



Arboricultural Impact Assessment

Land off Kelvedon Road
Tiptree
Essex
CO5 0LX

0357-03-AIA

28 October 2020

Revision A

Prepared by

Graham Underhill MICFor, CEnv, FArborA, DipArb (RFS)



SUMMARY TABLE		
Site Name & Address	Land off Kelvedon Road, Tiptree	
Nearest Postcode	CO5 0LX	
Central Grid Reference	TL 88692 17007	
Local Planning Authority & Tree Officer	Colchester Borough Council Liam McKarry	
Relevant Local Planning Policies See Appendix C	Local Development Framework, with Development Policies adopted October 2010. Core Strategy, adopted December 2008.	
Client & Brief	Marden Homes Ltd. To provide tree information on trees in relation to a proposed development. To include a site visit; collection and preparation of tree details; preparation of constraints details; an assessment of the impact of the proposal on trees; tree protection requirements and a draft arboricultural method statement.	
Statutory Controls See Appendix C	Tree Preservation Order	Conservation Area
	Yes. TPO/03/19 All trees (Area Order)	No
Soil Type (Source: BGS online Geology Map)	London Clay Formation – clay, silt and sand.	
Supplied Plans & Documents	<ul style="list-style-type: none"> • Topographical survey (unnumbered) • Proposed site layout 300.00 	
Report Author	Graham Underhill, Chartered Arboriculturist and Registered Consultant with the Institute of Chartered Foresters. Details of qualifications and experience can be found at http://www.underhilltc.co.uk/about-us .	
Previous Input	Previously issued a Tree Constraints Plan to inform feasibility and design options.	
Site Visit/s	January 2019 and August 2020; weather clear with no visibility issues.	
Limitations to Survey	<ul style="list-style-type: none"> • Where access to trees was limited by site conditions or materials, or where ivy growth or other vegetation prevented full assessment, this is highlighted in the tree schedule. • Observations were from ground level only and of a preliminary nature, and no detailed investigations were carried out. • Observations of trees outside the site boundaries are confined to what was visible from within the site. • No safety inspection of trees has been carried out, although any obvious defects and any need for further investigations, has been noted. 	
Revision	A - Changes to layout to minimise impact on RPAs	
Date of Issue	28 October 2020	
Notes		

SUMMARY

This report's purpose is to allow the local planning authority to assess the tree information as part of a planning submission. It follows the principles of British Standard *BS 5837:2012, Trees in relation to design, demolition and construction*. It assesses the impact the proposed development has on trees, as well as any adverse impacts caused by trees. Methods to avoid or mitigate impacts are assessed, along with identifying remediation and enhancement opportunities.

Arboricultural advice has been given during the design stage.

A tree preservation order covers all trees on site.

Out of a total of 39 trees and 9 groups, 10 trees and 2 groups are to be removed as part of the proposal. Four of these trees are dead.

Works are proposed within the root protection area of some trees to be retained and specialist methods of design and construction are proposed as mitigation.

New hard surfacing will be designed and constructed using a permeable system utilising the depth of the existing hard surfacing which will mean no-dig or minimal dig; therefore, this will have a minimal impact on the trees.

The report contains a draft Arboricultural Method Statement heads of terms in accordance with recommendations in Table B1 of BS 5837. BS 5837 recommends that a detailed Arboricultural Method Statement is produced in response to a planning condition following planning consent. This will describe in detail how retained trees will be protected from the development and methods of work close to trees. This report contains general details such as tree barriers and ground protection which are common to most developments, and principles to follow where works are proposed close to trees.

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1 INTRODUCTION

PURPOSE AND SCOPE OF THIS REPORT

- 1.1 This report's purpose is to allow the local planning authority (LPA) to assess the tree information as part of the planning submission to develop land at Kelvedon Road, Tiptree, CO5 0LX (hereafter referred to as the 'site'). It also includes an Arboricultural Method Statement and Tree Protection Plan in draft form describing how trees will be protected and managed during the development. Additionally, it informs the client and design team of tree constraints, opportunities and working requirements close to trees.
- 1.2 It follows the principles of British Standard *BS 5837:2012, Trees in relation to design, demolition and construction - Recommendations* (BS 5837)¹. This document gives guidance and recommendations on categorising the quality of trees, the protection of retained trees, and any operations with the potential to affect trees. It aims to guide decision making towards sustainable design and tree cover on all new developments.
- 1.3 The body of the report contains the main points, with supporting information in the appendices.

LEGAL & PLANNING POLICY CONSIDERATIONS

- 1.4 Where known, legal protection or planning policy relating to trees is shown in the Summary Table above, with further details in Appendix C.

ECOLOGICAL CONSIDERATIONS

- 1.5 It is important that any tree removals or works to trees does not harm or disturb protected species. See Appendix C for further details.

2 TREE SURVEY & APPRAISAL

THE SITE

- 2.1 The site is a mix of residential properties with various outbuildings in a semi-rural setting to the north-west of Tiptree. Much of the site is open grass fields with vegetation to the boundaries.
- 2.2 The frontage of the site is clearly visible from publicly accessible points.
- 2.3 The topography of the site is predominantly level.
- 2.4 Precautions to prevent soil compaction to rooting zones of retained trees will be particularly important on this site due to the presence of clay (see Summary Table above and Appendix B).

THE SUBJECT TREES

- 2.5 Full details of all trees surveyed can be found in the tables in Section 5. Their locations can be found on the plans below.
- 2.6 Several of the trees are offsite but could be affected by the development.

¹ British Standards Institution (2012) BS 5837: Trees in relation to design, demolition and construction - Recommendations, BSI <https://shop.bsigroup.com/>



TREE QUALITY

2.7 Trees have been assessed using the tree categorisation method in BS 5837. This identifies the quality and value (non-fiscal) of existing trees to allow an informed decision to be made concerning which trees should be removed or retained as part of the development proposal. See Section 5 for full category definitions.

TREE QUALITY

BS 5837 Category	A High quality	B Moderate quality	C Low quality	U Unsuitable for retention
Individual trees	-	T4, 5, 6, 7, 12, 13, 15, 16, 20, 22, 24, 25, 26, 27, 29, 30, 36, 37	T2, 3, 8, 9, 10, 11, 14, 21, 23, 28, 31, 32, 33, 34, 35, 38, 39	T1, 17, 18, 19
Groups	-	G1, 2, 3, 5, 6	G4, 7, 8, 9	-
Hedges	-	-	-	-
Woodlands	-	-	-	-
Totals	0	23	21	4

Category A trees

2.8 Category A trees are considered to be of high value and particularly important and desirable to retain and therefore could be considered a major constraint during the design process.

- None on this site

Category B trees

2.9 Category B trees are considered to be of moderate value. They are considered important to retain.

Category C trees

2.10 Category C trees are considered to be of low value and of limited benefits which may be readily replaced in the existing context. Therefore, it is generally accepted they are excluded from consideration regarding development although they may be suitable to retain where they pose no constraint on development.

Category U trees

2.11 Category U trees are in such a condition that they cannot realistically be retained in the current context for longer than 10 years. Although Category U trees should not be a constraint to development, sometimes they have conservation value and may be desirable to retain where appropriate.



3 ARBORICULTURAL IMPACT ASSESSMENT

- 3.1 This section evaluates the direct and indirect effects of the proposals on trees on and adjacent to the site. Methods to avoid or mitigate impacts are assessed, along with identifying remediation and enhancement opportunities. It sets out protection measures and principles for work close to trees, including in Root Protection Area (RPAs²). The buildability of the project is considered, including access, site facilities, plant movement, parking etc.
- 3.2 Due to the stage of the project, full details of construction methods, required mitigation, materials etc., are given in principle, to demonstrate the viability of the proposal. Following planning consent, full details of tree protection and methods of work close to tree should be addressed in the Arboricultural Method Statement. At this stage, a heads of terms Arboricultural Method Statement is included (see Appendix A).
- 3.3 The principles for work methodology close to trees can be found in Appendix B.
- 3.4 The layout has taken in to consideration the presence of better quality trees and has (where possible) incorporated them in to open space areas away from new dwellings.

TREE REMOVALS

BS 5837 Category	A High quality	B Moderate quality	C Low quality	U Unsuitable for retention
Individual trees	0	T26, 27,	T28, 35, 38, 39,	1, 17, 18, 19
Groups	0	0	G8, 9	0
Hedges	0	0	0	0
Woodlands	0	0	0	0
Removed/Total	0	2/23	6/21	4/4

- 3.5 Two B category trees are to be removed as part of the proposals. These are both weeping willows which are internal to the site and therefore not as prominent as the remaining 16 B category trees and 5 groups, which are mostly sited around the perimeters of the site, all of which are to be retained, along with 15 C category trees.

ROOT PROTECTION AREA INCURSIONS

- 3.6 New hard surfacing will be within the RPAs of some trees to be retained. Areas affected have been highlighted on the draft Tree Protection Plan. Conventional hard surfacing using a sub-base requiring excavation, is damaging to tree roots and is not acceptable within RPAs. Above-ground, or no-dig principles, using permeable materials, will be followed. This usually results in higher finished levels and this must be considered during design. The principles can be found in Appendix B; however the design should be produced by an engineer and be covered in detail in the Arboricultural Method Statement.
- 3.7 New hard surfacing must stop a minimum of 500mm from the trunk of retained trees. This is to allow for incremental growth of the trunk and prevent materials/debris building up at the base of the trunk, which can have detrimental impacts on tree health.

² A Root Protection Area (RPA) is a layout design tool indicating the minimum area surrounding the tree that contains sufficient rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority.



- 3.8 During construction, all excavation within RPAs will be supervised by the project arboriculturist.
- 3.9 The exact location of services is often difficult to establish until construction is in progress. New lighting is proposed as part of the development. The principle should be no new services to be installed within RPAs. When existing services within RPAs require upgrading or where it can be demonstrated that it is unavoidable to install new services in RPAs, conventional excavation techniques are unacceptable and great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible, any excavation must be carried out by hand or using a compressed air lance under arboricultural supervision or by following the methodology in Appendix B.
- 3.10 It is unknown whether there may be a requirement to excavate soil as part of investigation or remediation works not directly connected to the development, such as archaeological investigations, contaminated soil or Japanese knotweed control etc. This has the potential to be very damaging to trees which must be considered in any proposals and the project arboriculturist should be consulted on any excavation within RPAs.
- 3.11 It is important that space is allocated during the design stage for temporary welfare buildings, site storage, car parking etc., as this must be outside RPAs.

TREE WORKS

- 3.12 Facilitation pruning such as crown lifting of lower branches to allow for vehicular or pedestrian access, or the removal of dead branches for safety reasons, are shown on the plans, where relevant. The exact specification will depend on a detailed assessment of site usage etc. and should be dealt with in the Arboricultural Method Statement produced following planning consent. Dead branches should only be removed where there is an identifiable risk as they are a valuable ecological resource. The removal of ivy may be specified where it is deemed important to enable a close inspection of parts of a tree currently hidden, or because the ivy is causing problems for the tree by competing for light or adding excessive weight which could result in limb or tree failure. Routine severing and removal of ivy is not recommended as ivy has high ecological value as a nesting site and nectar source.
- 3.13 Tree surgery works to be undertaken in accordance with *BS 3998:2010 Recommendations for tree works*³, or industry best practice. The Arboricultural Association run an Approved Contractor scheme and provide details of assessed contractors <https://www.trees.org.uk/Find-a-professional>.
- 3.14 Where appropriate, the arisings from tree felling and pruning should be retained on site as ecological features. The advice of the project ecologist should be sought.

CHANGES TO GROUND LEVELS

- 3.15 During design, consideration should be given to changes in ground levels. This should be dealt with in the detailed AMS, however, it is important at the planning stage to recognise any significant changes. Even where this occurs outside the RPA of a retained tree it still has the ability to impact on the tree, particularly in respect to changes in water availability, and methods of dealing with the change in levels such as retaining walls, slopes etc. should be assessed by the project arboriculturist. See Appendix D for further details.

³ British Standards Institute (2010) BS 3998: Tree work - Recommendations, BSI <https://shop.bsigroup.com/>



TREE PLANTING

- 3.16 In the context of the loss of trees, a new landscaping scheme is proposed. Planting locations should be determined at the planning stage and protected during the development to preserve soil structure. The suggested selection of species, size, method of planting and location are outside the scope of this report, however, the general principles should be for bigger tree species to be chosen which have the potential to reach their ultimate height and spread without the need for excessive management. This must be balanced with available site-specific space, both above and below ground. Tree planting and establishment should follow the principles laid out in *BS 8545 Trees: from nursery to independence in the landscape - Recommendations*⁴.
- 3.17 Landscape operations have the potential to damage trees if not carried out appropriately; in addition, the removal of protective barriers to carry out landscape operations may allow other contractors in previously protected areas. Appropriate measures should form part of the Arboricultural Method Statement.

PROTECTION OF RETAINED TREES

- 3.18 Tree protection measures, usually in the form of barriers and/or ground protection, must be in place before any works, including site clearance or demolition, begin, and stay in place for as long as a risk of damage remains. The location and specification of protection is shown on the Tree Protection Plan together with the RPR (root protection radius) which is the minimum distance protection barriers or ground protection are to be positioned from the trunks of retained trees. Further details on tree protection are in Appendix B.
- 3.19 Due to access requirements and construction of hard surfaces, it is not possible to use conventional barriers to protect the entire RPAs of all trees. Ground protection, either in the form of retaining the existing surfaces for as long as possible, or the laying of temporary ground protection, must be used to prevent soil compaction and damage to tree roots. The logistics of timings of work on site are important considerations on this site to ensure tree protection is effective. This will be an important part of the Arboricultural Method Statement which will require the input of the construction team, post consent.

MONITORING AND SUPERVISION OF WORKS CLOSE TO TREES

- 3.20 It is important to recognise that the local planning authority have the power to serve a Stop Notice if a breach of conditions occurs. Therefore, it is important that works which may impact upon trees are suitably controlled by competent personnel.
- 3.21 The project arboriculturist's role is to monitor compliance with arboricultural conditions and advise on any tree problems that arise or modifications that become necessary. This will usually involve regular site visits, following which a report will be sent to the local authority tree officer and the client/developer as an audit trail of compliance (ref. subsection 6.3 of BS 5837). See Appendix B.
- 3.22 On this site, the following monitoring and supervision are likely to be needed:
- A visit following installation of tree protection prior to any works commencing on site to confirm that it is fit for purpose.
 - Any agreed works in Root Protection Areas.

⁴ British Standards Institute (2014) BS 8545: Trees: from nursery to independence in the landscape - Recommendations, BSI <http://shop.bsigroup.com/>



- Any time there are potential conflicts with tree protection.
- A visit at the completion of construction works to confirm tree protection can be removed to enable final landscaping.

3.23 A site supervision and monitoring schedule is often conditioned as part of planning consent and would form part of the Arboricultural Method Statement.



SUMMARY OF IMPACTS ON RETAINED TREES - SEE APPENDICES FOR FURTHER DETAILS			
Activity	Tree/s	Potential impact	Mitigation & any remediation or enhancement measures
RPA & CROWN/TRUNK IMPACT	All retained trees	Potential damage to trees from demolition and construction activities.	Follow requirements for tree protection on TPP and in method statement.
RPA INCURSION (DEMOLITION)	T1, T2, T35	Demolition of structures and hard surfaces has the potential to cause damage to tree roots, as can general site clearance, particularly topsoil stripping.	The impact can be minimised by methods that retain the existing footings and subbase, or by carrying out excavations manually within the root protection area to protect tree roots that may be present under the footings or subbase. Both issues can be managed with an approved Arboricultural Method Statement and arboricultural site supervision. Tree protection MUST be in place before soil stripping occurs.
RPA INCURSION (CONSTRUCTION)	T7, T9, T10, T12, T21, T22, T24, T25, T36, G1, G3, G5	New hard surfacing. Conventional hard surfacing requires excavation for a subbase which removes any roots present and restricts water and air transfer.	Above-ground, or no-dig principles, using permeable materials, will be followed.
RPA INCURSION (SOIL LEVEL CHANGE)	T36, T37, possibly others		Level changes will be kept to a minimum during detailed design in these areas.
RPA INCURSION (SERVICES & DRAINAGE)	Unknown at this stage		Any new services will be routed to avoid RPAs.
RPA INCURSION (LANDSCAPE OPERATIONS)	T2, T3, T4, T5, T6, T8, T10, T11, T12, T13, T14, T15, T16, T20, T21, T22, T23, T24, T32, T33, T34, T36, T37, G1, G2, G3, G7	Landscape operations have the potential to damage trees if not carried out appropriately; in addition, the removal of protective barriers to carry out landscape operations may allow other contractors in previously protected areas.	RPAs to be landscaped must be protected before any works begin and MUST NOT have soil stripped at the site-setup stage. Any vegetation clearance and soil preparation must be carried out by hand or using hand-operated machinery by appropriately trained operatives. Appropriate measures should form part of the Arboricultural Method Statement.
PRUNING TO FACILITATE DEVELOPMENT	-	Pruning by untrained site operatives causing damage to trees.	Pruning is not anticipated but any requirements are likely to be minor and can be dealt with in the Arboricultural Method Statement.



4 CONCLUSIONS & RECOMMENDATIONS

- 4.1 An Arboricultural Constraints Plan has been produced to inform design and as many trees have been retained as possible, including those of low quality where appropriate. Where this is not possible, the loss of trees will be offset with new tree planting as part of the landscaping proposals.
- 4.2 To implement the design proposal, it will be necessary to remove 8 individual trees and 2 groups of trees out of a total of 39 trees and 9 groups. Four of these trees are dead.
- 4.3 Various works will be within the root protection area of trees to be retained. To ensure these do not adversely impact on trees, design and construction methods must be carefully planned. As recommended in Table B.1 of BS 5837, this report includes a Heads of Terms Arboricultural Method Statement. A detailed Arboricultural Method Statement should be produced in response to a planning condition, and this should cover all works within root protection areas.
- 4.4 It is important that the project arboriculturist monitors and supervises key stages, particularly any works within RPAs of retained trees. Supervision/monitoring reports should be issued after each inspection as a record of compliance and audit trail for the local authority.
- 4.5 New hard surfacing within the root protection areas will have a permeable subbase and surface and be of a minimal, or no-dig construction.
- 4.6 Foundation design should take into account trees to be retained, trees to be removed and new trees to be planted.
- 4.7 The routes of proposed services should be assessed by the project arboriculturist and a detailed Arboricultural Method Statement produced in conjunction with the services engineer and contractor if services are to be routed within root protection areas.
- 4.8 The project arboriculturist should review proposals for any archaeological investigations, contaminated soil remediation or Japanese knotweed control, that may be required, to assess any impact on retained trees and if there is a conflict, advise on mutually acceptable solutions.

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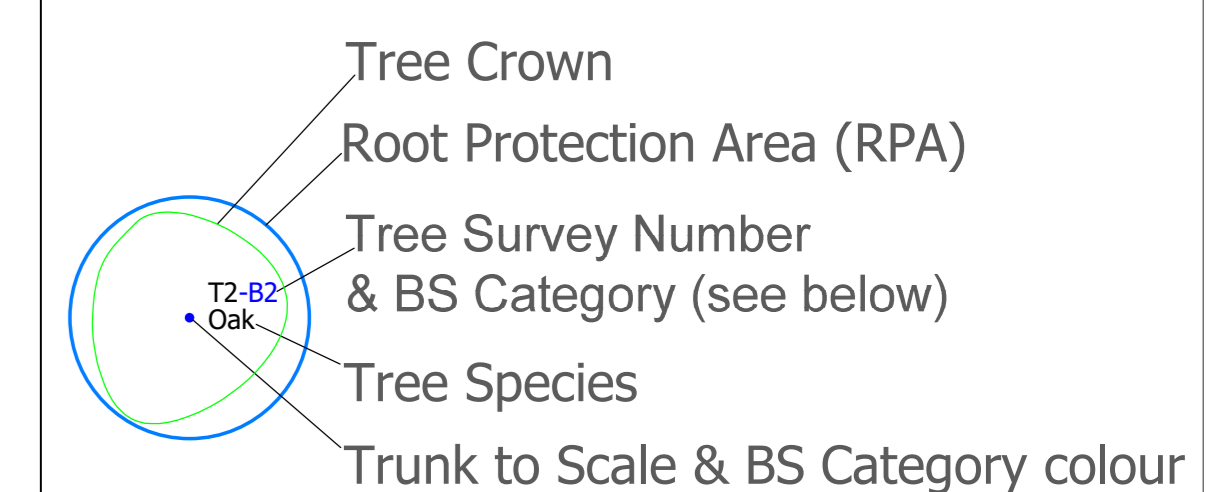
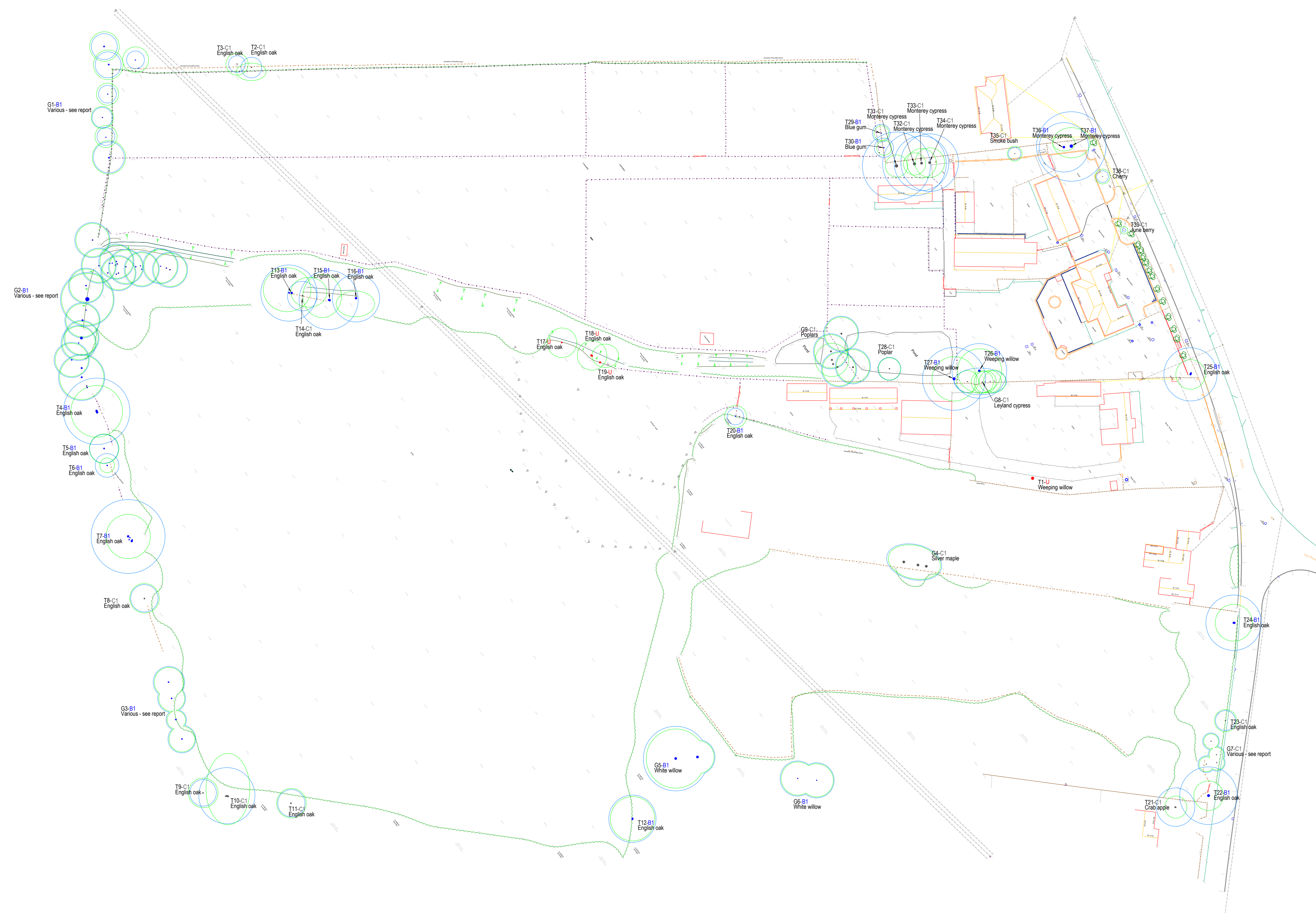
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01245 209928

07973 756886



BS 5837 Category
(see report for full details)

Category A - Green Category Letter
Tree of high quality and value

Category B - Blue Category Letter
Tree of moderate quality and value

Category C - Grey Category Letter
Tree of low quality and value

Category U - Red Category Letter
Tree of poor quality and value

Rev	Description	Date	Drawn



Elizabeth House, 28 Baddow Road, Chelmsford, CM2 0DG
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Project
Kelvedon Road, Tiptree

Title
Tree Constraints Plan

Drawing Number	Scale	Date
UTC-0357-P02-TCP	1:500 @ A0	03.10.2020

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TREE WORK SPECIFICATION

Legal Status of Trees

Tree Preservation Order TPO/03/19 protects all trees on site as part of an Area Order. Therefore, trees listed for removal in the report (summarised below) can only be removed with written approval from the LPA, or unless works are necessary to implement a full planning consent.

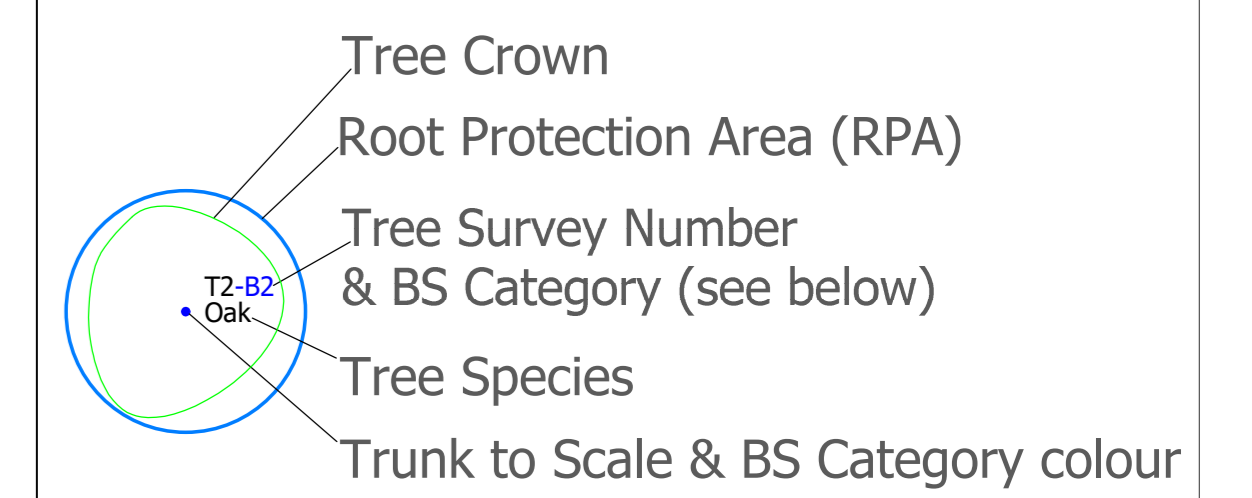
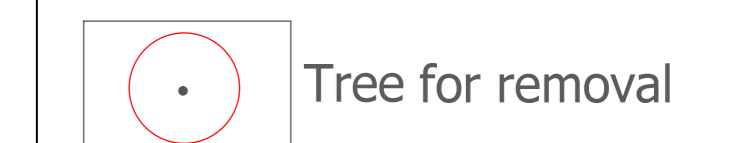
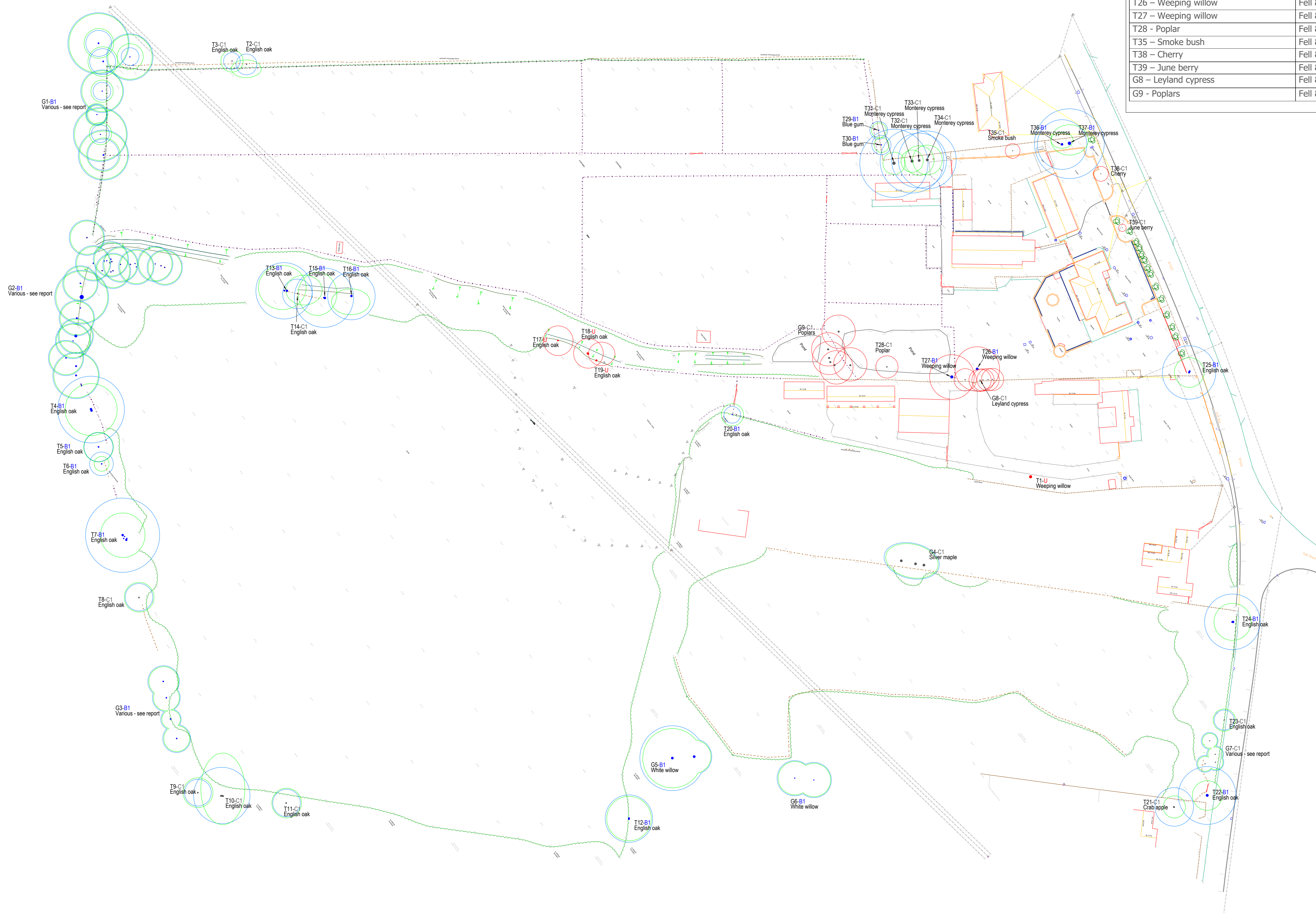
Tree Works

Only works specified on this plan or accompanying report will be carried out. Any variation or uncertainty must be clarified with the project arboricultural consultant or local authority before continuing.

All tree works to be in accordance with BS 3998: 2010 Recommendations for tree works, or industry best practice.

Tree works have the potential to cause harm to wildlife and some wildlife which use trees is legally protected. It is the responsibility of the main contractor and tree surgery contractor to ensure no protected species are harmed whilst carrying out site clearance or tree surgery works.

Tree Number & Species	Tree Works
T1 – Weeping willow	Fell & grind roots
T17 – Oak	Fell & grind roots
T18 – Oak	Fell & grind roots
T19 – Oak	Fell & grind roots
T26 – Weeping willow	Fell & grind roots
T27 – Weeping willow	Fell & grind roots
T28 – Poplar	Fell & grind roots
T35 – Smoke bush	Fell & grind roots
T38 – Cherry	Fell & grind roots
T39 – June berry	Fell & grind roots
G8 – Leyland cypress	Fell & grind roots
G9 – Poplars	Fell & grind roots



BS 5837 Category (see report for full details)

Category A - Green Category Letter
 Tree of high quality and value

Category B - Blue Category Letter
 Tree of moderate quality and value

Category C - Grey Category Letter
 Tree of low quality and value

Category U - Red Category Letter
 Tree of poor quality and value

A	Revised layout added	03.10.20	GJU
Rev	Description	Date	Drawn



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Project
 Kelvedon Road, Tiptree

Title
 Tree Removal Plan - Draft

Drawing Number	Scale	Date
UTC-0357-P03-TRP	1:500 @ A0	03.10.2020



ARBORICULTURAL METHOD STATEMENT

British Standards 5837:2012
 This method statement follows the principles of BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations, which provides a methodology for the assessment and protection of trees on development sites.

Tree Works
 Only tree works specified on this plan or in the associated report shall be carried out. Any variation or uncertainty must be clarified with the project arboricultural consultant or local authority before continuing.

All tree works to be in accordance with BS 3998:2010 Recommendations for tree works, or industry best practice.

Tree works have the potential to cause harm to wildlife and some wildlife which use trees is legally protected. It is the responsibility of the main contractor and tree surgery contractor to ensure no protected species are harmed whilst carrying out site clearance or tree surgery works.

Monitoring & Supervision
 The project arboricultural consultant's role includes monitoring compliance with tree related planning conditions. All works within Root Protection Areas (RPAs), and any other works with the capacity to impact retained trees, shall be monitored or supervised by the arboricultural consultant. Site visits shall be timed to cover key activities, and/or at timing agreed by planning condition or at the pre-commencement site meeting.

Protective Barriers & Ground Protection
 Tree protection must be in place before any works, including site clearance or demolition, begin, and stay in place as long as a risk of damage remains.

The position of protection is shown on this plan. The minimum distance of protective barriers measured from the tree trunk is shown on the plan and in the Tree Survey Sheets. The edge of the tree crown MUST NOT be used to indicate the position of protective barriers except where the crown extends beyond the RPA.

The specification for barriers can be found in the figures on this plan.

Signs shall be fixed to every third panel stating it is a Tree Protection Area - see example on this plan and in the report.

The main contractor shall inform the project arboricultural consultant and local authority tree officer that tree protection is in place before any site clearance or demolition begins.

Services
 Where agreed with the local authority, the installation or alteration of services within RPAs will follow the guidance within BS 5837 or NJUG Volume 4: Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.

No works will occur within RPAs without the prior agreement of the project arboricultural consultant.

Excavations
 The default position is that no excavation is carried out within RPAs. Only where agreed in advance with the local authority and supervised by the project arboricultural consultant, can this occur. Specialist methods will be required.

No-Dig Surfacing
 Any areas of no-dig hard surfacing is indicated on this plan. No-dig involves building-up levels on top of existing levels, or removing an existing surface and sub-base and building-up from there. No scraping or reducing of existing soft surfaces, other than the removal of turf, will be undertaken.

A specification for no-dig is on this plan, with full details in the accompanying report.

Generic Protection Issues
 No changes in soil level within RPAs without prior consent of the local authority.

No vehicles, machinery, plant or personnel will be permitted within RPAs at any time without the prior consent of the project arboricultural consultant.

No fires will be permitted within 10m of the crown of any tree.

No materials or liquids which will contaminate soil (e.g. cement, diesel, vehicle washings, chemical toilets etc.) must not be permitted within, or close to RPAs of retained trees. Consideration must be given to sloping ground to ensure contamination will not occur in the event of a spillage.

Procedure for Incidents
 If any breach of the approved tree protection measures occurs:

The site manager must be informed immediately.

The Local Authority Tree Officer (or other Planning Officer) and the Project Arboriculturist, must be informed at the earliest opportunity.

Immediate action must be taken to halt the breach and prevent any further breaches.

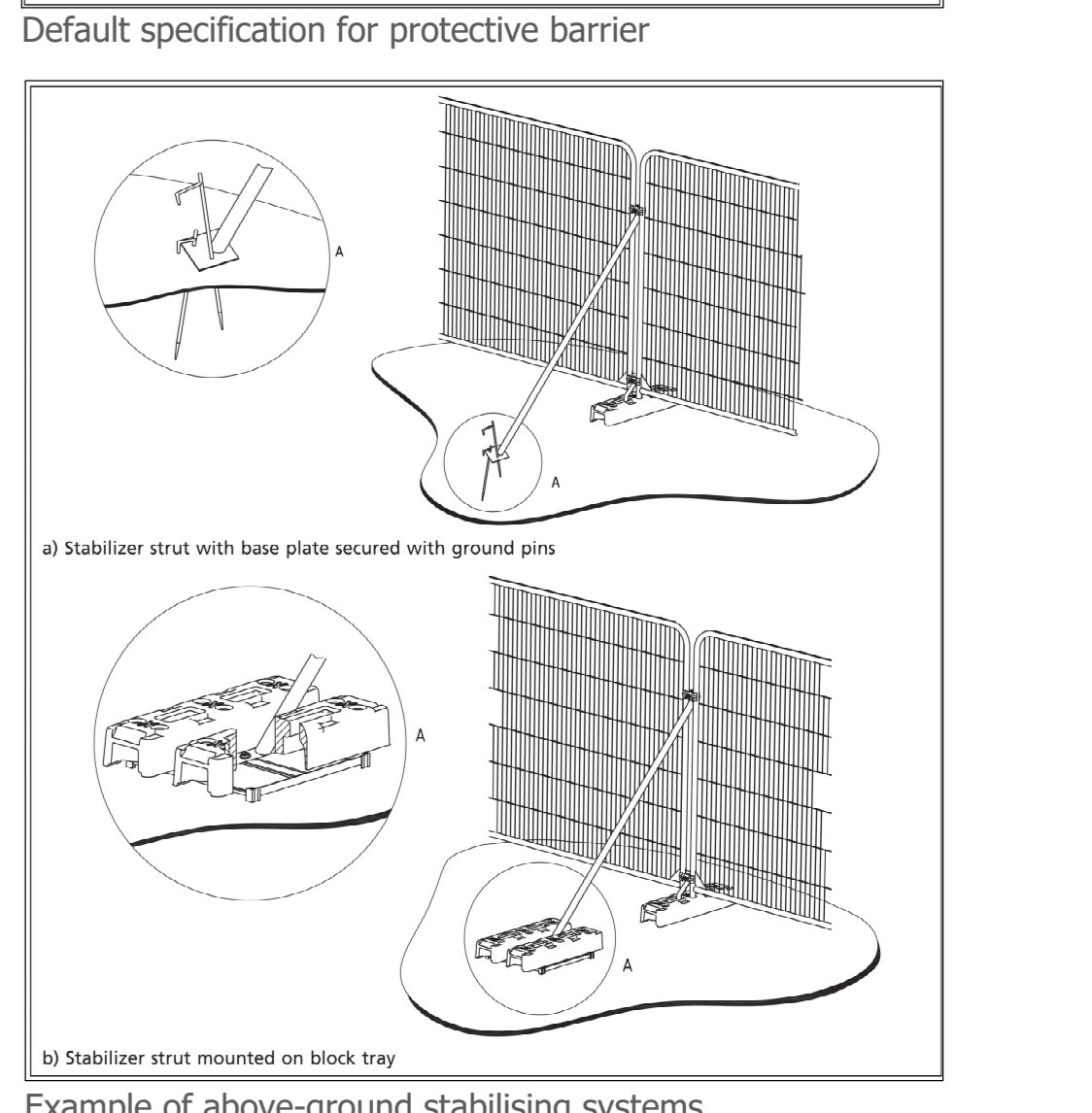
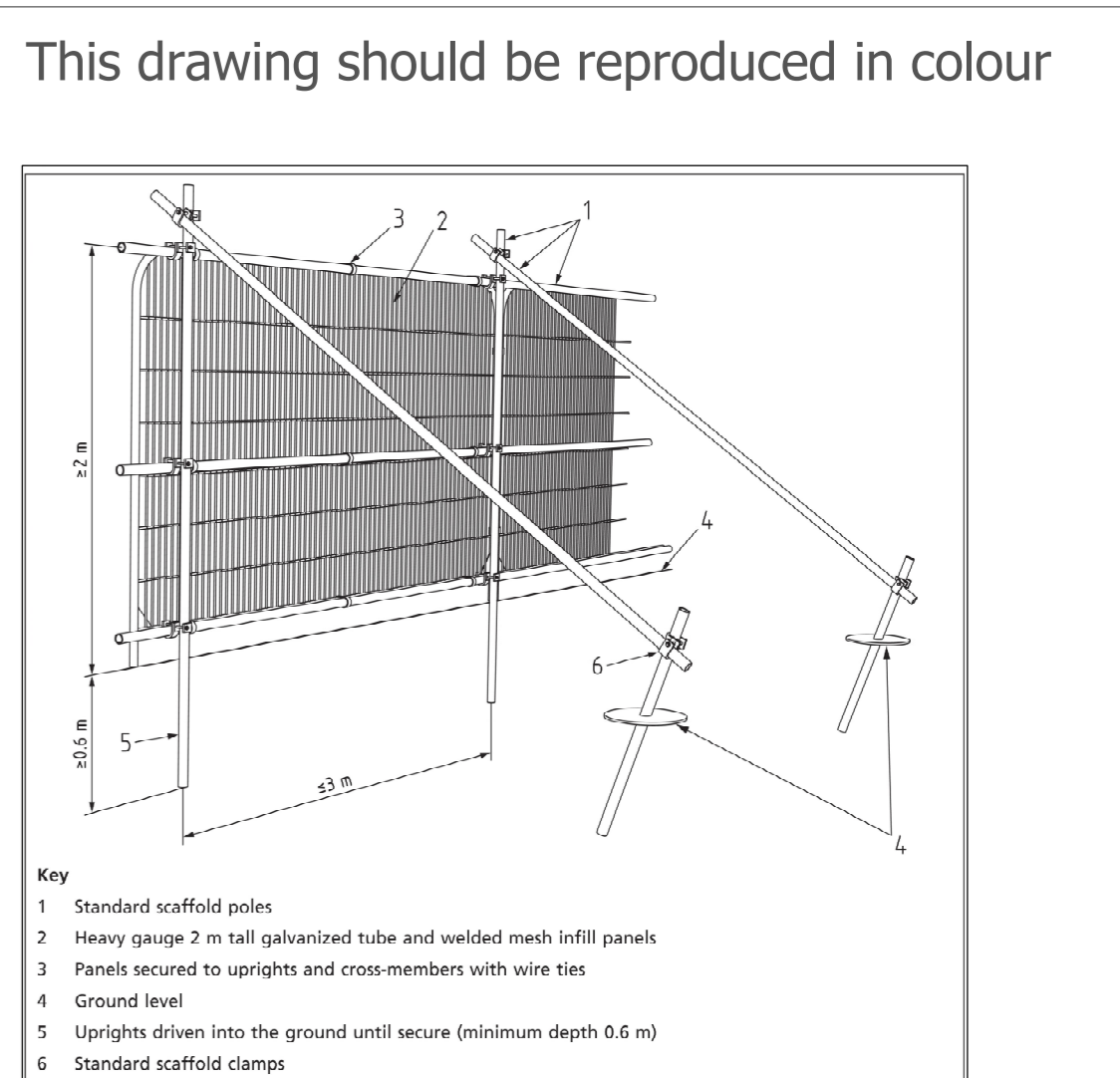
All preventative action and details of agreed remedial works must be recorded and reported to the LPA.

GROUND PROTECTION

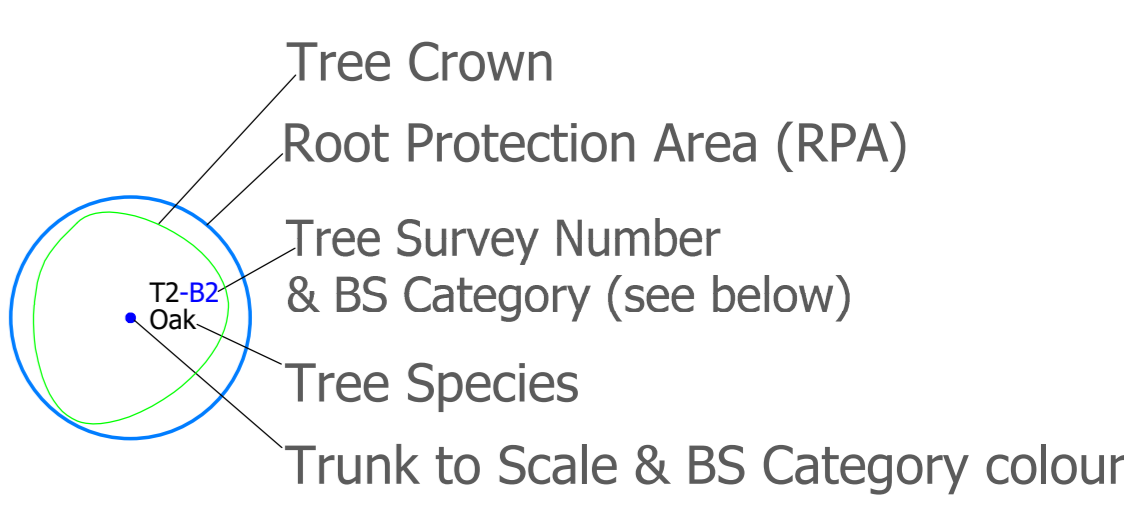
Ground protection must be fit for the purpose of supporting any traffic, including foot-traffic, entering or using the site without being distorted or causing compaction of underlying soil. It might comprise one of the following:

- for pedestrian movements or the erection of scaffolding within the RPA the installation of ground protection in the form of a single thickness of scaffold boards 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 geotextile);
- for pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards or panels placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane; or
- for wheeled or tracked construction traffic exceeding 2t 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.

Examples of ground protection below.

- Example of above-ground stabilising systems
- Specialist methods of construction & ground protection
 - Specialist methods of construction
 - Ground protection
 - Tree protection barrier - position to include other vegetation
 - Tree protection barrier - position during specialist works
 - Tree protection barrier - default position



- BS 5837 Category**
 (see report for full details)
- Category A** - Green Category Letter
Tree of high quality and value
 - Category B** - Blue Category Letter
Tree of moderate quality and value
 - Category C** - Grey Category Letter
Tree of low quality and value
 - Category U** - Red Category Letter
Tree of poor quality and value

C	Revised layout added	29.10.20	GJU
B	Revised layout added	19.10.20	GJU
A	Revised layout added	03.10.20	GJU
Rev	Description	Date	Drawn

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Project
 Kelvedon Road, Tiptree

Title
 Tree Protection Plan

Drawing Number	Scale	Date
UTC-0357-P05-TPP	1:500 @ A0	03.10.2020



5 TREE SURVEY SCHEDULE - EXPLANATORY NOTES & SURVEY SHEETS

<p>Methodology A ground level only survey was undertaken. No specialist decay detection equipment was used with basic sounding and probing tools used where necessary. No soil samples or investigations were carried out. Access to trees outside the site boundaries may not have been possible, thus observations are confined to what was visible from within the site and any surrounding public areas. Where heavy ivy, or other vegetation is present, trees are assessed from what can be seen. The survey and this report are prepared for planning purposes only and is not a safety assessment of trees. Any obvious faults, hazards or health issues will be commented on and are part of the assessment for suitability for retention; however, it must be understood that this report is not a tree risk assessment and should not be construed as such. This report must not be relied on to ensure the tree owner's Duty of Care has been fulfilled.</p> <p>Tree No. T: Tree; G: Group; W: Woodland; H: Hedge; S: Shrub mass</p> <p>Species See below.</p> <p>Height Estimated or measured with the use of a Disto laser measurer, given in metres.</p> <p>Trunk Diameter Measured at approximately 1.5m above ground level and given in millimetres.</p> <p>Radial Crown Spread Measured by Disto laser measurer at the main cardinal points and given in metres. For trees with reasonably symmetrical crowns, a single averaged figure is given.</p> <p>Crown Clearance Estimated height of main crown above ground level. Given in metres.</p>	<p>Height to 1st Branch (where relevant) Any low branches that would not be feasible for removal during normal management and should be considered a design constraint, are noted. Given as the height of the first main branch above ground level and aspect. Given in metres.</p> <p>Life Stage NP: Newly planted. Y: Young - an establishing tree that could be easily transplanted. High ability to cope with change. SM: Semi-mature - an established tree still to reach its ultimate height and spread and with considerable growth potential. High ability to cope with change. EM: Early mature - a tree reaching its ultimate height and whose growth is slowing, however, it will still increase considerably in stem diameter and crown spread. Moderate ability to cope with change. M: Mature - a tree with limited potential for further significant increase in size although likely to have a considerable safe useful life expectancy. Limited ability to cope with change. LM: Late mature - a senescent tree, in decline, although may still have a useful life expectancy. Very little ability to cope with change. V: Veteran - has features associated with advanced age for its species but not necessarily very old chronologically. Very low ability to cope with change. A: Ancient - a tree older than typical for the species and of great ecological, cultural, or aesthetic value. Very low ability to cope with change.</p> <p>Physiology Health, condition and function of the tree, in comparison to a normal specimen of its species and age.</p> <p>Structure Structural condition of the tree, based on both the structure of its roots, trunk, major stems and branches, and on the presence of any structural defects or decay. Given as Good, Fair, Poor or Hazardous.</p>	<p>Landscape Value (where used) An evaluation of the visibility of the tree from public viewpoints. Given as Unspecified, Low, Moderate or High.</p> <p>Estimated Years Estimated remaining useful contribution in years. This is not necessarily the ultimate life expectancy of the tree as trees can often exist in a collapsed, decayed form for many years, however, this may not be appropriate in the site context.</p> <p>Comments Where appropriate, comments could expand on tree condition and health, features within the rooting zone, safety concerns etc. Recommendations for any tree works are only intended to address significant issues identified during the inspection and is not for works to facilitate the development. Shown in red text.</p> <p>BS 5837 Category U: Unsuitable for retention. Existing condition is such that they cannot be realistically retained as living trees in the context of the current land use for longer than 10 years. Note, category U trees can have existing or potential conservation value which it might be desirable to preserve. A: High quality and value (non-fiscal) with at least 40 years remaining life expectancy. B: Moderate quality and value with at least 20 years remaining life expectancy. C: Low quality and value with at least 10 years remaining life expectancy, or young trees with a stem diameter below 150 mm. A, B and C category trees are additionally graded into 1) Mainly arboricultural values; 2) Mainly landscape values; 3) Mainly cultural values including conservation.</p> <p>RPA Radius Root protection radius in metres measured from base of tree.</p> <p>RPA m² The total area of the RPA in square metres.</p>
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All trees with a trunk diameter of 75mm or above were surveyed, as recommended in BS 5837. Obvious hedges and shrub masses were identified where appropriate. Information collected is in accordance with recommendations in subsection 4.4.2.5 of BS 5837 and includes species, height, diameter, branch spread, crown clearance, age class, physiological condition, structural condition, and remaining contribution. Each tree was then allocated one of four categories (U, A, B or C) to reflect its suitability as a material constraint on development.

No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Height to 1st Branch	Life Stage	Physiology	Structure	Est. Years	Comments	Category	RPA Radius	RPA m2
T1	Weeping willow (<i>Salix x sepulcralis</i> 'Chrysocoma')	8m	720mm	N1m E1m S1m W1m	3m	5m S	M	Dead	Poor	-	Completely dead	U	-	-
T2	Pedunculate oak (<i>Quercus robur</i>)	7m	230mm	N0m E4m S7m W4m	2m	2.5m S	Y	Good	Good	40+	Small tree of good form and free from significant defects, growing within hawthorn hedge.	C1	2.8m	24m ²
T3	Pedunculate oak	7m	220mm	N3m E3m S3m W3m	4m	-	Y	Good	Good	40+	Small tree of good form and free from significant defects, growing within hawthorn hedge.	C1	2.6m	22m ²
T4	Pedunculate oak	12m	520mm 540mm	N7m E7m S7m W7m	3m	3m N	EM	Good	Good	40+	Hedgerow tree of good form and free from significant defects growing within common hawthorn hedge Minor deadwood scattered throughout crown	B1	9m	254m ²
T5	Pedunculate oak	9m	325mm	N4m E4m S4m W4m	2m	2m N	Y	Good	Good	40+	Hedgerow tree of good form and free from significant defects growing within common hawthorn hedge	B1	3.9m	48m ²
T6	Pedunculate oak	9m	270mm	N2m E2m S2m W2m	2m	-	Y	Good	Good	40+	Tree leans to the southeast otherwise tree of good form and free from significant defects	B1	3.2m	33m ²
T7	Pedunculate oak	12m	520mm 500mm 250mm 250mm 230mm	N6m E6m S6m W6m	2.5m	3m N	EM	Good	Good	40+	Multi-stemmed hedgerow tree of good form and free from significant defects growing within common hawthorn hedge	B1	10m	316m ²



No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Height to 1st Branch	Life Stage	Physiology	Structure	Est. Years	Comments	Category	RPA Radius	RPA m2
T8	Pedunculate oak	10m	200mm 150mm 150mm 100mm	N4m E4m S5m W4m	3m	4m	EM	Good	Good	40+	Multi-stemmed hedgerow tree of good form and free from significant defects growing within common hawthorn hedge Dead tree immediately adjacent to T8, remove for health and safety reasons	C1	3.7m	43m ²
T9	Pedunculate oak	9m	300mm	N4m E4m S4m W4m	4m	4m N	EM	Good	Good	40+	Hedgerow tree of reasonable form and free from significant defects growing within common hawthorn hedge	C1	3.6m	41m ²
T10	Pedunculate oak	12m	400mm 390mm 300mm	N12m E6m S8m W6m	1.5m	1m N	EM	Good	Good	40+	Multi-stemmed hedgerow tree of good form and free from significant defects growing within common hawthorn hedge	C1	7.6m	182m ²
T11	Pedunculate oak	9m	310mm	N4m E4m S4m W4m	3m	4m N	EM	Good	Fair	40+	Hedgerow tree of poor form	C1	3.7m	44m ²
T12	Pedunculate oak	10m	420mm 335mm	N6m E6m S6m W6m	4m	4m W	EM	Good	Good	40+	Tree of good form Bark wound at one metre on west-side of stem	B1	6.4m	131m ²
T13	Pedunculate oak	12m	510mm 375mm	N7m E6m S5m W7m	3m	4m W	EM	Good	Good	40+	Tree of reasonably good form Minor deadwood scattered throughout crown	B1	7.6m	181m ²
T14	Pedunculate oak	8m	335mm	N5m E7m S3m W3m	3m	4m W	EM	Good	Good	40+	Tree of reasonably good form Minor deadwood scattered throughout crown and numerous old pruning stubs	C1	4m	51m ²
T15	Pedunculate oak	12m	555mm 370mm	N7m E3m S5m W8m	2.5m	4m W	EM	Good	Good	40+	Tree of poor form Minor deadwood scattered throughout crown and numerous old pruning stubs	B1	8m	201m ²
T16	Pedunculate oak	8m	540mm	N2m E5m S5m W5m	3.5m	3m W	EM	Good	Good	40+	Tree of reasonably good form Minor deadwood scattered throughout crown	B1	6.4m	132m ²
T17	Pedunculate oak	7m	330mm	N4m E4m S4m W4m	4m	4m S	EM	Dead	Fair	-	Dead	U	-	-



No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Height to 1st Branch	Life Stage	Physiology	Structure	Est. Years	Comments	Category	RPA Radius	RPA m2
T18	Pedunculate oak	11m	440mm 270mm 260mm 230mm	N4m E4m S4m W4m	2m	2m N	EM	Dead	Fair	-	Dead	U	-	-
T19	Pedunculate oak	11m	440mm	N5m E5m S1m W2m	2m	3m N	EM	Dead	Fair	-	Dead	U	-	-
T20	Pedunculate oak	7m	220mm	N3m E3m S3m W3m	4m	-	Y	Good	Good	40+	Tree of good form	B1	2.6m	22m ²
T21	Crab apple (<i>Malus</i> sp.)	7m	320mm 220mm 200mm	N3m E3m S3m W3m	3m	1.5m E	M	Fair	Fair	20+	Mature apple, trunk forks at 750mm Off-site tree	C1	5.2m	86m ²
T22	Pedunculate oak	7m	650mm e	N4m E4m S4m W4m	3m	-	EM	Fair	Fair	40+	Tree located on edge of public highway Ivy covered stem extending into crown to 7m	B1	7.8m	191m ²
T23	Pedunculate oak	7m	230mm	N3m E3m S3m W3m	4m	4m N	Y	Good	Good	40+	Young healthy tree growing adjacent to the public highway	C1	2.7m	24m ²
T24	Pedunculate oak	9m	520mm 290mm 200mm	N5m E5m S5m W5m	4.5m	-	EM	Good	Good	40+	Tree growing at the edge of the public highway. Minor damage to branches growing over the carriageway. Prune to clear highway to a height of 5.1	B1	7.5m	179m ²
T25	Pedunculate oak	10m	430mm 420mm	N4m E4m S4m W4m	5m	-	EM	Good	Good	40+	Twin stemmed tree growing adjacent to public highway	B1	7.2m	164m ²
T26	Weeping willow	13m	620mm	N6m E6m S6m W6m	1m	4m S	M	Good	Good	20+	Tree of good form previously reduced to approximately 8 metres	B1	7.4m	174m ²
T27	Weeping willow	14m	710mm	N6m E6m S6m W6m	1m	4m S	M	Good	Good	20+	Tree of good form previously reduced to approximately 8 metres	B1	8.5m	228m ²



No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Height to 1st Branch	Life Stage	Physiology	Structure	Est. Years	Comments	Category	RPA Radius	RPA m2
T28	Hybrid poplar (<i>Populus</i> sp.)	13m	260mm	N3m E3m S3m W3m	3m	-	M	Fair	Fair	20+	Tree growing on bank of ornamental pond Tree heavily reduced previously tree of poor form as consequence	C1	3.1m	31m ²
T29	Blue gum (<i>Eucalyptus gunnii</i>)	6m	200mm	N2m E2m S2m W2m	2.5m	-	Y	Good	Good	40+	Tree of good form and health Off-site tree - section of crown extends over survey site	B1	2.4m	18m ²
T30	Blue gum	6m	220mm	N2m E2m S2m W2m	2m	-	Y	Good	Good	40+	Tree of good form and health Off-site tree - section of crown extends over survey site	B1	2.6m	22m ²
T31	Monterey cypress (<i>Cupressus macrocarpa</i>)	8m	770mm	N3m E3m S3m W3m	3m	-	M	Fair	Fair	40+	Extensive bark wound at base of tree. Tree of poor form, previously reduced to approximately 7 metres	C1	9.2m	268m ²
T32	Monterey cypress	8m	720mm	N3m E3m S3m W3m	3m	-	M	Fair	Fair	40+	Tree forks at 1500mm. Tree of poor form, previously reduced to approximately 7 metres	C1	8.6m	234m ²
T33	Monterey cypress	8m	620mm	N4m E4m S4m W4m	2.5m	-	M	Fair	Fair	40+	Tree of poor form, previously reduced to approximately 7 metres	C1	7.4m	174m ²
T34	Monterey cypress	8m	650mm	N4m E4m S4m W4m	3.5m	-	M	Fair	Fair	40+	Tree of poor form, previously reduced to approximately 7 metres	C1	7.9m	191m ²
T35	Smoke bush (<i>Cotinus coggygria</i>)	4m	100mm 95mm	N2m E2m S2m W2m	1.5m	-	Y	Good	Good	20+	Young tree of good form and health	C1	1.7m	8.6m ²
T36	Monterey cypress	11m	560mm	N3m E3m S1m W6m	4m	-	M	Good	Good	40+	Tree growing in raised bed. Previously reduced to approximately 10m	B1	6.7m	142m ²
T37	Monterey cypress	11m	785mm	N5m E5m S3m W5m	3m	-	M	Good	Good	40+	Tree growing in raised bed. Previously reduced to approximately 10m. Small section of crown is dead as a result of Coryneum canker	B1	9.4m	279m ²



No.	Species	Height	Trunk Dia.	Radial Crown Spread	Crown Clearance	Height to 1st Branch	Life Stage	Physiology	Structure	Est. Years	Comments	Category	RPA Radius	RPA m2
T38	Flowering cherry (<i>Prunus sp.</i>)	2m	130mm	N2m E2m S2m W2m	1m	-	Y	Good	Good	20+	Young, healthy tree growing within brick raised bed Tree could be lifted and replanted	C1	1.5m	7.6m ²
T39	June berry (<i>Amelanchier lamarckii</i>)	1m	85mm	N1m E1m S1m W1m	-	-	Y	Good	Good	20+	Young, healthy tree growing within brick raised bed Tree could be lifted and replanted	C1	1.0m	3.3m ²
G1	Mixed species group	Up to 15m	Group of pedunculate oak, field maple (<i>Acer campestre</i>), common hawthorn (<i>Crataegus monogyna</i>), blackthorn (<i>Prunus spinosa</i>) and bramble. Largest tree c. 350mm diameter; most c. 200mm diameter. Major deadwood noted in crown of oaks within group.									B1	-	-
G2	Mixed species group	Up to 12m	Group of pedunculate oak, field maple (<i>Acer campestre</i>), common hawthorn (<i>Crataegus monogyna</i>), blackthorn (<i>Prunus spinosa</i>), common ash (<i>Fraxinus excelsior</i>) and bramble. Unable to assess trees within group owing to impenetrable thicket.									B1	-	-
G3	Mixed species group	Up to 9m	Group of thorn, blackthorn and elm (<i>Ulmus sp.</i>)									B1	-	-
G4	Group of 3 no. silver maple (<i>Acer saccharinum</i>)	Up to 10m	4.1 twin stem tree with stem diameters of: 200 and 200; 4.2 multi stemmed tree: 170, 290. 120, 75, 70,75 and 50.									C1	-	-
G5	White willow (<i>Salix alba</i>)	Up to 18m	Group of multi-stemmed trees. Unable to access group as vegetation impenetrable. Trees within group have healthy crown and appear to be free from significant defects.									B1	-	-
G6	White willow	Up to 17m	Group of multi-stemmed trees. Unable to access group as vegetation impenetrable. Trees within group have healthy crown and appear to be free from significant defects.									B1	-	-
G7	Mixed species group	Up to 8m	Group of young elm and oak adjacent to public highway.									C1	-	-
G8	Walden cypress	Up to 7m	Line of trees maintained to a height of 7 metres.									C1	-	-
G9	Line of 10 no. hybrid poplar	Up to 13m	Trees of poor form and structure, previously topped to 5 metres.									C1	-	-



APPENDIX A – ARBORICULTURAL METHOD STATEMENT – HEADS OF TERMS

An Arboricultural Method Statement (AMS) describes how operations which may affect trees will be carried out to minimise any adverse effect on them. Details of site management, detailed construction methods, materials etc. can only be finalised once the post-consent detailed design begins. For that reason, at this stage in the process, only a draft list of heads of terms summary is given and this will need more detailed consideration once consent is issued. This is as recommended in Table B1 of BS 5837 (reproduced courtesy of BSI below).

WORKS WITHIN RPAs OR WITH LIKLIHOOD TO IMPACT TREES	ARBORICULTURAL IMPACT
Who will be responsible for protecting the trees on site.	Usually the site manager – to be agreed at pre-construction meeting.
Auditable system of arboricultural site monitoring, including a schedule of specific site events requiring input or supervision and how problems will be reported and solved.	To be agreed at pre-construction meeting.
Tree works pre-development and any facilitation pruning to allow for site access.	Review with tree work contractor
Site clearance, demolition including the removal of hard surfaces.	Review with main contractor/demolition contractor regarding working practices.
Installation of tree protection barriers and any ground protection.	Review specification and supervise installation.
Details of soil and archaeological investigations, contaminated soil removal, Japanese knotweed control and other works requiring excavation, if near trees.	Review with specialist.
Site hoarding, temporary services, site facilities, parking, storage of materials and plant and welfare.	Review at detailed-design stage and supervise where close to trees.
Crane access, location and movements.	Review at detailed-design stage and with contractor on site.
Details of changes in soil levels, grading, mounding and removal of spoil and details of retaining structures where permanent changes of soil level are proposed.	Review at detailed-design stage and supervise where close to trees.
Measures to control dust, concrete washings and wheel washings near trees.	Review at detailed-design stage and with contractor on site.
Any excavations within CEZs.	Review at detailed-design stage and supervise where close to trees.
Specialist foundations, including details of piling operations.	Review at detailed-design stage and supervise where close to trees.
Installation of new hard surfacing.	Review at detailed-design stage and supervise where close to trees.
Precise services locations, including methods of installation near trees where unavoidable.	Review at detailed-design stage and supervise where close to trees.
Landscaping works, including removal of tree protection.	Review at detailed-design stage and supervise where close to trees.
Post construction amelioration where required.	Specify and supervise.



APPENDIX B – PRINCIPLES FOR WORKING CLOSE TO TREES

TECHNICAL DESIGN CONSIDERATIONS

- 1 The following information is to allow for proper consideration of requirements close to trees at the planning application stage. Details are generic. Site-specific details shall be prepared once detailed design takes place following planning consent.
- 2 It does not set out the working specifications of tree protection measures and specialist engineering requirements but provides enough detail to demonstrate the feasibility of the scheme.
- 3 During detailed design, post planning consent, the project arboriculturist should be involved with the design team with particular emphasis on any works close to retained trees.
- 4 The Tree Protection Plan is based on supplied information and should only be used for dealing with tree issues.
- 5 It is in draft form and shows all known areas where protective measures will be required. Tree protection is shown as barriers and/or ground protection defining the Construction Exclusion Zone (CEZ)⁵. Where necessary, areas outside the CEZ but still within the RPA are indicated. Any works within these areas will require arboricultural input, supervision and likely to require specialist techniques.
- 6 Trees for removal are shown with a red outline and any areas of crown reduction pruning are indicated.
- 7 Where known, the location of new tree planting is shown so it can be protected during development.

GENERAL POINTS

- No excavation within RPAs without a written method statement, approved and supervised by the project arboriculturist.
- No changing of levels within RPAs.
- No storage of plant or materials within RPAs.
- No access to vehicles within RPAs, and no unauthorised pedestrian access.
- No substances with the potential to harm tree health, including fuels, oil cement (including washings), concrete mixing or other chemicals, shall be stored or used within or directly adjacent to RPAs of retained trees.
- No fires shall be lit within 5m of RPAs due to the danger of scorching the upper parts of trees.

AUDITABLE SYSTEM OF ARBORICULTURAL SITE MONITORING

- 1 It is important to recognise that the local planning authority have the power to serve a Stop Notice if a breach of conditions occurs. Therefore, it is important that works which may impact upon trees are suitably controlled by competent personnel.
- 2 The project arboriculturist's role is to monitor compliance with arboricultural conditions and advise on any tree problems that arise or modifications that become necessary. Following every

⁵ Construction Exclusion Zone. An area based on the RPA in m² identified by an arboriculturist, to be protected during development, including demolition and construction work, by the use of barriers and/or ground protection fit for purpose to ensure the successful long-term retention of a tree.



site visit, a report will be sent to the local authority tree officer and the client/developer as an audit trail of compliance (ref. subsection 6.3 of BS 5837).

- 3 A pre-commencement site meeting will be held between the project arboriculturist, the site manager or developer's representative and an LPA representative before works on site start. If an LPA representative cannot attend, the project arboriculturist will provide details of the meeting. The purpose of the meeting is to discuss all tree protection measures in the AMS and agree tree protection to be used. The necessity and frequency of site monitoring and supervision will also be agreed. The monitoring and supervision visits should be sufficiently flexible to allow for supervision of all works within RPAs. On this project, these should include:
 - A visit following installation of tree protection prior to any works commencing on site to confirm that it is fit for purpose.
 - Any agreed works in root protection areas.
 - Any time there are potential conflicts with tree protection.
 - A visit at the completion of construction works to confirm tree protection can be removed to enable final landscaping.
- 4 The meeting should include an induction where the responsible person will be fully briefed on tree protection measures, areas where specialist methods of work are required, and any other tree related issues. This should be before any site workers are allowed on site. Following induction, a copy of the Induction Sheet (a copy will be in the detailed AMS produced following consent) will be provided and should be signed in recognition of acceptance of their role in monitoring and enforcing tree protection.
- 5 All site workers have a duty to comply with tree protection measures and this should be part of the site induction of all workers. Signed induction sheets including recognition of tree protection will be kept on site for inspection.
- 6 General monitoring of tree protection would normally be at intervals of two to four weeks but could be longer if agreed by all parties.
- 7 Should any issues or compromises occur during the development which have an impact on any retained tree it is the responsibility of the site manager to inform the project arboriculturist who will notify the LPA tree officer of the issue and any proposed remedial works.
- 8 It is the responsibility of the main contractor to ensure that the details of this report are known, understood and followed by all site personnel. As part of the site induction, all site personnel who could have an impact on trees should be briefed on specific tree protection requirements. Copies of the report and plans should be available on site at all times.
- 9 The LPA are able to schedule arboricultural monitoring and supervision by way of a planning condition. To be effective, the LPA should provide us with a copy of the formal decision notice (mail@underhilltc.co.uk)

PROTECTION OF RETAINED TREES

- 1 Trees are very easily damaged during construction activities, often at the initial site clearance and set-up stage. Compared to the obvious damage to branches and above ground parts of the tree from construction activity, damage to roots and soil structure is largely unseen but is probably the most common cause of tree decline and death following development. Root severance from trenching often removes most roots in a given area, as the majority of roots are found in the top 600mm of soil. Tree root diameter tapers very quickly a few metres from the tree stem, so seemingly small diameter roots may be vital to the health and stability of the tree.



- 2 Compaction of soil by the passage of vehicles, and even pedestrians in wet conditions, causes the greatest long-term detrimental effects on trees. Soil compaction reduces soil pore space, which in turn reduces soil air, the passage of water and available nutrients. These anaerobic conditions prevent root growth and the proliferation of soil microbes essential to tree health. Symptoms in trees will include crown die-back, sparse, and small foliage, poor extension growth etc., and ultimately death, however these may not be evident until well after the occurrence of compaction. Even one pass of a vehicle in wet conditions can cause irreparable soil compaction.
- 3 The protection of trees must take account of the buildability of the proposal, including services, and ensure that all activities such as storage of materials, parking and the use of plant and vehicles can be accommodated outside of RPAs. Particular care and planning are necessary for the operation of excavators, lifting machinery and cranes to ensure all vehicle movements and lifting operations will not impact on retained trees.
- 4 Unless agreed in writing with the LPA, tree protective barriers shall be erected in accordance with Section 6 of BS 5837. Examples are shown on the draft Tree Protection Plan and full details should be given in an Arboricultural Method Statement conditioned as part of planning consent.

NO-DIG HARD SURFACING

- 1 Cellular confinement systems (CCS) are constructed using a three-dimensional grid of plastic cells filled with no-fines angular aggregate. The system transfers vertical loads horizontally, thereby reducing ground pressure. The cells prevent sideways displacement of the aggregate.
- 2 No-dig CCS result in higher finished levels than conventional construction by as much as 300mm.
- 3 It is important to ensure that a raised finished level can be incorporated into the development. Existing road levels and existing and proposed building thresholds often cause conflict.
- 4 Speed-humps or similar can sometimes be used to disguise changes in level between roads.
- 5 Hard surfacing must finish no closer than 500mm from the base of the trunk of any retained tree. This is to allow for incremental growth and minimise the risk of distortion to the hard surface.
- 6 Several manufacturers produce CCSs (see below). Cellweb® Geosynthetics recommend a grid depth of:
 - 100mm for domestic vehicles.
 - 150mm for refuse vehicles, fire engines etc.
 - 200mm for heavy construction vehicles.
- 7 Other than removal of surface vegetation and filling of ground irregularities with sharp sand, there is to be no preparation of the soil beneath the CCS with NO COMPACTION of soil by vehicles or plate compactors.
- 8 Between the soil and the CCS, a geotextile such as Treetex™ is laid. Apart from separating the soil from the aggregate, Treetex™ minimises the movement of oil pollution into the root zone beneath. A general geotextile such as Terram™, is not suitable.
- 9 The CCS cells are filled with a no-fines angular aggregate, such as Type 4/20 or Type 20/40. MOT Type 1 or Type 3 MUST NOT BE USED. The fine particles in these products prevents air and water diffusion.
- 10 The CCS edges can be retained by several methods, such as filling the outermost cells with concrete, mounding with soil, or by using railway sleepers or timber board edging. These methods



can also be used to retain the wearing surface, or a system using aluminium edging, such as AluExcel™ or similar, can be fixed into the concrete in the outermost cells.

- 11 The wearing surface must be permeable such as SuDS block paving using grit between blocks, permeable Bitmac, permeable resin-bound gravel using a permeable binder course, loose gravel, or a proprietary product such as Golpla System infilled with gravel, or Sudscape.
- 12 The suggested methods and products are for illustration only. A structural engineer or other professional, should be consulted to ensure suitability for the intended use and ground conditions. Some CCS manufacturers provide a design service.
- 13 The following is a list of manufacturers and suppliers of CCSs and edging materials. Other products and suppliers are available:
 - Cellweb® - Geosynthetics www.geosyn.co.uk/product/cellweb-tree-root-protection
 - InfraGreen Solutions - Infracore TRP <http://infragreen-solutions.com/tree-root-protection>
 - ProtectaWeb™ - Wrekin www.wrekinproducts.com/articles/protectaweb-meets-tree-root-protection-requirements
 - Treetex™ - Geosynthetics www.geosyn.co.uk/wp-content/uploads/2015/08/cellweb-fact-sheet-4-60.pdf
 - AluExcel™ - Kinley <http://www.kinley.co.uk/products/edging/exceledge>

SERVICES

- 1 The location and direction of new underground services should be designed to allow services to be routed away from RPAs of retained trees. When existing services within RPAs require upgrading or it is unavoidable for new services to be installed in RPAs, conventional excavation techniques are usually unacceptable. Trenchless installation should be the preferred option but if that is not feasible, any excavation is likely to have to be carried out by hand or using a compressed air lance under arboricultural supervision. The methodology used must comply with *NJUG Volume 4: Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*⁶. A specific method statement will be required before any works are undertaken within RPAs.
- 2 Overhead services such as lighting, electricity, telecoms etc., should be routed outside the present and future canopy spread of retained trees. This is especially important with CCTV cameras to avoid the need for regular pruning in the future.

FOUNDATIONS

- 1 Conventional foundations require deep excavations which will sever any roots encountered. The principle of acceptable foundations within RPAs is that important tree roots are not just retained but can continue to function normally which includes further growth.
- 2 Pile and beam foundations are often assumed to be more suitable than strip foundations, however, conventional pile and beam requires the top of the beam to be at soil level and therefore requires excavation for the beam and any compressible zone beneath. The overall depth is usually 600mm upwards. Most roots are usually found at this depth and therefore this system will not be acceptable where root loss would adversely affect a retained tree.
- 3 Where tree species, health and site circumstances allow, it can be advantageous for a trial trench to be excavated using a compressed air lance under arboricultural supervision. The purpose is to allow a proper assessment of the presence or otherwise, of roots. This can help satisfy the local

⁶ National Joint Utilities Group (NJUG) (2007) Volume 4, Issue 2: *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*, <http://www.njug.org.uk/publications/>



planning authority tree officer that foundations can then be designed which will have a minimal impact on the tree/s.

Principles of pile and beam foundation design in RPAs

- 4 For where excavation is not possible, or important roots are known to be present, the use of pile and beam or pile and raft can be acceptable providing the beams or raft are designed to be at or above ground-level. This will result in higher finished levels which must be allowed for during design due to the effect on access thresholds and structure heights etc.
- 5 The use of conventional piling mats of crushed stone, usually to a depth of around 200-300mm is not acceptable within RPAs and during the design stage the system must allow for the use of mini-piling rigs which can work from proprietary ground protection mats or metal sheets. A hole 600mm deep should be hand-dug in the position of each pile to ensure no important roots will be damaged. The design for the position of the piles should be flexible enough to allow for repositioning if roots are encountered.
- 6 The position of the piles should also take account of sufficient headroom for the piling rig where there are overhanging branches. Pruning may not be acceptable; thin branches can sometimes be tied back, however, positioning the piles to avoid this is desirable.
- 7 The beam or raft must be designed so an absolute maximum of 100mm excavation takes place. This is to allow for the removal of minor undulations and allow for close contact between the soil and the beam.
- 8 Steel beams are available with a lower profile than concrete beams thereby resulting in a lower finished floor level.
- 9 Where there is a need for a compressible layer beneath the beam, an acceptable method is to open up a trench using a compressed air lance, which retains roots, and inserting the compressible material between retained roots. An assessment of the exposed roots can be made to determine if roots can be pruned to allow for sufficient compressible material to be inserted.
- 10 Depending on the percentage of the RPA covered by the building, and site circumstances, it may be necessary to leave a void for gaseous exchange, and to direct rainwater underneath.

HAND EXCAVATION

- 1 Where hand digging is specified and agreed with the LPA, it must be carefully planned. Roots are very easily damaged, if bark is removed around the root it will die from that point on. Even with the use of hand tools, bark can be damaged easily by spades etc. If ground conditions allow, the use of a compressed air lance such as an AirSpade® (www.airspade.com), should be considered. Any excavation within RPAs must only be carried out under arboricultural supervision. The supervising arboriculturist will give a toolbox talk before any works begin. The methodology below shall be followed:
 - Excavation by using hand-tools only or where ground conditions do not allow for hand excavation, by an excavator equipped with a smooth-bucket and under strict arboricultural supervision.
 - Spades and other hand tools can easily damage roots as the bark is generally much softer than above-ground parts of trees. Roots must not be used to lever spades against when digging. As soon as a root is located, it may be necessary to use hand trowels and stiff brushes to expose the root.
 - Depending on the purpose of the excavation, all roots found should initially be retained and protected by wrapping in damp hessian to reduce desiccation.



- Where necessary, any roots found with a diameter less than 25mm to be cut cleanly with secateurs making as small a wound as possible.
- Roots with a diameter of 25mm or more shall be assessed by the project arboriculturist to determine whether they can be cut or not. If deemed important to the tree, the root shall be carefully exposed and retained and temporarily wrapped in damp hessian to reduce desiccation.
- If large diameter roots have been retained, the foundation, utility etc., must be designed to accommodate the roots. Depending on the roots' location it may be possible to bridge a root using a concrete lintel or similar supported by concrete pads either side before continuing with a conventional footing for example, or use flexible service pipes etc., to avoid retained roots.
- Where roots have been retained it is important that any foundation allows for incremental growth of the root. There should also be sufficient space around the root to backfill with topsoil.
- If wet concrete is to be poured into the trench the sides of the trench must be lined with an impermeable membrane such as plastic sheeting to prevent the caustic and toxic effects of wet cement in the concrete from damaging tree roots.



APPENDIX C - OTHER CONSIDERATIONS

NATIONAL PLANNING POLICY

- 1 The government's National Planning Policy Framework (NPPF)⁷ came into effect in March 2012, with subsequent revisions. At the centre of the NPPF is a presumption in favour of sustainable development including recognising the wider benefits of ecosystem services and to move from a net loss of biodiversity to achieving net gains for nature.
- 2 Chapter 14 - Meeting the challenge of climate change, flooding and coastal change, states in relation to climate change:

150. a) [...] care should be taken to ensure that risks can be managed through suitable adaptation measures, including through planning of green infrastructure.
- 3 Chapter 15 - Conserving and enhancing the natural environment, states:

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:
a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services - including the economic and other benefits of [...] trees and woodland.
- 4 With direct reference to trees, the 2019 update states that:

174. c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists.
- 5 The trees subject to this report are not considered to be part of ancient woodland or aged or veteran trees, and therefore this aspect of NPPF is not considered applicable.

LOCAL PLANNING POLICY

- 1 Colchester Borough Council's Local Development Framework, adopted October 2010, and Core Strategy, adopted December 2008, appears to make no specific mention of trees other than retaining landscape character and the natural environment.

STATUTORY DESIGNATIONS

- 1 Trees may have statutory protection in the form of a Tree Preservation Order (TPO), or by being within a Conservation Area (CA). Further control over tree removal may be conferred by the Forestry Act 1967. Rural hedgerows may fall within the provisions of the Hedgerow Regulations 1997.
- 2 Tree preservation order TPO/03/19 covers all trees on site as part of an Area Order.
- 3 A Tree Preservation Order on any subject tree means written consent for any works will be required from the LPA unless works are necessary to implement a full planning consent.
- 4 BS 5837 does not make a distinction between trees subject to statutory protection, such as a TPO, and those trees without. This is principally because all trees are a material consideration and works to implement full planning consent overrides any TPO protection. Therefore, we do not seek to

⁷ National Planning Policy Framework (NPPF), published by DCLG, <http://www.gov.uk/government/publications/national-planning-policy-framework-2>



offer any comparison between, or imply any difference in the quality or importance of trees covered by a TPO and other trees.

- 5 The tree protection status is correct at the time of report production but can be subject to change. It is therefore the responsibility of any persons undertaking tree works operations to the trees which are the subject of this report and in accordance with our recommendations, to undertake their own statutory tree protection checks with the local planning authority, to include TPO, Conservation Area and planning conditions prior to works commencing. Tree work necessary to implement full planning consent overrides the need to apply separately although pre-commencement planning conditions may need to be discharged first. Wilful damage or destruction of TPO/Conservation Area trees can result in prosecutions for companies or individuals and fines can be up to £20,000 (County Court fines are unlimited).

ECOLOGICAL CONSIDERATIONS

- 1 Although outside the specific scope of this report, tree removal and tree work have the potential to cause harm to wildlife, and this should be considered at the planning stage. Additionally, some wildlife which uses trees is legally protected: the Wildlife and Countryside Act 1981, as amended, The Conservation of Habitats and Species Regulations 2010 and the Countryside and Rights of Way Act 2000, provide statutory protection to species of flora and fauna including birds, bats and other species that are associated with trees. These could impose significant constraints on the use and timing of access to the site. It is the responsibility of the main contractor and tree surgery contractor to ensure that no protected species are harmed whilst carrying out site clearance or tree surgery works. Unless competent to do so, the advice of an ecologist must be sought. It is generally considered that birds nest between March and August but it must be understood that birds and active nests are protected irrespective of the time of year and some species can nest in any month. Therefore, due diligence must be observed towards nesting birds whenever tree works are carried out.



APPENDIX D – ADDITIONAL INFORMATION

TREE CONSTRAINTS

- 1 Tree constraints can be categorised in two areas and are indicated on the Tree Constraints Plan. This plan is only included within this report where it has been used during the design stage of the proposal:
 - **Below Ground Constraints**
 A Root Protection Area (RPA) is a layout design tool indicating the minimum area surrounding the tree that contains sufficient rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority. Clause 4.6.2 of BS 5837 states that the RPA may be changed in shape, taking into account local site factors, species tolerance, condition and root morphology. BS 5837 states that no construction works should be carried out within RPAs except in exceptional circumstances, which may need demonstrating.
 It is based on a multiplication of the stem diameter of a single-stemmed tree and a formula for multi-stemmed trees. Note, for groups, the RPA is based on the largest individual trees’ stem diameter, half the height, or 2m beyond crown spread, whichever is the greater. For hedges and hedgerows, it is taken as half the height, or 2m beyond crown spread, whichever is the greater.
 - **Above Ground Constraints**
 These are indicated by the crown spread of trees to be retained, including their ultimate spread, along with a shade pattern shown for each tree, where relevant.
 Space needs to be allowed around a tree to be successfully retained after development and to reduce post-development pressures due to shade, daylight, leaf-drop etc. Considerations include: the current and ultimate height and spread of the tree and subsequent shade, daylight and mass issues; species characteristics including evergreen or deciduous, density of foliage, and factors such as susceptibility to honeydew (sticky exudation from aphids) drip, branch drop, fruit fall etc. Areas unsuitable for occupied accommodation may be suitable for unoccupied structures or hard surfacing and this will be indicated on the tree constraints plan where applicable.

OPPORTUNITIES

- 1 Trees are long-lived organisms which take a long time to mature and if considered at an early stage can complement a development. Research has shown that mature trees increase the value of properties by 5-18%⁸.
- 2 The maturity of trees on site can be seen as an asset if incorporated into the development appropriately as they give a feeling of establishment to an otherwise new-build site.
- 3 There is an opportunity to plant new trees throughout the development and if carefully designed and implemented, this can go some way to offsetting any detrimental effect of the development on existing trees, although ideally new trees should be proposed as a way of improving tree canopy cover and not for mitigating loss.

HOW TREES ARE DAMAGED ON DEVELOPMENT SITES

- 1 Trees are very easily damaged during construction activities, often at the initial site clearance and set-up stage. Damage can be obvious and immediate, or unseen and slow acting. Damage to

⁸Research by CABI Space in 'Does money grow on trees?', CABI 2005, reported that, in the 8 UK parks they studied, proximity to them added a premium to house prices of between 5-7%; While a US study of parks claimed house values were between 10-20% higher; The value of US properties in tree lined areas was estimated as being 6% higher by 'Urban Forest Values: Economic Benefits of Trees in Cities', Wolf K, University of Washington College of Forest Resources, Factsheet 29, 1998; 'Benefits of community trees', Nowak DJ, USDA Forest Service General Technical Report; 'The contribution of trees to residential property value', Morales DJ, Journal of Arboriculture 6, 1980.



branches, trunks and other above-ground parts of the tree from construction activity is visually obvious, can be serious and must be avoided. However, probably the most common cause of decline and death of trees on construction sites is as a result of damage to the root system and soil structure. Tree roots grow much shallower than is often assumed, with the majority in the top 600mm of soil and often going no deeper than 1 metre. Roots require air as well as water, and both come from the surface down. Most of a tree's water supply comes from rainfall. Therefore, unless the soil structure allows air and water to percolate deeply, there is no advantage to roots going deep, as air particularly, diminishes rapidly with depth. Trees mostly grow in topsoil, which is rarely deeper than 300-400mm, often much less.

Compaction

- 2 Compaction of soil by the passage of vehicles, and even pedestrians in wet conditions, causes the greatest long-term detrimental effects on trees. Soil compaction reduces soil pore space, which in turn reduces soil air, the passage of water and available nutrients. These anaerobic conditions prevent root growth and the proliferation of soil microbes essential to tree health. Symptoms in trees will include crown die-back, sparse, and small foliage, poor extension growth etc., and ultimately death, however these symptoms may not be evident until well after the occurrence of compaction. Even one pass of a vehicle in wet conditions can cause irreparable soil compaction.

Direct Root Damage

- 3 Given how shallow most tree roots are, trenching or any excavation often removes the majority of roots in a given area. Tree root diameter tapers very quickly a few metres from the tree stem, so seemingly small diameter roots may be vital to the health and stability of the tree.

Changes in Soil Level

- 4 Any reduction in soil levels will remove important roots, along with the topsoil they need for survival; however, raising soil levels can be just as harmful as even a modest increase disturbs the ability of water, and particularly air, to move into and out of the root zone, therefore, roots can suffocate from a lack of oxygen or a build-up of carbon dioxide.

ROOT PROTECTION AREA INCURSIONS

- 1 The default position should be that development is not sited within RPAs. RPAs represent the minimum area required to confidently retain a tree.
- 2 On space constrained sites, or where structures already exist within RPAs, it is accepted that incursions into RPAs may be required and BS 5837 recognises this as set out in 5.3 of BS 5837:

5.3.1 The default position should be that structures are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s). If operations within the RPA are proposed, the project arboriculturist should:

- a) demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA:*
- b) propose a series of mitigation measures to improve the soil environment that is used by the tree for growth.*

5.3.2 The cumulative effects of incursion into the RPA, e.g. from excavation for utility apparatus, are damaging and should be avoided. Where there is evidence that a tree has been previously subjected to damage by construction activity, this should be taken into account when considering the acceptability of further activity within the RPA.



- 3 Technical solutions to prevent or minimise damage to trees include specialist engineered design for foundations or hard surfaces, and strict working methodology. During the detailed design phase, it is important to consider that most construction within RPAs will result in higher finished levels for foundations and hard surfaces than conventional construction. Without careful design, this can often result in conflict with existing and proposed building thresholds and road levels etc.
- 4 It is particularly important to ensure that any encroachment does not compromise tree stability. If an encroachment does not reduce the overall assimilative function of a root system, it is unlikely to cause long-term harm. Site-specific factors, including species, age, vitality and health, and soil condition, must be considered on a case-by-case basis. Considerations in relation to the existing rooting environment may include existing hard surfaces and structures within RPAs, recent disturbances in the RPA, features affecting root extension beyond the existing RPA.
- 5 BS 5837 references hard surfacing and slabs for sheds etc., should not exceed an area greater than 20% of the RPA, therefore an RPA encroachment of <20% may be considered as low impact if the tree is in good health and of normal vitality. In practice, healthy trees can lose a considerable percentage of their root system (50% according to Thomas 2000⁹), provided there are healthy roots elsewhere. We are not recommending this, however; where sufficient space allows for new root growth, trees can tolerate and recover from root loss in a similar fashion to regrowing upper parts of the tree. Before this is considered, a full assessment of the health, vitality and species adaptation, should be undertaken, along with the current and future rooting zone of the tree. Mitigation in the form of improving the existing and future rooting environment can often more than outweigh the damage caused by moderate root loss.
- 6 The BS 5837 value categorisation is a consideration with encroachment. U Category trees are discounted from the planning process due to their limited life, although they may be retained on a site. C Category, low value trees are not normally considered a constraint on a development, and therefore, incursion into the RPA of a C Category tree is more acceptable provided it does not threaten the stability of the tree. This applies where the alternative is the removal of the tree, not simply to help the design of the scheme.

⁹ Thomas P, 2000 & 2014. Trees: Their Natural History. Cambridge University Press, Cambridge.



TECHNICAL REFERENCES

In preparing the analysis in this report, reference has been made to the guidance and advice in the following technical references:

- Climate Change Act (2008) www.legislation.gov.uk/ukpga/2008/27/contents
- Town and Country Planning Act 1990 <http://www.legislation.gov.uk/ukpga/1990/8/contents>
- National Planning Policy Framework ("NPPF"), published by the DCLG www.gov.uk/government/publications/national-planning-policyframework--2
- BS 5837 (2012) Trees in relation to design, demolition and construction - Recommendations, BSI <http://shop.bsigroup.com/>
- BS 8545 (2014) Trees: from nursery to independence in the landscape - Recommendations, BSI <http://shop.bsigroup.com/>
- BS 3998 (2010) Tree work - Recommendations, BSI <http://shop.bsigroup.com/>
- Trees in the Townscape: A Guide for Decision Makers, published by the Trees & Design Action Group <http://www.tdag.org.uk/>
- Trees in Hard Landscapes: A Guide for Delivery, published by the Trees & Design Action Group <http://www.tdag.org.uk/>
- National Joint Utilities Group (2007) Volume 4, Issue 2: Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees www.njug.org.uk/publications/



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The report covers arboricultural issues; however, non-arboricultural matters may be referred to such as soils, ecology, construction methods etc. This should be viewed as provisional and the appropriate expert should be consulted where required.

No assessment has been made of the potential influence of trees upon existing buildings or other structures because of shrinkable soils or from direct damage.

Trees are dynamic living organisms and their condition can change rapidly and therefore this report is valid for a period of 12 months. This period may be reduced if significant changes occur to the trees or the ground conditions close to them.



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