

ARBORICULTURAL IMPACT ASSESSMENT AT 2 DE SALIS ROAD, UXBRIDGE



Prepared for Mialex

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Executive Summary

This assessment outlines the tree constraints that affect the construction a new dwelling and demonstrates how the retained trees can be protected throughout the development process.

No trees will require removal for development purposes.

All the retained trees will be provided with proper protection as set out in BS5837:2012 during the construction phase. Protection measures will include erecting temporary protective fencing, special foundations, and the use of No-Dig surfaces as appropriate.

This assessment forms an important stage in the process of managing and protecting the trees on site in relation to the proposed development. However, it will only ensure the protection of the trees on site if the tree protection measures in the Arboricultural Method Statement are implemented in full and the prescribed system of arboricultural supervision is followed. Tree protection works must be fully integrated into the construction process.

The proposed new dwelling is to be situated extremely close to existing trees and therefore the foundations for the building must be carefully designed, and the building carefully constructed to minimise the impact of the building on the trees.

G.G. Robbie

AT Coombes Associates Ltd.

26 February 2021



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Appendix 1 Tree Survey Schedule

Appendix 2 Notes on Column Headings in Appendix 1

Appendix 3 Tree Constraints Plan

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Appendix 5 Arboricultural Method Statement

Appendix 6 Timetable for Implementation of Tree Protection Works

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1. Terms of Reference

- 1.1 The aim of this assessment is to survey trees that may be affected by the construction of a new dwelling at 2 De Salis Road, Uxbridge.
- 1.2 The assessment addresses the likely impact of the proposed development on surrounding trees and provides recommendations for the protection of retained trees during construction work based on BS 5837:2012 "Trees in relation to design, demolition and construction-Recommendations".
- 1.3 The client has provided a plan showing the position of the proposed development. However, the plan provided did not show the tree positions which have been plotted on the plan based on site measurements. These tree positions should be regarded as approximate and if accurate positions are needed the services of a land surveyor would be required.

2. Site Description

- 2.1 The site is 2 De Salis Road, Uxbridge, and currently comprises a semi-detached residential dwelling (Fig 1). There are no trees within the property, but it is immediately adjacent to Knight's Garden a small public park. There is a row of trees close to the boundary of 2 De Salis Road, with three sycamore in particular immediately adjacent to the existing garage (Fig 2).



Fig 1: 2 De Salis Road adjacent to Knight's Garden



Fig 2: Sycamore immediately adjacent to existing garage

- 2.2 The area close to the boundary is largely set to brambles. Two trees closer to De Salis Road include a horse chestnut and a Norway maple (Fig 3). There is a difference in levels between the ground in Knight's Garden and 2 De Salis Road, and the three sycamore are situated on this small bank (Fig 4).



Fig 3: Norway maple and horse chestnut closer to De Salis Road.



Fig 4: Sycamore situated on small bank on boundary line

3. Tree Survey Details

- 3.1 Appendix 1, the Tree Survey Schedule gives the survey findings in tabular form. The schedule contains all the information specified in section 4.4.2.5 of the British Standard. Appendix 2 gives a full explanation of the survey headings.
- 3.2 The trees were surveyed on 4 February 2021; they were not climbed but surveyed from ground level.
- 3.3 The details recorded during the tree survey have been collected independently of any development proposals, and the categorisation of the quality and amenity value of the trees is made purely on arboricultural grounds.
- 3.4 No assessment of the soil has taken place as part of this report. The British Standard states that a soil assessment should be carried out by a competent person to establish the structure, clay content and potential for volume change of the soil. A survey of this nature is considered outside the scope of this Arboricultural Assessment. For guidance on soil structure in relation to construction advice should be sought from a Structural Engineer. Guidance on foundation depth in relation to building and trees can be found in NHBC Chapter 4.2.

4. Assessment of Tree Constraints

- 4.1 To facilitate the proper assessment of tree constraints a Tree Constraints Plan (TCP) has been prepared and forms Appendix 3. The plan has been produced as a basis for the assessment of the constraints imposed by existing trees on the proposed design.
- 4.2 Appendix 3 shows the position of trees marked by a coloured dot matching the retention category status and a reference number (as listed in Appendix 1). Heights (Ht) are marked in metres for each tree, together with the predicted ultimate heights (U/Hgt).
- 4.3 The plan deals with constraints that the trees may place on the development in two areas as follows:

Below ground Constraints.

- 4.4 The Root Protection Areas (RPA) for the trees are shown as a coloured circle to match the retention category colour. The RPA will be used to help inform the closest positions of any future buildings. The RPA will be protected during any development work with temporary barriers as prescribed by the British Standard.
- 4.5 The British Standard states that likely root morphology should be considered when drawing the RPAs of trees. It is possible that the existing garage and associated hardstanding has provided unfavourable rooting conditions for trees immediately adjacent. However, access within the gated area was not possible so the likely foundation structure of it cannot be assessed, and therefore it has been assumed that it may not be a total root barrier, and accordingly the RPAs have not been adjusted on the Tree Constraints Plan (TCP, Appendix 3).

Above Ground Constraints

- 4.6 The branch spreads were measured at the four cardinal compass points, with a shape drawn around these points to indicate approximate branch spread, represented by green broken lines on the plan. The ultimate crown spread has been shown with an orange dashed line. This is a predicted distance, and is based on personal experience of how far it is likely the crown will grow.
- 4.7 A shade pattern has been shown for each tree forming an arc from north west to due east. This gives an indication of the patterns of shadows created by the trees around mid-day in the summer. This is as recommended in BS5837:2012 (Section 5.2.2) but actual shade patterns throughout the year will vary widely. If shading is likely to be a serious constraint a more detailed analysis of shade pattern using proprietary software may be deemed necessary.

5. Arboricultural Impact Assessment

- 5.1 A total of five individual trees were included in this report. Groups contain trees forming continuous features or clusters with similar characteristics. The trees are largely confined to the southern boundary of the site and are all under separate ownership.
- 5.2 Three of the trees (T3, T4, T5) have been classed as Category B. These trees are generally in good condition and confer landscape values. They are suitable for retention, and, as trees under separate ownership, it must be assumed that they will be retained throughout the course of the development.
- 5.3 Two individual trees (T4, T5) have been classified as Category C. These trees are in poorer condition and as such have been placed in this lower category. However, these trees are under separate ownership and therefore it must be assumed that they will be retained and therefore protected throughout the course of the development.
- 5.4 Any trees that are retained will be provided with their proper protection according to BS5837:2012 regardless of which category they have been placed in.
- 5.5 The tree constraints for each element of the development, are considered separately below:

Element	Detail
Demolition of Existing Garage	The existing garage is within the RPA of adjacent trees. Their foundations and associated hard standing have inhibited the extent of rooting, but this may not be the case depending on the foundations of the existing structure. Demolition must take place in a top-down, pull-back method, ensuring that debris falls away from trees outside of the RPAs. Where surfaces are to be removed within the RPA of these trees, this work must be carried out very carefully and under arboricultural supervision. Handheld tools, or appropriate machinery (such as an excavator fitted with a non-toothed ditching bucket) will be used, with due care and attention paid to any roots that may be underneath the surface. If roots are found they must be covered with good quality topsoil to a depth no greater than 150mm within 24 hours. Temporary protective barriers should be erected to prevent any demolition debris falling against the stems of the adjacent trees. If significant roots are found, especially engineered footings such as piled foundations may be a requirement for plots as outlined below. Such foundations should be created by a suitably qualified and experienced structural engineer.
Construction of New Dwelling	The proposed new dwelling is situated within the footprint of the existing garage area and the driveway, and also within the RPA of trees T1-T3. Without further investigation it cannot be ascertained whether these structures have sufficient foundations / sub-base to prevent any roots from these trees being present within these area. It is likely that, due to the proximity of the trees and the apparent relatively light construction of the garage, that roots from T1-T3 will be within the footprint of the proposed new dwelling. The British Standard allows for the use of special foundations if there is no alternative to placing the structure in this position. The design for the foundations of this building or any others within the RPAs must be assessed and approved by the consulting arborist and the Local Authority Tree Officer to ensure that they are suitable. Exact design details will be specified by the engineers. However, the key point is that the floor of the building will be set at or above ground level with minimum excavation. It is likely that mini piled foundations will provide the best option, but other engineering solutions may be suitable. The new dwelling is close to the current branch spread of trees T1-T3 which will need facilitative pruning to provide clearance between the outer branches and the new building and provide sufficient clearance for construction works. The amount of facilitative crown pruning will be agreed and carried out prior to the commencement of construction works. All trees are under separate ownership, and therefore it is recommended the works are carried out in consultation with the tree's owners. See section 8 below for more details.

Element	Detail
Construction of New Dwelling cont.	The shade patterns of T1-T5 will affect the proposed new dwelling. The shading mostly impacts the southern wall of the dwelling which have been designed without windows which means any shading should not have an impact on the liveability of the building.
New Driveway	The proposed new driveway area will, in part, be within the footprint of the existing driveway. The current driveway is only of light construction, and therefore it is recommended that the new driveway be constructed using a No-Dig surface at or above ground level. The key point is that it will be constructed without excavation. The surface should be designed by an engineer to ensure it is suitable for the traffic and loading that will be experienced when it is in use. It is likely that a three-dimensional cellular confinement system will provide the best solution. There are several manufactures of cellular confinement systems including "Cellweb" by Geosyn, Geocell by Terram or another proprietary three-dimensional cellular confinement system. The areas in question have been marked with purple hatching on the Tree Protection Plan (TPP, Appendices 4). The surface can be no closer than 0.5m from the stem of any retained tree. Any design must be approved by the consulting arborist and the Local Authority Tree Preservation Officer. The construction of the no-dig surface must be supervised by the consulting Arboriculturist. The driveway will be within the branch spread of trees T1 and T2, but the clearance height of these trees over the existing driveway is good and it is unlikely that there will be any issues with branches from these trees.
Services and Soakaways	No details of any new service runs have been provided. They should be routed to avoid the RPAs of trees. If this is not possible, special techniques must be employed to place the services within the RPA of the trees. The British Standard suggests a range of trenchless methods suitable for various applications including microtunnelling, surface launched directional drilling, Pipe ramming and Impact Moleing/thrust boring. It is important common ducts should be used where it is not possible to avoid the RPA. Further guidance on installing underground services adjacent to trees can be found in the NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Volume 4 Issue 2). This document outlines a number of techniques that may be used for trenching near trees, including trenchless techniques, discontinuous trenching and hand digging. It will be necessary to prepare detailed plans for any services that run thorough the RPA of retained trees. This should be produced in conjunction with an arboriculturist and include allowance for the space needed for access for the installations, and the levels across the proposed area. Any above-ground apparatus including CCTV cameras and lighting should also be positioned to avoid the need for any regular or detrimental pruning to the trees. Minor facilitative pruning is acceptable. However, positions that require repetitive and significant tree work must be avoided.

Element	Detail
Garden Fencing	If any new boundary fencing is to be erected, it will be within the RPA of retained trees. To ensure that the trees are not damaged when putting the fencing in place, the post holes for the fence will be excavated using an airspade or hand tools. If roots over 25mm diameter are found the position of the hole will be adjusted to avoid them. If roots under this diameter are found they will be pruned to the edge of the hole using a sharp handsaw or secateurs. The holes will then be lined with a rootbarrier material to prevent the leaching of any phytotoxic material from the wet concrete. As there may be the need for adjusting lengths between post holes, this method is not suitable for fixed panel fences. Close board fencing may provide a satisfactory alternative.

6. Tree Management and Replanting Proposals

- 6.1 No tree work has been specified in column 12 of Appendix 1 for arboricultural and health and safety reasons.
- 6.2 This schedule does not refer to, and is superseded by, any requirements for tree felling for development purposes that may be required.
- 6.3 Please note that the inspection of trees on site was of a preliminary nature, gathering, as set out in the British Standard, only information needed to assess tree constraints. While any obvious tree defects that may constitute a risk have been recorded in the survey and appropriate remedial work specified this assessment does not constitute a full tree health and safety survey. In particular inaccessible trees, trees with heavy Ivy cover and trees within groups have not been inspected fully and dimensions estimated. However, any comments on the trees relating to health and safety remain valid for 12 months from the date of this report after which the trees will require re-inspection.
- 6.4 No trees require removal for development purposes.
- 6.5 It will be necessary to carry out facilitative crown pruning to trees T1, T2 and T3 to provide sufficient clearance for the construction of the new dwelling. This must be carried out prior to the commencement of construction works by suitably qualified and experienced arborists.

7. Further Arboricultural Input into the Design Process, Construction and Aftercare

- 7.1 A Tree Protection Plan (TPP), Arboricultural Method Statement (AMS) and Timetable for implementation of Tree Protection Works form Appendices 4, 5 and 6 respectively.
- 7.2 The AMS contains a timetable for implementation of the tree protection works. No work will commence until the protective fencing is in place.

- 7.3 If the proposed layout of the development changes it will be necessary to revise this report.

8. Permissions and Constraints

- 8.1 A constraints check was carried out on 26th February 2021 on the Hillingdon Borough Council website to check for any tree constraints. The site is not within a Conservation Area and none of the trees included within the survey are protected by a Tree Preservation Order (TPO). However, TPOs can be put in place immediately and with no prior warning and therefore it is strongly recommended a constraints check is carried out prior to carrying out any works that may impact the condition of the trees, including adjacent groundworks.
- 8.2 The trees are within a neighbouring property and overhang the boundary. The trees will require crown pruning to allow for the construction of the new dwelling. There is a Common Law right to prune tree branches and roots back to the boundary, provided that the arisings are offered back to the owner of the tree. If the owner refuses these arisings, they must be disposed of responsibly. The work must be carried out with due consideration as those carrying out the works may be liable to be prosecuted for criminal damage should the trees be significantly damaged by the works. It is strongly recommended that the work is carried out in consultation with the owner of the trees.
- 8.3 To assist the planning process the LPA should be provided with a copy of this report and invited to comment on the proposals.
- 8.4 When dealing with developments close to trees, special attention should be paid to related legislation ensuring that the Wildlife and Countryside Act (1994), Conservation of Habitats and Species Regulations (2010) and the Countryside Rights of Way Act (2000) are adhered to. It must be ensured that nesting birds and protected species such as bats and reptiles are considered and protected.

9. Conclusions

- 9.1 All trees can be retained and protected as set out in BS5837:2012 throughout the works.
- 9.2 The existing garage is within the RPA of trees and is to be demolished carefully, and any existing hard standing is to be lifted under arboricultural supervision.
- 9.3 The proposed new building is to be situated very close to existing trees, and therefore must be constructed on specialist foundations that avoid excavation within the RPA of trees T1-T3.
- 9.4 The new driveway will be constructed using No-Dig surfacing.
- 9.5 The shade patterns of all trees included within the survey will affect the southern wall of the dwelling. This has been considered in the design of the dwelling with minimal fenestration on the southern aspect to minimise the impact of any shading.
- 9.6 Where new structures are located near trees, pruning will be required, either prior to construction to allow enough space between the trees and the buildings, or in the future after construction, to maintain adequate clearance.

- 9.7 Post holes for garden fences within the RPA of retained trees will be excavated carefully to ensure that major roots are not severed the surrounding roots are protected from leachates from the concrete.
- 9.8 The proposed new building is extremely close to existing trees, and therefore the foundations of the new dwelling must be carefully designed, and, in turn, carefully built to minimise the chance of significant impact to the condition of these trees.

G. G. Robbie, BSc Hons For, MICFor, M Arbor A

A.T. Coombes Associates Ltd

26 February 2021

**APPENDIX 1-
TREE SURVEY SCHEDULE**

SITE: 2 DE SALIS ROAD, UXBRIDGE, UB10 0SP

SURVEY COMPLETED: 04/02/21

1	2	3	4	5	6				7	8	9	10	11	12	13	14	15	16
Tree No.	Species	Ht (m)	Stem dia (mm)	No of Stems	Branch Spread				Height and Direction of First Branch (m)	Mean Canopy Ht	Life Stage	Physiological Condition	Structural Condition	Preliminary Tree work	Estimated remaining contribution (Yrs)	Cat grading	Radius of RPA (m)	RPA (sq m)
					N	E	S	W										
T1	Sycamore	15.5	545	4	5.2	5.6	7.0	4.0	3.0 N	6.0	EM	Fair - moderate vitality	Moderate - Multi-stemmed at base	No work required	20+	C1	6.5	134.2
T2	Sycamore	11.0	440	4	4.8	4.0	4.0	4.0	6.0 N	1.0	EM	Fair - moderate vitality	Moderate - Multi-stemmed at base	No work required	20+	C1	5.3	87.6
T3	Sycamore	15.5	755	3	4.7	5.0	5.0	5.5	3.0 W	5.0	EM	Fair - moderate vitality	Moderate - Multi-stemmed at base	No work required	20+	B2	9.1	257.9
T4	Horse chestnut	12.2	420	1	6.9	5.0	5.0	5.5	1.5 N	2.0	EM	Good	Moderate - stem wounds present	No work required	20+	B2	5.0	79.8
T5	Norway maple	12.5	300	1	4.5	4.5	4.5	4.5	2.0 W	2.5	EM	Good	Good	No work required	20+	B2	3.6	40.7

SURVEYED BY A.T. COOMBES ASSOCIATES

denotes estimated dimensions due to lack of access to tree

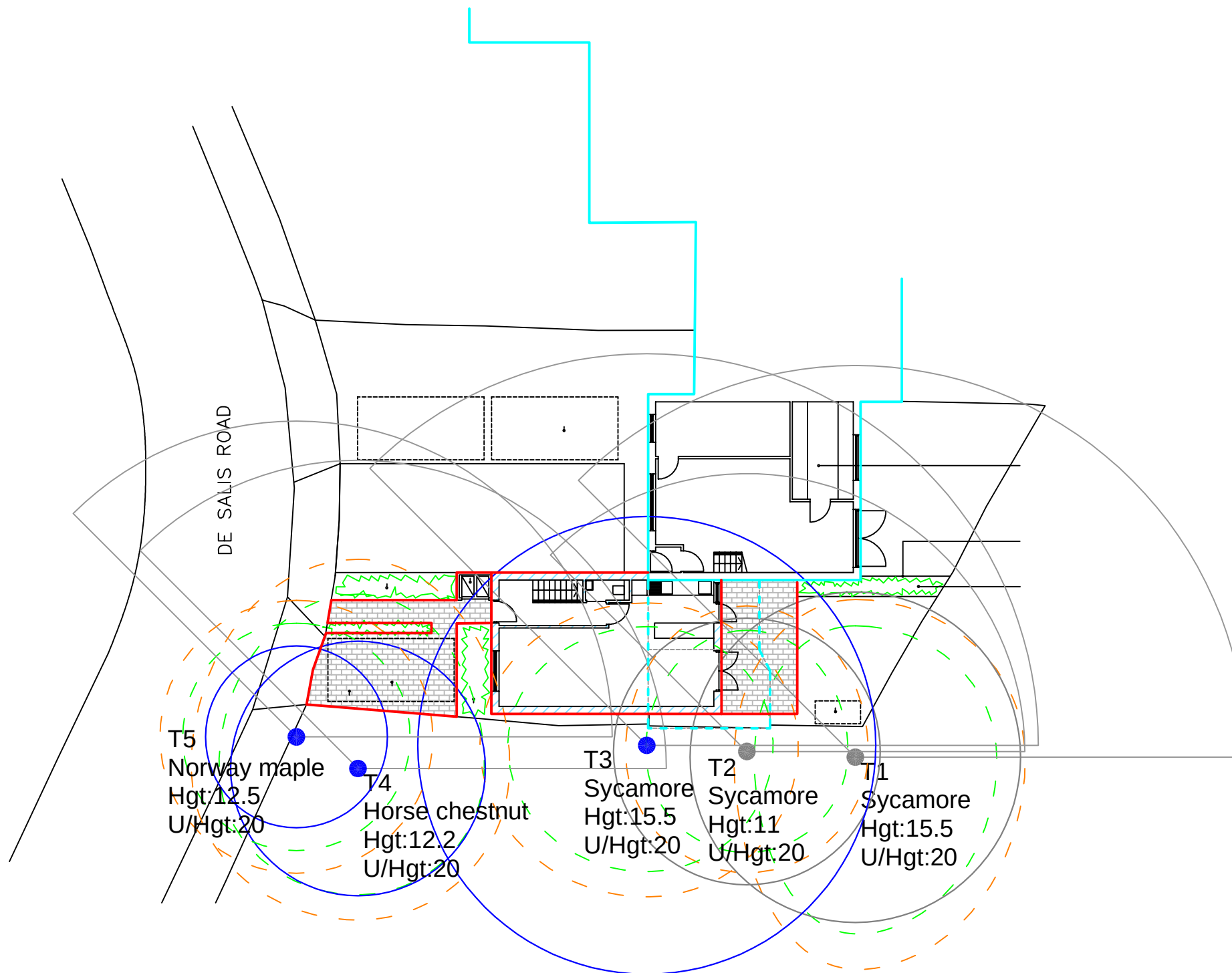
Sheet 1 of 1

Appendix 2: Notes on the Column Headings in Appendix 1

Col#	Title	Notes
1	Tree No.	Tree numbers to correspond with those shown on the TCP.
2	Species	Each tree has been identified and the common name given in each case.
3	Ht (m)	Height of the tree
4	Stem dia (mm)	The stem diameter measured in millimetres at 1.5 metres above ground. For multi-stemmed trees the stem diameter has been calculated according to the formula given in BS 5837:2012. For trees with up to 5 stems, each stem has been measured at 1.5m, squared and added together. The diameter shown is the square root of the total. For multi-stemmed trees with over 5 stems a sample of five diameters has been taken at 1.5m, averaged and squared, then multiplied by the total number of stems. The square root of this sum gives the stem diameter figure.
5	Number of Stems	Total number of stems on the tree.
6	Branch Spread	The branch spread measured in metres from the stem to the tip of the outer branches has been measured in four directions of the compass North, South, East and West.
7	Height and Direction of First Branch spread (m)	First significant branch and direction of growth (relative to the four cardinal compass points).
8	Canopy Ht	Mean height of the canopy above ground level.
9	Life Stage	The life stage of the tree has been assessed into one of the following categories: Y =Young, SM = Semi Mature, EM = Early Mature M = Mature, OM = Over mature and V = Veteran.
10 and 11	Condition	The British Standard recommends that a note is made of the structural and physical condition of the tree.

Col#	Title	Notes
12	Preliminary Management Recommendations	This column includes all work considered necessary to, as far as is practicable, ensure health and safety and for the good arboricultural management of the trees. These works are not associated with the development proposals. All work to be carried out to BS 3998: 2010 "Tree Work-Recommendations". Recommendations given in respect of Health and Safety remain current for 12 months from the date of this assessment after which further inspection is recommended. It should be noted that trees are dynamic structures subject to the forces of nature, which can fail without showing external symptoms.
13	Estimated remaining Contribution (Yrs)	The estimated remaining contribution of each tree in years has been assessed, using personal experience, into the following groupings: < 10 = Less than 10 years 10+ years = More than 10 years 20+ years = More than 20 40+ years = More than 40 years
14	Category grading	U = Those in such a condition that any existing value would be lost within 10 years and which should in the current context, be removed for reasons of sound arboricultural management. (Trees that have serious, irremediable structural defects, such that their early loss is expected due to collapse or ill health including trees that will become at risk due to the loss of other U category trees). A = Those trees of high amenity quality and value in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested) 1) Trees that are particularly good examples of their species if rare unusual or essential components of groups or formal or semi-formal arboricultural features 2) Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views in or out of the site, or those of particular visual importance. 3) Trees groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran tree or wood pasture)

Col#	Title	Notes
14 cont	Category grading cont	B = Those of Moderate quality and amenity value: those in such a condition as to a significant contribution (a minimum of 20 years is suggested) 1) Trees that might be included in the high category but are downgraded because of impaired condition (e.g. remediable defects) 2) Trees and woodland that forming distinct landscape features but do not form essential components 3) Trees with clearly identifiable conservation or other cultural benefits. C = Those of low quality and amenity value currently in adequate condition to remain until new planting is established (minimum of 10 years is suggested) or trees under 150 mm stem diameter. 1) Tree not qualifying in higher categories 2) Trees present in groups or woodlands but not with a significantly higher landscape value and or offering low or temporary screening benefit. 3) Trees with very limited conservation or other cultural benefits. Note: Category C trees are the least suitable for retention, where they would impose a significant constraint on the development their removal for development purposes may be considered acceptable by the LPA. Trees with a stem diameter under 150mm could be considered for relocation.
15	Radius of RPA (m)	The distance that would form the radius of a circular protection zone is given in metres calculated by multiplying the stem diameter given in column 4 by 12. The methods for calculating the stem diameter of multi-stemmed trees is given in section 4 above.
16	RPA (m ²)	The area of the RPA is given in square metres calculated by the following formula: Single Stemmed Trees; $RPA\ m^2 = \left(\frac{(stem\ diameter\ mm\ @\ 1.5m \times 12)}{1000} \right)^2 \times 3.142$ The methods for arriving at the stem diameter for multiple stemmed trees are described above in the notes for column 4.



Drawing Title:

Appendix 3 - Tree Constraints Plan

Site:

2 De Salis Road, Uxbridge

Client:

Mialex



To Scale 1:200 at A3
Tree Positions are Approximate

KEY

B Category RPA



C Category RPA



Current Crown Spreads



Ultimate Branch Spreads



Shade Pattern



Existing Buildings



Existing Garage to be Demolished



Proposed New Buildings and Surfaces



Drawn By: GR

Date: 26/02/21

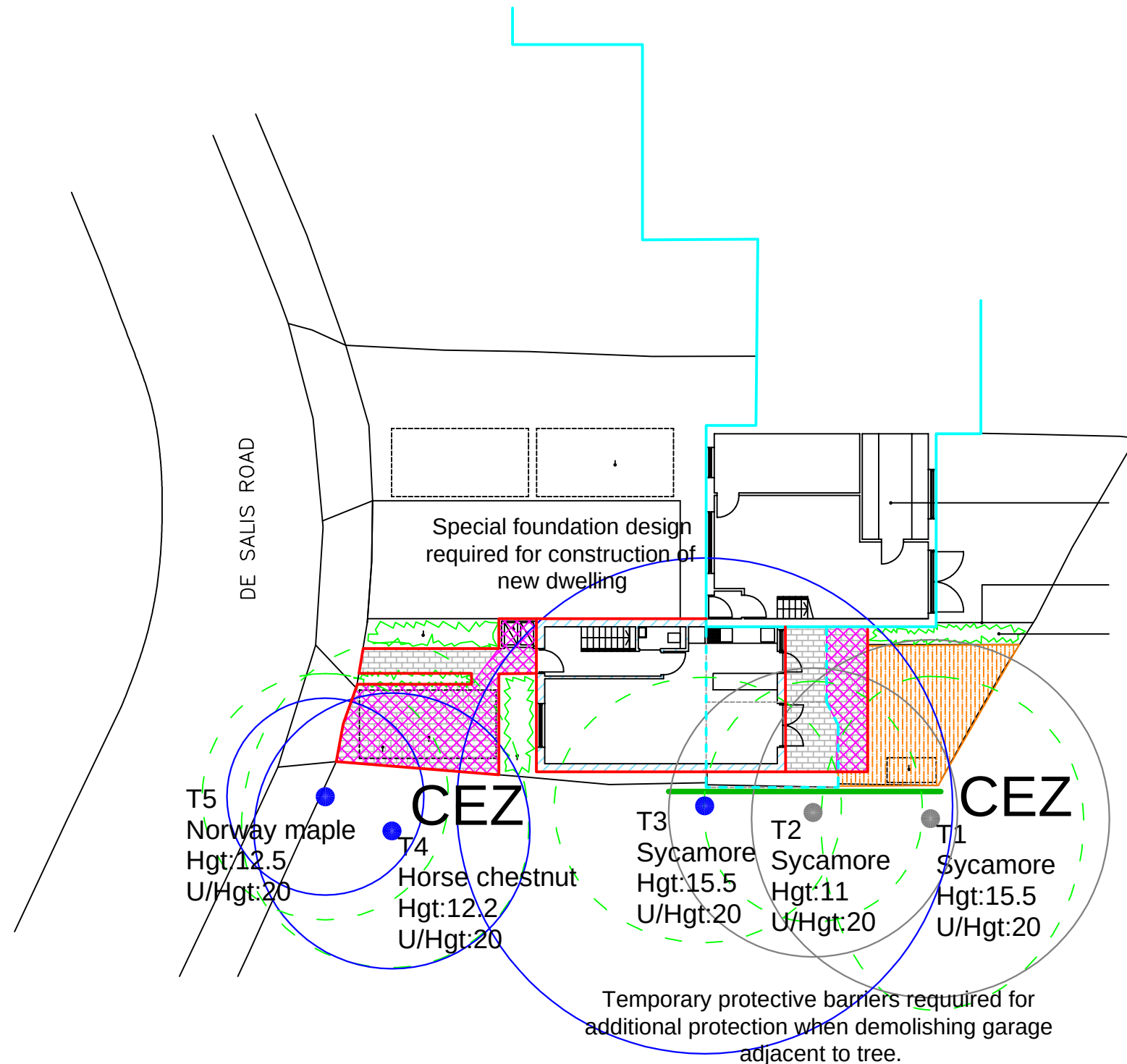


**A. T. Coombes
Associates Ltd**

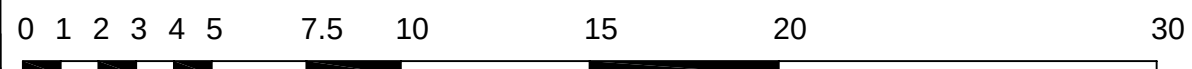
mail@atcoombes.com
01603 759618

Scale (m)

0 1 2 3 4 5 7.5 10 15 20 30



Scale (m)



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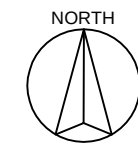
Appendix 4 - Tree Protection Plan

Site:

2 De Salis Road, Uxbridge

Client:

Mialex



To Scale 1:200 at A3
Tree Positions are Approximate

KEY

Construction Exclusion Zone

CEZ

Line of Temporary Protective Barriers



Temporary Ground Protection



No-Dig Surface



Existing Buildings



Existing Garage to be Demolished



Proposed New Buildings and Surfaces



Drawn By: GR

Date: 26/02/21



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Appendix 5: Arboricultural Method Statement for a Proposed Development at 2 De Salis Road, Uxbridge

1. Scope of the Works

- 1.1 The document provides a methodology for protection of trees during the Demolition of an existing garage and construction of a new dwelling at the above site and should be read in conjunction with the Tree Protection Plan Appendix 4 and Timetable for Protection Works Appendix 6.
- 1.2 The main features in the protection of the retained trees on site are as follows:
 - Careful demolition of existing buildings
 - Provision of temporary protective barriers
 - Provision of temporary ground protection
 - Use of special foundations.
 - Use of a No-Dig surfaces
 - Audited arboricultural site monitoring
- 1.3 A meeting between the site manager/main contractor and a consulting arboriculturist must take place prior to construction work commencing so that the above protection measures set out in this document can be discussed and agreed. At this point a list of contact details for all relevant parties will be produced and circulated including the Tree Officer of the Local Planning Authority.
- 1.4 Protective measures must be in place prior to any ground or construction works take place.

2. Timing of Works

- 2.1 Tree protection works will be completed as detailed below according to the attached timetable Appendix 6.
- 2.2 The exact commencement date is not known. However, the timetable provided gives the order that the works need to be implemented to ensure the trees are fully protected and states when specific arboricultural input will be required.

3. Tree Protection Barriers

- 3.1 Remaining trees will be protected by forming Construction Exclusion Zones (CEZ) as shown on Appendix 4 the Tree Protection Plan (TPP).
- 3.2 Tree protection will largely be provided by existing boundary fencing. However additional temporary barriers will be erected adjacent to T1-3 to reduce the risk of accidental damage to the trees during demolition and construction works.

- 3.3 The barriers will consist of 2m tall, welded mesh panels (Heras) supported on rubber or concrete feet. The fence panels should be joined together using a minimum of two anti-tamper couplers installed so they can be removed from the inside of the fence. The distance between couplers should be at least 1m and be uniform throughout the fence.
- 3.4 Panels should be supported on the inner side by stabilizer struts which should normally be attached to a base plate and secured with ground pins. Where the fence will be erected on hard surfacing or it is otherwise unfeasible to use ground pins the struts should be mounted on a block tray.

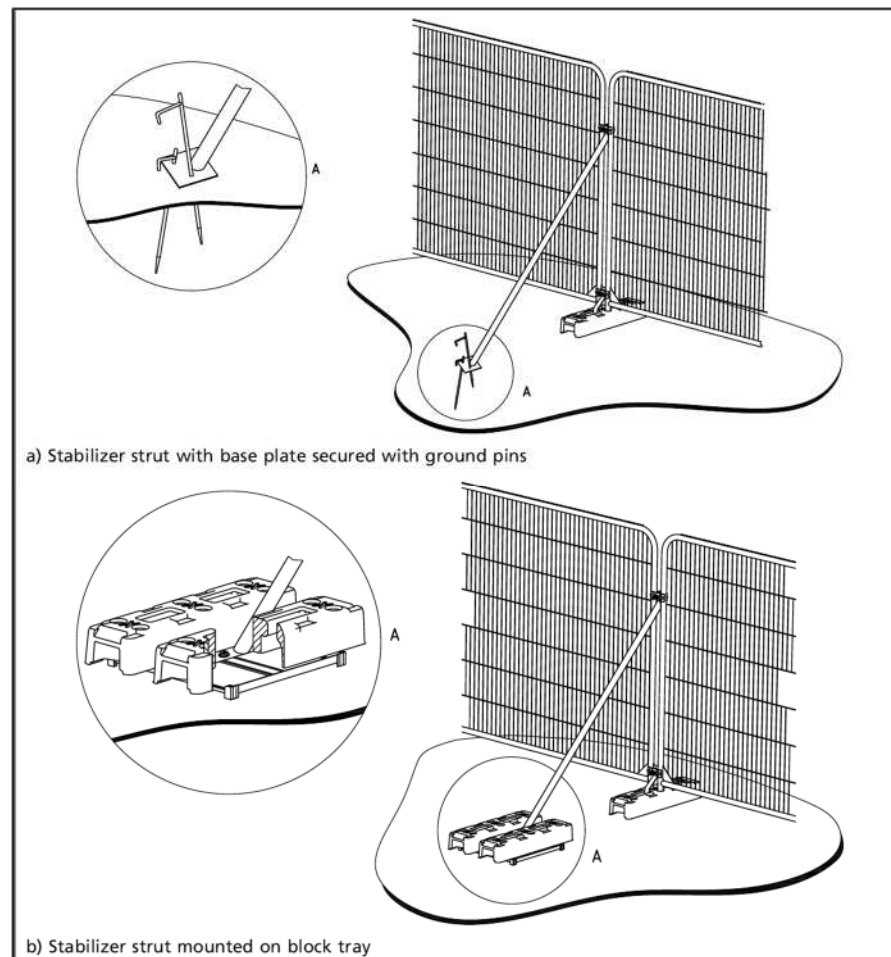


Fig 1: Temporary protective fencing as recommended by the British Standards (2012).

- 3.5 Figure 1 is an extract from BS5837:2012 showing the method of supporting the panels with ground pins and a block mounted tray for use on hard surfaces. Stabiliser struts should be fitted at each panel junction.
- 3.6 At least 1 all-weather notices should be erected on the barriers forming each CEZ stating "Construction Exclusion Zone – No Access ". These should face outwards towards the work area. Signs must be maintained in good condition and remain in place until completion of the works.
- 3.7 Barriers will be maintained throughout the duration of the works, ensuring that access is denied to the CEZ throughout the process.

4. Demolition of Existing Buildings

- 4.1 The existing garage will be removed prior to the development. Protective fencing, as set out in the AMS, will be put in place prior to the commencement of works to protect retained trees.
- 4.2 Where buildings to be demolished are within the RPA of retained trees, all machinery will remain outside the RPA, and operate in a “top down, pull back” method.
- 4.3 Where surfaces are to be removed within the RPA, this work must be carried out very carefully and under arboricultural supervision. Hand held tools, or appropriate machinery (Such as an excavator fitted with a non-toothed ditching bucket) will be used, with due care and attention paid to any roots that may be underneath the surface. If roots are found they must be covered with good quality topsoil to a depth no greater than 150mm within 24 hours.

5. Temporary Ground Protection

- 5.1 Temporary ground protection will be required as shown on the TPP with orange crosshatching. The ground protection should be constructed as follows depending on the type of traffic that will use it:
- Pedestrian traffic only – a single thickness of scaffold boards on top of a driven scaffold frame to form a suspended walkway, or on top of a compression resistant layer (100mm woodchip) laid on top of a geotextile membrane.
 - Light plant up to a gross weight of 2t, proprietary ground protection boards linked to one another on top of a compression resistant layer (150mm woodchip) laid on a geotextile membrane.
 - Plant exceeding gross weight of 2t, a specification devised by an engineer will be designed in conjunction with the arboricultural consultant to support the loading that the ground will be subjected to.
- 5.2 Compaction of the soil can occur from a single pass of a heavy vehicle, especially in wet conditions, and therefore the ground protection must be put in place before any access is allowed.

6. Installation of Specialist Foundations

- 6.1 The building is within the RPA of T1-T3. The British Standard states that buildings can be built within the RPA of trees provided special foundations are used. It is important that specialist engineers are consulted who are experienced in designing foundations that have a minimal impact on the tree roots.
- 6.2 Any design for the foundations of this building must be assessed and approved by the consulting arborist for the project and by the Local Authority Tree Officer to ensure that they are suitable. Exact design details will be specified by the engineers. It is likely that mini piles will provide a satisfactory solution. However, the overriding principle will be that the need to excavate is minimised and the floor supported at or above ground level.

6.3 If mini piles are used these principals must be adhered to:

- Minimal excavation will take place within the RPA of the tree.
- Trial holes will be excavated using a hand auger or air spade when placing the piles to ensure that large roots are not damaged. If roots over 25mm diameter are found the final pile position will be adjusted to accommodate them.
- The piles will support a suspended floor or floor beams that will not be sunk into the ground.
- Tree roots will be protected during the piling process by preventing any leachates from wet concrete coming into contact with them by using prefabricated piles, or a sheath around the pile.

6.4 Piling rigs must be small tracked machines with low ground pressure and work off proprietary temporary ground protection mats to minimise compaction.

6.5 Arboricultural supervision will be required during the piling works.

7. Hard Surfacing within the RPA of Retained Trees

7.1 The areas for hard surfacing shown cross hatched in purple on the Tree Protection Plan Appendix 4 require a No-Dig method of construction. Within the hatched zone no excavation is allowed.

7.2 A hard surface should be designed to avoid localized compaction by evenly distributing the load over the path or car parking space. The proper source of advice on a finished design are the structural engineers for the project to ensure it is fit for the intended loading and ground conditions. The design must also take full account of arboricultural advice. Appropriate methods include three dimensional cellular confinement systems or in some circumstances engineered solutions. The key element is that there will be no excavation.

7.3 In this situation it is likely that a three dimensional cellular confinement system constructed without excavation will be the best solution. Figure 2, below, shows a typical construction method of such a No-Dig surface using Cellweb produced by Geosynthetics. It should be noted that there are other manufacturers of cellular confinement systems.

7.4 It will be important ensure that the surface design merges with the level of the other sections of the road. An appropriate depth of confinement system should be chosen and if necessary ramps to smooth out level changes should be constructed.

7.5 Figure 2 shows a typical construction of a No-Dig surface using Cellweb. This example has block paving as the top surface but gravel and a range of other permeable surfaces can be used.

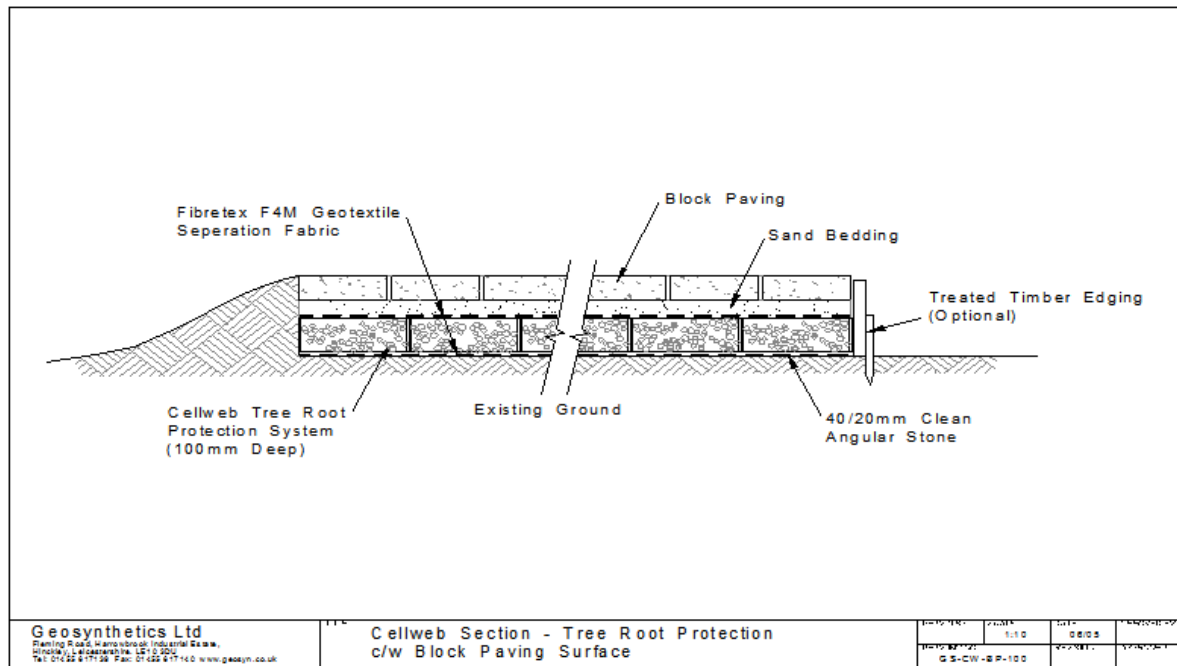


Fig 2: Example of No-Dig surfacing as illustrated by Geosynthetics Ltd.

7.6 The following methodology should be used for the installation of a No-Dig Surface.

- The construction must be undertaken in dry weather. There will be no machine movement within the RPA of the trees before the ground is protected by a load spreader and sub-base.
- Any major protrusions such as flints will be removed prior to commencement. Any hollows will be filled with clean sharp sand prior to laying a fibretex F4M separating geotextile.
- The Cellweb panels will be extended to the full length and pinned into place with staking pins to anchor the cells open. Adjacent panels will be stapled together to form a continuous mattress. The surface must be located at least 0.5m from the base of the retained trees.
- The mattress will be edged with treated softwood edging boards of sufficient width to accommodate the infill material and held in place with pegs at a minimum spacing of 500mm.
- The cells will be filled with a minimum of 100mm of no fines angular granular fill (40 to 20mm). The infill material to be piled at the end of the extended web and pushed over the expanded cells working off the infill material. No machinery will encroach on the ground unless supported by the infill material.
- It is recommended that the No-Dig surface is not used for construction traffic. If it is, a sacrificial layer of stone should be laid on another geotextile membrane and scraped off at the end of the construction to form the final surface.
- To lay the final surface a second layer of Fibretex F4M Geotextile separation fabric will be laid over the in filled Cellweb sections. Then a layer of sharp sand will be laid and compacted with a vibro-compactor plate prior to laying block paver or concrete blocks dry jointed. A range of

other surface finishes can be used. However the final surface must be permeable to allow continued water and gaseous diffusion.

8. Site Huts and Temporary Buildings

- 8.1 All site huts and temporary buildings will be sited outside the CEZ.

9. Additional Precautions

- 9.1 The movement of plant in proximity to retained trees should be conducted under the supervision of a banksman to ensure adequate clearance from the branches of the trees. Hydraulic cranes, forklifts, excavators or piling rigs (other than small rigs used for mini piling) must be avoided in the immediate vicinity the crown of the trees.
- 9.2 Cement, oil, bitumen or any other products which spillage would be likely to be detrimental to tree growth should be stored well away from the outer edge of the RPA of retained trees. Precautions should include ensuring all toxic liquids are stored in fully bunded containers. Equipment such as barriers or sandbags must be available on site to deal with any accidental spillages that may occur.
- 9.3 Lighting of fires on site should be avoided. Where they are unavoidable they must be at such a distance from retained trees that there is no risk of the heat causing fire damage to the trunk or branches. Full account must be taken of wind direction. Fires must be attended at all times until they are completely extinguished.

10. Service Trenches

- 10.1 No details of new service runs have been provided at this stage. They should be routed to avoid the RPAs of trees. If this is not possible, special techniques must be employed to place the services within the RPA of the trees. The British Standard suggests a range of trenchless methods suitable for various applications including microtunnelling, surface launched directional drilling, Pipe ramming and Impact Moleing/thrust boring. It is important common ducts should be used where it is not possible to avoid the RPA. Further guidance on installing underground services adjacent to trees can be found in the NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Volume 4 Issue 2). This document outlines a number of techniques that may be used for trenching near trees, including trenchless techniques, discontinuous trenching and hand digging.
- 10.2 It will be necessary to prepare detailed plans for these services that should be produced in conjunction with an arboriculturist, and include allowance for the space needed for access for the installations, and the levels across the proposed area.
- 10.3 Any overground services including CCTV must also be positioned to avoid the need for any regular or detrimental pruning to the trees.

11. Arboricultural Supervision and Aftercare

- 11.1 Arboricultural/site monitoring will be carried out throughout the construction phase by a nominated arborist who will be responsible for consultation with the Local Authority's Tree Officer.
- 11.2 The arborist will complete regular site visits to check that the tree protection measures are being carried out. The frequency of the visits will be dictated by the level of activity and degree to which the tree protection measures are being respected. A note of the date of each visit and a summary of the findings will be forwarded to both the Tree Officer and the Main Contractor to provide an audit trail enabling the proper implementation of the tree protection measures to be checked and verified.
- 11.3 There are four key stages where on-site arboricultural advice will be needed:
- Prior to commencement, to review the contents of the AMS, and deal with any queries the main contractor may have.
 - To confirm that the protective fencing and ground protection is in place.
 - To supervise the installation of specialist foundations.
 - To ensure the No-Dig surface is in place prior satisfactorily.
- 11.4 On completion of the works the trees will be inspected by the arborist to check the condition of the trees and advise if any remedial work is necessary.

A.T. Coombes Associates Ltd

27 February 2021



Appendix 6: Timetable for Tree Protection Works at 2 De Salis Road, Uxbridge

Item	Operation *	Before Commencing Construction Works	During Construction Works	On Completion
1.	Carry out a pre-commencement site meeting to discuss any tree protection matters arising	X		
2.	Carry out tree work as detailed in in the AIA.	X		
3.	Erect temporary protective fencing (thick green line) on edge of the CEZ as specified in the AMS and TPP and put temporary ground protection in place (Orange Hatching)	X		
4.	Erect warning signs on fencing around each CEZ stating "Construction Exclusion Zone - Keep Out".	X		
5.	Maintain Protective fences and signs in good condition.		X	
6.	Put specialist foundations in under arboricultural supervision		X	
7.	Construct No-Dig surface		X	
8.	Arboricultural supervision and advice including site visits during the course of the works to check the CEZ and liaison with the Local Authority.	X	X	X
9.	Remove protective fencing			X
10.	Check condition of the protected trees and consider if remedial works are necessary.			X
	<i>* All work to comply with the attached Arboricultural Method Statement and BS5837: 2012 Trees in relation to design, demolition and construction - Recommendations"</i>			