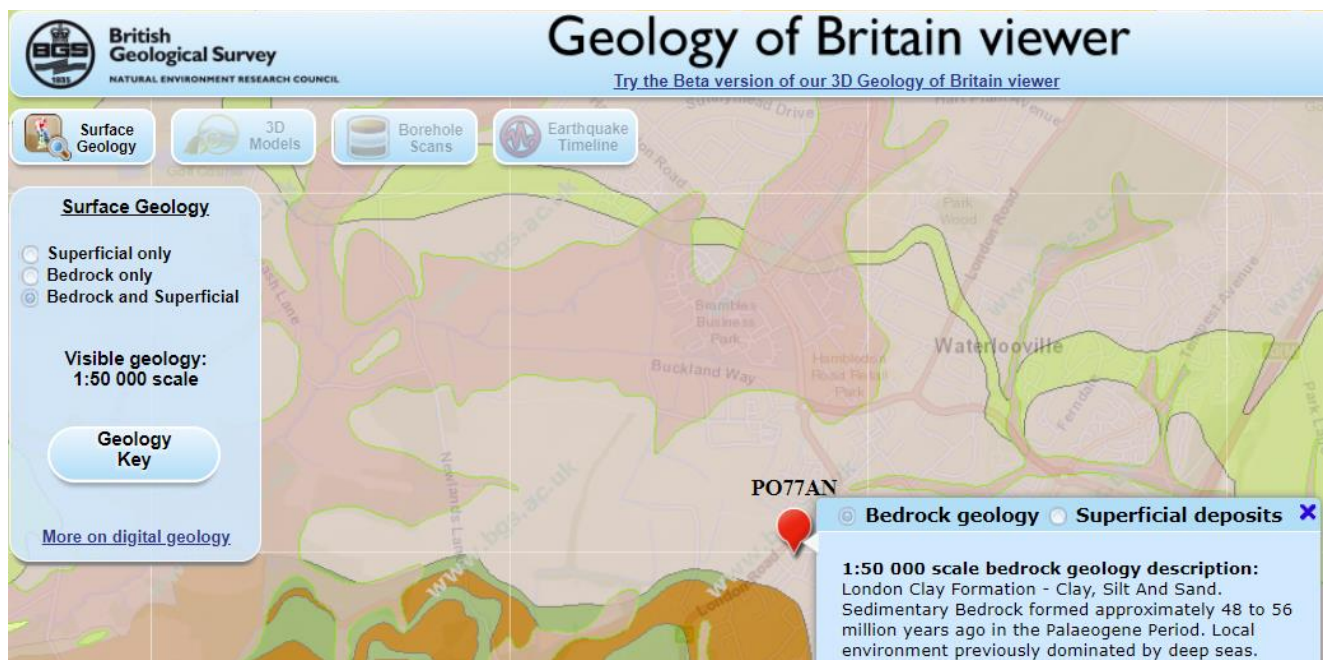
2. Tree survey

- 2.1 The tree survey was carried out by Martin Dobson on 11th August 2018.
- 2.2 Appended at **MD1** is the tree survey schedule which provides details of the ten trees and two groups present within or immediately adjacent to the property.
- 2.3 The site survey drawing appended at **MD2** shows the positions of the surveyed trees and gives a reasonable indication of their comparative branch spreads. The drawing has been colour coded as follows:
- | | |
|--|-------------|
| A trees (high quality and value, minimum 40 years useful life) | LIGHT GREEN |
| B trees (moderate quality and value, minimum 20 years useful life) | MID BLUE |
| C trees (low quality and value, minimum 10 years useful life) | GREY |
| U trees (unsuitable or dead/dying/dangerous, less than 10 years useful life) | RED |
- 2.4 It should be understood that no individual safety inspection has been carried out on any tree. Similarly, any suggestions for tree work should not be taken as a specification for tree works.
- 2.5 Adequate protection, both above and below ground, is essential for trees that are to be retained as part of a development. The British Standard BS5837: 2012 *Trees in relation to design, demolition and construction - Recommendations* advises that there should be a root protection area (RPA) around trees which is kept free of construction activities by means of an exclusion zone enforced by protective fencing and/or ground protection. The RPA is calculated as the area equivalent to a circle with a radius of 12 times the trunk diameter at a height of 1.5 m above ground level. Based on the tree survey data root protection areas (and radial distances from the trunk to be protected) have been calculated and these are shown as circles around the trees on the tree constraints plan at **MD2** and are tabulated at **MD3**.

3. Soil assessment

- 3.1 BS5837: 2012 advises that soil properties should be considered as part of a tree survey report. This is necessary because trees can cause damage to structures founded on soils that shrink and swell with changes in moisture content (principally clays). Such movement is exacerbated by the influence of trees and therefore if a shrinkable soil is suspected foundations should be designed to extend below the likely zone of seasonal moisture change.
- 3.2 The British Geological Survey 1: 50,000 scale map indicates that the underlying geology of the site is shrinkable London Clay Formation – Clay, Silt and Sand (Figure 1). Thus, foundations will need to be deepened beyond the minimum of 1 m to take account of trees. Oak is regarded as being a high water demand species and the National House Building Council's Standards Chapter 4.2 *Building near trees* suggests that foundations closest to the oak tree should be a minimum of 2.2 m deep. It is recommended therefore that foundations should be designed by a suitably qualified engineer under the guidance of NHBC Chapter 4.2 taking account of all trees within influencing distance of the proposed new dwelling.

Figure 1. British Geological Survey 1: 50,000 scale map showing that the site is underlain by the London Clay Formation – Clay, Silt and Sand



4. Arboricultural impact assessment

- 4.1 The purpose of an arboricultural impact assessment (AIA) is to evaluate the direct and indirect effects of proposed development on trees and, where necessary, to consider appropriate mitigation. It should set out which, if any, trees are to be removed to facilitate the development and should consider the possible effects on retained trees of potentially damaging activities on the site (for example changes in ground level and installation of below ground services). Requirements for access around trees should be considered and potential conflicts identified, for example, where branches overhang the development area and may require pruning.
- 4.2 Mitigation for any issues identified should be proposed and addressed in the arboricultural method statement (AMS).

Tree removals

- 4.3 The proposed development requires the removal of three category C trees (T2 and T6 pittosporum and T3 damson) and one category C group (cypress hedge) as they are too close to the proposed driveway/bungalow to be considered suitable for retention.
- 4.4 The pittosporum T2 is one-sided due to suppression from the cypress hedge and the damson T3 is a small mature fruit tree with a very limited useful life expectancy. Neither have any wider landscape value outside the environs of the garden. T6 is a multi-stem pittosporum growing close to the boundary with the neighbouring garden at No. 200. The tree appeared sparsely foliated at the time of the survey and was considered to have very limited private amenity value and no wider landscape value outside the garden. The cypress hedge G1 is a closely planted etiolated hedge which was pruned to a height of about 2 m at one time but has been neglected thereafter. The hedge has very little foliage below a height of about 2 – 3 m and there is little scope for bringing it back into reasonable management as cypresses do not regrow from bare wood. The hedge has outgrown its usefulness and it would be best to remove it and replace with alternative hedging or a close-boarded fence.
- 4.5 It is unclear whether T1 contorted willow is on land at 198 London Road or in the neighbouring garden as it is close to the unmarked boundary. It has been categorised U as it has basal decay and infection with honey fungus (Figure 2). One stem out of three original stems which divide at ground level has collapsed, and been removed, but the remaining two stems (440 mm and 360 mm diameter) cannot be considered safe. Whilst the tree does not create a conflict with the development proposals it should be removed on safety grounds.

Figure 2. Basal decay and missing stem of contorted willow T1.



- 4.6 Four new trees will be planted to replace those removed and to enhance landscaping of the proposed bungalow.

Tree pruning

- 4.7 Pruning of low overhanging branches of the neighbouring trees T9 birch and T10 willow is likely to be required to provide clearance of 4 – 5 m over the proposed new access drive. This will involve small diameter branches only and will not harm the health or appearance of the trees.

Tree protection

- 4.8 Trees G1, T4, T5, and T7 – T10 are to be retained and G1, T4 and T5 will be protected from mechanical damage to their trunk, branches and roots by the installation of 2 m high protective fencing to create a construction exclusion zone (CEZ) to exclude site workers, machinery and storage of materials. Trees T7 and T8 will be protected behind a close-boarded fence to be erected between the development site and the existing bungalow. Trees T9 and T10 are protected because they are separated from the site by a masonry boundary wall.
- 4.9 The RPAs of T9 and T10 theoretically extend under the proposed new driveway. However, the boundary wall will create a partial root barrier as it will have foundations of 500 mm or more. Moreover, the existing tarmac parking area at the front, single storey side extension (to be demolished) and paving slabs will all serve to restrict root growth at shallow depth. Installation of the new drive will therefore not cause harm to roots of T9 and T10.
- 4.10 An emergency access is intended to be created through the rear boundary of the site. This will involve erecting two gate posts and a small amount of hardstanding. All operations will be conducted outside of root protection areas.

5. Arboricultural method statement and tree protection plan

- 5.1 Trees can very easily be damaged during construction activities through their branches being broken by construction traffic passing close to the canopy or by root severance during the digging of foundation or service trenches. The majority of roots are to be found in the upper 600 mm of soil and so even relatively shallow trenches can sever a significant number of roots growing across the direction of the trench. Similarly, the diameter of tree roots tapers sharply within a few metres of the trunk of a tree, so that what might seem to an uninitiated site worker to be an insignificant root (perhaps only a few centimetres in diameter) may actually be highly important.
- 5.2 Tree roots can also be damaged indirectly, often inadvertently, through soil compaction, which disrupts soil structure and can lead to root death through the development of anaerobic soil conditions. Spillage of toxic materials (e.g. oil or diesel) can also result in root damage and ultimately the death of a tree. Protection of the soil around trees by means of a construction exclusion zone (CEZ) is therefore vitally important in order to preserve roots undamaged.

Protective fencing

- 5.3 Tree protection will comprise of 2 m tall fencing installed in the positions shown at **MD4** before demolition takes place or materials are delivered to site or construction commences. The fencing will consist of a scaffold framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3 m (Figure 3). Onto this, weld mesh panels or 2 m high shuttering board will be securely fixed with wire or scaffold clamps. 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 is shown in Figure 4.

Figure 3. Diagram to illustrate design of protective fencing with scaffolding anchored into the ground

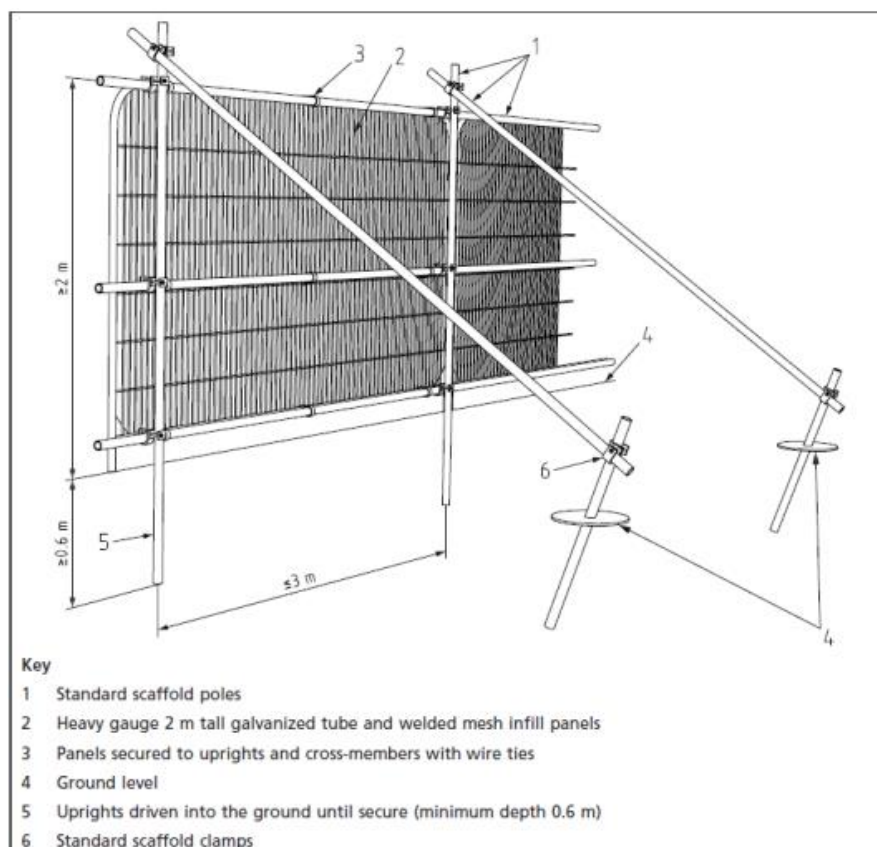


Figure 4. Diagram to illustrate alternative design of protective fencing

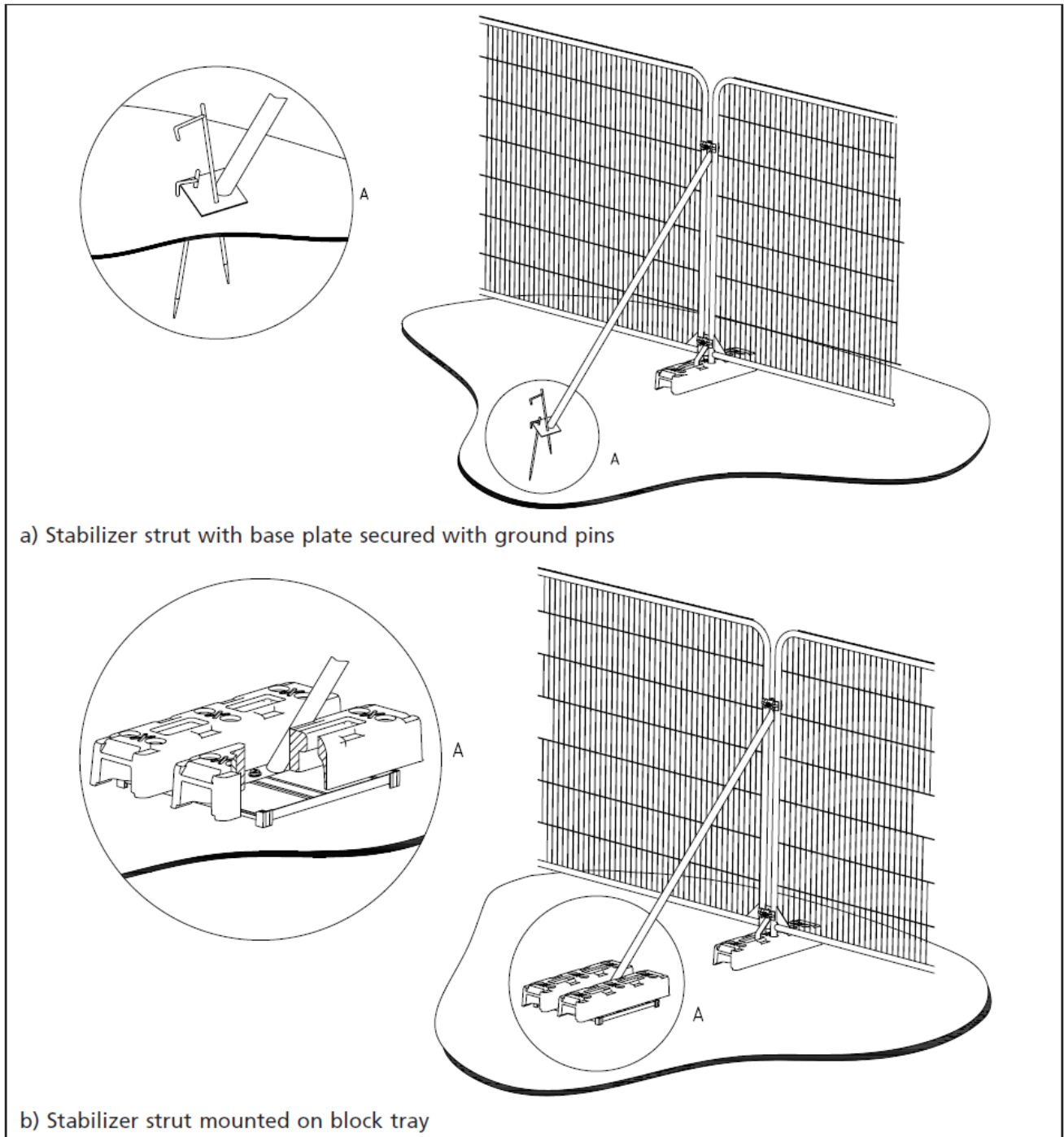
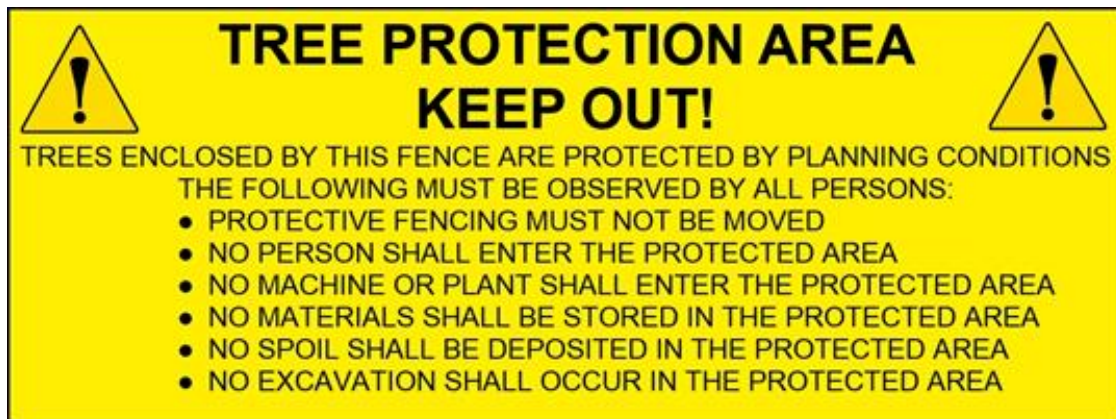


Figure 5. Photograph to illustrate installed protective fencing



- 5.4 High visibility all weather notices at a size no less than A3 will be securely attached to every second panel of the barrier around the CEZ with wording as shown in Figure 6.

Figure 6. Wording to be included in high visibility all-weather sign attached to protective fencing



Installation of driveway

- 5.5 The driveway to the side of the existing bungalow will be installed after the side extension has been demolished. The demolition should take place without removing the existing tarmac surface which will act as ground protection preventing compaction of the underlying soil. If possible, the existing foundations should be left in situ so as not to disturb the rooting zone of trees. Likewise, the patio paving should be left in place during demolition.
- 5.6 The new driveway should be installed early in the development and should ensure that, in the areas shaded blue on the tree protection plan (**MD4**), there will be no excavation into virgin soil below the existing sub-base. The final surface is proposed to be block pavements and this will be an improvement on the existing impermeable tarmac as it will allow water to percolate into the soil.

Arboricultural supervision

- 5.7 It is recommended that a project arboricultural consultant is appointed to oversee tree protection for the duration of the construction contract. Alternatively, a designated person (site foreman or site owner) should take on the responsibility of overseeing tree protection. If appointed, the project arboriculturists 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:
- Following installation of tree protection but prior to any works commencing on site to confirm that it is fit for purpose;
 - At any time that there are potential conflicts with tree protection;
- 5.8 A pre-start meeting should be held on site with the project arboriculturist and the contractor's representative(s) after fencing has been installed. 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. Following induction, a copy of the Induction Sheet (**MD5**) will be provided to and be signed by the site manager/foreman in recognition of acceptance of their role in enforcing day to day tree protection.

- 5.9 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.
- 5.10 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.
- 5.11 Fencing will not be removed under any circumstances during construction unless with the express approval of the local authority. If in any doubt the site manager must contact the nominated arboricultural consultant.

Burning of waste

- 5.12 No fires will be lit on site within 3 m 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

- 5.13 All machinery required on site will operate outside of root protection areas or from driveway. Site accommodation, if required, will be located outside root protection areas.
- 5.14 Delivery vehicles will park in the drive and storage of materials will be outside root protection areas. At each delivery, where materials are unloaded by crane, a banksman will be present to ensure that sufficient clearance is allowed for to avoid conflict with branches of T9 and T10. Any incidents must be reported to the project arboriculturist.

Services

- 5.15 The proposed layout of incoming (water, gas and electricity) and outgoing (foul sewer) 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.

Tree works

- 5.16 Tree removals and crown lifting of T9 and T10 will be undertaken as preliminary works. This will be carried out by suitably qualified arboriculturists to the standards set out in BS3998: 2010 *Tree works – recommendations*. Heavy machinery must not be used on unprotected ground.

Landscaping

- 5.17 Once construction has demonstrably finished fencing may be removed in order to allow final landscaping to be undertaken. Landscaping will not involve any changes in soil levels, digging of any trenches or construction of masonry or retaining walls within root protection areas.
- 5.18 Four replacement trees will be planted on the site to replace those that have been removed.

6. Conclusions

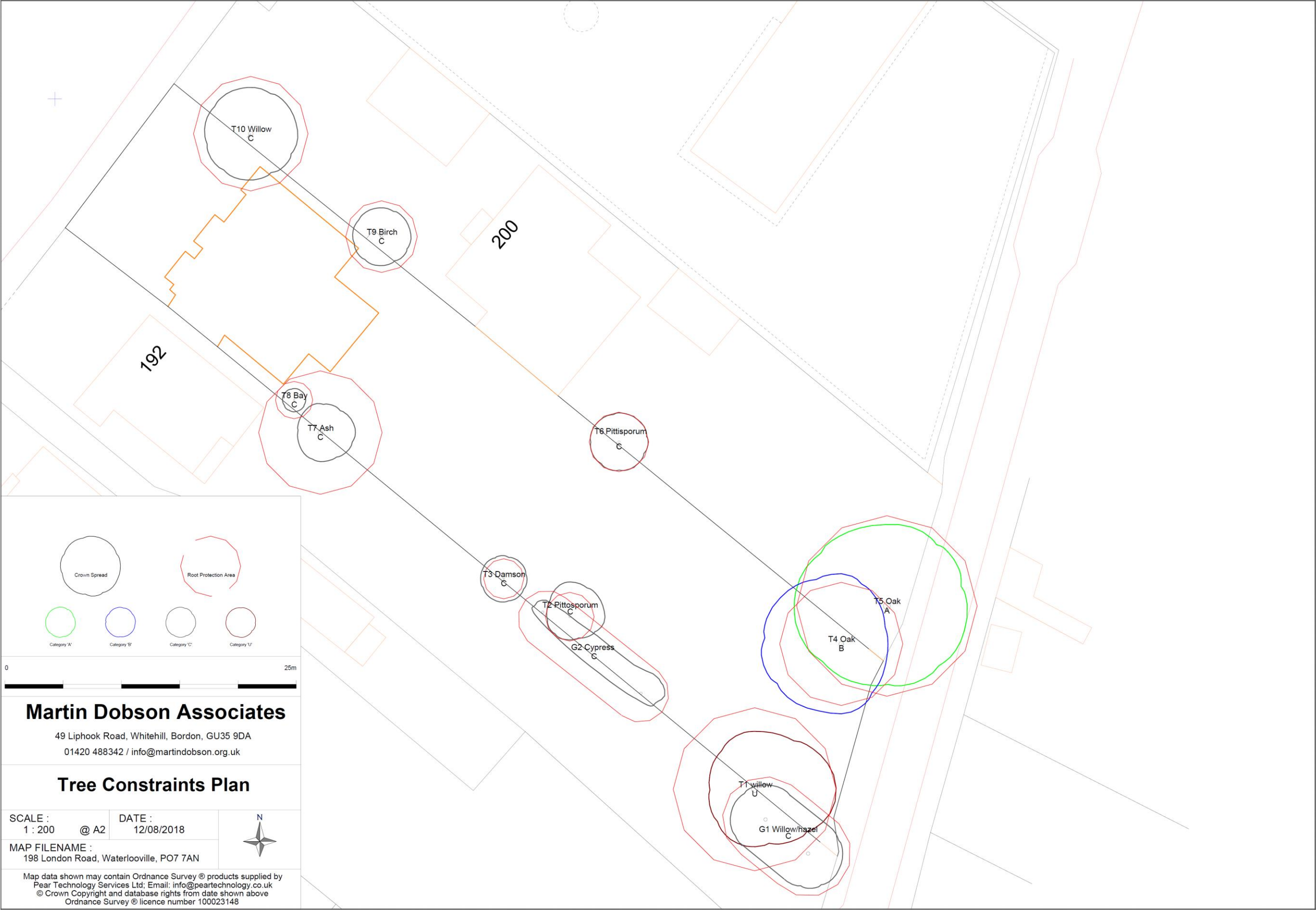
- 6.1 A BS5837: 2012 survey of ten trees and two groups has been carried out at 198 London Road, Waterloooville, PO7 7AN. One tree is considered to be category A and of high value (T5 oak) and one is considered to be category B and of moderate value (T4 oak). The remainder are category C and are of low value.
- 6.2 The proposed development requires the removal of three category C trees (T2 pittosporum, T3 damson and T6 pittosporum) and one group (G2 cypress). A category U willow (T1) needs to be removed on the grounds that it is unsafe.
- 6.3 The trees to be retained will be protected during development and methods for ensuring their protection have been described. It is proposed that four new trees will be planted to enhance landscaping.

APPENDIX MD1
Tree survey schedule (BS5837: 2012)

Tree No.	Species	Height (m)	Trunk diameter (mm)	N (m)	S (m)	E (m)	W (m)	Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Useful life	BS5867 Grade	Comments
G1	Willow /hazel	8	300	3	3	3	3	3	MA	Fair	Fair	10-20	C	Scrubby trees
T1	Contorted willow	14	569	7	5	5	4	3	OM	Poor	Poor	<10	U	Decay at base of trunk. One stem fallen. Honey fungus infection. Remove.
G2	Cypress	9	200	2	2	1	1	2	Y	Fair	Fair	<10	C	Overgrown poorly maintained hedge
T2	Pittosporum	7	170	3	3	2	2	1.5	MA	Fair	Good	10-20	C	Suppressed to N by G2
T3	Damson	5.5	140	2	2	2	2	1.5	MA	Fair	Good	10-20	C	
T4	Oak	16	430	6	4	6	7	3	Y	Good	Good	40+	B	Slight lean to E
T5	Oak	17	630	7	7	7	8	4	MA	Good	Good	40+	A	Suppressed to S by neighbouring oak. Remove major dead wood.
T6	Pittosporum	9	208	2.5	2.5	2.5	2.5	1	MA	Fair	Good	10-20	C	Sparse crown
T7	Ash	11	431	2.5	3	2.5	2	5	Y	Good	Fair	10-20	C	Cavity on neighbour's side of trunk
T8	Bay	5	130	1	1	1	1	1	Y	Good	Good	10-20	C	Multi-stem coppice regrowth
T9	Birch	9	250	2.5	2.5	2.5	2.5	2	Y	Good	Good	10-20	C	Close to boundary wall

APPENDIX MD2

Tree constraints plan (TCP) showing existing plot layout with tree numbers, BS5837: 2012 colour codes (A – Green, B – Blue, C – Grey, U - Red) and root protection areas (red circles). The plan has been provided separately as a PDF at a scale of 1: 200 @ A2.

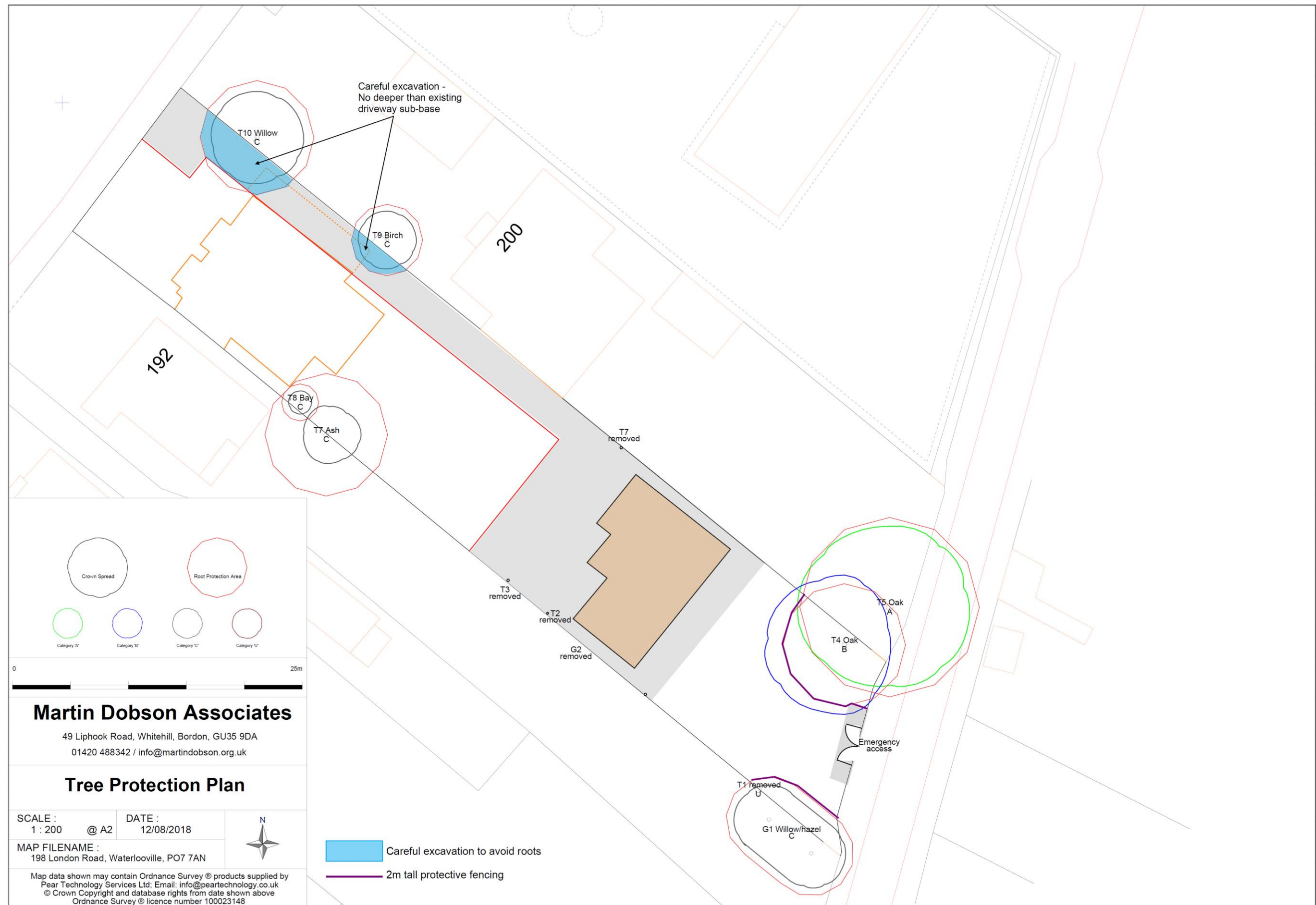


APPENDIX MD3
BS5837 schedule of root protection areas

Tree No.	Species	Trunk diameter (mm)	BS5837: 2012 Root protection area, RPA, (m ²)	BS5837: 2012 Radial protection distance (m)
G1	300	356	40.7	3.6
T1	569	280	146.5	6.8
G2	200	300	18.1	2.4
T2	170	320	13.1	2.0
T3	140	340	8.9	1.7
T4	430	590	83.7	5.2
T5	630	540	179.6	7.6
T6	208	140	19.6	2.5
T7	431	120	84.0	5.2
T8	130	250	7.6	1.6
T9	250	383	28.3	3.0
T10	400	350	72.4	4.8

APPENDIX MD4

Tree protection plan (TPP) showing retained trees, tree numbers and root protection areas (red circles). The location of protective fencing is shown as purple lines and area for careful excavation of driveway as blue shading. The plan has been provided separately as a PDF at a scale of 1: 200 @ A2



APPENDIX MD5

TREE AWARENESS – SITE INDUCTION SHEET

SITE NAME: 198 London Road, Waterloooville, PO7 7AN

Trees are an important part of this development and all trees noted on the Tree Protection Plan are protected by planning conditions and by virtue of being in a Conservation Area. Trees must not be damaged in any way, including indirectly through compaction/contamination of soil, so that they can fully integrate into the finished project and stay healthy well into the future. All persons working on this site have a responsibility to be aware of trees and to abide by tree protection procedures.

How can trees can be damaged?

Above the ground – contacts and impacts with branches and trunk (for example by machine operations: piling rigs, high-sided vehicles, crane use, fixings to trunk, unauthorised cutting back of branches). Make sure there is adequate clearance under the tree canopy and don't stray close to the trunk. Damage to bark allows infections to enter the tree.

Below the ground – roots spread out from the trunk horizontally at shallow depth and are therefore easily damaged. Vehicle and pedestrian movements and storage of materials on unprotected ground causes compaction, especially in wet weather, and must be avoided. Soil stripping during site clearance or landscaping is prohibited in root protection areas. The effects of root damage may take some time to become obvious, but can result in disfiguring dieback of leaves and branches, or even death.

Tree protection procedures

Provided that the simple steps below are followed most tree protection is straightforward:

- Stay out of tree Construction Exclusion Zones (CEZs). These are the areas of ground surrounding retained trees that are protected by barriers and/or ground protection. If you need to go into a CEZ, you must first gain authorisation from the Site Manager.
- No construction activity of any description within CEZs, e.g. soil stripping, cement mixing, services installation, storage of materials etc.
- No fires within 20m of trunk of any retained tree.
- If authorised to work within a CEZ, for example, for installation of an above-ground no-dig driveway you must follow the procedures set out in the **Arboricultural Method Statement**.
- If damage occurs, you must inform the Site Manager who must, in turn, inform the project arboriculturist.

Planning Authority enforcement action needs to be avoided:

- 'Breach of Conditions' notices can prevent a site from being signed-off.
- 'Temporary Stop Notices' halt site operations and result in associated high costs.
- Wilful damage/destruction of TPO/Conservation Area trees can result in company and/or individual prosecutions - fines can be anything up to £20,000 (County Court fines are unlimited). Remember that fines may apply to the person committing the offence as well as the site owner and main contractors!

I have received site induction in tree awareness and tree protection procedures

PRINT NAME

SIGN

DATE

APPENDIX MD6

Qualifications and Experience

Dr Martin Dobson has been engaged in research and advisory work on trees since graduating in 1986 with a BSc (Hons) Degree in Biology. Subsequent postgraduate research led to the award of a Doctor of Philosophy (DPhil) Degree in Tree Physiology in 1990.

Postgraduate studies began in 1986 at the University of Ulster and continued in 1987 at the Forestry Commission's Research Station in Hampshire and focussed on the influence of air pollution on trees. Upon completion of this research in 1989 Dr Dobson was employed by the Forestry Commission and worked in both the Tree Pathology and Environmental Research Branches. During the next six years he was responsible for Department of Environment research contracts focussing on air pollution, climate change, de-icing salt damage to trees, woodland establishment on landfills and tree root research. He has authored two books: *De-icing Salt Damage to Trees and Shrubs* and *The Potential for Woodland Establishment on Landfill Sites*. He concluded his time at the Forestry Commission as Project Manager for research into the interaction between trees, roots and clay soils which included laboratory investigations, testing of root barriers and a three-year field-scale monitoring programme investigating the influence of woodland and grassland on the moisture status of clay soils.

In 1995 Martin joined the Arboricultural Advisory and Information Service as a senior Arboricultural Advisor. The AAIS advised the (then) Department of the Environment on matters concerning amenity trees and was the principal source of technical advice and information to the arboricultural profession as well as landscape architects, engineers, the horticultural industry and private individuals. A large proportion of advisory work focussed on issues relating to tree diseases and interactions between trees and buildings.

In 1997 Martin started an arboricultural consultancy practice specialising in subsidence and tree root claims, planning and development, tree safety and disease diagnosis. He was a local authority retained consultant providing expertise on tree protection practice and legislation from 1999 - 2006 and has dealt with several thousand Tree Preservation Order and Conservation Area applications.

He has extensive experience as an Expert Witness in the High Court, County Court and Magistrates Court. Notable recent cases he has been involved in include *Robbins v London Borough of Bexley* and *Khan v London Borough of Harrow* and Kane.

From 1995 to 2011 he was an examiner for the Professional Diploma in Arboriculture for the Royal Forestry Society/ABC Awards and he is currently an assessor for the Arboricultural Association Registered Consultant scheme. He has been a guest lecturer for the Middlesex University Countryside Management MSc course and for Portsmouth University. Together with Dr Giles Biddle he has devised and teaches introductory and advanced courses on trees and subsidence and co-presents seminars on trees and climate change with Professor Andy Moffat for the Arboricultural Association.

In addition to over 30 publications in scientific and technical journals he is the author of *Arboriculture Research and Information Note 130/95/ARB Tree Root Systems*, and leading author of:

Driveways Close to Trees. Arboricultural Practice Note 1. AAIS, Farnham.

Trees in Dispute. Arboricultural Practice Note 3. AAIS, Farnham.

Root Barriers and Building Subsidence. Arboricultural Practice Note 4. AAIS, Farnham.

He is a Fellow and Registered Consultant of the Arboricultural Association and is a Member by examination of the Expert Witness Institute.