Treework Environmental Practice

Arboricultural Impact Assessment

Branch Hill Allotments, Hampstead, London

Report Reference Number: 210820-1.3-BHAHL-AIA-LF

On behalf of

London Borough of Camden

20 August 2021

Document Control Sheet

Project Name: **Branch Hill Allotments, Hampstead, London**

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Report Title: **Arboricultural Impact Assessment**

	Name	Position	Date
Prepared by:	Luke Fay	Senior Arboricultural Consultant	08/07/2021
Surveyed by:	Michal Mixa	Arboricultural Consultant	18/06/2021 & 21/062021

Revision	Date	Description	Prepared by
1.0	08/07/2021	Draft	LF
1.1	16/07/2021	Issued for submission	LF
1.2	19/07/2021	Minor amendments	LF
1.3	20/08/2021	Update following consultation and issue for planning	LF

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Executive Summary

- This report provides an assessment of the impact of the proposal to *raise the levels across the whole site by c.500 mm in depth in conjunction with the installation of a capping barrier below the new imported soil, as well as below the network of internal paths to prevent plot holders from coming into contact with contaminated soil* upon on site trees and relevant off-site trees, and makes recommendations for mitigating any negative impacts. It is suitable for submission in support of a planning application.

- The design has been developed with careful consideration to minimise the impact on the most important trees.

- Sixty-seven tree features were surveyed. The data for each is presented within the Tree Schedule at Appendix A.

- Twelve tree features have been identified for removal. Eleven of these are C category trees that are to be removed to facilitate the proposal, a further single dead U category tree is also proposed to be removed.

- Some tree features will be subject to soil level increase within their root protection areas. The areas and methods have been assessed and the soil level rises are not considered to present a risk to the trees. These trees are shown on the Tree Protection Plan at Appendix B

- No retained trees require remedial tree work to facilitate the development and to reduce the likelihood of their being subject to excessive pressure after the completion of the development. These works are detailed in the Tree Schedule at Appendix A.

- London Borough of Camden has confirmed that no Tree Preservation Orders (TPOs) are present on the site. The site is located in the Hampstead Conservation Area.

1 Introduction

1.1 Brief and Context

1.1.1 Treework Environmental Practice was instructed by Joe Lewis on 28 May 2021 to provide an Arboricultural Impact Assessment, in accordance with British Standard BS5837: 2012 Trees in *Relation to Design, Demolition and Construction – Recommendations*, of the effect of development proposals on trees at Branch Hill Allotments, Hampstead, London, NW3 7LS.

1.1.2 Trees are a material consideration for a Local Planning Authority when determining planning applications, whether or not they are afforded the statutory protection of a Tree Preservation Order or Conservation Area. British Standard BS 5837:2012 *Trees in Relation to Design, Demolition and Construction* sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and new developments. The Standard recommends a sequence of activities that starts in the initial feasibility and design phase (RIBA Stage 2 'Concept Design') with a survey to qualify and quantify the trees on site and establish the arboricultural constraints to development (above- and below-ground) to inform the design in an iterative process, and continues with an assessment of the arboricultural impacts of the final design and measures to mitigate such impacts should they be negative. Detailed technical specifications for mitigation and protection measures are devised in the design phase that follows (RIBA Stage 3 and 4 'Spatial Coordination' and 'Technical Design'), and the sequence ends with the 'Handover' and 'Use' phases (RIBA Stages 6 and 7), with the implementation of those measures once planning permission is granted, guided by Arboricultural Method Statements (RIBA Stage 4 and 5, 'Technical Design' and 'Manufacturing and Construction) and professional guidance where appropriate.

1.1.3 This Arboricultural Impact Assessment (AIA) reports on the direct and indirect impacts of the proposed development on trees in terms of both the buildability of the proposals and the long-term impact of the finished scheme, and where necessary presents mitigation for these impacts.

1.2 Purpose of this Report

1.2.1 This AIA, and accompanying Tree Schedule and Tree Protection Plan, is provided to support a planning application for the proposed development. It sets out the arboricultural impacts of the proposals using the following considerations as a framework:

- Trees to be removed and trees to be retained.
- Remedial tree work to retained trees to allow development and ensure retained trees will form a harmoniously integrated component of the proposed development.
- Suitable measures to protect retained trees.

- Special construction or engineering measures required to enable trees to be harmoniously integrated into the proposed development.

1.3 The Proposal

1.3.1 A number of phases of site investigations and data analysis have concluded that some plots within the allotment site may require some form of remediation as a result of risks posed by elevated concentrations of lead, benzo[a]pyrene and/or asbestos. Following careful assessment, the decision was taken not to designate the site as contaminated land under Part 2A of the Environmental Protection Act of 1990 and a voluntary remediation approach is recommended.

1.3.2 A Remediation Options Appraisal was undertaken to consider the viable options for remediation of selected plots and establish which of the options provides the best overall approach to remediation.

1.3.3 Through this process it was decided that the best approach was to raise the levels across the whole site by c.500 mm in depth in conjunction with the installation of a capping barrier below the new imported soil as well as below the network of internal paths to prevent plot holders from coming into contact with contaminated soil.

1.3.4 This option has the benefit of no significant soil disposal (thus significantly reducing vehicle movements which would have significant negative impact to the local community) and does not require the handling of impacted soils (as raised beds would simply be constructed over the impacted soils). The drawback of this option is that that some future monitoring of the site will be required to ensure that future residents adhere to the growing restrictions in specific areas where raising the levels is not viable due to existing trees RPAs.

1.3.5 The following documents have been provided to and reviewed by Treework Environmental Practice:

Document Title	Document/Drawing number	Originator
Topographical Survey	920506	APR Services
General Arrangement	11358-LD-PLN-050 (Rev E)	LUC
Outline Hard Landscape Specification	11358-LD-SPE-801 (Rev E)	LUC
Design Note: Comment on Constraints from RPAs	210630-1.0-BHAHL-Comment on RPAs-LF	Treework Environmental Practice
Tree Constraints Plan	210624-1.0-BHAHL-TCP-MM	Treework Environmental Practice

2 Existing Tree Population and Constraints

2.1.1 A survey covering trees on site and trees on adjacent land close enough to be affected by the proposals was undertaken on 18 and 21 June 2021. The full survey results are presented in the Tree Schedule at Appendix A.

2.1.2 The survey was undertaken based on trees plotted using an outline base map as reference in Treework Environmental Practice's specialist tree management software – MyTrees. The basemap contained a topographical survey of the trees. Trees and hedges were plotted on the basemap using the topographical survey as reference.

2.1.3 The site currently houses Branch Hill Allotments. There are several small fruit trees located among the allotment plots. Mature trees (mainly Common lime and Sycamore) line the southern boundary of the site, adjacent to Oak Hill Way, with apparently naturally regenerated understory of younger trees. The northern boundary with Spedan Close, comprises a line of mature Common lime trees with mainly Holly and shrub understory, located on a steep bank above a retaining wall and a line of brick buildings. Large mature trees are also present neighbouring properties and contribute the to the character of the area.

2.1.4 BS 5837:2012 recommends classifying trees into four quality and value categories to determine their relative retentive worth. A summary of the relative retentive worth of the trees on site as recorded during the tree survey and expressed by their categories is given in Table 1. Appendix A explains the BS 5837:2012 tree categorisation process.

Table 1: Trees/Groups in each Retention Category

Category	Total	Tree	Group
A	6	6	0
B	14	14	0
C	46	44	2
U	1	1	0
Total	67	65	2

2.1.5 Of the trees and groups that are recorded by the survey, 59 trees and one group, comprising 12 trees, are located within the site. Six trees and one group are located in neighbouring properties.

2.1.6 Trees present constraints to development both above and below ground. The above ground constraints comprise the physical extent of tree crowns. The below ground constraints comprise the roots, and are expressed in terms of the root protection area (RPA), which is the minimum rooting area that a tree needs to sustain itself in reasonable health. These constraints, as established by the tree-survey, inform this assessment of the impact of the development proposals.

2.1.7 The full results of the tree survey on which this report is based are given in the Tree Schedule at Appendix A, and the above- and below-ground constraints are illustrated on the Tree Protection Plan at Appendix B. Each tree (T), tree group (G), woodland, (W) and hedge (H) has been allocated an individual number to which it is referred in this report and all associated documents. The survey method and limitations are set out in Appendix E.

2.1.8 London Borough of Camden has confirmed that no Tree Preservation Orders (TPOs) are present on the site. The site is located in the Hampstead Conservation Area.

3 Arboricultural Impact of the Proposals

3.1 The Implications of the Proposed Works

3.1.1 Clean soil will be imported to the site and laid over a permeable geotextile to a depth of 500 mm (300 mm top soil, 200 mm subsoil).

3.1.2 The raised soil level will be held in place with rigid structures including, existing walls, welded mesh gabions containing limestone, and oak sleepers (see Outline Hard Landscape Specification at Appendix F).

3.1.3 The increased soil level is likely to cause the horizons of soil where the trees are currently rooting to become less able to support healthy rooting and may become anaerobic which would be likely to result in the death of feeding roots in those areas. Where a significant proportion of the rooting area of a tree is affected in this way the physiological condition of the tree will be impacted.

3.1.4 Welded mesh gabions, comprise galvanised steel cages (450 mm wide, 500 mm high) with crushed angular Mendip Limestone (100 mm – 150 mm diameter). While the presence of the gabions on soft ground will result in minor localised compaction, air and water can pass easily between the angular stone fill and so they will not significantly impact the rooting environment of trees.

3.1.5 Where oak sleepers are to be used to contain the imported soil, these are also considered to be unlikely to significantly impact the rooting environment of trees.

3.2 Tree Removal and Retention

3.2.1 Every effort has been made to retain trees wherever possible. Where high-quality trees have been found to be in conflict with the proposed design, the decision to remove such trees has been informed by an iterative process, following a review of alternative options.

3.2.2 The 11 trees proposed for removal to facilitate the proposed development and one dead tree which is proposed to be removed due to its proximity to the road and footpath, are summarised in Table 2 by BS5837: 2012 category. Trees have been identified for removal where they come into direct conflict with structures, where construction cannot be achieved without their removal, or where their future relationship with the development is considered unsustainable, having regard to their eventual potential size. All Category U trees should be removed due to their poor condition, which would be advisable regardless of the development proposal. Where higher value trees may be in minor conflict with the proposals, pruning or special construction and protection measures have been specified, as explained in Section 3.4.

Table 2 – Tree Features for Removal by BS Category

Category A Trees/Groups/Hedges/ Woodland	**Category B** Trees/Groups/Hedges/ Woodland	**Category C** Trees/Groups/Hedges/ Woodland	**Category U** Trees/Groups/Hedges/ Woodland
None	None	T21, T22, T38, T42, T43, T58, T59, T60, T61, T62, T64	T1
0	**0**	**11**	**1**

3.2.3 All trees other than those in Table 2 will be retained and protected during development (see section 3.3).

3.3 Facilitative Tree Works

3.3.1 No tree works will be required to enable the proposed development, other than the removal of the trees listed in Table 2.

3.4 Tree Protection

3.4.1 ***Root Protection Areas and Construction Exclusion Zones***

Retained trees will be protected during development by establishing a Construction Exclusion Zone (CEZ) around their Root Protection Areas (RPAs). RPAs are a layout design tool, indicating the minimum area around a tree deemed to contain sufficient roots and soil to maintain the tree's viability. RPAs should be treated as a precautionary area within which activities such as ground compaction, excavation, the storing of materials, ground level changes and other construction activity are likely to cause damage to trees and should therefore be excluded. This CEZ can be achieved by the erection of barriers at the locations shown on the Tree Protection Plan at Appendix B. Tree protection barriers must be installed before any demolition or construction works start, and, unless approved by the Local Planning Authority or by an arboriculturist approved by them, should remain in place until all construction activity has been completed.

3.4.2 The type of barriers should match the level of activity around the retained trees. Where a high level of construction activity is expected, fencing must be braced to be robust to vehicular impact and to prevent it from being easily repositioned; a specification similar to drawing 3 in BS 5837:2012 will be suitable (reproduced at Appendix D). In areas away from the main construction activity and vehicle movement, it may be appropriate to install a lower specification fencing, examples of which are given at Appendix D.

3.4.3 All protection fencing should carry identifying signs that state its purpose and proscribe its removal until all demolition and construction work is complete. An example sign is given at Appendix D.

3.4.4 ***Ground Protection***

The access to the site passes through the RPAs of T3, T4, T5, T7, T8, T9 and T11. Depending on the weight, type and frequency of traffic required to implement the proposals, the existing concrete path surface may be augmented with additional protective surfacing to prevent compaction and other damage to the root environments of trees. The location of ground protection is shown as light blue on the Tree Protection Plan at Appendix B and options for additional ground protection are presented in Appendix D.

3.5 Special Technical Measures

3.5.1 Conflicts between retained trees and aspects of the proposed development that cannot be dealt with by exclusion zones, tree protection or tree work can be mitigated by the use of special technical measures. General recommendations for these measures are presented in the sections that follow based on the information about the proposed development that is currently available and the locations of these are shown with yellow hatch on the Tree Protection Plan. The specific details must be carefully planned once detailed construction information is available to avoid tree damage.

3.5.2 ***Installation of Gabions and Sleepers within the RPA***

Gabions and oak sleepers will be installed to contain the imported soil. Where these are located in the RPAs of trees, they will be carefully laid in place so as not to damage the root environments of trees. No plant or vehicles will enter unprotected areas of the RPAs that are not designated for installation of imported soil; where plant or vehicles need to enter these areas, the root environments of trees will be protected with suitably robust ground protection measures. If excavation is required to create a level surface this will be kept to a maximum depth of 100 mm and will be caried out by hand, using hand tools only. The areas are shown on the Tree Protection Plan with yellow hatch.

3.5.3 ***Installation of Imported Soil within the RPA***

Imported soil will be installed within the RPAs of some trees. Where this is proposed, assessment has been made of the trees' condition and rooting environment and the proposals have been adjusted to reduce the encroachment where they have been assessed to be likely to negatively impact the trees. The remaining locations where imported soil will be installed within the RPAs of trees have been assessed to achievable without negatively impacting the trees concerned and are described on the Tree Protection Plan.

3.6 Additional Precautions

3.6.1 ***Utilities and Services***

Information on the location of utility and service runs for the proposed development was not available at time of writing. In principle, traditional trench-installed utilities should be routed outside of the RPAs of retained trees to avoid root damage. Where routing utility runs within RPAs is unavoidable, all work should comply with The National Joint Utilities Volume 4 and advice should be sought from a professional Arboricultural Consultant.

Appendix A

Tree Schedule

Branch Hill Allotment, Hampstead, London
Tree Survey BS5837-2012

Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T1	1	*Salix sp.* Willow sp.	7.0	1	20	NW 3.0 NE 2.0 SE 2.0 SW 3.0	2.0	2.0	Early Mature	Dead	Dead tree / trees. Leaning trunk - Minor. **Fell - Ground level.** Fell dead tree.			0-10	U	
T2	1	*Betula pendula* Silver Birch	7.0	1	15	N 2.0 E 2.0 S 2.0 W 1.0	3.0	3.0	Semi Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Leaning trunk - Minor. Not plotted on topographical survey.	10.2	1.8	20-40	C	1
T3	1	*Acer pseudoplatanus* Sycamore	18.0	1	110	N 7.0 E 7.0 S 7.0 W 7.0	4.0	6.0	Mature	Good	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Fork - Weak with included bark. Stems - Co-dominant.	547.4	13.2	40+	A	1 3
T4	1	*Crataegus sp.* Hawthorn sp.	4.0	1	9	N 2.0 E 2.0 S 1.0 W 1.0	2.0	2.0	Semi Mature	Fair	Leaning trunk - Minor. Tree leans towards gate.	3.7	1.1	20-40	C	1 3
T5	1	*Ulmus sp.* Elm sp.	8.0	1	14	N 3.0 E 2.0 S 1.0 W 3.0	2.0	2.0	Semi Mature	Good	Unbalanced crown - Minor.	8.9	1.7	20-40	C	1
T6	1	*Crataegus sp.* Hawthorn sp.	2.0	1	8	N 1.0 E 2.0 S 1.0 W 1.0	2.0	2.0	Young	Fair	Ivy or climbing plant. Leaning trunk - Minor.	2.9	1.0	20-40	C	1
T7	1	*Acer campestre* Field Maple	5.0	1	9	N 2.0 E 1.0 S 1.0 W 2.0	2.0	2.0	Young	Good	Unbalanced crown - Minor.	3.7	1.1	40+	C	1
T8	1	*Tilia x vulgaris* Common Lime	14.0	1	65	N 4.0 E 4.0 S 4.0 W 4.0	3.0	4.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Arboricultural work - Recent. Base / stems obscured - Structure. Pollard - Regrown.	191.1	7.8	20-40	C	1 3

Branch Hill Allotment, Hampstead, London
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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T9	1	*Tilia x vulgaris* Common Lime	18.0	1	69	N 5.5 E 5.5 S 5.5 W 5.5	0.0	3.0	Mature	Good	Access to inspect base - Not possible. Arboricultural work - Historic. Base / stems obscured - Vegetation. Epicormic growth - Base / bole / principal stems.	215.4	8.3	40+	A	1
T10	1	*Sambucus nigra* Elder	3.0	2	13	N 2.0 E 2.0 S 2.0 W 1.0	2.0	1.0	Semi Mature	Fair	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Multi-stemmed. Unbalanced crown - Minor.	8.4	1.6	20-40	C	1 3
T11	1	*Tilia x vulgaris* Common Lime	18.0	1	60	N 5.0 E 4.0 S 5.0 W 5.0	0.0	3.0	Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Epicormic growth - Base / bole / principal stems. Ivy or climbing plant.	162.9	7.2	40+	B	1 3
T12	1	*Acer pseudoplatanus* Sycamore	18.0	1	80	N 8.0 E 5.0 S 8.0 W 4.0	0.0	0.0	Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Ivy or climbing plant.	289.5	9.6	40+	B	1 3
T13	1	*Crataegus sp.* Hawthorn sp.	4.0	1	8	N 3.0 E 1.0 S 1.0 W 1.0	0.0	1.0	Young	Fair	Suppressed crown - Major.	2.9	1.0	20-40	C	1
T14	1	*Taxus baccata* Yew	4.0	1	9	N 3.0 E 3.0 S 2.0 W 3.0	0.0	0.0	Semi Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Suppressed crown - Major.	3.7	1.1	40+	C	1
T15	1	*Ulmus sp.* Elm sp.	6.0	1	23	N 4.0 E 2.0 S 1.0 W 4.0	2.0	2.0	Semi Mature	Fair	Leaning trunk - Minor. Suppressed crown - Minor.	23.9	2.8	20-40	C	1 3

Branch Hill Allotment, Hampstead, London
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Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T16	1	*Salix sp.* Willow sp.	6.0	1	23	NW 4.0 NE 1.0 SE 1.0 SW 2.0	2.0	2.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Ivy or climbing plant. Leaning trunk - Major. Unbalanced crown - Major.	23.9	2.8	20-40	C	1 3
T17	1	*Salix sp.* Willow sp.	14.0	1	58	N 3.0 E 1.5 S 2.0 W 4.5	7.0	7.0	Early Mature	Fair	Arboricultural work - Recent. Unbalanced crown - Minor.	152.2	7.0	20-40	B	3
T18	1	*Salix sp.* Willow sp.	14.0	1	52	N 3.5 E 3.5 S 3.5 W 3.5	7.0	7.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Ivy or climbing plant.	122.3	6.2	20-40	B	3
T19	1	*Acer pseudoplatanus* Sycamore	14.0	1	32	N 5.0 E 3.0 S 5.0 W 4.0	0.0	4.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Suppressed crown - Minor.	46.3	3.8	40+	C	1 3
T20	1	*Ulmus sp.* Elm sp.	4.0	1	12	N 4.0 E 3.0 S 1.0 W 1.0	0.0	2.0	Semi Mature	Good	Suppressed crown - Minor.	6.5	1.4	20-40	C	1
T21	1	*Ulmus sp.* Elm sp.	6.0	1	24	N 4.0 E 4.0 S 2.0 W 2.0	0.0	3.0	Semi Mature	Fair	Suppressed crown - Minor. **Fell - Ground level.** Fell to facilitate path installation.	26.1	2.9	20-40	C	1
T22	1	*Ulmus sp.* Elm sp.	6.0	1	27	N 4.0 E 2.0 S 2.0 W 4.0	0.0	3.0	Semi Mature	Fair	Suppressed crown - Minor. **Fell - Ground level.** Fell to facilitate path installation.	33.0	3.2	20-40	C	1
T23	1	*Acer pseudoplatanus* Sycamore	18.0	1	80	N 7.0 E 7.0 S 7.0 W 7.0	3.0	7.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Ivy or climbing plant.	289.5	9.6	20-40	B	3

Branch Hill Allotment, Hampstead, London
Tree Survey BS5837-2012

Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T24	1	*Ulmus sp.* Elm sp.	6.0	1	13	N E S W 3.0 3.0 3.0 1.0	0.0	1.0	Semi Mature	Fair	Suppressed crown - Minor. Unbalanced crown - Minor.	7.6	1.6	20-40	C	1
T25	1	*Ulmus sp.* Elm sp.	8.0	1	29	N E S W 5.0 5.0 2.0 5.0	0.0	3.0	Semi Mature	Fair	Suppressed crown - Minor.	38.0	3.5	20-40	C	1
T26	1	*Quercus robur* English Oak	12.0	1	22	N E S W 4.0 4.0 2.0 2.0	5.0	6.0	Semi Mature	Good	Leaning trunk - Minor. Suppressed crown - Major.	21.9	2.6	40+	C	1 3
T27	1	*Acer pseudoplatanus* Sycamore	16.0	1	35	N E S W 3.5 3.5 3.5 3.5	6.0	6.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation.	55.4	4.2	40+	C	1 3
T28	1	*Nothofagus obliqua* Roble Beech	4.0	1	15	N E S W 4.0 2.0 2.0 1.0	2.0	2.0	Semi Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Suppressed crown - Major.	10.2	1.8	40+	C	1 3
T29	1	*Betula pendula* Silver Birch	5.0	1	8	N E S W 1.5 1.5 1.5 1.5	1.0	1.0	Young	Good	Young planted tree / trees.	2.9	1.0	20-40	C	1
T30	1	*Acer pseudoplatanus* Sycamore	7.0	2	20	N E S W 4.0 3.0 1.0 3.0	0.0	2.0	Semi Mature	Fair	Suppressed crown - Minor. Twin-stemmed.	18.5	2.4	40+	C	1 3
T31	1	*Acer pseudoplatanus* Sycamore	7.0	1	17	N E S W 2.5 2.5 2.5 2.5	0.0	2.0	Semi Mature	Fair	Suppressed crown - Minor.	13.1	2.0	40+	C	1 3
T32	1	*Acer pseudoplatanus* Sycamore	18.0	1	90	N E S W 8.0 8.0 8.0 8.0	3.0	1.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation.	366.4	10.8	20-40	A	1

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T33	1	*Acer pseudoplatanus* Sycamore	14.0	1	32	N E S W 5.0 4.0 4.0 5.0	0.0	4.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Suppressed crown - Minor.	46.3	3.8	40+	C	1 3
T34	1	*Acer pseudoplatanus* Sycamore	17.0	2	40	N E S W 6.0 4.0 4.0 6.0	0.0	2.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Suppressed crown - Minor.	74.2	4.9	40+	B	1 3
T35	1	*Ilex aquifolium* Holly	7.0	1	8	N E S W 2.0 2.0 2.0 2.0	0.0	0.0	Semi Mature	Good	Young planted tree / trees.	2.9	1.0	40+	C	1 3
T36	1	*Acer pseudoplatanus* Sycamore	20.0	1	55	N E S W 6.0 6.0 6.0 6.0	6.0	3.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation.	136.8	6.6	40+	C	1 3
G37	5 4 3	*Ilex aquifolium* Holly *Acer pseudoplatanus* Sycamore *Taxus baccata* Yew	10.0	1	15	N E S W 4.0 4.0 4.0 4.0	0.0	0.0	Semi Mature	Fair	Natural regeneration. Self-set trees. Dense group comprising semi-mature trees.	10.2	1.8	20-40	C	2 3
T38	1	*Salix caprea* Goat Willow/Great Sallow	5.0	1	50	N E S W 3.5 3.5 3.5 3.5	0.0	1.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Multi-stemmed. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	113.1	6.0	20-40	C	1 3

Branch Hill Allotment, Hampstead, London
Tree Survey BS5837-2012

Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T39	1	*Malus sp.* Apple sp.	3.0	4	20	N E S W 1.0 1.0 2.0 2.0	0.0	2.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Multi-stemmed. Suppressed crown - Major. Unbalanced crown - Major.	18.1	2.4	20-40	C	1 3
T40	1	*Malus sp.* Apple sp.	6.0	1	16	N E S W 2.0 2.0 2.0 2.0	0.0	0.0	Semi Mature	Fair	Epicormic growth - Bole / principal stems.	11.6	1.9	20-40	C	1 3
T41	1	*Sambucus nigra* Elder	8.0	4	34	N E S W 3.5 2.0 3.5 3.5	0.0	1.0	Early Mature	Fair	Deadwood - Minor. Ivy or climbing plant. Multi-stemmed.	52.7	4.1	10-20	C	1 3
T42	1	*Ficus sp.* Fig sp.	3.0	3	15	N E S W 2.0 2.0 2.0 2.0	0.0	0.0	Semi Mature	Fair	Multi-stemmed. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	11.0	1.9	20-40	C	1 3
T43	1	*Malus sp.* Apple sp.	2.0	2	15	N E S W 2.0 2.0 2.0 2.0	0.0	1.0	Semi Mature	Fair	Arboricultural work - Historic. Pollard - Regrown. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	11.0	1.9	20-40	C	1 3
T44	1	*Carpinus betulus* Hornbeam	16.0	2	40	N E S W 4.5 4.5 4.5 4.5	0.0	2.0	Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. Base / stems obscured - Vegetation. Twin-stemmed. Located in neighbouring property.	73.5	4.8	40+	B	1 3
T45	1	*Sambucus nigra* Elder	7.0	6	19	N E S W 2.0 3.0 3.0 1.0	0.0	2.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. Multi-stemmed. Suppressed crown - Minor. Located in neighbouring property.	17.4	2.4	20-40	C	1 3

Branch Hill Allotment, Hampstead, London
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Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T46	1	*Acer pseudoplatanus* Sycamore	18.0	1	60	N E S W 4.0 4.0 4.0 4.0	2.0	3.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. Base / stems obscured - Vegetation. Ivy or climbing plant. Located in neighbouring property.	162.9	7.2	40+	B	1 3
G47	7 3 1	*Corylus sp.* Hazel sp. *Salix sp.* Willow sp. *Quercus robur* English Oak	10.0	1	10	N E S W 4.0 4.0 4.0 4.0	0.0	0.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Coalesced decay seam - Suspected. Predominantly young self set trees on neighbouring land. Not plotted on topographical survey. Located in neighbouring property.	4.5	1.2	20-40	C	2 3
T48	1	*Tilia sp.* Lime sp.	19.0	1	70	N E S W 4.0 3.0 4.0 4.0	0.0	0.0	Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Coalesced decay seam - Suspected. Deadwood - Minor. Ivy or climbing plant.	221.7	8.4	40+	B	1 3
T49	1	*Ilex aquifolium* Holly	5.0	4	23	N E S W 1.0 3.0 3.0 3.0	2.0	1.0	Early Mature	Good	Multi-stemmed. Suppressed crown - Major.	24.4	2.8	40+	B	3
T50	1	*Aesculus hippocastanum* Horse Chestnut	16.0	1	109	N E S W 6.0 4.0 6.0 6.0	1.0	3.0	Mature	Good	Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Ivy or climbing plant. Suppressed crown - Minor.	537.5	13.1	40+	A	1

Branch Hill Allotment, Hampstead, London
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Treework Environmental Practice

Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T51	1	*Aesculus hippocastanum* Horse Chestnut	20.0	1	115	N 6.0 E 7.0 S 6.0 W 5.0	1.0	3.0	Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Epicormic growth - Base / bole / principal stems. Ivy or climbing plant. Suppressed crown - Minor.	598.3	13.8	40+	A	1
T52	1	*Ilex aquifolium* Holly	6.0	5	20	N 2.5 E 2.5 S 2.5 W 2.5	1.0	1.0	Early Mature	Good	Multi-stemmed.	18.3	2.4	40+	C	1 3
T53	1	*Ilex aquifolium* Holly	6.0	2	18	N 1.0 E 1.0 S 2.5 W 2.5	1.0	1.0	Early Mature	Good	Multi-stemmed. Suppressed crown - Major.	15.2	2.2	40+	C	1 3
T54	1	*Aesculus hippocastanum* Horse Chestnut	20.0	1	100	N 4.0 E 5.0 S 6.0 W 3.0	1.0	3.0	Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Epicormic growth - Base / bole / principal stems. Ivy or climbing plant. Suppressed crown - Minor.	452.4	12.0	40+	A	1
T55	1	*Tilia sp.* Lime sp.	19.0	1	90	N 5.0 E 5.0 S 5.0 W 5.0	7.0	7.0	Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Arboricultural work - Recent. Base / stems obscured - Structure. Base / stems obscured - Vegetation. Pollard - Regrown.	366.4	10.8	40+	B	1 3
T56	1	*Betula pendula* Silver Birch	14.0	1	20	N 2.0 E 4.0 S 4.0 W 4.0	6.0	6.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. Base / stems obscured - Vegetation. Leaning trunk - Minor. Unbalanced crown - Minor. Tree on top of the shed	18.1	2.4	20-40	C	1

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T57	1	*Tilia x vulgaris* Common Lime	20.0	1	100	N 6.0 E 6.0 S 6.0 W 6.0	1.0	1.0	Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Arboricultural work - Recent. Base / stems obscured - Structure. Base / stems obscured - Vegetation.	452.4	12.0	40+	B	1 3
T58	1	*Malus sp.* Apple sp.	2.0	1	7	N 1.0 E 1.0 S 1.0 W 1.0	0.0	1.0	Young	Good	Young planted tree / trees. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	2.2	0.8	20-40	C	1
T59	1	*Cerasus avium* Wild Cherry	2.0	1	16	N 2.5 E 2.5 S 2.5 W 2.5	1.0	1.0	Semi Mature	Fair	Arboricultural work - Historic. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	11.6	1.9	20-40	C	1 3
T60	1	*Cerasus avium* Wild Cherry	2.0	2	21	N 3.0 E 3.0 S 3.0 W 3.0	1.0	1.0	Semi Mature	Fair	Arboricultural work - Historic. Leaning trunk - Minor. Twin-stemmed. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	20.9	2.6	20-40	C	1 3
T61	1	*Malus sp.* Apple sp.	3.0	2	11	N 2.0 E 2.0 S 2.0 W 2.0	1.0	1.0	Early Mature	Fair	Twin-stemmed. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	5.8	1.4	20-40	C	1 3
T62	1	*Malus sp.* Apple sp.	3.0	2	11	N 2.0 E 2.0 S 2.0 W 2.0	1.0	1.0	Early Mature	Fair	Die-back - Throughout crown. Leaning trunk - Minor. Twin-stemmed. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	5.8	1.4	20-40	C	1 3
T63	1	*Cerasus avium* Wild Cherry	8.0	1	20	N 3.0 E 3.0 S 3.0 W 3.0	0.0	0.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation.	18.1	2.4	20-40	C	1

Branch Hill Allotment, Hampstead, London
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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T64	1	*Ficus sp.* Fig sp.	2.0	3	13	N E S W 2.0 2.0 2.0 2.0	0.0	0.0	Semi Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Vegetation. Multi-stemmed. **Fell - Ground level.** Fell to facilitate installation of gabions / imported soil.	8.7	1.7	20-40	C	1
T65	1	*Betula pendula* Silver Birch	8.0	1	25	N E S W 4.0 2.0 4.0 4.0	2.0	2.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. Suppressed crown - Minor. On the neighbouring land behind the premises.	28.3	3.0	40+	B	1
T66	1	*Betula pendula* Silver Birch	8.0	1	30	N E S W 4.0 4.0 4.0 2.0	2.0	2.0	Early Mature	Good	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. Suppressed crown - Minor. On the neighbouring land behind the premises.	40.7	3.6	40+	B	1
T67	1	*Pyrus sp.* Pear sp.	8.0	1	20	N E S W 2.5 2.5 2.5 2.5	2.0	2.0	Early Mature	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Base / stems obscured - Structure. All dimensions are estimated. Located in neighbouring property.	18.1	2.4	20-40	C	1

Tree Schedule Key

Treework Environmental Practice

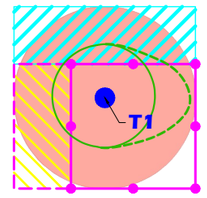
Tree/Group Reference	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland), H (Hedge) or S (Shrub) to indicate the type of feature.
Tree Count	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single trees.
Species	Scientific name followed by common name (where available).
Height (m)	Tree height to the nearest metre, either measured with a device or estimated. Tree height for group records refers to the estimated average height of trees within the group (unrepresentative trees may be excluded from this estimate).
Stem Count	Number of stems. Stem count indicates whether the tree is single-stemmed or multi-stemmed and informs the RPA calculation.
Stem Diameter (cm)	Stem diameter, measured at 1.5m above ground level in accordance with Annex C of BS5837:2012. Diameters of multi-stemmed trees are presented as a combined stem diameter calculated in accordance with the formulae in Section 4.6.1 of BS5837:2012. Stem diameter for group records refers to the estimated average stem diameter of trees within the group (unrepresentative trees may be excluded from this estimate).
Crown Radius (m)	Distance from stem position to crown periphery in either the four cardinal or four ordinal directions, estimated to the nearest half metre. Crown spreads for group records refer to the estimated average spreads of trees within the group (unrepresentative trees may be excluded from this estimate).
Crown Clearance Height (m)	Distance between the ground and the lowest point of the crown periphery, estimated to the nearest half metre.
Lowest Branch Height (m)	Height of the lowest branch, the removal of which is considered likely to have a significant negative effect on the tree in terms of physiology or in terms of the size of wound created.
Life Stage	Young, Semi-mature, Early Mature, Mature, Late Mature, Ancient or Veteran.
Physiological Condition	Good, Fair, Poor, Dead.
Observations	General description of the tree or tree group, including basic features and morphology, structural and physiological condition, growing conditions and surroundings.
Recommendations	Management recommendations for tree works to address immediate unacceptable risks, or to facilitate development proposals.
RPA (m^2)	Minimum area around a tree deemed to contain sufficient roots and rooting soil volume to maintain the tree's viability, in which the protection of roots and soil structure is treated as a priority. Calculated from the stem diameter according to the formulae in BS5837:2012. RPA for group records is based on the estimated average stem diameter of trees within the group (unrepresentative trees may be excluded from this estimate).
RPR (m)	Radius of the RPA, in metres, when this is plotted as a circle around the tree stem.
Remaining Contribution (years)	Estimated number of years for which the tree will continue to make a positive contribution to the site, banded as < 10, 10-20, 20-40, 40 +.
Retention Category	Quality and value category (**A**, **B**, **C** or **U**) as defined in Table 1 of BS5837: 2012 (reproduced below), where **A** = high quality and value; **B** = moderate quality and value; **C** = low quality and value and **U** = tree identified for removal due to poor condition regardless of development proposals.
Retention Sub-category	One or more sub-categories (1-3) as defined in Table 1 of BS5837: 2012 (reproduced below), assigned for Categories **A**, **B** or **C** where 1 = arboricultural qualities, 2 = landscape qualities and 3 = conservation and cultural value.

Table 1 **Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix B

Tree Protection Plan



- Tree or Group Reference Number
- Tree Stem Position A Category Tree
- Tree Stem Position B Category Tree
- Tree Stem Position C Category Tree
- Tree Stem Position U Category Tree
- Tree Crown
- Root Protection Area
- Tree Protection Fencing
- Initial Tree Protection Fencing
- Ground Protection
- Special Engineering /Supervised Excavations
- Construction Exclusion Zone
- Pruning/Tree Removal
- Site Boundary

Date:
August 2021

Scale:
1:400 @ A3

Project Name:
Branch Hill Allotment, Hampstead, London

Drawing Title:
Tree Protection Plan

Drawing Number:
210819-1.6-BHAHL-TPP-NC

Treework Environmental Practice
Monarch House
1-7 Smyth Road
Bedminster
Bristol
BS3 2BX
Tel: 0117 244 0012
Web: www.treeworks.co.uk
Email: info@treeworks.co.uk

Appendix C

Tree Constraints Plan

N

W E

S

T1

Tree or Group Reference Number

Tree Crown

Root Protection Area

Tree Survey Boundary

Tree Stem Position A Category Tree

Tree Stem Position B Category Tree

Tree Stem Position C Category Tree

Tree Stem Position U Category Tree

5m 10m 20m

Date:
June 2021

Scale:
1:400 @ A3

Project Name:
Branch Hill Allotment, Hampstead, London

Drawing Title:
Tree Constraints Plan

Drawing Number:
210624-1.0-BHAHL-TCP-MM

Treework Environmental Practice
Monarch House
1-7 Smyth Road
Bedminster
Bristol
BS3 2BX
Tel: 0117 244 0012
Web: www.treeworks.co.uk
Email: info@treeworks.co.uk

Appendix D

Tree Protection Specifications

Treework Environmental Practice

Technical measures to prevent tree damage

Tree Pruning

Tree pruning will be carried out where the design and / or planned site operations encroach into the crowns of trees and where these encroachments can be accommodated through facilitation pruning without significantly reducing the landscape value and / or viability of the tree.

Tree pruning operations will:

- be specified by the arboricultural consultant
- be in accordance with current best practice
- be carried out by a suitably experienced and qualified arborist

Tree Protection Fencing

Tree protection fencing will be located at the edge of the Construction Exclusion Zone (CEZ) and will be suitably robust to provide sufficient protection trees.

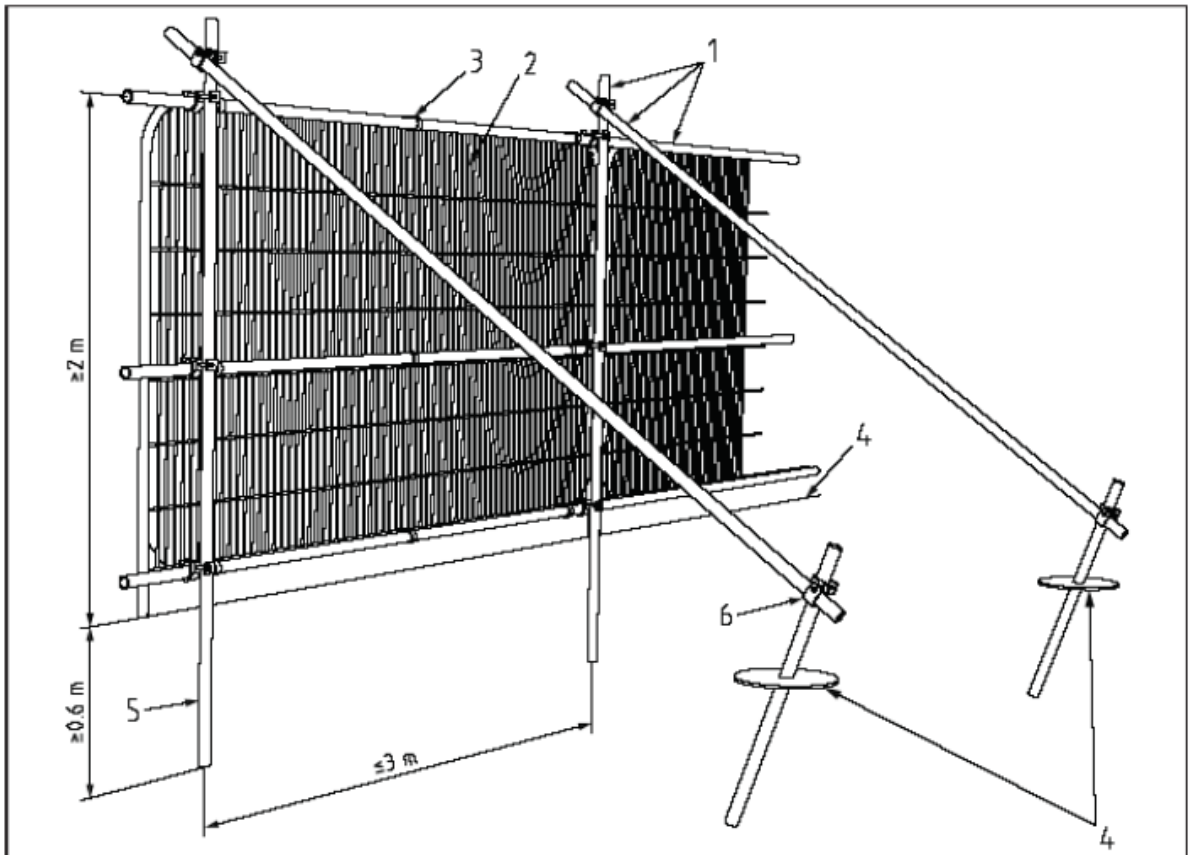
The performance requirement for fencing will be determined by the type of activity that will take place in the area around the CEZ.

Typically the performance requirement for the Tree Protection Fencing will be:

- Tree Protection Fencing will be installed prior to commencement of activity on the site.
- Tree Protection Fencing will only be removed once all works associated with the development have been completed.
- The Tree Protection Fencing will be installed and removed without causing damage to retained trees
- Installation, removal and, where required, replacement of Tree Protection Fencing will be supervised and signed off by the Arboricultural Consultant
- The Tree Protection Fencing will be stable and robust (minimum construction method, in accordance with BS5837: 2012, see illustration below)
- The area between the Tree Protection Fencing and the tree will be a Construction Exclusion Zone (CEZ)
- Fence panels will be made of mesh (e.g.: heras fencing) or, if solid, will have 30cm windows cut into each panel to allow visual assessment of conditions within the CEZ

- The CEZ will be clearly identified (see construction exclusion zone sign example below)

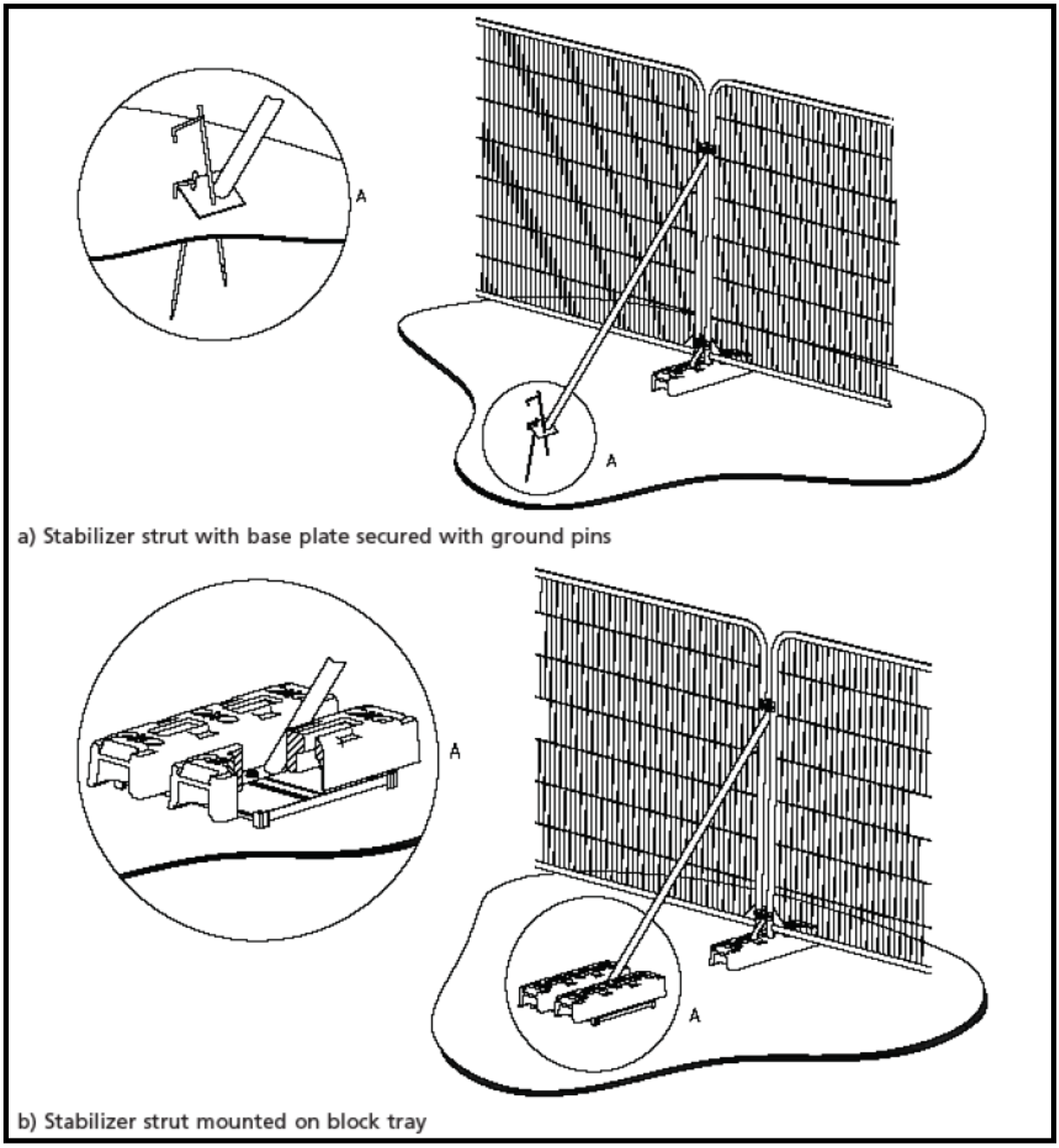
Tree Protection Fencing Sign



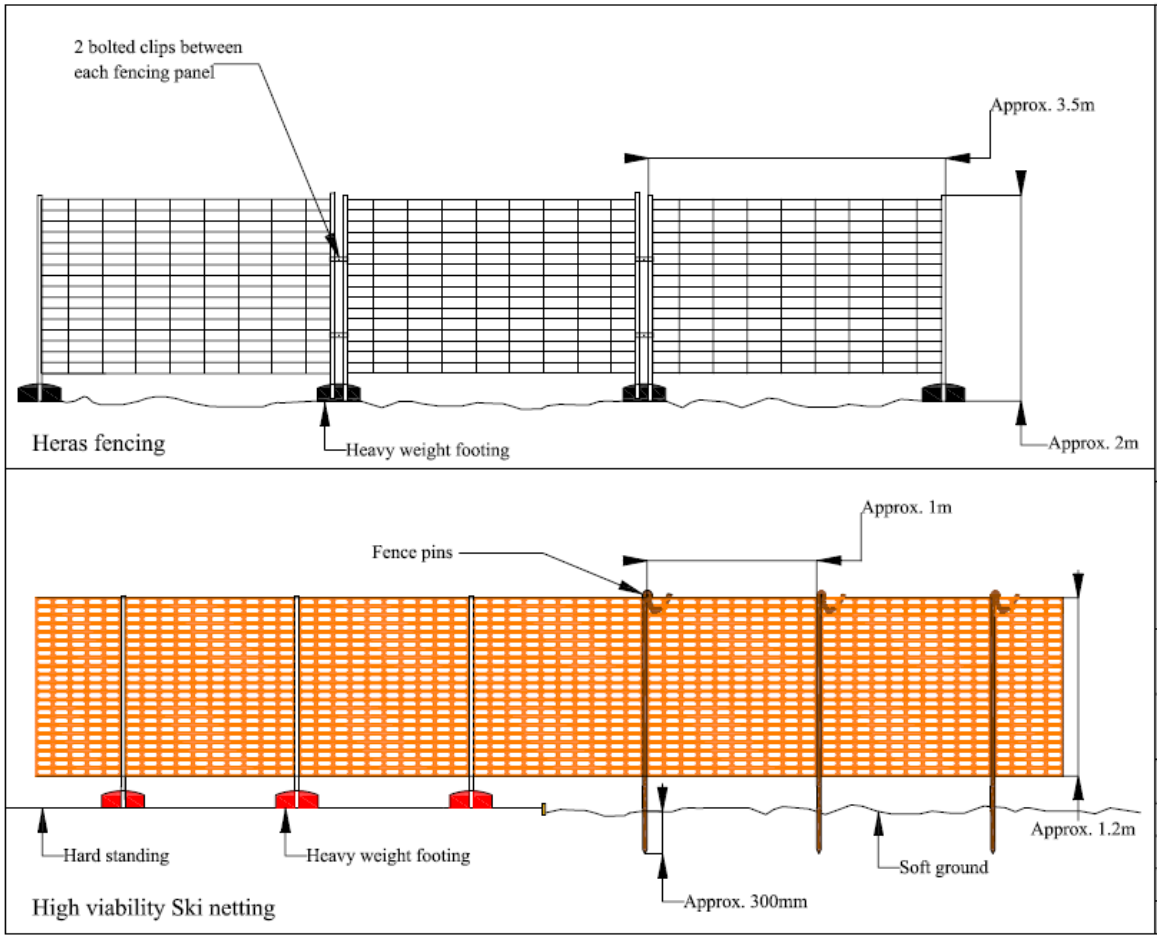
Key

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

BS5837: 2012 - Figure 2 – Tree Protective Barrier



BS5837: 2012 – Figure 3 – Examples of Above Ground Stabilisation Systems for Temporary Tree Protection Fencing.



Examples of lower specification fencing may be considered areas of low intensity activity.

Ground Protection Measures

BS5837: 2012 provides the following examples of temporary ground protection measures:

a) *for pedestrian movements only, a single thickness of scaffold boards placed 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 membrane;*

b) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*

c) *for wheeled or tracked construction traffic exceeding 2 t 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.

Concrete Temporary Ground Protection:

The Ground Protection will be installed using reinforced concrete slabs to an engineering specification, designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

For the roots of the trees to remain undamaged there must be no excavation, soil stripping or site grading within the rooting areas – in other words NO DIGGING. This means that finished levels of the Temporary Ground Protection will be above existing ground level.

The ACoW and Construction Manager will supervise and sign off the installation and removal of the Ground Protection and any change to the Ground Protection.

General Performance Specification:

- The Ground Protection will ensure that tree roots are not physically damaged
- The Ground Protection will ensure that soil within the tree root environment is not compacted
- The Ground Protection will reduce the possibility for spilled materials / substances to seep into the soil
- The Ground Protection will be designed to prevent anaerobic conditions building up under the Ground Protection allow sufficient gaseous exchange and water penetration to the covered root environment.
- The Ground Protection will only be removed once all works associated with the demolition have been completed
- The installation and removal of Ground Protection will not damage trees.

This is a typical specification for Temporary Ground Protection:

The Ground Protection will be installed using a cellular confinement system minimum 100mm thick laid upon a permeable membrane and filled with washed no fines gravel such as 20-40mm washed angular stone.

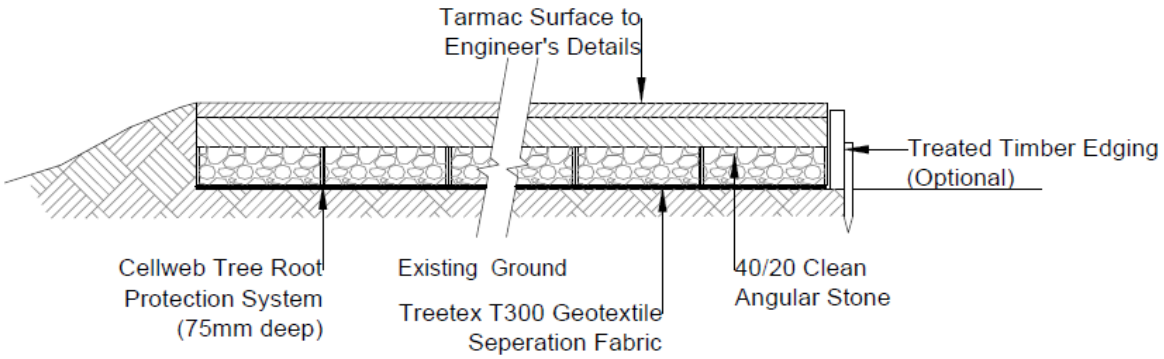
For the roots of the trees to remain undamaged there must be no excavation, soil stripping or site grading within the rooting areas – in other words NO DIGGING. This means that finished levels of the Temporary Ground Protection will be above existing ground level.

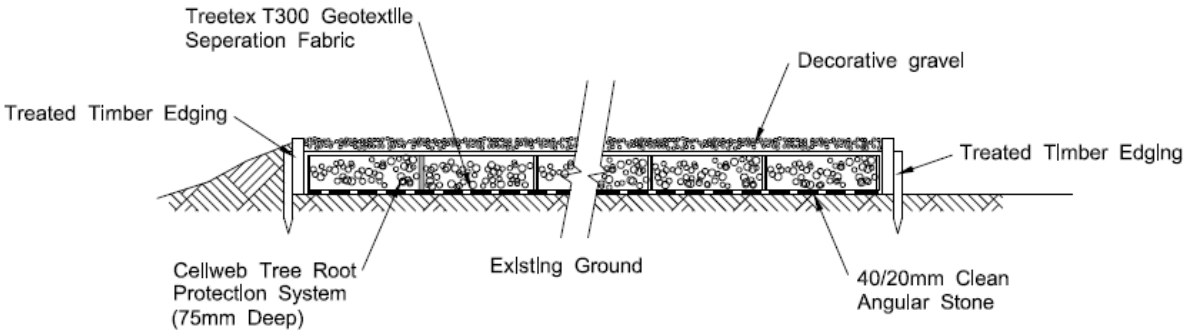
The Arboricultural Consultant will supervise and sign off the installation and removal of the Ground Protection and any change to the Ground Protection.

The installation of Ground Protection will involve the following sequence of operations:

1. *All organic material should be removed to prevent any build up of anaerobic conditions beneath the construction.*
2. *Rocks and other obstacles will be removed by hand.*
3. *Major hollows will be filled with sharp sand.*
4. *A suitable permeable membrane will be laid directly on to the ground and a cellular confinement system e.g. 'Cellweb' (see Appendix H) will be laid directly upon the membrane and pegged into position.*
5. *Washed, no-fines 20/40mm angular stone, to fill the cellular confinement system will be placed at one end and then pushed on to the grid so that machinery moves on the spread sub-base, not directly on the cellular confinement system and not the ground either side of it.*
6. *Depending on the type of access required, a sufficiently porous surface material may be laid over the top of the cellular confinement system.*
7. *The Ground Protection will only be removed once all works requiring access to the protected area have been completed and prior to commencement of soft landscaping.*

Operations to remove the Ground Protection within the RPAs of trees will be supervised and signed off by the Arboricultural Consultant.





Examples of Cellular Confinement System Details (Cellweb)

Appendix E

Tree Survey Method and Limitations

Treework Environmental Practice

Tree Survey Method and Limitations

Tree Survey Method

1. The tree survey was conducted from ground level aided by the Visual Tree Assessment method (Mattheck and Breloer, 1994) and in accordance with BS5837: 2012.

2. All trees on the site with a stem diameter of over 75 mm (measured at 1.5 m above ground) were included in the survey.

3. Offsite trees within influencing distance of the site (typically those located within a distance of up to 12 times their stem diameter away from the site) were included in the survey.

4. Data collected included:

   - a designated tree number
   - type of feature (trees, group, woodland, hedge)
   - number of trees in group
   - tree species
   - height (metres)
   - number of stems
   - stem diameter (in centimetres, as measured at 1.5 m above ground)
   - crown clearance (height of periphery of crown spread above ground level in metres)
   - height of lowest branch (metres),
   - branch spread (to N, S, E and W)
   - age class
   - physiological condition
   - useful life expectancy
   - structural condition
   - BS5837 retention category (A, B, C or U)
   - site notes (where this has a bearing on the present or future health or structural condition of the tree)
   - preliminary management recommendations.

5. All measurements were made in metric using measuring devices where applicable. Estimated stem diameters (e.g., due to lack of access or dense undergrowth) were recorded as such and are shown in the Tree Schedule in bold (see the key at the end of the Tree Schedule table at Appendix A for an explanation of the measurements and codes presented therein).

6. While the appraisals of the surveyed trees are not tree risk assessments, they nonetheless take into account observed structural defects in drawing conclusions about the trees' retentive worth.

Survey Limitations

1. The survey was a preliminary assessment from ground level and observations were made solely from visual inspection for the purposes of an assessment relevant to planning and development. Only binoculars, trowel, mallet and fine manual metal probe were used to aid tree assessment, where necessary. No invasive or other detailed internal decay detection devices were used in assessing trunk condition.

2. The conclusions relate to conditions found at the time of survey. Any significant alteration to the site that may affect the trees that are present or have a bearing on the planning implications (including level changes, hydrological changes, extreme climatic events or other site works) will require a re-assessment of the trees and the site.

3. This survey is not a tree safety inspection. It is carried out in order to inform the planning process. Where clear and obvious hazards have been observed, these have been addressed in the recommendations (see Appendix A - Tree Schedule). A full assessment of the levels of risk posed by trees would need to consider site use together with tree hazards.

Appendix F

Outline Hard Landscape Specification (LUC)

Camden Borough Council

Camden Allotments

Outline Hard Landscape Specification

11358-LD-SPE-801

For Planning
Revision E

LUC

Contents

Iss	Date	Version Details	Prep	Chk
A	201223	Tender Issue	LC	AW
B	210104	Areas added	LC	AW
C	210119	Raised planters increased	LC	AW
D	250221	Re-deisgn of both sites - gabions	LC	AW
E	130721	For planning	LC	AW

Gabions & Steps

Ref	Element	Description	Suggested Supplier(s)	
W01	Gabions	Welded mesh gabions, finished in galvanised steel, cages, 0.45m wide, 0.5m height wall, 5mm wire gauge, hand-packed with crushed angular Mendip Limestone between 100 - 150mm diameter, e.g. from Enviromesh, or acceptable equivalent. Stainless Steel CL35 clips or Galfan coated CL50 'C' rings at a maximum spacing of 225mm for all joints. Internal bracing is formed by creating a continuous windlass tie between the face and rear of the exposed cells within the structure. The windlass tie is to span two or three mesh openings on the front and rear cells to spread the load. The exposed end gabions to the wall should also be braced in both directions to prevent end face deformation. The units shall be filled in layers not exceeding 340mm, if large voids are present then the stone must be re-orientated to minimise voids. The units shall be filled such that the mesh lid bears down onto the gabion filling material. Mesh fabric, lacing wire, helical binders and preformed corner bracing ties to be manufactured in accordance with the requirements of BS EN 10223-8:2013. Corrosion resistance to be in accordance with BS EN 10244-2: 2009 (Class A). Terram Hi-Vis Geotextile separation membrane to be used to the internal walls which face the soil infill.	EnviroMesh or acceptable equivelent https://enviro-mesh.com/products/gabion/	
W02	Concrete steps	Steps to be either 1m or 1.5m wide as denoted on drawings. To consist of 3 no. steps . Step tread to be 300mm depth, step raiser to be no greater than 170mm heigh. Concrete to be compliant with BS 8500-1:2006. To contractors design.	Contractor to submit proposals	
W03	Raied planter	500mm high planters made from 200x100 UK sourced Oak sleepers. Interconnected with stainless steel timberlock screws. Timber to have minimum life span of 15 years, and is dry, free from oil, grease, dust, dirt, fungi, moss and algae .	Contractor to submit proposals	

Note:
At the commencement of the project once the gabion and steps detail is confirmed and agreed, the contractor is to construct a control sample of the agreed gabion and steps detail. The control is for the client's sign-off and approval, before commencing the full works.

Soil

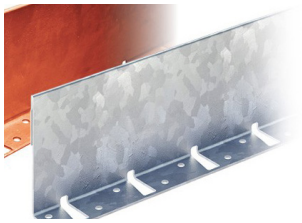
Ref	Element	Description	Suggested Supplier(s)
Topsoil	Imported topsoil	Multipurpose topsoil. Fully broken up and laid to 300mm depth. To BS3882:2015	Contractor to submit proposals **Contractor to submit soil testing results before application.**
Subsoil	Imported subsoil	Multipurpose subsoil: of a sandy loam textural class. Fully broken up and laid to 200mm depth. To BS 8601:2013	Contractor to submit proposals **Contractor to submit soil testing results before application.**

Note:
The control soil sample tests to have the client's sign-off and approval, before commencing the full works.

Contractor to allow for soil settlement and allow for topping up of levels. Finished levels to be flush with paths and gabion walls.

Paths

Edge Type

Ref	Element	Description	Suggested Supplier(s)	
E01 Flush Edge	Metal edging	AluExcel Edging by Kinley Systems. or similar approved 75mm deep 4mm thick, galvanied finish	Kinley Systems or similar approved	

Surface Material

Ref	Element	Description	Suggested Supplier(s)	
P01	Main pathways within plots	Compacted MOT type 1 limestone aggregate laid to falls, 75mm depth. Terram Hi-Vis Geotextile separation membrane to be used.	Contractor to submit proposals	

Geotextile

Ref	Element	Description	Suggested Supplier(s)
Geotextile	Geotextile	Terram Hi-Vis Geotextile separation membrane	TERRAM

Note:
At the commencement of the project, the contractor is to construct a control sample of the agreed path detail.
The control is for the client's sign-off and approval, before commencing the full works.