Treework Environmental Practice

Arboricultural Impact Assessment

13-22 Brook Parade, Chigwell, IG7 6PF

Report Reference Number: 191203-1.0-13-22BP-AIA-LL_MS

On behalf of

Andooi Design

05 December 2019

Document Control Sheet

Project Name: **13-22 Brook Parade, Chigwell, IG7 6PF**

Report Ref: **191203-1.0-13-22BP-AIA-LL_MS**

Report Title: **Arboricultural Impact Assessment**

	Name	Position	Date
Prepared by:	Lisa Lee	Arboricultural Consultant	03/12/2019
Surveyed by:	Lisa Lee	Arboricultural Consultant	27/11/2019

Revision	Date	Description	Prepared by
1.0	05/12/2019	Final for Submission	LL

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Executive Summary

- This report provides an assessment of the impact of the proposal to construct a roof extension to the existing properties at 13-22 Brook Parade 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.

- Twelve individual trees and three tree groups were surveyed. The data for each is presented within the Tree Schedule at Appendix A.

- Three trees have been identified for removal to facilitate the development, of which one is a category C, and two are category U, it is recommend that the latter be removed due to their poor condition, which would be advisable regardless of the development proposal.

- The remaining trees and tree groups will be retained and integrated into the development. Sufficient space and adequate protection measures have been set out to ensure that retained trees are not damaged during the pre-construction and construction phase and to enable their successful development post-construction. Retained tree protection measures are discussed throughout this report and illustrated on the Tree Protection Plan at Appendix B.

- No trees will be subject to construction within their root protection areas.

- Three retained trees will require relatively minor remedial tree work to facilitate the development. These works are detailed in the Tree Schedule at Appendix A.

- At the time of writing, Epping Forest District Council are to confirm if the site is situated within a Conservation Area or any of the trees are subject to Tree Preservation Orders

1 Introduction

1.1 Brief and Context

1.1.1 Treework Environmental Practice was instructed by Andooi Design on 22 November 2019 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 13-22 Brook Parade, Chigwell, IG7 6PF.

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 3-4 'Developed and Technical design'), and the sequence ends with the Implementation and Aftercare phase (RIBA Stages 5-7) with the implementation of those measures once planning permission is granted, guided by Arboricultural Method Statements (RIBA Stage 4-5, 'Technical Design 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 Development

1.3.1 The proposed development is for a single storey roof extension on top of existing flats and shops at 13-22 Brook Parade.

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

Document Title	Document/Drawing number	Originator
Proposed Layout	749_P9_Proposed_Roof_Plan_A1	Andooi Design
Tree Constraints Plan	191128-1.0-13-22BP-TCP-NC	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 development was undertaken on 27 November 2019. 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 OS Mastermap base map as reference in Treework Environmental Practice's specialist tree management software – MyTrees. The basemap did not contain a topographical survey of the trees. Trees and hedges were plotted on the basemap using GPS as a reference, and their positions are therefore approximate.

2.1.3 The proposed development site is part of a parade of shops with flats overhead. There are three walkways to the rear accessed vis Brook Mews which give access to the rear yards of the individual premises. Each yard is broken into 2 distinct areas in varying states of repair. Some yards have extensive vegetative coverage with little or no maintenance, others are laid to lawn with shrub beds and some are laid to hard surface. Trees on the site are predominantly semi mature in fair to good physiological condition. All trees within the site are a category 'C' with the exception of T3 and T8 which are considered to be category 'U'.

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

BS Category	No. of Trees (T)	No. of Groups (G)	Total
A	0	0	0
B	0	0	0
C	7	3	10
U	2	0	2
Total	**9**	**3**	**12**

2.1.5 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.

2.1.6 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) and tree group (G), 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.

2.1.7 An email has been sent to 'contacttrees@eppingforestdc.gov.uk' at Epping Forest District Council to confirm if the site is situated within a Conservation Area or is subject to any Tree Preservation Areas.

3 Arboricultural Impact of the Proposals

3.1 Tree Removal and Retention

3.1.1 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.

3.1.2 The three trees proposed for removal to facilitate the proposed development 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	Category B Trees/Groups	Category C Trees/Groups/	Category U Trees/Groups
0	0	T1	T3 and T8
0	**0**	**1**	**2**

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

3.2 Facilitative Tree Works

3.2.1 T5, T6 and T7 require crown lifting to allow impeded access along the rear walkway. The specifications for facilitative tree works are given in the Tree Schedule at Appendix A. Some clearance of the saplings and overgrown vegetation to the rear of number 22 may be required to facilitate the installation of the scaffolding.

3.3 Tree Protection

3.3.1 ***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 location

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.

3.3.2 The trees to be protected are located a significant distance away from the construction area and therefore it would be appropriate to install a lower specification fencing, examples of which are given at Appendix D.

3.3.3 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.

3.3.4 ***Ground Protection***

No ground protection is required due to there being adequate space within the rear yards of the properties for storage of material outside of the Construction Exclusion Zones enclosed within the Tree Protection fencing. The hard standing to the front of the garages accessed via Brook Mews will be utilised for further storage of materials and skips.

3.3.5 ***Installation of scaffolding***

The footprint of the structures within the proposed development does not encroach within the RPA of any of the retained trees. The scaffolding will be set on top of the single storey rear extensions.

3.4 Additional Precautions

3.4.1 ***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.

3.4.2 ***Soft Landscaping***

No development of the rear yards is included within the present application.

Appendix A

Tree Schedule

13-22 Brook Parade, Chigwell
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	*Fraxinus excelsior* Ash	11.0	8	36	N 4.5 E 4.5 S 4.5 W 4.5	0.5	1.5	Semi Mature	Fair	Inappropriate species / location. Main stems less than 1m from building. No topographical survey. Position approximate. **Fell - Ground level.** Remove tree to installation of scaffolding.	61.2	4.4	10-20	C	1
G2	5	*Quercus robur* English Oak	6.5	1	9	N 3.0 E 3.0 S 3.0 W 3.0	0.0	1.0	Young	Good	No topographical survey. Position approximate.	3.7	1.1	20-40	C	1 2
T3	1	*Fraxinus excelsior* Ash	9.0	1	17	N 2.5 E 2.5 S 2.5 W 2.5	2.5	4.5	Semi Mature	Fair	Inappropriate species / location. Structural impact - Footpath / highway / drive disturbance. Twin-stemmed. Twin stemmed at 2m. Main stem in direct contact with wall. Damage to wall. No topographical survey. Position approximate. **Fell - Ground level.** Remove tree for arboricultural reasons.			0-10	U	
T4	1	*Salix caprea* Goat Willow/Great Sallow	6.5	1	9	N 2.0 E 2.0 S 2.0 W 2.0	1.0	1.5	Semi Mature	Fair	Inappropriate species / location. No topographical survey. Position approximate. No access. In direct contact with adjacent building.	3.7	1.1	10-20	C	1
T5	1	*Fraxinus excelsior* Ash	15.0	2	46	N 6.5 E 6.5 S 6.5 W 6.5	1.5	4.0	Early Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Ivy or climbing plant. No topographical survey. Position approximate. **Lift low canopy - Pedestrian clearance.** Crown lift to allow impeded access along footpath.	98.3	5.6	20-40	C	1

13-22 Brook Parade, Chigwell
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
T6	1	*Fraxinus excelsior* Ash	13.0	8	25	N 4.0 E 4.0 S 4.0 W 4.0	2.0	2.0	Semi Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Ivy or climbing plant. No topographical survey. Position approximate. **Lift low canopy - Pedestrian clearance.** Crown lift to allow impeded access along footpath.	29.3	3.1	10-20	C	2
T7	1	*Betula pendula* Silver Birch	12.0	2	22	N 4.5 E 4.5 S 4.5 W 4.5	1.5	4.5	Semi Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Ivy or climbing plant. No topographical survey. Position approximate. No access. **Lift low canopy - Pedestrian clearance.** Crown lift to allow impeded access along footpath.	23.5	2.7	10-20	C	2
T8	1	*Fraxinus excelsior* Ash	9.5	2	14	N 3.0 E 3.0 S 1.0 W 2.0	2.0	4.5	Semi Mature	Fair	Arboricultural work - Recent. Poor past pruning. No topographical survey. Position approximate. No access. Adjacent stem recently cut back to 0.5m **Fell - Ground level.** Remove tree for arboricultural reasons.			0-10	U	
G9	2	*Acer pseudoplatanus* Sycamore	14.0	1	24	N 4.5 E 4.5 S 3.0 W 2.0	0.0	2.5	Early Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Ivy or climbing plant. No topographical survey. Position approximate. No access.	26.1	2.9	10-20	C	2
T10	1	*Acer pseudoplatanus* Sycamore	11.0	2	29	N 4.0 E 4.0 S 4.0 W 4.0	2.0	4.5	Semi Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Ivy or climbing plant. Leaning trunk - Minor. No topographical survey. Position approximate. No access.	40.0	3.6	10-20	C	1

13-22 Brook Parade, Chigwell
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
G11	4	*Fraxinus excelsior* Ash	10.0	1	8	N 2.0 E 2.0 S 2.0 W 2.0	1.5	2.5	Young	Fair	No topographical survey. Position approximate. No access.	2.9	1.0	10-20	C	2
T12	1	*Fraxinus excelsior* Ash	11.0	4	26	N 4.0 E 4.0 S 4.0 W 4.0	1.0	4.5	Semi Mature	Fair	Access to inspect base - Not possible. Base / stems obscured - Vegetation. Inappropriate species / location. Ivy or climbing plant. No topographical survey. Position approximate. No access.	30.8	3.1	10-20	C	1

Tree Schedule Key

Treework Environmental Practice

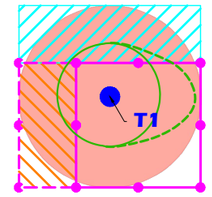
Tree/Group Reference	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland), H (Hedge) or S (Shrub) to indicate the type of feature.
Tree Count	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single 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



T1 Tree or Group Reference Number	Tree Protection Fencing
Tree Stem Position A Category Tree	Initial Tree Protection Fencing
Tree Stem Position B Category Tree	Ground Protection
Tree Stem Position C Category Tree	Special Engineering /Supervised Excavations
Tree Stem Position U Category Tree	Construction Exclusion Zone
Tree Crown	Pruning/Tree Removal
Root Protection Area	Site Boundary

Date:
December 2019

Scale:
1:400 @ A3

Project Name:
13-22 Brook Parade, Chigwell

Drawing Title:
Tree Protection Plan

Drawing Number:
191202-1.0-13-22BP-TPP-NC

Treework Environmental Practice

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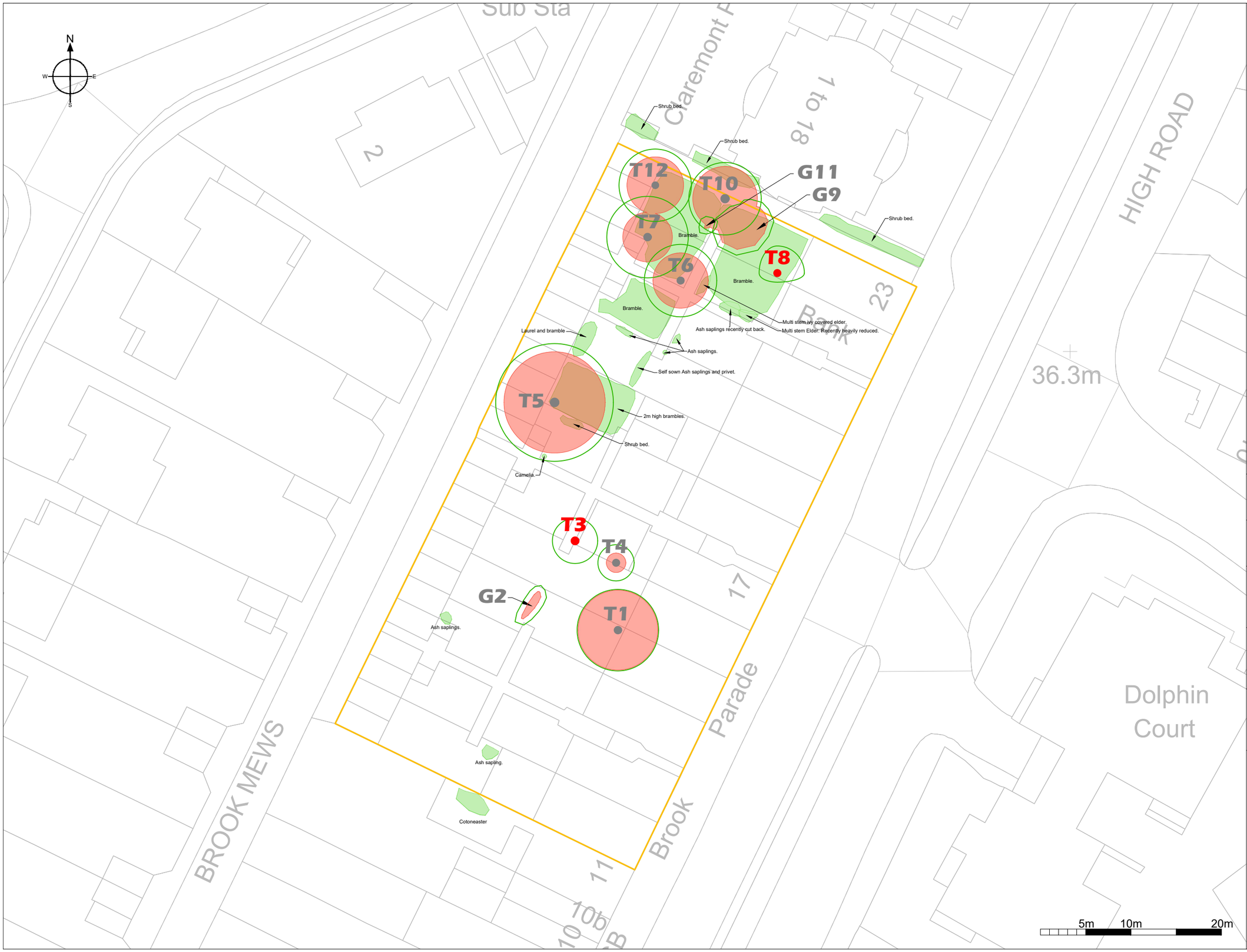
Web: www.treeworks.co.uk
Email: info@treeworks.co.uk

Appendix C

Tree Constraints Plan



T1

T1 Tree or Group Reference Number	Tree Stem Position A Category Tree
Tree Crown	Tree Stem Position B Category Tree
Root Protection Area	Tree Stem Position C Category Tree
Tree Survey Boundary	Tree Stem Position U Category Tree

Date: November 2019

Scale: 1:400 @ A3

Project Name: 13-22 Brook Parade, Chigwell

Drawing Title: Tree Constraints Plan

Drawing Number: 191128-1.0-13-22BP-TCP-NC

Treework Environmental Practice

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BS3 2BX

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Web: www.treeworks.co.uk
Email: info@treeworks.co.uk

Appendix D

Tree Protection Specifications

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

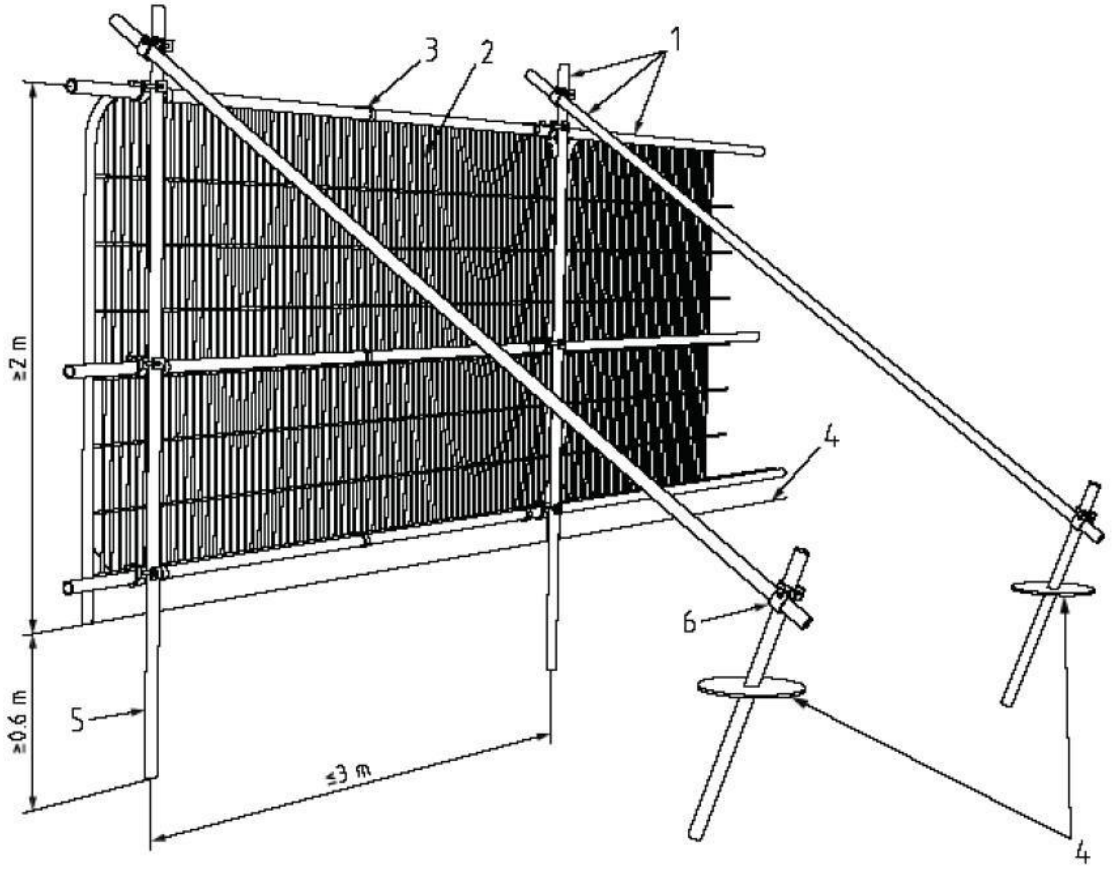
Tree Protection Fencing

Tree protection fencing will be located at the edge of the Construction Exclusion Zone (CEZ) and will be suitably robust to provide sufficient protection for 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 (typical construction method, in accordance with BS5837: 2012, see 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 enough panels to enable conditions within the CEZ to be viewed.
- The CEZ will be clearly identified (see Construction Exclusion Zone sign example below)

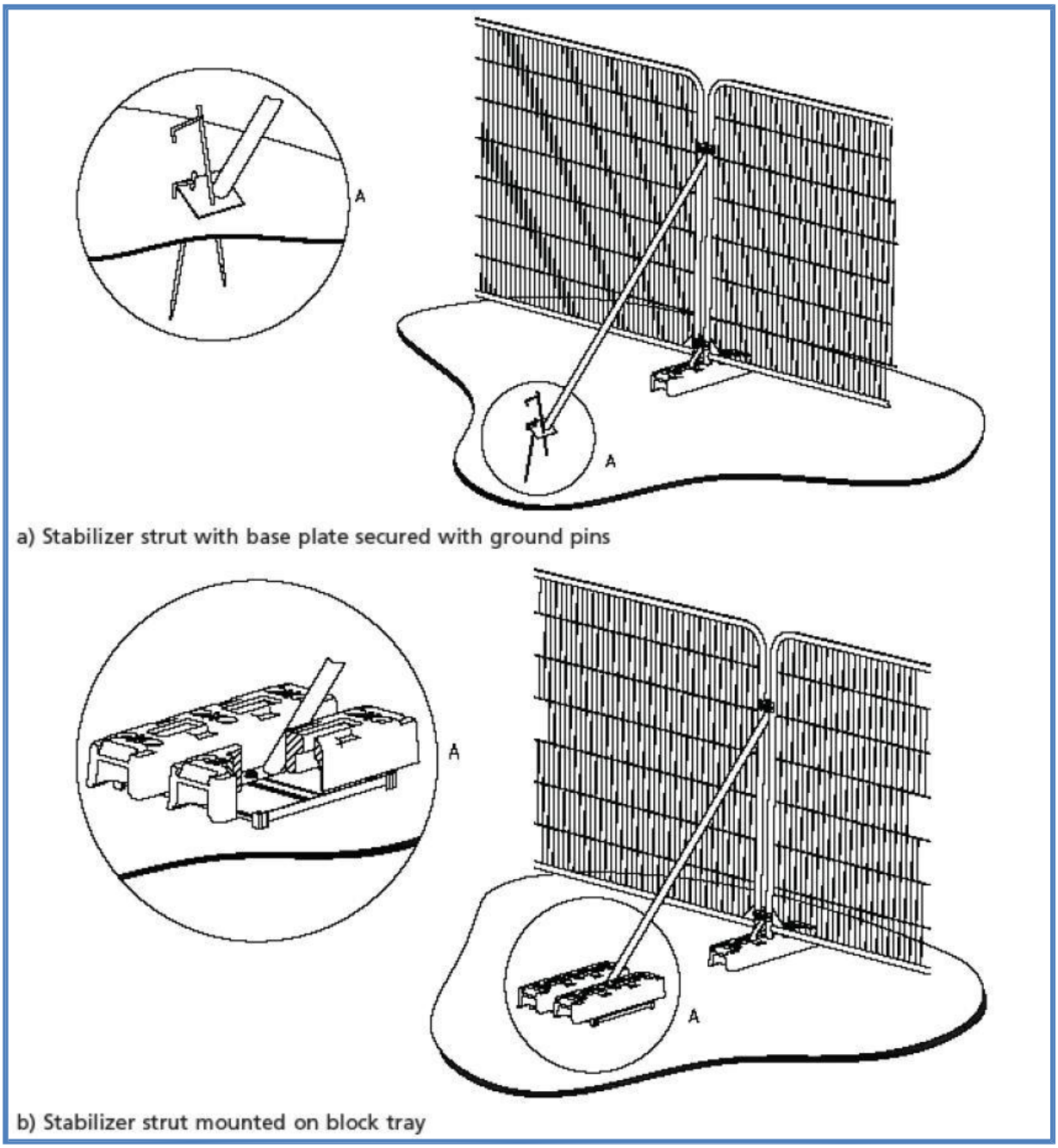
Example Tree Protection Fencing Sign



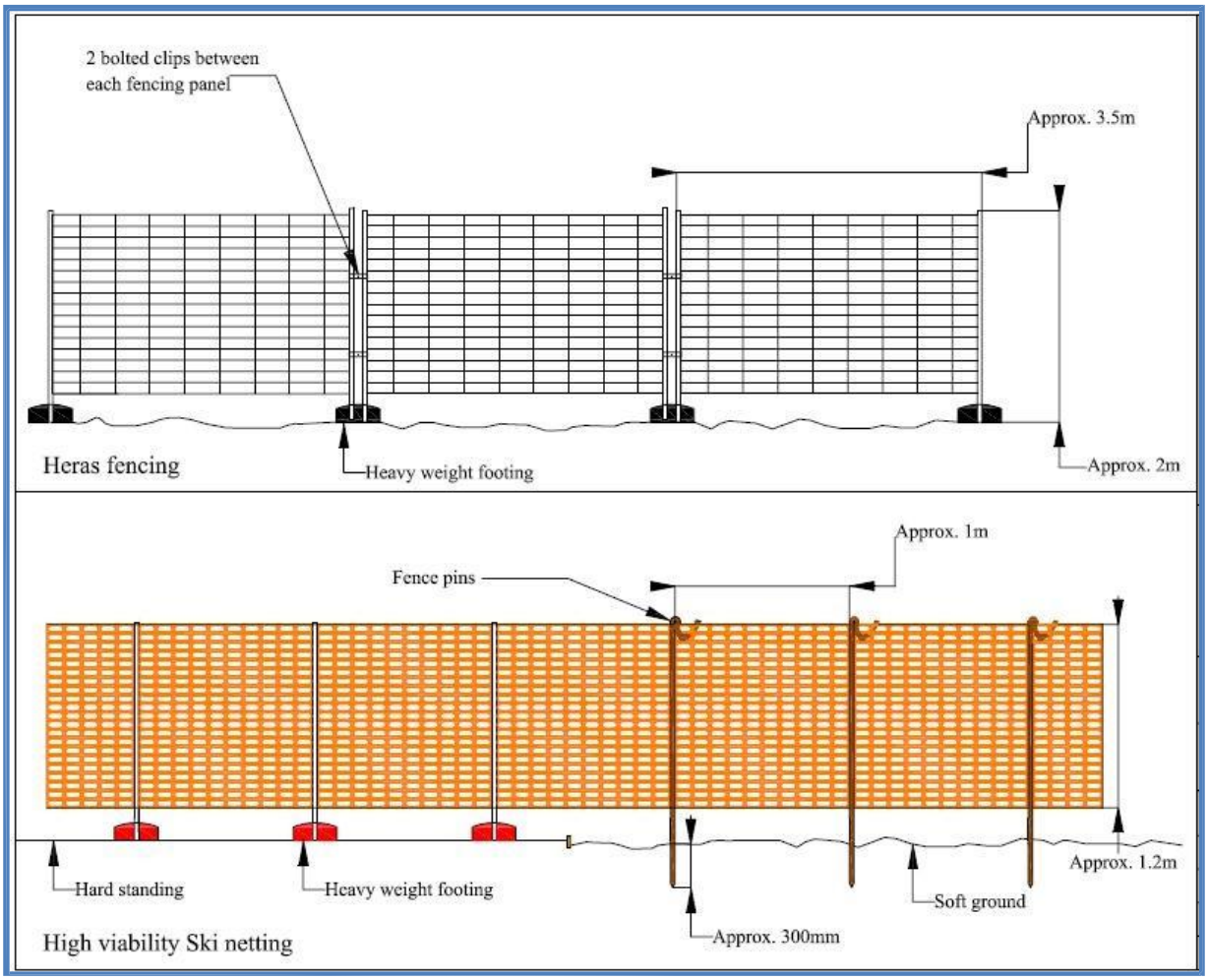
Key

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



Examples of specification fencing that may be appropriate for areas of low-intensity activity

No-dig Construction and Special Engineering Measures

No-dig construction methods and special engineering measures will be employed to enable the construction of roads and other built features within the RPAs of trees without damaging tree roots. Installation of built features using no-dig and special engineering measures will meet the following performance criteria:

- Ensure that tree roots are not damaged.
  - *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.*
- Ensure that soil is not compacted.
- Ensure that no spilled toxic materials seep into the soil.
- Ensure that sufficient rain water reaches tree roots.
- Ensure that gaseous exchange can take place within the soil around tree roots.
- All operations will be supervised and signed off by the Arboricultural Consultant.

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.