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Arboricultural Survey (BS5837:2012) & Impact Assessment

Site

45 Highgate West Hill
London
N6 6DB

Client

Mr Timothy Rowe
45 Highgate West Hill
London
N6 6DB

Date of Report:

December 2020

Report Reference:

AIA/MF/069/20

Report Prepared by:

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1.0 Introduction

1.1 This report has been commissioned by Chris Dyson Architects on behalf of Timothy Rowe to survey, assess and provide an Arboricultural Impact Assessment for the 26 x trees and 1 x hedge (T5-T31 & H1) sited at and within close proximity of proposed development works of an outbuilding at the front of 45 Highgate West Hill, London, N6 6DB.

1.2 A site visit was conducted on 3rd July 2019 to survey the trees at the front of the property. The weather at the time of inspections was bright with warm temperatures with tree's in full canopy cover.

1.3. The details of the subject trees are set out in the tree survey table in *Appendix A*. The trees were surveyed on the date and time shown above and the tree survey assessment information for the tree describing size, condition and surroundings are found within this appendix.

1.4 The trees located within the site are shown in site plans T001-T002 - *Appendix B*, and these correspond to the tree survey results table, Appendix A.

1.5 Photographs of the trees can also be found in Appendix C.

1.6 This report and the opinions within it have been produced by Marcus Foster, a qualified Arboriculturist with over 19 years experience and holding a National Diploma in Arboriculture, the Arboricultural Association's Technicians Certificate, Professional Tree Inspection Certificate (LANTRA) as well as a degree in History and Society. Work experience within the industry includes work as a Contracts Manager for an Arboricultural Association Approved Company, a Local Authority Tree Preservation Officer and an independent Arboricultural Consultant. As a consultant many of projects undertaken are in the inner London Boroughs of Islington, Hackney, Westminster, Camden, Southwark and RBKC, making Marcus Foster familiar with the most recent requirements of development and constraints on urban trees.

1.7 No additional documentation has been referred to relating to the tree or the building at this property for the compilation of this report.

2.0 Survey Details and Scope

2.1 The site survey included the 26 x trees and 1 x hedge (T5-T31 & H1) as shown in the survey, *Appendix A*, and also highlighted on the site plans, *Appendix B*. It should be noted that trees T1-T4 and T32-T34 surveyed for a previous application have not been included within plans T001 & T002 within this report.

2.2 The trees were surveyed from ground level from within the site. The diameter of the trunks have been measured using a DBH tape at 1.5m height. The height of the trees have been estimated.

2.3 The following information was recorded for the tree and is shown in the Tree Schedule included in Appendix A:

- Number: an identity number which cross-references locations shown on the plan in Appendix A with the schedule in Appendix B.
- Species: listed by common names
- Tree Height: height in metres (m)
- Tree Spread: spread in metres (m)
- Stem diameter: measured in millimetres (mm) and taken at 1.5m above ground level
- Age Class: Y (young); EM (early-mature); M (mature); OM (over-mature)
- Vigour: G (good); F (fair); P (poor); D (dead)
- Structural Condition: G (good); F (fair); P (poor); D (dead)
- General Condition Specific comments relating to each tree
- Estimated Remaining Contribution (years)
- BS5837 Category Grading
- Protection Distance m2 Area (where applicable – BS5827: 2012)
- Protection Distance Radius (where applicable – BS5827: 2012)

2.4 Information recorded in the tree survey, *Appendix A* is expanded in the report findings and preliminary recommendations have been made in *Section 5*.

2.5 Findings as shown within *Appendix A* and discussed within *Section 4* are also highlighted within *Appendix B* which incorporates the Tree Constraints Plan (TCP) addressing areas where arboricultural solutions are required.

3.0 Survey Limitations

3.1 No soil excavations have been carried out.

3.2 This report only considers the trees and conditions at the time of inspection. As the inspection was only visual no guarantee can be given concerning the condition of the wood at present in any of the trees inspected and furthermore that no future problems or deficiencies may arise.

3.3 The survey has been undertaken as a survey of the trees without prior influence of the development and implicating factors.

3.4 No invasive tools were used during this site survey.

3.5 It should be noted that vegetation including shrubs within this / the neighbouring sites have not been included in the survey and report as there are none were deemed of relevance for the purposes of this report.

3.6 This report is preliminary and further investigations may be required in order to reach firm conclusions and/or further recommendations for action.

4.0 Tree Survey Summary

4.1 The trees have been surveyed in accordance with BS5837: 2012 'Recommendations for trees in relation to construction' (BS5837: 2012) and have been rated as follows:

Category 'A' trees

Trees of high quality with an estimated remaining life expectancy of at least 40 years. Trees have been categorised as 'A' trees for one of the following reasons:

- Mainly arboricultural qualities
- Mainly landscape qualities
- Mainly cultural values including conservation

Within the Site Plan (Appendix B) those trees rated as 'A' category trees have a **green** outline as denoted within the site plan key / survey.

T5, T11, T13, T15, T18, T23

Category 'B' trees
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years. Trees have been categorised as 'B' trees for one of the following reasons

- Mainly arboricultural qualities
- Mainly landscape qualities
- Mainly cultural values including conservation

Within the Site Plan (Appendix B) those trees rated as 'B' category trees have a blue outline as denoted within the site plan key.

T6, T7, T8, T9, T12, T16, T17, T19, T20, T24, T30

Category 'C' trees
Trees of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm. Trees have been categorised as 'C' trees for one of the following reasons

- Arboricultural qualities - unremarkable trees of very limited merit
- Mainly landscape qualities
- Trees with no material conservation or cultural value

Within the Site Plan (Appendix B) those trees rated as 'C' category trees have a grey outline as denoted within the site plan key.

T10, T14, H1, T21, T22, T25, T26, T27, T28, T9, T31

Category 'U' trees
Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

Within the Site Plan (Appendix B) those trees rated as 'U' category trees have a red outline as denoted within the site plan key.

N/A

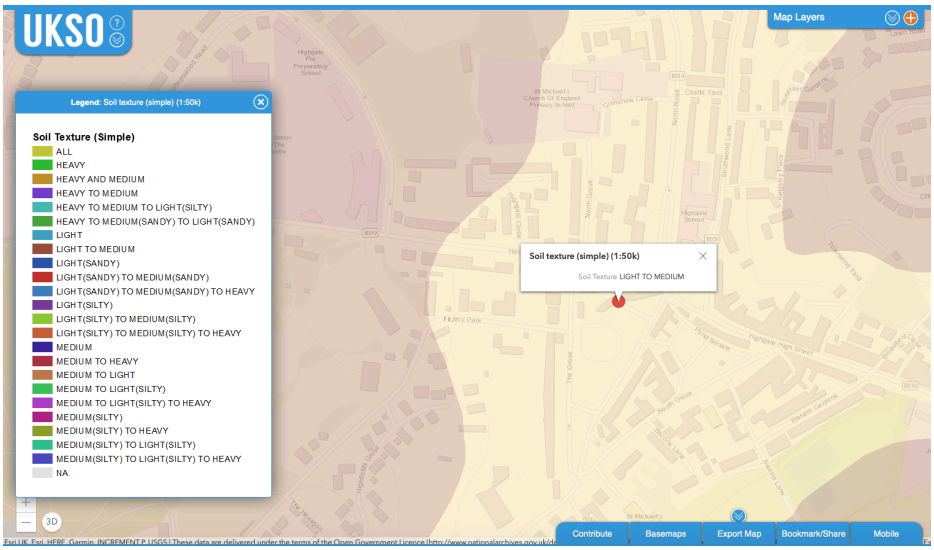
4.2 The trees have been surveyed taking into account condition, general health and form without the development process influencing the survey. In addition they have also been surveyed taking account of amenity value that is offered in relation to both the landscape and surrounding buildings and streetscape. This report outlines the impact that the proposed development will have on the overall treescape and landscape; it provides recommendations to ensure that long-term amenity value for the area is retained.

5.0 Findings and Discussion:

Site Overview

5.1 There are 26 x trees and 1 x hedge (T5-T31 & H1) located within close proximity of the proposed development. The trees surveyed are located within the London Borough of Camden; the property is sited within the Highgate Conservation Area and is also Grade II listed - extract of appraisal map and conservation area status / boundary shown below:

5.2 The underlying soil to this area is classified as 'sand to sandy loam' within the UK Soil Observatory - www.ukso.org - a light to medium to heavy soil mix.



5.3 It should be noted that no trial investigations have been undertaken in relation to the trees for the purposes of this report.

5.4 For the purposes of this report, reference has been made to the following plans / document for the proposed development:

CHRIS DYSON LLP
0417_DOC_010 Rev 00
0417/A/1110/03 (April 2020)

5.5 The proposed development of a timer clad single storey outbuilding (non-insulated) has the potential to affect the trees in the following ways

- Ground works to enable construction of outbuilding structure
- Foundations for construction of outbuilding structure
- Access road surface
- Associated landscape works
- Implementation of main development works
- The use of and storage of materials and chemicals on site within close proximity of the trees
- Site access for development works
- The long-term impact of associated works of the proposed development

This report addresses the proposed development works and highlights where tree protection measures are required to be outlined within an Arboricultural Method Statement (AMS).

5.6 The report has been written with close reference to the British Standard Guidance, British Standard 5837: 2012 'Recommendations for trees in relation to construction' (BS5837: 2012), which addresses the juxtaposition between trees and structures. The Arboricultural Impact Assessment highlights areas where the trees will require protection which should be addressed within an Arboricultural Method Statement (AMS) specific to the site and proposed scheme. and corroborating with all construction and landscape method statements as relevant.

5.7 All trees are proposed for retention and the Root Protection Area (RPA) for each tree is evaluated in relation to proposed development works. The assessments of the arboricultural impact are highlighted within drawing *Tree Constraints Plan* (TCP) - T002 which outlines where tree protection measures are required in relation to development works.

Tree Survey Notes in Relation to Development

Summary of Trees - Trees T5 - T31

5.8 The site currently comprises a triangular shaped mixed species woodland area at the front of the property providing a buffer between the front of the property and Highgate West Hill. The species mix is as follows:

Ash (*Fraxinus excelsior*)
Cypress (*Cupressus spp*)
Leyland Cypress (*Cupressus x leylandii*)
Cherry (*Prunus spp*)
Sycamore (*Acer pseudoplatanus*)
Hawthorn (*Crataegus monogyna*)

5.9 Based on the species mix the woodland / soft landscape area is likely a mix of plantings which have developed naturally alongside the more recent managed hedge / tree planting schemes which have been implemented in order to provide evergreen screening for the dormant months. However the Ash and Sycamore provide dominance of canopy cover and mature tree stock and provide a focal point within the Highgate Conservation Area.

5.10 All trees are generally in good condition having been regularly managed, notably with crown lifting works and selective crown reduction to the public highway. Works were likely last carried out within the past 2-3 years ago

5.11 The exception is tree T21 - Ash, which is in declining condition and having been selectively heavily reduced. This tree also has low growth over the driveway which would require remedial works for significant access to the proposed development site. Remedial action may be required for reasons of health and safety which should be addressed independently or within the AMS.

Trees in relation to Development - Trees T5 - T31

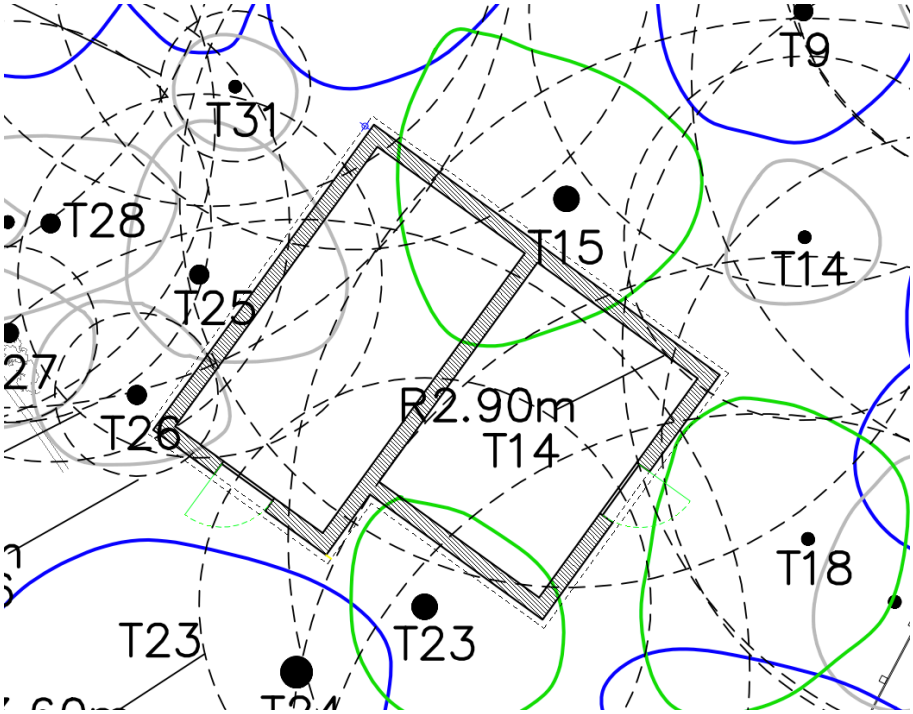
5.12 The proposed structure and access entrance to the outbuilding is sited within the RPA of the following trees:

T7, T8, T14, T15, T23, T24, T25, T26, T27

5.13 Additionally the proposed outbuilding is sited within very close proximity of the main stems of the following trees:

T15, T23, T25 & T26

5.14 The following extract from the TCP, drawing T002 demonstrates how the structure is sited within the central area where the trees do not exist meaning that the structure can be constructed without the loss of trees.



5.14 Additionally the canopies shall remain unaffected from development works due to their naturally lifted form having grown as a grouping. The projected height of the structure is single storey (with pent roof) height only.

5.15 For the trees highlighted above and the identification of the full coverage of the area as a RPA, protective measures will be required for any development works which have the potential to damage the trees.

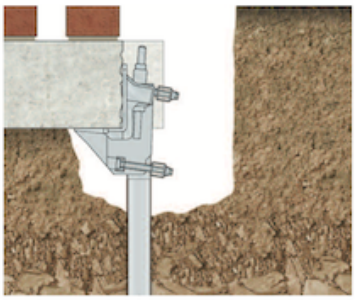
5.16 In order to achieve full protection for the trees the following measures shall be required to be outlined within an AMS:

- Tree protection fencing (BS5837:2012 and basal shuttering specification - see Appendix D & E)
- Ground protection for access within the RPA
- Trial works for determining selective pile locations
- Storage of welfare, materials, chemicals and site infrastructure outside of the RPA
- Load bearing and permeable access / driveway final surface
- Utility services layout and method of installation
- Protection from final landscape works

5.15 The tree protection measures to be outlined within an AMS & TPP will require a scheme of supervision s to ensure full tree protection is carried out during the development process.

Recommendations of Structural Methodology

5.16 The foundation design is recommended to be a non disruptive foundation system - profile of the product and photographs summarising method of implementations shown below - a micro pile / helical screw pile:



EXAMPLE: https://www.helifix.co.uk/products/remedial-products/micro-piles/

This methodology allows for the following within a RPA:

- Excavations within area of piles only
- Minimal and selective excavations
- Loading of structure above RPA
- Limited use of concrete and chemicals

5.17 All foundation details and ground works sequence must be outlined within an AMS which must demonstrate the following methodology:

GROUND WORKS SEQUENCE

TO DETERMINE LOCATIONS OF PILES FOR INSTALLATION OF NEW FOUNDATIONS:

PRECAUTIONARY WORKS AREA IDENTIFIED
A Precautionary area is an area where tree protection for excavations and foundation works require implementation within RPA of retained trees. The identification of this area ensures any root severance is undertaken with arboricultural supervision and without poor severance of exposed tree roots

↓

All works within precautionary area highlighted within 'Toolbox Talk'

↓

Under arboricultural supervision initial hand dug locations of proposed foundations to be undertaken to ensure no severance of major roots.

↓

The exact location of piles and evidence of no tree root damage must then be approved by the consulting arboriculturist and findings within the supervision report provided to LB Camden within 5 days of visit

↓

All further construction works for the highlighted precautionary area to be undertaken under arboricultural supervision

5.18 The structure must also not be ground bearing in order to prevent excavations, future compaction and also allow for oxygen and water to exist within the root plates of retained trees beneath the structure. Therefore a beam and block floor or similar is recommended as deemed appropriate within the structural engineering methodology to demonstrate all tree protection measures as identified.

Recommendations of Entrance Driveway

5.19 For the area highlighted within TPP drawing T002 where ground protection is required for access within the RPA of retained trees, the ground protection is recommended to be constructed to the specification as below:

Terram Geocell 22/20 – 200mm depth / 220mm cell diameter

This product should be installed to guidelines as highlighted within *Terram Cellular Confinement System – For the Protection of Tree Root*s guidelines as issued by the manufacturer and also as highlighted within Arboricultural Practice Note 12: Driveways Close to Trees (APN12) as provided by the Arboricultural Advisory and Information Service (2007).

5.20 Illustrative examples of Terram cellular membrane solution and Installation method are below and detailed specifications are outlined within *Appendix F* of this AMS.

A: General Overview of Terram Product. Illustrating versatility for providing load bearing surfaces (temporary & permanent)

B: Terram Geocell 22/20 – 200mm depth / 220mm cell diameter installed prior to infill of aggregate

Recommendations of Final Landscape Works

5.21 Final soft landscape works surrounding the outbuilding, notably to the east where the view from the public highway could be altered during the dormant season the following soft landscapes are recommended:

- Under-storey soft landscape scheme
- comprising mixed deciduous or evergreen shrubs
- Plantings of maximum 10 litre specimens within RPA

5.22 The shrub plantings are recommended from the following species:

- *Amelanchier canadensis*
- *Hammamelis* 'Ruby Glow'
- *Osmanthus x burkwoodii*

5.23 In addition to providing screening to the proposed structure the scheme shall provide improved biodiversity as is recommended within the Draft New London Plan (Policy G5 Urban Greening). It should be noted that no mitigation is required as tree removal is not proposed and therefore the scheme aims to provides enhancement of the existing site with this proposal.

6.0 Summary

6.1 For the proposed development tree protection measures for retained trees are required. For trees T7, T8, T14, T15, T23, T24, T25, T26, T27, tree protection measures shall be requires for all stages of the development and associated construction site activities. In summary the arboricultural impact upon trees as highlighted within T002 (Tree Constraints Plan) are as follows:

6.1.1 Excavations within RPA of retained trees with the potential to cause damage to the trees root systems

6.1.2 General construction activities associated with the development within close proximity of retained trees

6.1.3 Final access entrance / driveway within RPA of retained trees

6.1.4 Final landscape works within RPA of retained trees

6.2 Therefore the following tree protection measures will be required as outlined within an Arboricultural Method Statement (AMS) report:

(i) Tree protection fencing to create a Construction Exclusion Zone (CEZ)
(ii) Ground protection for development works
(iii) Grounds work and structural engineering methodology
(iv) Trial works to determine foundation locations
(iv) Ground protection for final access driveway area
(vi) Arboricultural supervision scheme as outlined within the AMS to ensure trees are protected during the development process

6.3 Final soft landscape works including under-storey planting shall further enhance the biodiversity of the area for the long term and provide screening where the structure may be viewable from the public highway.

6.4 With implementation of all protection measures as highlighted and the demonstration of structural engineering solutions to protect tree roots, the proposed outbuilding structure can be constructed and exist harmoniously within the wooded area at the front of the property.

7. Appendices

Appendix A

Tree survey (BS5837:2012)

45 Highgate West Hill
London
N6 6DB

Colour Key: BS5837: 2012 (see Section 2.6)

- Category A
- Category B
- Category C
- Category U

MARCUS FOSTER ARBORICULTURAL DESIGN & CONSULTANCY
BS5837:2012 TREE SURVEY SCHEDULE
SITE: 45 HIGHGATE WEST HILL, LONDON, N6
DATE: 03.07.19

Tree No	Species	Height (m)	DBH (mm)	Spread (m)	Age	Visual Condition	Vigour	BS5837 (2012) Rating	Remaining Contribution (years)	Comments / Structural Condition	Root Protection Area (RPA) m2	Root Protection Area (RPA) Radius
T5	Sycamore	17	580	N: 7 E: 3 S: 7 W:6	M	G	G	A2	40 years +	Twin stemmed at 1m. Ivy clad to 4m. Some thinning crown in upper crown. Significant crown lifting particularly to north - fair occluding growth with some minor cavities	152.2	6.8
T6	Sycamore	17	680	N: 6 E: 2 S: 5 W:3	M	F	F	B2	20 years +	Generally structurally sound. Significant crown lifting particularly to north - fair occluding growth with some minor cavities	209.21	8.2
T7	Ash	17	380	N: 5 E: 3 S: 4 W:2	SM	F	F	B2	20 years +	Excessive crown lifting to 7m - no lower-mid crown. Compact canopy	65.33	4.6
T8	Ash	17	400	N: 6 E: 3 S: 1 W:3	SM	G	G	B2	20 years +	Generally structurally sound at base; light lean to the north. Within raised verge at 150mm height above access road	72.39	4.8
T9	Ash	16	370	N: 6 E: 3 S: 4 W:2	M	F	F	B2	20 years +	Generally structurally sound at base; selective crown reduction works and crown lifted to 7m height	61.94	4.4
T10	Sycamore	7	300	N: 6 E: 1 S: 4 W:2	SM	F	G	C2	10 years +	Congested form - 3 x stems developing at 1.6m height. Over-extended form to north	40.72	3.6
T11	Ash	16	400	N: 6 E: 5 S: 5 W:3	M	G	G	A2	40 years +	Generally structurally sound at base; balanced form. Possible decay pocket in main union at 9m	72.39	4.8
T12	Sycamore	10	300	N: 5 E: 4 S: 2 W:2	SM	F	F	B2	20 years +	Suppressed tree leaning to east with some major deadwood overhanging public highway	40.72	3.6
T13	Sycamore	16	540	N: 6 E: 6 S: 5 W:3	M	G	G	A2	40 years +	Good form - generally structurally sound	72.39	6.5
T14	Cypress	9	240	N: 2 E: 2 S: 1 W:2	SM	G	G	C2	10 years +	Understorey planting, originally for screening; inappropriate location	26.06	2.9
T15	Sycamore	17	520	N: 4 E: 4 S: 5 W:4	M	G	G	A2	40 years +	Ivy clad to 7m height with balanced form	122.34	6.2
T16	Sycamore	17	540	N:6 E: 6 S: 4 W:3	M	G	G	B2	20 years +	Lightly declining upper crown - leaning to east and suppressed with minor deadwood overhanging public highway	131.93	6.5
T17	Sycamore	17	410	N: 3 E:6 S: 3 W:2	M	G	F	B2	20 years +	Suppressed crown mainly growing to east over public highway - lightly declining in upper crown	76.06	4.9

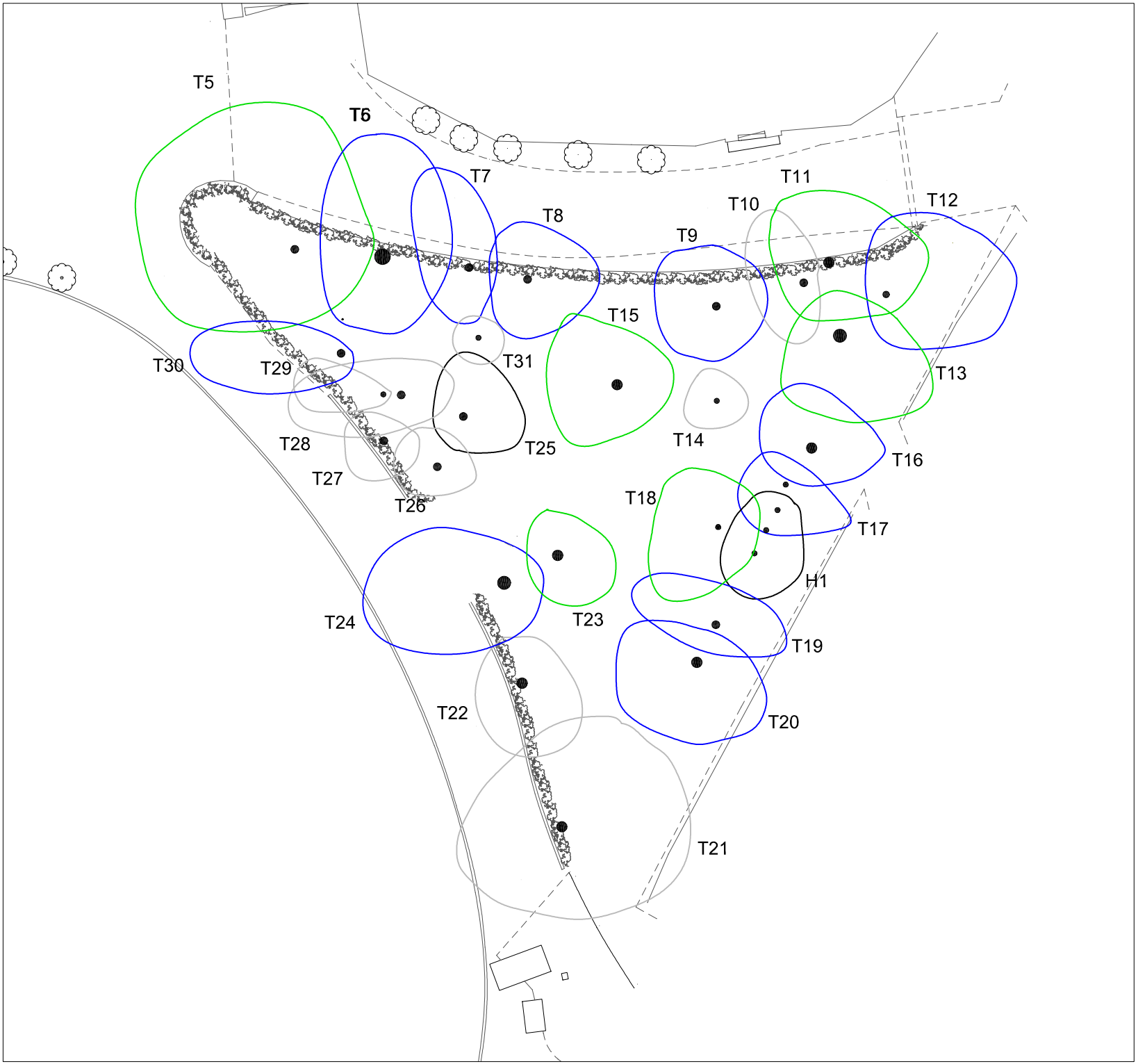
Tree No	Species	Height (m)	DBH (mm)	Spread (m)	Age	Visual Condition	Vigour	BS5837 (2012) Rating	Remaining Contribution (years)	Comments / Structural Condition	Root Protection Area (RPA) m2	Root Protection Area (RPA) Radius
H1	Leyland Cypress Hedge	10	m/s 180	N: 4 E: 2 S: 3 W:2	SM	F	G	C2	10 years +	3 x stems to give front boundary hedging effect; will become inappropriate for long term	10.18	1.8
T18	Sycamore	17	690	N: 4 E: 6 S: 6 W:4	M	G	G	A2	40 years +	Generally structurally sound at base with co-dominant stems at 1.0m. Crown dominant to east	215.41	8.3
T19	Leyland Cypress	10	680	N: 3 E: 3 S: 3 W:3	M	G	G	B2	20 years +	Screening trees, part of lapsed hedge originally planted for screening	209.21	8.2
T20	Leyland Cypress	16	600	N: 2 E: 3 S: 4 W:3	M	G	G	B2	20 years +	Screening trees, part of lapsed hedge originally planted for screening	162.88	7.2
T21	Ash	13	m/s 680	N: 6 E: 4 S: 6 W:3	OM	P	F	C2	Less than 10 years	Multi-stem form; union ivy clad. Main leader largely declining with secondary re-generative leaders showing normal vigour. Ivy clad to 9m. Recently selectively pruned; deadwood developing	149.59	6.8
T22	Sycamore	12	200	N: 2 E:3 S: 4 W:2	SM	G	G	C2	10 years +	Generally structurally sound with young to semi-mature developing form - fair	18.1	2.4
T23	Sycamore	17	300	N: 4 E:4 S: 3 W:3	M	G	G	A2	40 years +	Generally structurally sound with developing form. Limited pruning history with good form	40.72	3.6
T24	Sycamore	16	600	N: 4 E: 4 S: 7 W:3	M	G	F	B2	20 years +	Generally structurally sound at base with significant crown lifting to south. Lighlty declining vigour	162.88	7.2
T25	Sycamore	17	240	N: 4 E: 3 S: 2 W:3	M	G	G	C2	10 years +	Generally structurally sound with columnar form - some major deadwood	26.06	2.9

Tree No	Species	Height (m)	DBH (mm)	Spread (m)	Age	Structural Condition	Vigour	BS5837 (2012) Rating	Remaining Contribution (years)	Comments / Structural Condition	Root Protection Area (RPA) m2	Root Protection Area (RPA) Radius
T26	Cherry	7	110	N: 1 E: 1 S: 1 W:1	SM	G	G	C2	10 years +	Planted within past 5-10 years; lacking form and vigour for such recent planting	5.47	1.3
T27	Hawthorn	5	120	N: 1 E: 1 S: 3 W:1	SM	G	G	C2	10 years +	Ornamental specimen, suppressed to south - generally structurally sound	6.5	1.4
T28	Sycamore	16	320	N: 2 E: 3 S: 6 W:4	M	G	G	C2	10 years +	Majority of crown to south with declining vigour Fair form only	46.33	3.8
T29	Cypress	9	270	N: 1 E: 1 S: 2 W:1	SM	F	G	C2	10 years +	Inappropriate location, originally planted for additional screening	32.98	3.2
T30	Sycamore	17	410	N: 2 E: 4 S: 7 W:4	M	M	G	B2	20 years +	Generally structurally sound with fair form; asymmetric to south. Minor deadwood	76.06	4.9
T31	Yew	5	100	N: 1 E: 1 S: 1 W:1	Y/SM	G	G	C2	10 years +	Understorey tree with limited form; generally structurally sound	4.52	1.2

Appendix B

Existing Tree Survey Plan (T001)
&
Tree Constraints Site Plan (T002)
(BS5837:2012)

45 Highgate West Hill
London
N6 6DB



KEY

+	CATEGORY A
+	CATEGORY B
+	CATEGORY C
+	CATEGORY U
- - - -	RPA RADIUS

BS5837 (2012) TREE SURVEY NOTES

1. In accordance with BS5837(2012) this drawing is a colour coded schedule and should not be read in black and white
2. If received electronically it is the recipients responsibility to print this drawing to correct scale. Only written dimensions should be used where not printed to scale.
3. This drawing should be read in conjunction with all other relevant drawings and specifications
4. Marcus Foster Arboricultural Design & Consultancy accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided

NORTH

0 1 5m

Revisions

Rev.	Date		Checked

JOB TITLE: 45 Highgate West Hill London N6

DWG TITLE: EXISTING TREE SURVEY garage area

SCALE: 1:100 @ A2

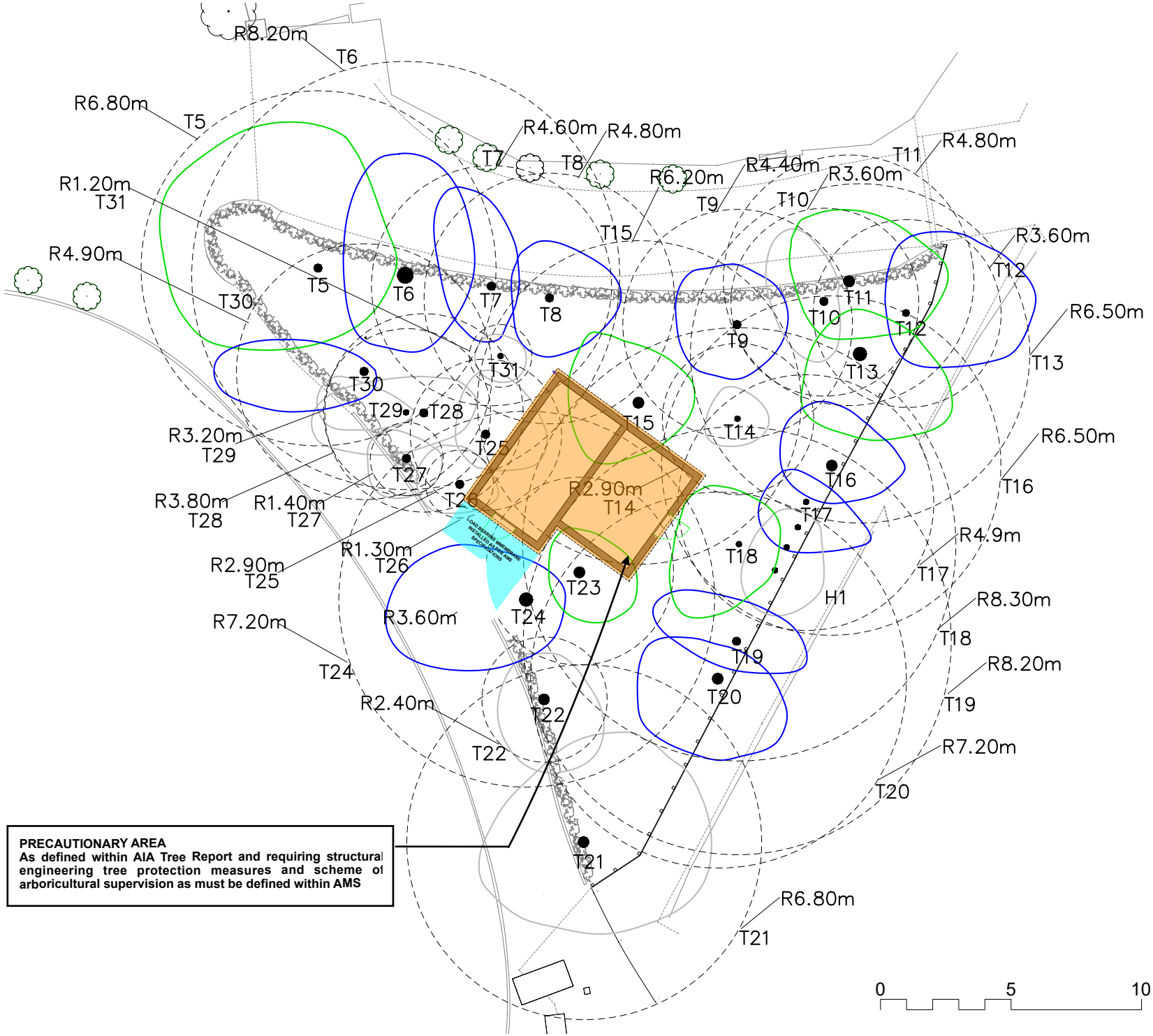
DATE: FEB 2019

JOB NO: AIA/MF/021/19

DWG NO.: T001b

T: 0781 2024070
mail@marcus-foster.com
www.marcus-foster.com

Marcus Foster
TREE CONSULTANCY



PRECAUTIONARY AREA
As defined within AIA Tree Report and requiring structural engineering tree protection measures and scheme of arboricultural supervision as must be defined within AMS

BS5837 (2012) TREE SURVEY NOTES
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Revisions

Rev.	Date		Checked
A	22.12.20	FOOTPRINT UPDATE	MF

JOB TITLE: 45 HIGHGATE WEST HILL - OUTBUILDING
DWG TITLE: TREE CONSTRAINTS PLAN
SCALE: 1:100 @ A2
DATE: JUL 19
JOB NO: AIA/MF/069/20
DWG NO.: T002

T: 0781 2024070
mail@marcus-foster.com
www.marcus-foster.com
Marcus Foster
TREE CONSULTANCY

Appendix C

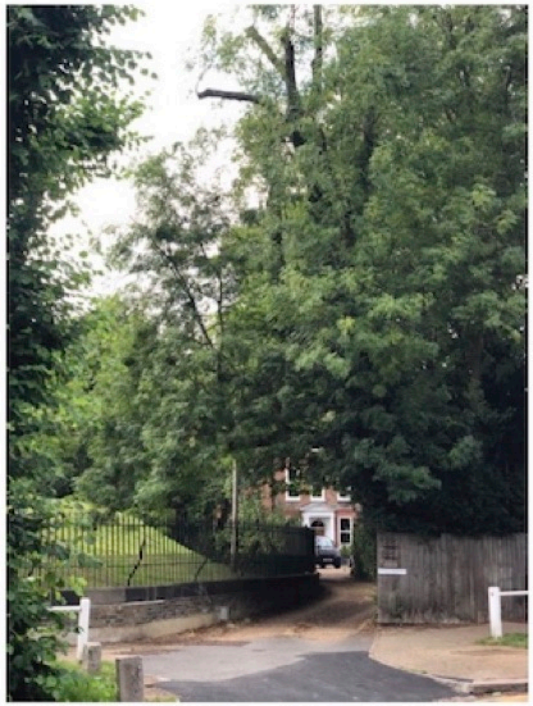
Site Photographs:

45 Highgate West Hill
London
N6 6DB

** Taken July 2019 - MFoster*

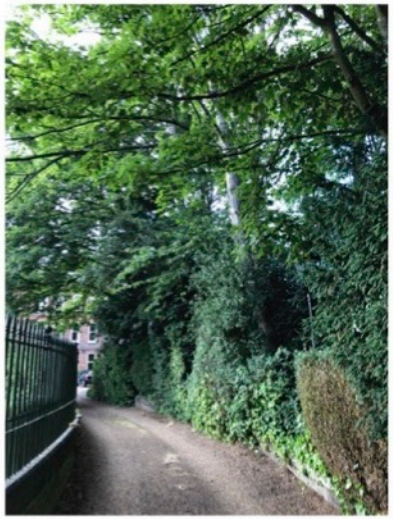
Trees T12-T21 at frontage with 45 Highgate West Hill as viewed in a southerly direction

Trees T12-T21 at frontage with 45 Highgate West Hill as viewed in a westerly direction

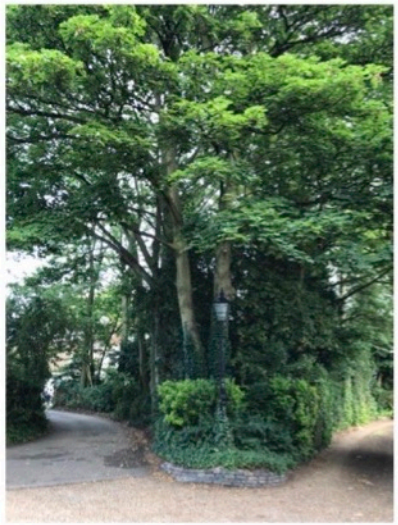


Tree T21 as viewed in a westerly direction showing moderate form and declining vigour

Northern access driveway from 45 Highgate West Hill with trees within woodland area to south as viewed to west



Southern access driveway from 45 Highgate West Hill with trees within woodland area to north



Southern and northern access driveway from 45 Highgate West Hill with trees within woodland area and T5 notably

Northern access driveway from 45 Highgate West Hill with trees within woodland area to south as viewed to east

Appendix D:
Tree Protection Notice

Generic Tree Protection Notice
(BS5837: 2012):

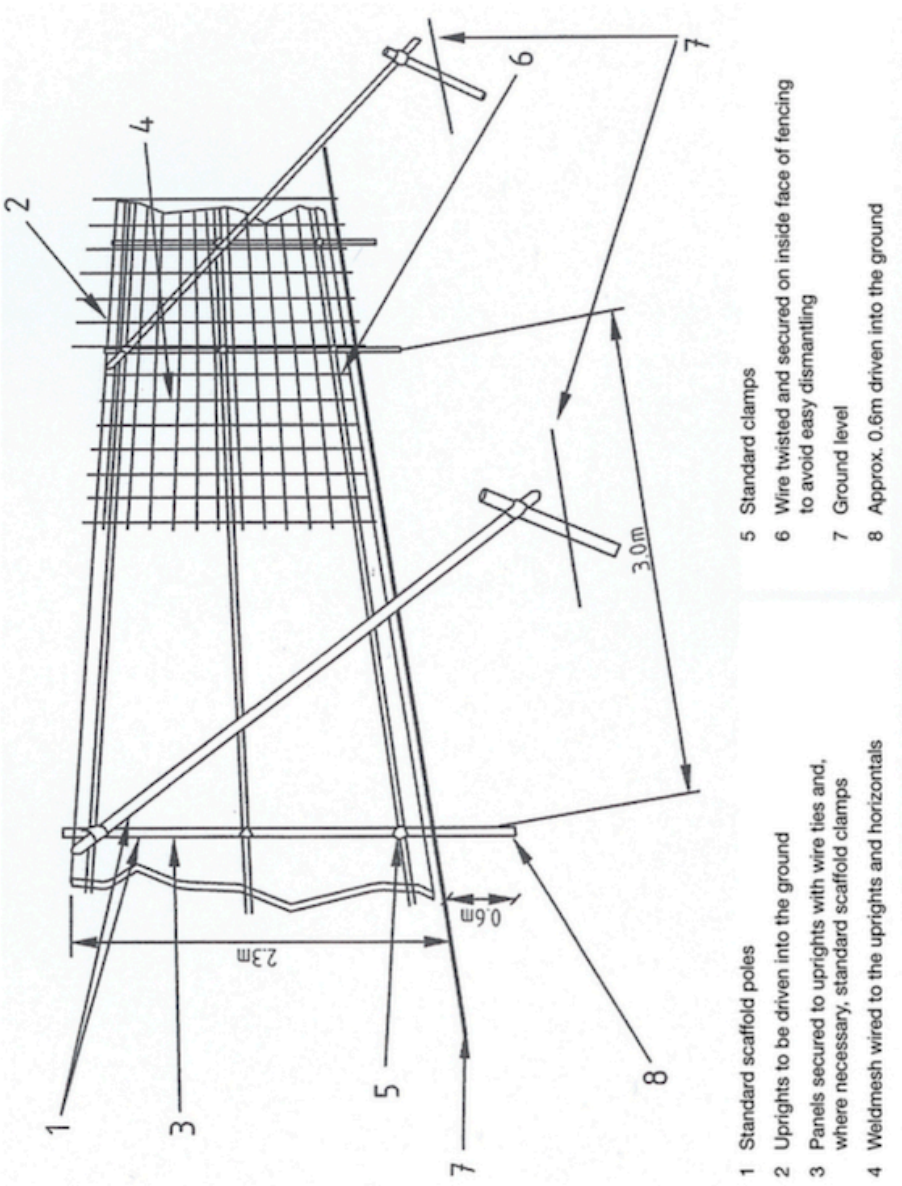
Notice to be clearly shown on site where fencing constructed
AT ALL TIMES

TREE PROTECTION AREA
KEEP OUT !
(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.
CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.

Appendix E
Tree Protection Fencing Specifications

Appendix E1 Tree Protection Fencing as outlined in BS5837 (2012) Specifications



Appendix E2
Basal Shuttering Tree Protection Fencing Example

Basal shuttering offers immediate protection for the lower main stem and initial root plate of a tree where exposed with a porous surface. This method of tree protection does not offer protection to the root plate of a tree where surfaces are exposed / development works are being undertaken within the Root Protection Area of a tree. however, it does offer immediate protection to the main stem and provides vital clearance between the tree and construction site activities such as storage of materials, ad hoc toilet usage and compaction of exposed soft landscaped ground (in addition to many other additional construction site activities.

Photograph taken by Marcus Foster within City of Westminster, 2015

Appendix F
Terram Geo-cell Product Information Sheet

Tree Roots Protection

Protect tree roots from vehicle traffic, whilst maintaining water and nutrient absorption using TERRAM GEOCELL.

Using TERRAM GEOCELL for tree root protection ensures the roots beneath are protected from vehicle loads by confining the sub-base and stabilising the ground. When the permeable TERRAM GEOCELL is filed with a porous, no fines, free-flowing aggregate the system allows essential passage of air and water providing essential nutrients to the roots. TERRAM GEOCELL is ideal for "No-Dig" situations.

Typical Applications

- Permanent Woodland Trails
- Paths & Cycleways
- Driveways*
- Roads
- Access Routes*
- Parking Areas

**See Arboricultural Advisory and Information Services APN12: Driveways close to trees*

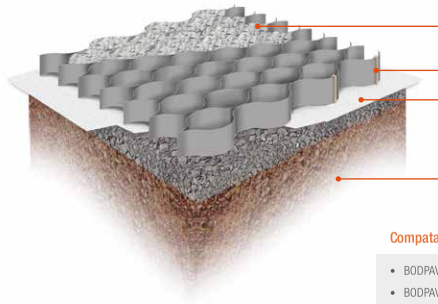
TERRAM GEOCELL is supplied as flat packed panels which are opened to form the honeycomb-like structure. These are positioned and pinned to the ground using fixing pins and filled with a suitable, permeable infill.

TERRAM GEOCELL confines the infill and ensures that downward forces are spread laterally, reducing pressure on the sub-base. Without this cellular system, the surface would become rutted and compacted with the traffic loads, damaging the tree roots and potentially resulting in the death of the tree.

WHY TERRAM GEOCELL?

- Lightweight and easy to handle reducing installation costs.
- Permeable geotextile allows free flow of water, essential in tree root applications.
- The flexible TERRAM geotextile material allows TERRAM GEOCELL to effectively adapt to any variations in the terrain.
- TERRAM GEOCELLS are easily cut to size without damage, therefore reducing cost.

Typical Profile



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Compatable Products

- BODPAVE™40 porous pavers
- BODPAVE™85 porous pavers
- TRUCKPAVE™
- TERRAM geotextile filter
- Geogrid

Fixing Pins
Fixing pins available upon request.

Product Details

PRODUCT	PANEL SIZE (m)	CELL Dia & DEPTH (mm)	PANEL WEIGHT	TYPICAL LOADING
GEOCELL 25/10	5 x 7	250 dia x 100	17kg	Pedestrian cycle*
GEOCELL 25/15	5 x 7	250 dia x 150	23kg	Light vehicles*
GEOCELL 22/20	6 x 3	220 dia x 200	20kg	Optimum for heavier vehicles or more frequent traffic*

* These are typical profiles only.

TERRAM Data Sheets, Installation & Design Guidances and Case Studies can be downloaded from **www.terram.com**

Appendix G: References

1. BS5837: British Standard: Trees in relation to construction - Recommendations, British Standard (2012)

2. Arboricultural Practice Note 12: Driveways Close to Trees (APN12) as provided by the Arboricultural Advisory and Information Service (2007)

3. Principles of Tree Hazard Assessment and Management, Lonsdale, D. (Department for Transport, Local Government and the Regions, 1999)

4. The Body Language of Trees, Mattheck, C. and Breloer, H. (HMSO, 1994)

5. Trees in Britain, Philips, R. (Pan Books, 1978).

6. Diagnosis of Ill Health in Trees, Strouts, R. and Winter, (TSO, 1994)

7. NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Issue 2), (November 2007)

8. Draft New London Plan, Chapter 8 Green Infrastructure and Natural Environment - Policy G5 Urban Greening (Greater London Authority, 2017)