70 Elsworthy Road London NW3 3BP

Phase II Arboricultural Impact Assessment

(Ref. 798)

Date: 12/05/2015

Prepared by:
Russell Ball BSc. (Hons.), P.G. Dip. LM, CBiol., MSB.
Chartered Biologist
LANTRA Approved "Professional Tree Inspector"

Tel. 0208 863 8151 **Mobile: 078844 26671** **Email:** russell@arboleuro.co.uk www.arboleuro.co.uk

CONTENTS

APPENDICES

Local Planning Authorities that have previously seen our standard report format are directed to Sections 7-9 that contain the key relevant information for this planning application.

1.0 INSTRUCTIONS & TERMS OF REFERENCE

1.1 INSTRUCTIONS

Arbol Euro Consulting Ltd. is instructed to assess the on and off-site trees in regard to the proposed development. See section 7.1.2.

NB This report does not seek to authorise any tree works (see Section 4.1).

Please be advised that this is a Development Control – and not a Building Control – focused document. In regard to the latter, this deals with foundation depth and design in relation to trees using NHBC/Zurich national guidance. For advice, consult with the local council Building Control Officer or an approved NHBC inspector in order to gain Full Plans Approval or a Completion Certificate. The latter are governed by the Building Act 1984 and Building Regulations 2010. As such the above Building Control issues are outside the remit of a Consulting Arborist.

1.2 PHASE 1, 2 & 3: ARBORICULTURAL IMPLICATION ASSESSMENTS (AIA) IN CONTEXT

1.2.1 Phase 1 (AIA1). The initial stage for trees within the development process is a survey of those trees that should be retained and those that may/should be removed. Retention trees are allocated Root Protection Areas (RPAs) that are then detailed on a Tree Constraints Plan (TCP). The RPAs provide for sufficient rooting (soil) volume to ensure that trees are successfully retained during and after the completed development. The TCP represents Phase 1 of an Arboricultural Implications Assessment (AIA1). It indicates a notional development footprint for any given site but moreover, it ***may affect the value of land*** earmarked for development. The AIA1 is ***only*** a baseline survey. It is not intended to represent, in isolation, the supporting information for an LPA* application: to obtain full planning permission.

* Local Planning Authority

1.2.2 Phase 2 (AIA2). The next stage is for 'site layout master planners' to factor the tree constraints into draft layout proposals. This draft is then referred to the consulting Arborist for further implication assessment, to arrive at a 'best fit' scheme, which achieves site proposal viability whilst allowing for the retention of appropriate trees. This layout review represents Phase 2 of an Arboricultural Implications Assessment (AIA2). Once it has been agreed, the consulting Arborist can then prepare a supporting report to accompany the planning application. This report should demonstrate that the trees have been properly considered such that the site layout is defensible in arboricultural terms, both at the application stage and also, if necessary, at Appeal. As the proposal develops, the AIA2 also involves the consulting Arborist working as part of the development team to secure discharge of any initial (frequently pre-commencement) tree related LPA planning conditions. These will need to be formally discharged to avoid any breach of Condition and/or enforcement action.

1.2.3 Phase 3 (AIA3). All the effort put into the pre-application phases (AIA12) to protect retention trees is likely to fail without effective site supervision. Arboricultural Implications Assessment (AIA3) covers the ***on-site project implementation***, including arranging (LPA) approved tree removal/ pruning, overseeing the installation of tree protection fencing, ground protection and any special engineering works through to periodic reporting on the retention of tree protection measures. Many if not all of the latter are usually specified as LPA planning conditions that need to be formally discharged. All personnel associated with the construction process must be familiar with the specified Tree Protection Plans (TPP) and Arboricultural Method Statements (AMS) that affect the site. The TPP and AMS should be retained on site at all times and they should be included in the site's Project Management Plan.

1.2.4 Phases 1–3 are in line with *BS 5837; 'Trees in relation to design, demolition and construction - Recommendations'* (2012).

1.3 TREES & BUILDING SUBSIDENCE/HEAVE ISSUES

Assessing the potential influence of trees upon load-bearing soils beneath existing and proposed structures, resulting from water abstraction by trees on shrinkable soils, was not included in the contract brief and is not, therefore, considered in any detail in this report. **Arbol EuroConsulting** cannot be held responsible for damage arising from soil shrinkage or heave issues related to the retention or removal of trees on site.

1.4 TREE SAFETY MATTERS AND TREE RISK ASSESSMENT

The BS:5837 tree survey is carried out in sufficient detail to gather data for and to inform the current project. Our appraisal of the structural integrity of trees on the site is of a preliminary nature and sufficient only to inform the current project. The tree assessment is carried out from ground level – as is appropriate for this type of survey - without invasive investigation. The disclosure of hidden tree defects cannot therefore be expected. Whilst the survey is not specifically commissioned to report on matters of tree safety, we report obvious visual defects that are significant in relation to the existing and proposed land use.
Lastly and to further clarify, this BS:5837 survey does not constitute a full *Visual Tree Assessment* (= TRAM* Level 2 - *Basis Assessment*) that would ordinarily be carried out for Tree Risk Assessment reporting. In effect, this BS:5837 survey equates to a TRAM Level 1 *Limited Visual Assessment*.

> * "Tree Risk Assessment Manual" Dunster, Julian A., E. Thomas Smiley, Nelda Matheny, and Sharon Lilly (2013) International Society of Arboriculture

1.5 SITE OBSERVATIONS

This report has been based on my site observations and in light of my experience. This along with my qualifications are appended to this report.

1.6 CAVEATS

The author does not have formal qualifications in the areas of structural engineering or law. However, making comment on such matters from an arboricultural perspective is both within the normal scope of our instructions and also within the range of the author's experience. Notwithstanding this, specialist professional advice should be sought to clarify/confirm any observations on engineering or legal matters that this report may contain.

2.0 INTRODUCTION

2.1 THE ASSESSMENT METHODOLGY

The British Standard BS:5837 '*Trees in relation to design, demolition, construction - Recommendations*' (2012) provides "guidance on the principles to be applied to achieve a satisfactory juxtaposition of trees…….with structures". The Standard recommends that trees with categories A-C (where A is the highest quality) are a material consideration in the development process. Such trees may then become a constraint for a planning proposal. Category U trees are those that will not be expected to exist for long enough to justify their consideration in the planning process (i.e. no more than 10 years). Tree categories are used with the number 1, 2, or 3 to signify whether the category was made based on arboricultural, landscape or cultural (including conservation) values respectively. The tree categories are shown on plan by colour-coding:

> Category A (green colour-coded): Good examples of their species with an estimated life expectancy of at least 40 years.
>
> Category B (blue colour-coded): Not suitable for an 'A' category due to impaired condition or a tree lacking special 'A' qualities: with an estimated life expectancy of at least 20 years.

Category C (grey colour-coded): Unremarkable trees of very limited merit or with a significant impaired condition not warranting an 'A' or 'B' category: with an estimated life expectancy of at least 10 years. See young trees below.

Category U (red colour-coded): See above.

Reasonably young trees below 150mm stem diameter would normally be given a C category (if they satisfy the retention quality criteria). However, as they are small they could be replaced/transplanted and as such they should not be regarded as a significant constraint on a development.

2.2 ARBORICURAL IMPACT ASSESSMENT (AIA)

We have considered - with access permitting for 3rd party trees - the following BS:5837 (2012) recommendations:

1. Tree Categories (Quality Assessment).
2. Crown Spread measured to the four cardinal compass points for single specimens only.
3. Root Protection Areas (RPAs).
4. Tree Constraints.
5. Tree retention & protection - Tree Protection Plan (TPP) incorporating the Tree Constraints Plan & Construction Exclusion Zones (CEZs).

N.B. Trees and shrubs are living organisms whose health and condition can change rapidly, for this reason the BS 5837 grades along with any conclusions or tree management recommendations remain valid for a period of 12 months.

The specific tree report is documented in Section 7 of this report.

Refer to the Tree Protection Plan (TPP) incorporating the Tree Constraints Plan (TCP) for further detail.

3.0 GENERAL DATA

3.1 GENERAL

The three phases of an Arboricultural Implication Assessment were outlined in Section 1.1.1-1.1.4. In addition, during the development process for retention trees, there may be three and even four constraints to consider - Construction Exclusion Zone (CEZs):

- CEZ 1: Root Protection Area (see 3.1.1).
- CEZ 2: Tree Crown Protection (see 3.1.2).
- CEZ 3: Tree Dominance (see 3.1.3).
- CEZ 4: New Tree Planting Zone (see 3.1.4).

The above CEZ's are explained further below.

3.1.1 CEZ 1: ROOT PROTECTION AREA (RPA)

The RPA, calculated in m^2, should be protected before and during any demolition/construction works. This ensures the effective retention of trees by preventing physical damage to (a) roots and (b) their rooting environment (typical problems - soil compaction; soil level changes and soil capping that can impede gaseous exchange to living roots*). The RPA is based on a radial measure from the centre of the tree stem, which is calculated by multiplying the stem diameter by a factor of twelve (or by a factor of ten when measuring basal diameter immediately above the root flare for multi-stemmed trees). With the AIA1, the RPA is only shown indicatively on the preliminary Tree Constraints Plan (TCP), as its shape may be subject to amendment as the design progresses.

During the AIA2, the derived radial measure is converted by the consulting Arborist into the actual area to be protected, having due regard to prevailing site conditions and how these may have affected the tree(s).
The means of protecting the RPA will include the installation of Tree Protection Fencing prior to the start of any demolition or construction work on site, the prohibition of various harmful activities within the RPA (e.g. mechanical excavation, soil stripping & trenching, fire lighting, materials storage and creating excessive sealed surfacing), and may include the use of temporary ground protection and/or special engineering solutions where construction is proposed near to retention trees or within the RPA.

* Roots must have oxygen for survival, growth and effective functioning.

3.1.2 CEZ 2: TREE CROWN PROTECTION ZONE

This is the area above ground occupied by the tree crown (branches) and considers the required demolition/construction working space necessary for the development. The possibility of an acceptable quantum of pruning may be considered: subject to Council permission/consent (see Section 4.1.1).

Arising from the above, the means of protecting CEZ 2 is likely to include providing an adequate separation distance between retention trees and new buildings. This will relate to the CEZ 3: below.

3.1.3 CEZ 3: TREE DOMINANCE ZONE

This is the area above ground dominated by the tree in relation to issues of shading, seasonal debris and the safety apprehension by the site owner/occupier. This area is assessed by considering the height and spread of the tree (now and in the future) relative to the proposed buildings, cross-referenced with the intended end-use. As such, what is assessed is the likely psychological effect of the tree(s) on the end-user.

The purpose of identifying CEZ 3 is to protect trees from post-development pressure by the site's end-users, who may, if resentful of the trees, seek to procure excessive pruning treatments (i.e. the bad practice of topping & lopping) or even to have them removed. This is a common Local Planning Authority (LPA) concern, which may lead to application withdrawals, refusals and/or dismissed Appeals.

The means of protecting CEZ 3 is likely to include optimising the site layout and room type (especially in relation to new residential dwellings), such that any adverse impacts of trees are reduced to an acceptable minimum. The key principle is to ensure adequate separation distances between trees and new buildings: notably with habitable space & primary windows.

3.1.4 CEZ 4: NEW PLANTING ZONE

In some cases, it may be appropriate to identify and protect areas intended for new landscape planting, which can fail to establish if the soil has been heavily compacted or contaminated during the demolition/construction process. The means of protecting CEZ 4 will either be by fencing prior to the start of construction/demolition works or by pre-planting soil remediation once construction has finished. Topsoil protection in areas destined for new planting is frequently an economic measure, saving on soil structure remediation and tree (failure) replacement costs.

4.0 STATUTORY CONTROLS

4.1 PLANNING LEGISLATION (TREES)

4.1.1 STATUTORY TREE PROTECTION

Trees can be protected in law – via Tree Preservation Orders (TPOs) or by virtue of them growing in a Conservation Area – by the Government's Town & Country Planning Act 1990. (the Act). Trees may also be protected by Planning Conditions. If any of these apply, written LPA

permission/consent is required before protected trees can be pruned or felled*. Contravention of the Act may carry a fine of up to £20,000 and a criminal record.

* Exceptions include those trees that are dead/hazardous or those that are causing an actionable nuisance to a third-party. In any event, evidence must be provided to defend the removal of such trees.

4.1.2 TREES ON/OFF SITE

We are advised that the site is not within a Conservation Area and that it contains no TPO'd trees. The neighbouring property at No. 68 Elsworthy Road is in a Conservation Area. This may have implications for any branches/roots that may ingress into the subject site.

4.2 WILDLIFE LEGISLATION

The Wildlife and Countryside Act (1981) Chapter 69 forms the basis for the legal wildlife protection in Great Britain. Amongst other protected flora and fauna, nesting birds and all species of bat are afforded statutory protection. In brief, it is an offence to:

- Intentionally kill, injure or take a bat.
- Sell, hire, barter or exchange a bat, dead or alive.
- Be in possession or control of a bat or anything derived from them.
- Disturb a nesting bird.

It is recommended that the client and/or their agent review the Act - http://www.jncc.gov.uk/page-3614 - for further information and guidance.

5.0 WILDLIFE HABITATS

A cursory assessment of wildlife habitat values of trees and hedgerows on the site was carried out during the survey. No protected or exceptional habitats were identified and details were not recorded. However, trees and hedgerows of most species provide valuable nesting sites for a wide range of birds and it is likely that nesting birds will be present on the site during the period March to September. We have not been made aware of the presence of roosting bats and have not identified any obvious signs of roost sites. However, this does not mean that roost sites are absent.

6.0 UNDERGROUND SERVICES

6.1 LOCATION

Locations of proposed underground services were not identified on the provided plans. These ***must not*** be sited within the Root Protection Area (RPA) of any retention trees. **NB** In any event these would likely be taken off the existing underground services.

7.0 No. 70 Elsworthy Road London NW3 3BP: TREE REPORT (to be read in conjunction with the appended Tree Protection Plan and Tree Survey)

7.1 THE PROPERTY AND THE DEVELOPMENT PROPOSAL

7.1.1 Site description: A large detached property set back from the road and accessed via a long brick-paved driveway. At the rear of the property this driveway opens out to provide a car parking area. The garden is largely laid to lawn. At the front of the site (towards the main road) there is a semi-detached cottage with a frontage area used for car parking. See trees in section 7.2 below.

7.1.2 The proposal: The application site comprises no.70 Elsworthy Road and its ancillary mews property located to the south. The latter was constructed to serve the former and both buildings are in the same ownership. The proposal is for the demolition of the existing building at 70 Elsworthy Road and the construction of a new property on the same site. It is not proposed to change the relationship between the main house and the mews; this will remain an ancillary

structure linked to the larger house by the basement. Importantly the existing driveway running alongside and to the rear of the main property would be removed and converted to garden space.

The location and detail of the proposed development and the positioning and numbering of the trees can be found plotted on the Tree Protection Plan at Appendix 2. **NB** The original of this plan was produced in colour – a monochrome copy should not be relied upon.

7.2 TREES ON-SITE

7.2.1 Running along the eastern side of the driveway there is an informal (3-4m high) hedge of mostly laurel that provides some useful screening from the adjacent properties. Within the site there are seven trees (dove tree T7; damson T8; yew T9; hazel T13, Himalayan cotoneaster T14 and two wild cherry trees: T19 & T20) only two of which have good B-grade crown form: T7 and T13. The remainder are average C grade trees.

7.3 TREES OFF-SITE

Firstly, the third-party cottage at the site frontage has a pear (T21) with B-grade crown form that provides significant public visual amenity as viewed from the road.

7.3.1 No 68 Elsworthy Road: Both the horse chestnuts T4 and T6 have good crown form and merit B grades. In contrast the lime T5 has a suppressed C-grade crown.

7.3.2 Property in Wadhams Gardens: The poplar T3 has been topped in the past but has regained good B-grade crown form. The hawthorn T23 and holly T24 are suppressed by the latter tree and only merit C grades.

7.3.3 Property in Avenue Road: There are a number of trees of merits with B-grade crown form. These include the cypress T10; whitebeam T11; magnolia T16; hornbeam T18; cherry T25 and the magnolia T26. The hawthorn T12; Himalayan cotoneaster T15; hornbeam T17 and the cherry T27 have either suppressed/unbalanced crowns and correspondingly merit low C grades.

7.3.4 Property to the rear of the subject site: The Lime T1 has been topped in the past and only merits a C grade. Likewise the Norway maple T2 has been lopped back (eastern crown section) and also only merits a C grade.

7.3.5 Elsworthy Road: The London plane T22 (street tree) has a unnatural topped form and correspondingly only merits a C grade.

7.4 IMPACT PROPOSAL ON TREES **(to be read in conjunction with the Tree Protection Plan - TPP - at Appendix 2 and the Arboricultural Method Statement at Appendix 3)**

7.4.1 CEZ 1: Root Protection Areas (RPAs)

The RPAs on trees T22 and T26 have squared-off and off-set away from either the road/ adjacent building as under such structures that would be unfavourable tree rooting conditions.

7.4.1.1 Footprint of the Proposed Build

Main Detached Property and Basement: There would be some minor incursion with the poplar T3 (approx. 6%). However, this incursion would be on the edge of T3 and would be compensated for by the removal of the existing driveway adjacent to this tree that would provide an additional tree-rooting area (open ground). See section 7.4.1.2 below.

Driveway: Trees T7 and T8 would require removal. Regardless of grade however these trees provide little if any public visual amenity (PVA {i.e. they cannot be viewed from the road}) and as such are internal trees within the immediate locale. The young cherry T19 would also require removal. There would be limited RPA incursion with the driveway for

T6 (2.3%). However, for a tree with good vitality we regard this incursion as acceptable. In contrast, the driveway section that ***incurs into the RPA of T21*** would require a no-dig construction using **Infra-Web (IW).** See appendix 4. **NB** The final finished level of the IW driveway section would need to *match-in* with new driveway coming in off the road.
A site specific installation Method Statement (MS) should be obtained from InfraGreen (www.infragreen-solutions.com) and the product installed in accordance with this MS.

Also associated with these new driveway works T20 would be fenced-off. Due to the restricted space this tree would be fenced-off using braced heavy-duty ply-board sheeting. See also T22 below.

* Infra-Web Tree Root Protection System: 150mm deep - see Appendix 4.

Basement: This would require the removal of T9 and T13 inclusive of T14 to provide adequate space for construction activity.

7.4.1.2 Construction Activity
Removal of the existing drive: The block-pavers and any underlying foundation layer within the CEZ areas adjacent to trees T1-T3, T21, T23 & T24 would be taken up with a mini-JCB reversing backwards to expose the underlying soil. Immediately after the driveway section has been taken up within these areas they would be fenced-off using staked Tree Protection Barriers (see below).

Tree Protection Barriers (TPBs). As per the appended Tree Protection Plan, if *temporary* staked TPBs are installed – to establish Construction Exclusion Zones at the front and the rear - this would afford adequate RPA protection for all retention trees. See appendix 5. Due to restricted space those barriers adjacent to T21 would be booted & ***clamped together*** so they cannot be moved. The trunk of the street tree T22 would also be protected during the development works using braced heavy-duty ply-board sheeting. See photo at the end of the report narrative.

Storage of Machinery & Materials: Please refer to Camden Council *Construction Management Plan* and specifically the detail below provided* to address Q25 (pg. 10):

> "The selected Contractors will be asked to develop their plan in this regard so that all deliveries and removal of excavated materials will be managed within the confines of the site. If there are unusual circumstances while the site is excavated below the existing Mews House the Contractor will be asked to develop specific plans for this temporary period."

* Martin Macro of HB surveyors and valuers (martin.macro@hbsv.com)

7.4.2 CEZ 2: Tree Crown Protection Zones

Construction Vehicle Site Access (access facilitation pruning)

The site is open so there would be no such issues with this proposal. There are two (minor) exceptions: (a) one small low branch (30cm dia.) on T5 extending out over the driveway would require tipping back to the site boundary and (b) the two low branches (50cm dia.) would also require tipping back to the site boundary. This would be to provide for construction vehicle access and space for demolition. **NB** These pruning works are minor.

7.4.3 CEZ 3: Tree Dominance Zones

There would be no such issues with this proposal.

7.4.4 CEZ 4: New Tree Planting Zone

There would be no such issues with this proposal.

7.5 TREE PROTECTION DURING CONSTRUCTION

7.5.1 Tree Protection: The protection of retention trees is ***paramount*** to the granting of planning permission, the discharge of tree protection Planning Conditions, the design of the development and the future health, stability and success of the trees. It is widely recognised that mature trees add value to both land and property values.

7.5.2 The Root Protection Area (RPA): RPAs around retention trees should be maintained by the erection of a *temporary* tree protection barrier (TPB) as described at Appendix 5 to this report. The position and extent for the TPB will normally concur with the radius/squared area of the RPA. This staked-off area shall be known as the **Construction Exclusion Zone** (CEZ). The integrity of the TPB to protect **CEZs** should be maintained for the duration of the entire development works. The **CEZ(s)** are marked-up on the appended Tree Protection Plan.

7.6 ARBORICULTURAL METHOD STATEMENT

7.6.1 Purpose & Use

In consideration of the above issues, we have included an Arboricultural Method Statement (AMS) at Appendix 3, which details working methods in relation to trees. This AMS lays down the methodology for any demolition and/or construction works that may have an effect upon trees on and adjacent to this site. It is essential within the scope of any contracts - related to this development - that this AMS is observed and adhered to. It is recommended that this document forms part of the work schedule and that specifications are issued to the building contractor(s) and these should be used to form part of their contract.

7.6.2 Site Supervision

An individual – ideally the Site Agent - must be nominated to be responsible for all arboricultural matters on site. This person must:

- be present on site for the majority of the time;
- be aware of (a) the Tree Protection Plan and (b) the tree protection measures to be installed and maintained throughout the build;
- have the authority to stop any work that is causing, or has the potential to cause, harm to any retention trees;
- be responsible for ensuring that all site operatives are aware of their responsibilities toward on/off site trees and the consequences of the failure to observe these responsibilities;
- make immediate contact with the designated Consulting Arborist (contact number listed on the appended AMS) in the event of any tree related problems occurring, whether actual or potential.

7.6.3 AMS Adoption

If conflicts between any part of a tree and the build arise in the course of the development these can – and should be – resolved quickly and at little costs if a qualified and experienced Consulting Arborist is contacted promptly. Lack of such care will likely lead to the decline and even death of affected trees: often with legal ramifications. The loss or damage to retention trees can spoil design, affect site sale ability and reflects badly on the construction and design personnel involved. Conversely, trees that have received careful handling during construction add considerably to the appeal and value of the finished development. **NB** Failure to comply with the requirements of the AMS may result in a breach of a condition notice(s) and/or the suspension of work on site.

8.0 CONCLUSIONS

8.1 DEVELOPMENT PROPOSAL & POTENTIAL IMPACT ON TREES

8.1.1 The development would require the removal of trees T7-T9, T13, T14 and T19. These are internal trees within the immediate locale and provide little if any public visual amenity (i.e. they cannot be viewed from the road). In addition, minor tree works would be required on T5 and T3 for construction vehicle access and to provide construction space.

8.1.2 As plotted on the Tree Protection Plan at Appendix 2, if the tree protection measures and Construction Exclusion Zones specified in this report are implemented in a timely manner there should be no CEZ 1 (RPA) impact on the retention trees.

8.1.3 There are no CEZ 2, CEZ 3 or CEZ 4 issues with this application.

8.1.4 See Arboricultural Method Statement at Appendix 3. Active random monitoring by a Consulting Arborist throughout the development process is strongly recommended (AIA3: Phase 3).

9.0 RECOMMENDATIONS

9.1 EXECUTION OF CONTRACT

It is recommended that the Architect specifies in writing to the building contractor that tree care conditions apply to the execution of the contract. Lack of care frequently results in the damage, decline and eventual death of trees. This can adversely affect design aims & site sale-ability, and reflects poorly on the contractors and design personnel involved. Trees that have been the recipients of careful handling during construction add considerably to the appeal and value of finished developments.

9.2 PROPOSED REVISIONS TO THE SCHEME

We advise that all proposed revisions in respect of external layout, orientation of primary windows, location of underground services, external surfacing and/or landscaping; having implications for retention trees should be referred to us for review.

9.3 TREE WORKS - BEST PRACTICE

Subject to LPA written permission/consent (if applicable - see section 4.1.2), all tree works must conform rigorously to *BS 3998 (2010)* 'Recommendations for Tree Work'* and as modified by research more recent.

All retention trees should be inspected annually by an Arboriculturist to assess the significance of any future physiological, morphological or environmental changes.

* Including any subsequent revisions.

9.4 WILDLIFE CONSIDERATIONS

Trees and hedgerows should be carefully inspected for birds' nests prior to tree pruning or removal and any work likely to destroy or disturb active nests should be avoided until the young birds have fledged, unless however, the trees pose an immediate danger (advice should be sought from the relevant wildlife authorities).

All personnel working with or in trees should be vigilant and mindful of the possible presence of roosting bats. A competent ecologist should investigate any indication that trees on the site are used as bat roosts.

9.5 OUTDOOR AMENITY SPACE

Design of outdoor amenity space should fully consider the locations of existing trees to be retained. Alterations of soil levels and cultivation of ground beneath trees (the RPA) can result in significant root loss or damage and altered drainage patterns, which could lead to a decline in tree health and possible (tree) structural instability. Removal of existing herbaceous vegetation, by hand or appropriate herbicide application* and addition of a thin layer (100-150mm) of sandy-loam topsoil will facilitate the establishment of grass or other vegetation beneath the canopies of existing trees, whilst avoiding unnecessary root disturbance.

* The selection & application of herbicides must be undertaken by a competent person in accordance with the Control of Substances Hazardous to Health (COSHH) regulations. Inappropriate use of herbicides can damage/ kill leaves, shoots, branches or whole trees.

9.5.1 In order to avoid mower/strimmer damage to the base on tree trunks (i.e. bark stripping), grass seed/turf ***should not*** be laid within a 0.5m (min.) radius around trees.

9.5.2 With respect to any hard/soft landscaping works, there should only be limited soil excavation/cultivation works (max. depth 150mm) within the retention tree RPAs.

10.0 OCCUPIERS LIABILITY ACTS

Attention is drawn to the provisions of the Occupiers liability Acts (England & Wales - 1957 & 1984), which place a responsibility upon landowners to ensure the safety of others entering their land whether by invitation or permission: inclusive of trespassers. There is a special responsibility to ensure the safety of children, who may be unaware of hazards. Annual inspections of trees by a competent person, or following storm events, together with implementation of any remedial tree work recommendations, should ensure compliance with the legislation regarding the above legislation.

11.0 REFERENCES

- *BS 5837; 2012 'Trees in relation to design, demolition and construction - Recommendations'* British Standards Institute, London
- *BS 3998; 2010 'Tree Work Recommendations'* British Standards Institute, London
- *'NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees' 2007* National Joint Utilities Group (NJUG) Volume No. 4: No. 1.
- Arboricultural Practice Note 12; 2007 – AAIS
- *'Availability of Sunshine' BRE - CP 75/75*
- *'Tree Roots in the Built Environment'* 2006 - Dept. for Communities & Local Government (DCLG).
- *'Up by Roots: healthy soils & trees in the built environment'* 2008 James Urban, International Society of Arboriculture.
- *'Arboriculture';* 1999 3rd edition R. Harris, J. Clarke & N. Matheny. Prentice Hall.

Photo to show the braced heavy-duty ply-board sheeting to be used around T20 and T22

Russell Ball BSc. (Hons.), P.G. Dip. LM, CBiol., MSB.
Technical Director: Arbol EuroConsulting Ltd.
Institute of Biology **Chartered Biologist**
LANTRA Approved **Professional Tree Inspector** (Ref: HO00178227 504187)
International Society of Arboriculture **Qualified Tree Risk Assessor** (ID: 2148)

Tel. 0208 863 8151
Mobile: 078844 26671
Email: russell@arboleuro.co.uk
http://www.arboleuro.co.uk/

Consulting Arborist Society.com
PROFESSIONAL MEMBER

APPENDIX 1

TREE SURVEY SCHEDULE
(see appended at end of report)
5 pages

HEADINGS & ABBREVIATIONS

TREE NO.	REFERENCE NUMBER. REFER TO PLAN OR NUMBERED TAGS WHERE APPLICABLE
SPECIES:	COMMON NAME (LATIN NAMES AVAILABLE ON REQUEST)
AGE RANGE/LIFE STAGE:	Y = YOUNG, SM = SEMI MATURE, EM = EARLY MATURE, M = MATURE, PM = POST MATURE
HEIGHT:	ESTIMATED AND RECORDED IN METRES. APPROXIMATELY 1 IN 10 TREES ARE MEASURED USING A CLINOMETER AND THE REMAINDER ESTIMATED AGAINST THE MEASURED TREES
CROWN SPREAD:	MAXIMUM CROWN RADIUS MEASURED TO THE FOUR CARDINAL COMPASS POINTS FOR SINGLE SPECIMENS ONLY (MEASUREMENT FOR TREE GROUPS - MAXIMUM RADIUS OF THE GROUP)
CROWN CLEARANCE &DIRECTION OF GROWTH:	HEIGHT IN METERS OF CROWN CLEARANCE ABOVE ADJACENT GROUND LEVEL (TO INFORM ON GROUND CLEARANCE, CROWN/STEM RATIO AND SHADING)
STEM DIA/MULTI-STEM DIA:	STEM DIAMETER - MEASURED AT APPROXIMATELY 1.5 METRES ABOVE GROUND LEVEL OR A COMBINATION OF STEMS FOR MULTI-STEMMED TREES
VITALITY:	A MEASURE OF PHYSIOLOGICAL CONDITION. D = DEAD, MD = MORIBUND, P = POOR, M = MODERATE, G = GOOD
ESTIMATED REMAINING CONTRIBUTION:	RELATIVE USEFUL LIFE EXPECTANCY (YEARS)
BS 5837CATEGORY & SUB-CATEGORY GRADING:	A = HIGH QUALITY AND VALUE, B = MODERATE QUALITY AND VALUE, C = LOW QUALITY AND VALUE, U = UNSUITABLE FOR RETENTION: SUB-CATEGORY REFERS TO ARBORICULTURAL (1), LANDSCAPE (2) & CULTURAL/CONSERVATION VALUES (3).
BS 5837 RPA:	ROOT PROTECTION AREA - BS 5837 (2012) ANNEX D (THE RECOMMENDATIONS STATE THAT THE RPA SHOULD BE CAPPED AT 707 M^2)
BS 5837 RADIUS:	PROTECTIVE DISTANCE - RADIUS FROM THE CENTRE OF THE STEM TO THE LINE OF TREE PROTECTION (CONSTRUCTION EXCLUSION ZONE - CEZ) AND PROTECTIVE BARRIER

SITE:	70 ELSWORTHY ROAD LONDON NW3 3BP
CLIENT:	MR R. BEECHAM
BRIEF:	CARRY OUT A PHASE II ARBORICULTURAL IMPACT ASSESSMENT ON THE PROPOSED DEVELOPMENT AT THE ABOVE SITE.

SURVEYOR:	R. BALL
ASSESSMENT DATE:	12/05/2015
VIEWING CONDITIONS:	SUNNY - CLEAR
JOB REFERENCE:	798

TREE HEDGE GROUP NO.	SPECIES (COMMON NAME)	AGE RANGE/ LIFE STAGE	HEIGHT (m)	RADIAL CROWN SPREAD (m) N	E	S	W	CROWN CLEARANCE & DIRECTION OF GROWTH (m)	STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS/STRUCTURAL MORPHOLOGY	PRELIMINARY MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RPA RADIUS (m)	BS 5837 RPA (m^2)
T1	Common Lime *Third-party tree with no access to fully survey*	EM	18	3	2.5	3.5	3	? See access	Est 400	G	• Topped: poor crown form	? See access	C2(?) See access	4.8	72.3
T2	Norway Maple *Third-party tree with no access to fully survey*	EM	19	4	3	4	4	? See access	Est 450	G	• Crown has been lopped back on eastern side: poor crown form	? See access	C2(?) See access	5.4	91.6
T3	Hybrid Black Poplar *Third-party tree with no access to fully survey*	M	26+	11	10	9	7	? See access	Est 800	G	• Topped in past but has regained good crown form: focal trees in the immediate locale	? See access	B2(?) See access	9.6	289.5
T4	Horse Chestnut *Third-party tree with no access to fully survey*	M	24+	9	9	9	8	? See access	Est 700	G	• Well-balanced crown	? See access	B2(?) See access	8.4	221.6
T5	Common Lime	SM	15	3.5	3.5	2.5	3.5	? See access	Est 350	G	• Suppressed by T6 on south side	? See access	C2 (?) See access	4.2	55.4
T6	Horse Chestnut *Third-party tree with no access to fully survey*	EM	16	3.5	3.5	4	3.5	? See access	Est 400	G	• Dominate tree with good crown form	? See access	B2(?) See access	4.8	72.3

SITE:	70 ELSWORTHY ROAD LONDON NW3 3BP
CLIENT:	MR R. BEECHAM
BRIEF:	TO CARRY OUT AN ARBORICULTURAL IMPACT ASSESSMENT (PHASE 2 - SUBMISSION DOCUMENT)

SURVEYOR:	R. BALL
ASSESSMENT DATE:	12/05/2015
VIEWING CONDITIONS:	SUNNY - CLEAR
JOB REFERENCE:	798

TREE HEDGE GROUP NO.	SPECIES (COMMON NAME)	AGE RANGE/ LIFE STAGE	HEIGHT (m)	RADIAL CROWN SPREAD (m) N	E	S	W	CROWN CLEARANCE & DIRECTION OF GROWTH (m)	STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS/STRUCTURAL MORPHOLOGY	PRELIMINARY MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RPA RADIUS (m)	BS 5837 RPA (m^2)
T7	Dove Tree *Third-party tree with no access to fully survey*	SM	7.5	2	2	1.7	2	1.4	* 36; 95; 20	G	• Good crown form	None at Time of Survey (NATS)	B2	1.2	4.8
T8	Damson	EM	12	2	2	2	2	1.9	* 128; 110; 50	M	• Average crown (sparse) crown. Hanger in mid western crown	Remove hanger	C2	2.1	14.02
T9	Yew	SM	5.5	0.9	0.9	0.9	0.9	-	* 50; 40; 30; 30	G	• Insignificant tree	NATS	C2	0.9	2.6
T10	Leyland Cypress *Third-party tree with no access to fully survey*	SM	17	3.5	3.5	3.5	3.5	? See access	Est 350	G	• Good form	? See access	C2(?)	4.2	55.4
T11	Swedish Whitebean *Third-party tree with no access to fully survey*	EM	18	4.5	4.5	5	5	? See access	Est 450	G	• Good form	? See access	B2(?)	5.4	91.6

SITE:	70 ELSWORTHY ROAD LONDON NW3 3BP
CLIENT:	MR R. BEECHAM
BRIEF:	TO CARRY OUT AN ARBORICULTURAL IMPACT ASSESSMENT (PHASE 2 - SUBMISSION DOCUMENT)

SURVEYOR:	R. BALL
ASSESSMENT DATE:	12/05/2015
VIEWING CONDITIONS:	SUNNY - CLEAR
JOB REFERENCE:	798

TREE HEDGE GROUP NO.	SPECIES (COMMON NAME)	AGE RANGE/ LIFE STAGE	HEIGHT (m)	RADIAL CROWN SPREAD (m) N	E	S	W	CROWN CLEARANCE & DIRECTION OF GROWTH (m)	STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS/STRUCTURAL MORPHOLOGY	PRELIMINARY MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RPA RADIUS (m)	BS 5837 RPA (m^2)
T12	Midland Hawthorn *Third-party tree with no access to fully survey*	EM	7.5	2.5	1.8	2.5	2.5	? See access	Est 120 x4	G	• Suppressed by T13	? See access	C2(?)	2.8	26.1
T13	Hazel	EM	8.5	4	3.5	3	2.2	1.4	* 80 x3; 110 x2; 50 x4	G	• Good crown form	NATS	B2	2.6	21.9
T14	Himalayan Cotoneaster	SM	8.5	1.7	2.5	2.2	1.8	2.5	150	G	• Unbalanced crown	NATS	C2	1.8	10.1
T15	Himalayan Cotoneaster *Third-party tree with no access to fully survey*	EM	3	1.9	1.9	1.9	1.9	? See access	Est 120 x 3	M	• Sparse unbalanced crown	? See access	C2(?)	2.4	19.5
T16	Magnolia *Third-party tree with no access to fully survey*	M	12	4.5	4.5	4.5	4.5	? See access	Est 480	G	• Good form	? See access	B2(?) See access	5.7	104.2
T17	Bird Cherry *Third-party tree with no access to fully survey*	EM	16	7	4	3	4	? See access	420	G	• Unbalanced crown form: suppressed by T18	? See access	C2(?) See access	5.04	79.8

SITE:	70 ELSWORTHY ROAD LONDON NW3 3BP
CLIENT:	MR R. BEECHAM
BRIEF:	TO CARRY OUT AN ARBORICULTURAL IMPACT ASSESSMENT (PHASE 2 - SUBMISSION DOCUMENT)

SURVEYOR:	R. BALL
ASSESSMENT DATE:	12/05/2015
VIEWING CONDITIONS:	SUNNY - CLEAR
JOB REFERENCE:	798

TREE HEDGE GROUP NO.	SPECIES (COMMON NAME)	AGE RANGE/ LIFE STAGE	HEIGHT (m)	RADIAL CROWN SPREAD (m) N	E	S	W	CROWN CLEARANCE & DIRECTION OF GROWTH (m)	STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS/STRUCTURAL MORPHOLOGY	PRELIMINARY MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RPA RADIUS (m)	BS 5837 RPA (m^2)
T18	Hornbeam *Third-party tree with no access to fully survey*	EM	18	4.5	4.5	4.5	4.5	? See access	Est 480	G	• Dominate tree with good crown form	? See access	B2(?) See access	5.7	104.2
T19	Wild Cherry	Y	6	1.5	1	2.4	1	2.2	75	G	• Could be moved & replaced elsewhere on site	NATS	C2	0.9	2.5
T20	Wild Cherry	Y	5.5	1.5	1	1	1	2.2	75	G	• Could be moved & replaced elsewhere on site	NATS	C2	0.9	2.5
T21	Pear *Third-party tree with no access to fully survey*	EM	14	4.5	3	3.5	3	? See access	Est 350	G	• Tree with good crown form	? See access	B2(?)	4.2	55.4
T22	London Plane *Street tree*	EM	17	4	4	4	4	9	545	G	• Unnatural topped form	NATS	C2	6.5	134.3
T23	Midland Hawthorn *Third-party tree with no access to fully survey*	EM	12	2	2	2	3	? See access	Est 300	M	• Suppressed crown form	? See access	C2(?) See access	3.6	40.7

SITE:	70 ELSWORTHY ROAD LONDON NW3 3BP
CLIENT:	MR R. BEECHAM
BRIEF:	TO CARRY OUT AN ARBORICULTURAL IMPACT ASSESSMENT (PHASE 2 - SUBMISSION DOCUMENT)

SURVEYOR:	R. BALL
ASSESSMENT DATE:	12/05/2015
VIEWING CONDITIONS:	SUNNY - CLEAR
JOB REFERENCE:	798

TREE HEDGE GROUP NO.	SPECIES (COMMON NAME)	AGE RANGE/ LIFE STAGE	HEIGHT (m)	RADIAL CROWN SPREAD (m) N	E	S	W	CROWN CLEARANCE & DIRECTION OF GROWTH (m)	STEM/ MULTI-STEM* DIA. (mm)	VITALITY	COMMENTS/STRUCTURAL MORPHOLOGY	PRELIMINARY MANAGEMENT	CATEGORY & SUB-CATEGORY GRADING BS 5837	BS 5837 RPA RADIUS (m)	BS 5837 RPA (m^2)
T24	Holly *Third-party tree with no access to fully survey*	EM	13	4	3	3	3	? See access	Est. 350	G	• Suppressed crown form	? See access	C2(?) See access	4.2	55.4
T25	Wild Cherry *Third-party tree with no access to fully survey*	EM	11	2.7	2.7	2.7	2.7	3	Est. * 90; 120	G	• Good well-balanced crown form	? See access	B2(?) See access	1.8	10.1
T26	Magnolia *Third-party tree with no access to fully survey*	EM	12	3.0	3.0	3.0	3.0	3	Est. 320	G	• Good well-balanced crown form	? See access	B2(?) See access	3.8	46.3
T27	Wild Cherry *Third-party tree with no access to fully survey*	SM	9	1.9	1.9	1.9	1.9	3	Est. 220	G	• Suppressed crown form	? See access	C2(?) See access	2.6	21.9

APPENDIX 2

TREE PROTECTION PLAN

NB The original of this plan was produced in colour – a monochrome copy should not be relied upon.

(see appended to report)

1 page only

NOTES
1. Trees T7-T9, T13, T14 & T19 have been removed off plan to facilitate development
2. The existing buildings are shaded in gray with the proposed build detail overlaid
3. The existing driveway is shaded in green and the proposed driveway outlined in light blue.
4. The proposed basement is outlined in blue.
5. The block-pavers and any underlying foundation layer within the CEZ areas adjacent to trees T1-T3, T21, T23 & T24 to be taken up with a mini-JCB reversing backwards to expose the underlying soil. Immediately after these areas must be fenced-off using staked Tree Protection Barriers. Due to restricted space those barriers adjacent to T21 could be booted & clamped together so they cannot be moved.
6. This section of driveway within the RPA incursion of T21 must be constructed using a Infra-Web system with a depth of 150mm.
7. The RPA on T22 & T26 have been squared-off and off-set away from the road/building under which there would be unfavourable tree rooting conditions.

Arbol EuroConsulting

48 Risingholme Road, Harrow, HA3 7ER
Tel: 0208 863 8151 MoB: 07884426671

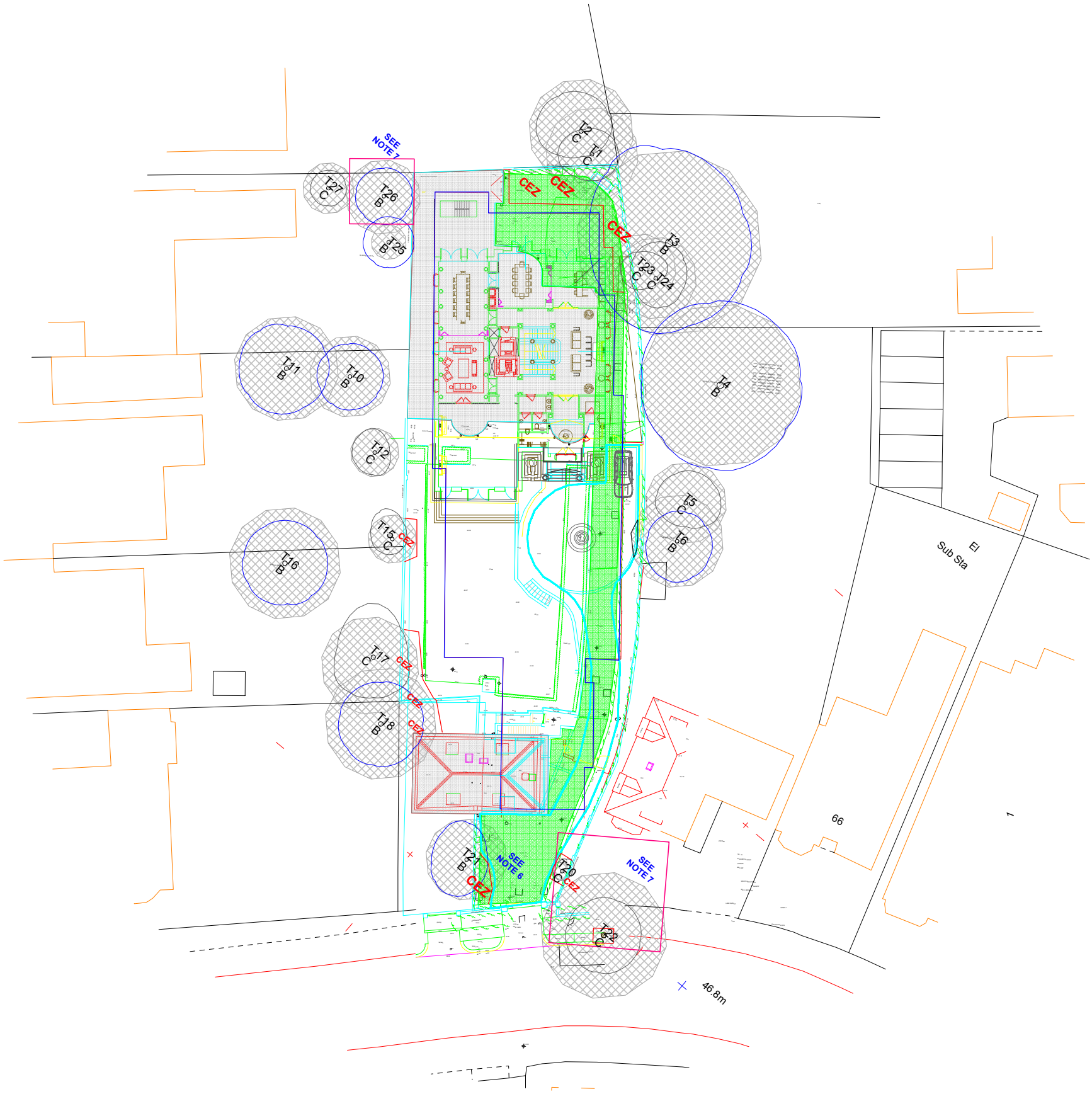
70 Elsworthy Road London NW3
TREE PROTECTION PLAN

SCALE :	DATE :
1:500 @ A3	8/5/2015

MAP FILENAME : 798

N

The original of this drawing was produced in colour - a monochrome copy should not be relied upon



THIS TREE PROTECTION PLAN MUST BE READ IN CONJUNCTION WITH THE ARBORICULTURAL METHOD STATEMENT THAT ACCOMPANIES THE TREE REPORT

5m 10m 15m 20m
SCALE BAR

KEY

- Root Protection Area (RPA)
- Crown Spread
- BS: 5837 Retention Grade
- Temporary Staked Tree Protection Barrier (TPB)

CEZ = Construction Exclusion Zone

NOTES
1. The RPA on T22 & T26 have been squared-off and off-set away from the road/building under which there would be unfavourable tree rooting conditions.

Arbol EuroConsulting

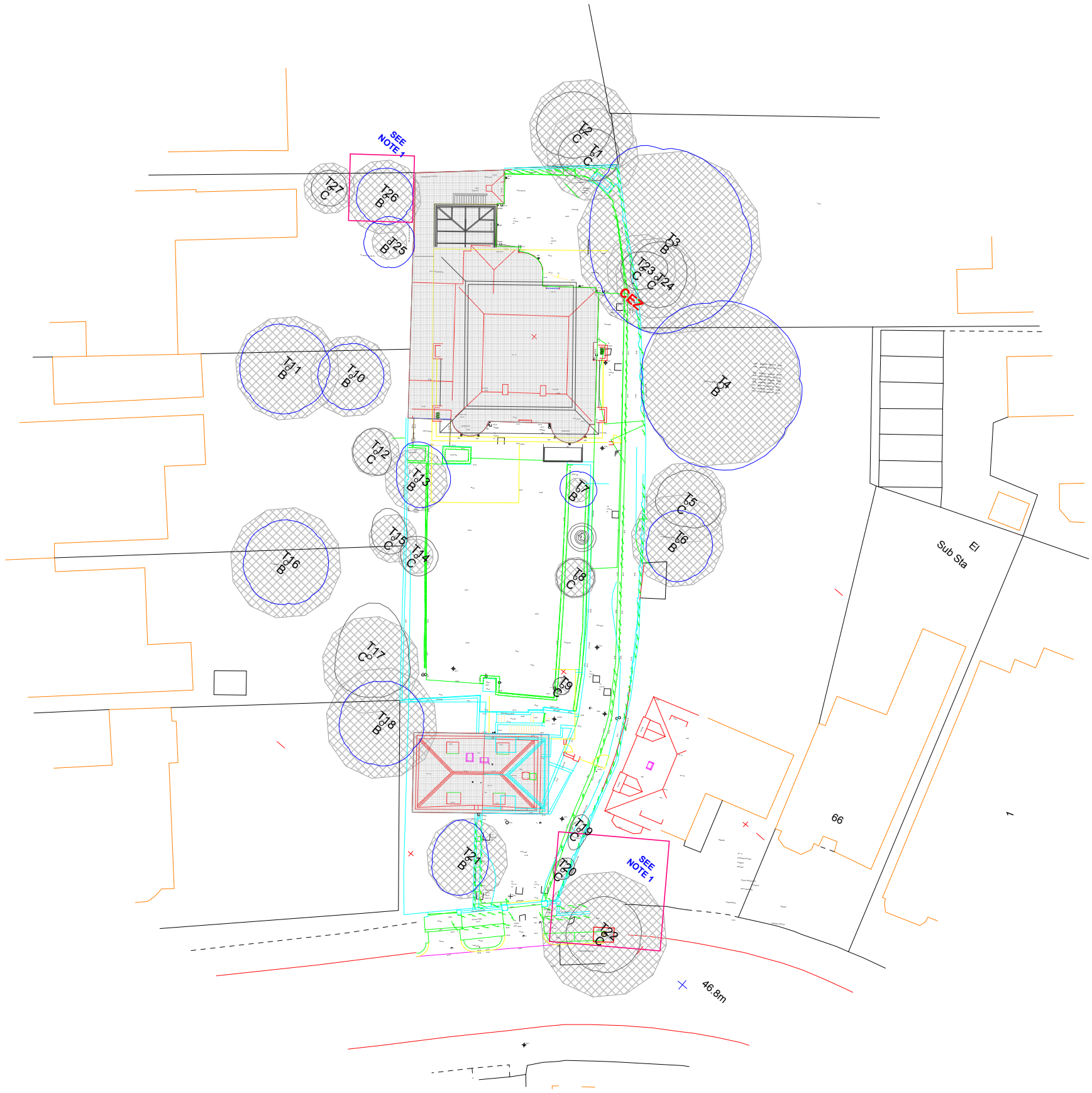
48 Risingholme Road, Harrow, HA3 7ER
Tel: 0208 863 8151 MoB: 07884426671

70 Elsworthy Road London NW3
TREE CONSTRAINTS PLAN

SCALE :	DATE :
1:500 @ A3	8/4/2015

MAP FILENAME : 798

The original of this drawing was produced in colour - a monochrome copy should not be relied upon



KEY

Root Protection Area (RPA)
Crown Spread
BS: 5837 Retention Grade

5m 10m 15m 20m
SCALE BAR

APPENDIX 3

ARBORICULTURAL METHOD STATEMENT

X pages

ARBORICULTURAL METHOD STATEMENT

Site: 70 Elsworthy Road London NW3 3BP

To be read in conjunction with the Tree Report sections 6-8 and Tree Protection Plan at Appendix 2.

NB The original of this plan was produced in colour – a monochrome copy should not be relied upon.

This AMS lays down the methodology for any demolition and/or construction works that may have an effect upon trees on and adjacent to this site. It is essential within the scope of any contracts - related to this development - that this AMS is observed and adhered to. It is recommended that this document forms part of the work schedule and that specifications are issued to the building contractor(s) and these must be used to form part of their contract.

Consulting Arborist contact details: Russell Ball – mob. No. 078844 26671

SEQUENCE OF WORKS

From commencement of the subject development, the following methodology will be implemented in the manner and sequence described:

1. Pre-contract site meeting.
2. Arboricultural pruning and felling works.
3. Erect *temporary* staked Tree Protection Barriers (TPB) to establish the fenced-off Construction Exclusion Zones (CEZ): ***before*** any demolition and/or construction works begin on-site.
4. Main construction works.
5. Infra-Web Tree Root Protection System.
6. Remove TPBs.

1. PRE-CONTRACT SITE MEETING

To outline on-site working methods in relation to trees prior to any demolition and/or construction activity, a site meeting of the following shall take place:

- Client
- Architect/Planning Consultant
- Structural Engineer
- Main Contractor
- LPA Arboricultural Officer (*optional)*
- Consulting Arborist
- Site Agent

2. ARBORICULTURAL PRUNING AND/OR FELLING WORKS

1. Before the erection of the *temporary* Tree Protection Barriers (see below): (a) remove trees: T7-T9, T13, T14 & T19 and (b) tip back to the site boundary one small low branch (30cm dia.) on T5 extending out over the driveway and (b) the two low branches (50cm dia.) on T3. This will provide for construction vehicle access and space for demolition. This pruning will be subject to written consent from the Local Planning Authority (Council) as these trees are sited in a Conservation Area.
2. All operatives must be equipped with and use personal protective equipment (PPE) in accordance with current Health & Safety Executive current directives and industry codes of practice.
3. Performance of all arboricultural operations and use of equipment must be in accordance with current Health & Safety Executive current directives and industry codes of practice.

3. ERECT *TEMPORARY* STAKED TREE PROTECTION BARRIERS (TPB)

1. Prior to any demolition and/or construction, the block-pavers and any underlying foundation layer within the CEZ areas adjacent to trees T1-T3, T21, T23 & T24 must be taken up with a mini-JCB reversing backwards to expose the underlying soil. Immediately after these areas must be fenced-off using staked Tree Protection Barriers.
2. Immediately following the removal of the above driveway sections the main contractor will erect the TPB as per the appended Tree Protection Plan (TPP) and as detailed in the *'Tree Protection Barrier Specification'* at Appendix 5 of this report. See also Appendix MS(i) below. This will establish the fenced-off **Construction Exclusion Zones**: CEZs (marked up on the TPP). **NB** Due to restricted space those barriers adjacent to T21 must be booted & clamped together so they cannot be moved.

3. The trunk (base) of the street tree T22 must also be protected during the development works using heavy-duty ply-board sheeting: see photo below. The cherry T20 must also be protected using the same method.
4. Prior to commencement of any site demolition, construction, preparation, excavation or material deliveries, the Consulting Arborist will inspect installation of the TPB and the CEZs. Any damage occurring to the TPB during the demolition or construction phase will be made good by the main contractor.

4. MAIN CONSTRUCTION WORKS

1. Before commencing work on site, all operatives must be briefed by the **Site Agent/Contract Manager** on the importance of protecting both on and off-site trees. The basis of this briefing will be the protection measures as set out on the Tree Protection Plan (TPP) including the position of staked **Tree Protection Barriers** and **Construction Exclusion Zones**. As such the TPP shall be clearly displayed on the wall of the site hut/office. The responsibility for all the above rests with the **Site Agent**.
2. There must be no storage of construction material, site parking, site huts/offices or equipment in any area designated as the Construction Exclusion Zone (CEZ) and enclosed by the TPB.

5. NEW DRIVEWAY: INFRA-WEB TREE ROOT PROTECTION SYSTEM

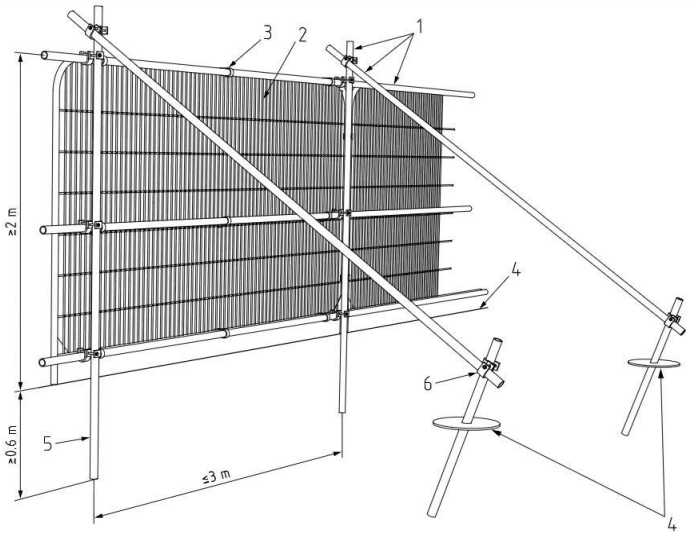
1. The driveway section adjacent to T21 requires a no-dig construction using **Infra-Web (IW).** See appendix 4. **NB** The final finished level of this IW driveway section must *match-in* with new driveway coming in off the road. In this instance the IW System must be 150mm deep for the load-bearing of fire tenders, removal Vehicles and dust carts up to 20 tons. See Appendix 4.

6. REMOVAL OF *TEMPORARY* TREE PROTECTION BARRIERS (TPB)

1. The TPB will be removed only upon completion of the construction works.

APPENDIX MS(i)

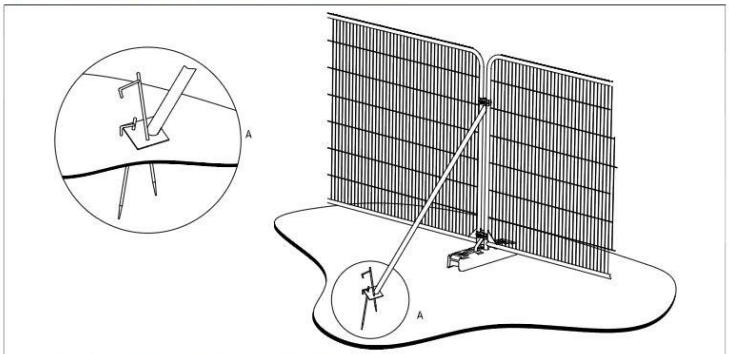
Figure 2 **Default specification for protective barrier**



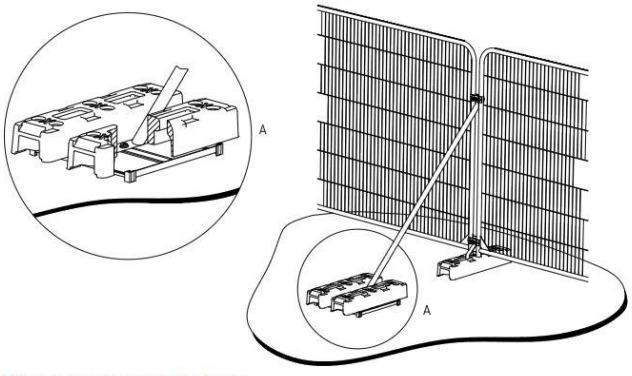
Key

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

Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

APPENDIX 4

INFRA-WEB TREE ROOT PROTECTION SYSTEM

(3 Pages)

Method Statement for the installation of InfraWeb Tree Root Protection System for building vehicular access paths above the RPA's of existing trees.

Introduction

The InfraWeb Tree Root Protection System is a combination of a 3 dimensional cellular confinement system, separation and filter geotextiles and a specific grade of granular material. This document should be read in conjunction with the appropriate section drawing for the specified system, to ensure the correct installation is achieved. InfraWeb conforms to the original specification for 3 dimensional cellular confinement systems as detailed by the US Corps of Engineers.

The system is available in 5 depths for varying traffic loadings but each site should have a specific design detailed to ensure the correct depth of product is used.

However, unless the existing ground conditions are very soft and have a low CBR then the following can apply:

- **50mm deep InfraWeb for Pedestrians and Cycleways, non vehicular traffic.**
- **75mm deep InfraWeb for Pedestrians, Cycleways and vehicles up to 1.5 tons**
- **100mm deep InfraWeb for Cars, 4 Wheel Drives, Vans etc up to 6 tons**
- **150mm deep InfraWeb for Fire Tenders, Removal Vehicles and Dust Carts up to 20 tons**
- **200mm deep InfraWeb for construction vehicles, cranes etc 40 tons and above**

No Dig System.

The InfraWeb is a no dig Tree Root Protection System, however, some preparation of the existing formation may be required prior to installation.

System Components

- **InfraWeb 3 Dimensional Cellular Confinement System**
- **Permatex 300 Separation Geotextile**
- **Permatex 200 Separation Geotextile (depending on surface finish)**
- **InfraWeb Staking Pins**
- **InfraWeb Stapler and Staples**
- **4/20mm or 40/20mm Clean angular stone to Bs EN 13242 and 12620.**
- **Surfacing Materials.**

Ground Preparation.

- Remove surface vegetation by hand or with suitable herbicide.
- Fill any hollows in the exposed ground with sharp sand or 4/20mm or 40/20mm clean angular stone.
- Place Permatex 300 Geotextile over the area to be protected ensuring laps are a minimum of 300mm

InfraWeb Cellular Confinement System.

- Place the collapsed panel on the geotextile and pin through 3 cells across the 2.42m orientation using InfraWeb staking pins. (See diagram in appendix 1)
- Expand the panel to its full length of 8.7m and pin across the opposite panel end using InfraWeb staking pins.
- Pin along the length of the panel with 2 pins on each side using InfraWeb staking pins.

- If full panels are not being used then ensure the cells have been expanded to their full dimension.
- Staple any adjacent panels together using the Infraweb stapler and staples. (stapling detail enclosed in appendix 1)
- The InfraWeb panels can be cut to shape if required with a heavy duty Stanley Knife

Filling the InfraWeb.
The correct specification of the granular infill is vital to the long term performance of the system. Use only 4/20mm or 40/20mm clean angular stone to Bs EN 13242 and 12620 (depending on cell depth being used)

- Fill the pockets of the InfraWeb with a 4/20mm or 40/20mm clean angular stone.
- Allow for any settlement of the stone in the cells and top up if necessary.
- Slightly surcharge the Infraweb with 4/20mm or 40/20mm clean angular stone if the area is to be trafficked immediately.

Surfacing Details.
The Infraweb TRP system can be surfaced with the materials listed below. Porous systems will be of greater benefit for the trees, however it is understood that this is not always possible.

Block Paving

- Place Permatex 200 separation fabric over the filled InfraWeb.
- Lay sand / gravel bedding material as per manufacturer's recommendations.
- Place porous / standard blocks as per manufacturer's instructions.

Porous and Standard Ashalt.

- Slightly surcharge the InfraWeb with 25mm of 4/20mm or 40/20mm clean angular stone.
- Place hot Asphalt as per manufacturer's instructions.

Resin Bound Gravels

- Place Permatex 200 separation fabric over the filled InfraWeb.
- Lay Asphalt carpet and resin bound gravel to the required thickness and as per manufacturer's instructions.

Loose Gravels

- Option 1 is to slightly overfill the InfraWeb with the clean angular stone.
- Option 2 is to place a 25mm thick decorative stone above the filled InfraWeb.

Slimblock Gravel Retention System

- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Place 20mm bedding layer of 5mm single sized stone and lightly tamp.
- Lay Slimblock units and fill with a 10 to 14mm decorative gravel.

Slimblock Grass Protection System.

- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Place 50mm of Rootzone (60% sand/40% soil) bedding layer and lightly tamp.
- Lay Slimblock units and fill with Rootzone mix and seed accordingly. (Please allow for 4 to 6 weeks for seed germination)

Tree Mulch

- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Lay mulch to desired depth.

Concrete

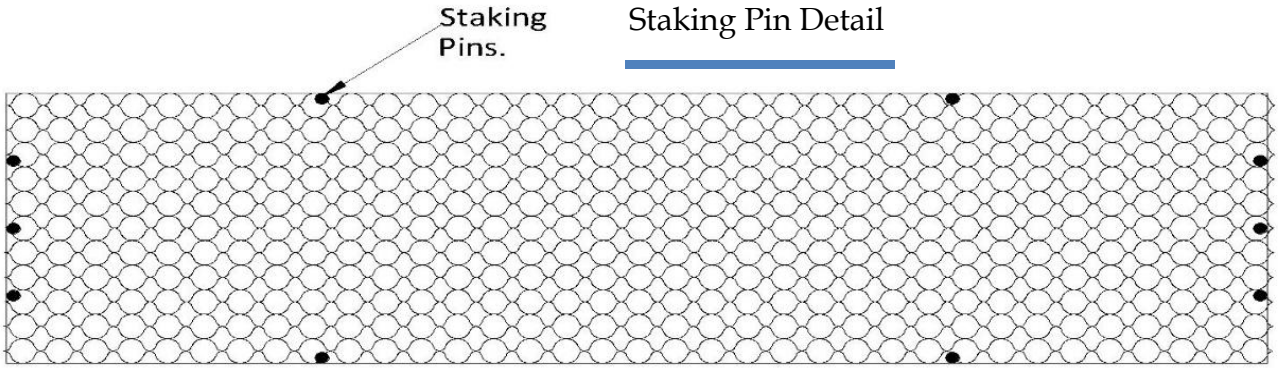
- Place Permatex 200 separation geotextile over the filled InfraWeb.
- Cast the concrete slab over the geotextile.

If the system requires trafficking immediately after installation for construction purposes then a 50mm sacrificial surcharge of the 4/20mm or 40/20mm granular material shall be placed on top of the InfraWeb.

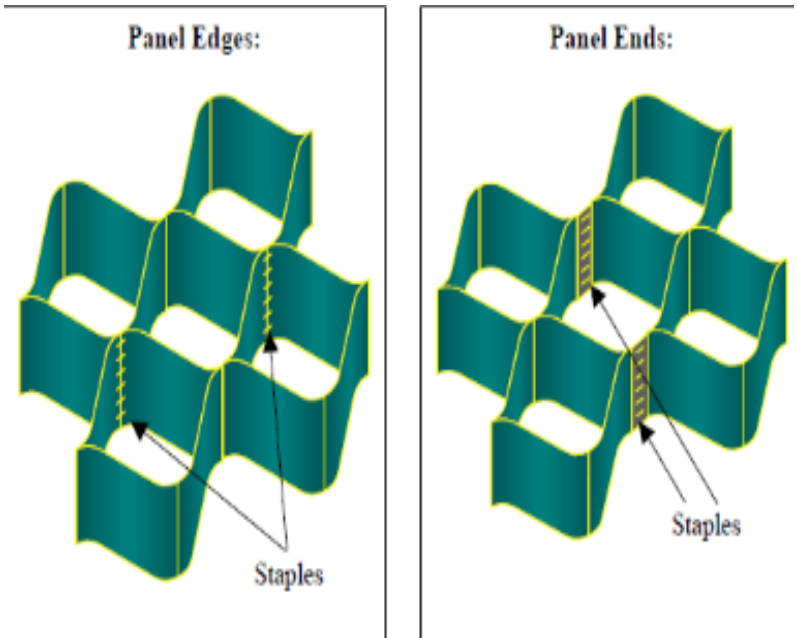
For further information or to arrange a site visit for design consultation or installation supervision, please contact Roy Partington on 07730148581 or e-mail roy@infragreen-solutions.com or contact our sales office on 01925 630976.

Appendix

Staking Pin Detail



Stapling Details



Cells During filling

APPENDIX 5

TREE PROTECTION BARRIER SPECIFICATION
(1 page only)

TREE PROTECTION BARRIER SPECIFICATION

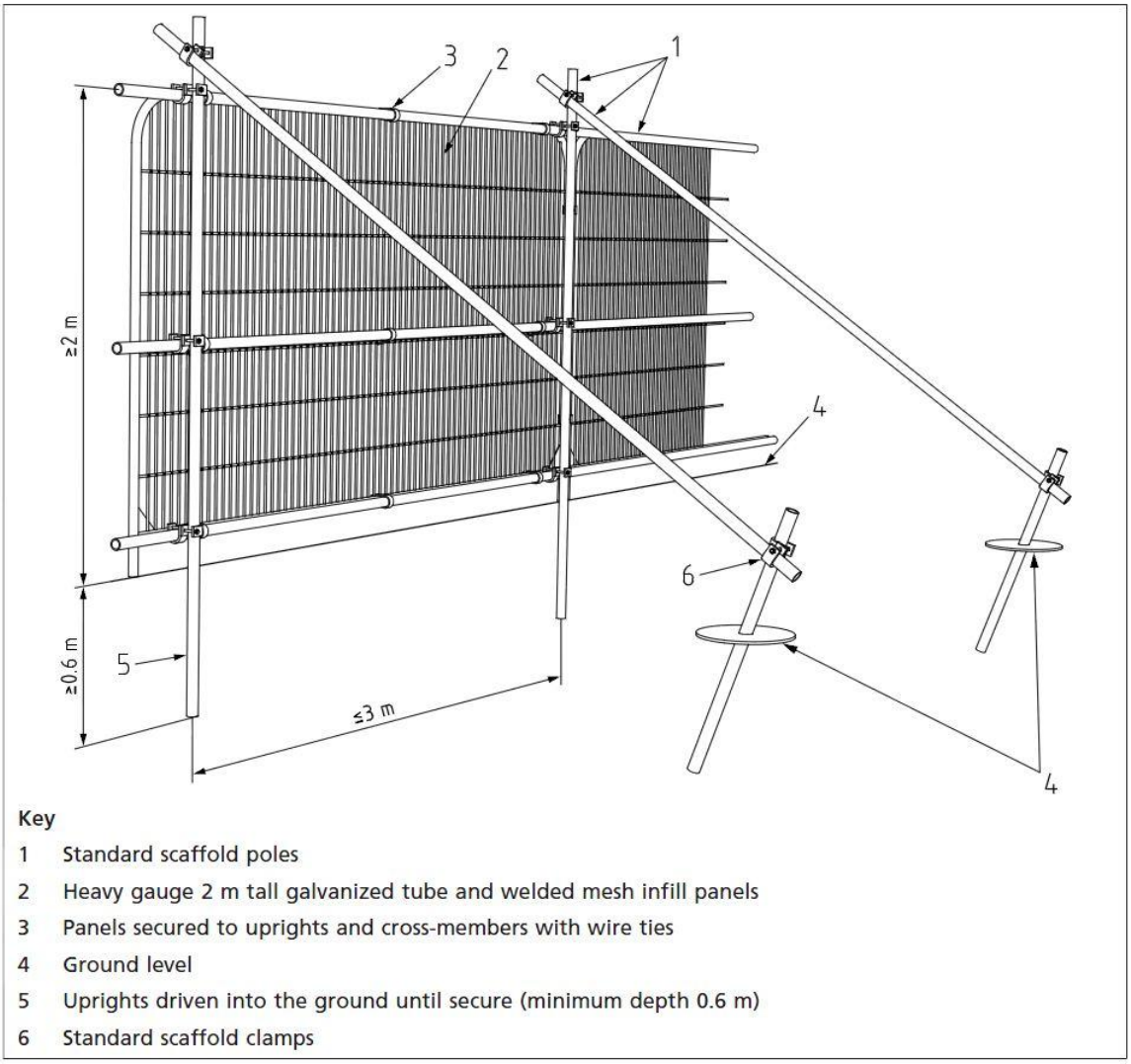
The Root Protection Area (RPA) and Construction Exclusion Zone (CEZ) enclosed by temporary protective fencing must:

1. Be erected prior to any site works, demolition or construction works, delivery of site accommodation or materials and must remain for the duration of the demolition/construction works. All-weather notices should be attached to the barriers with the following wording: **"CONSTRUCTION EXCLUSION ZONE – NO ACCESS"**
2. Be protected by temporary protective fencing and other measures as specified and as defined by area (m^2) on the drawings (Tree Protection Plan - TPP).
3. Preclude the storage or tipping of all materials and substances, in addition, toxic substances such as fuels, oils, additives, cement, or other deleterious substances within 5.0 metres of an exclusion zone.
4. Any incursion into the Root Protection Area (RPA) and Construction Exclusion Zone (CEZ) as indicated on the Tree Protection Plan (TPP) must be by prior arrangement, following consultation with the Local Planning Authority.

Protective Fencing Type:

Temporary Tree Protection Barrier (Specification taken from BS:5837 -2012)

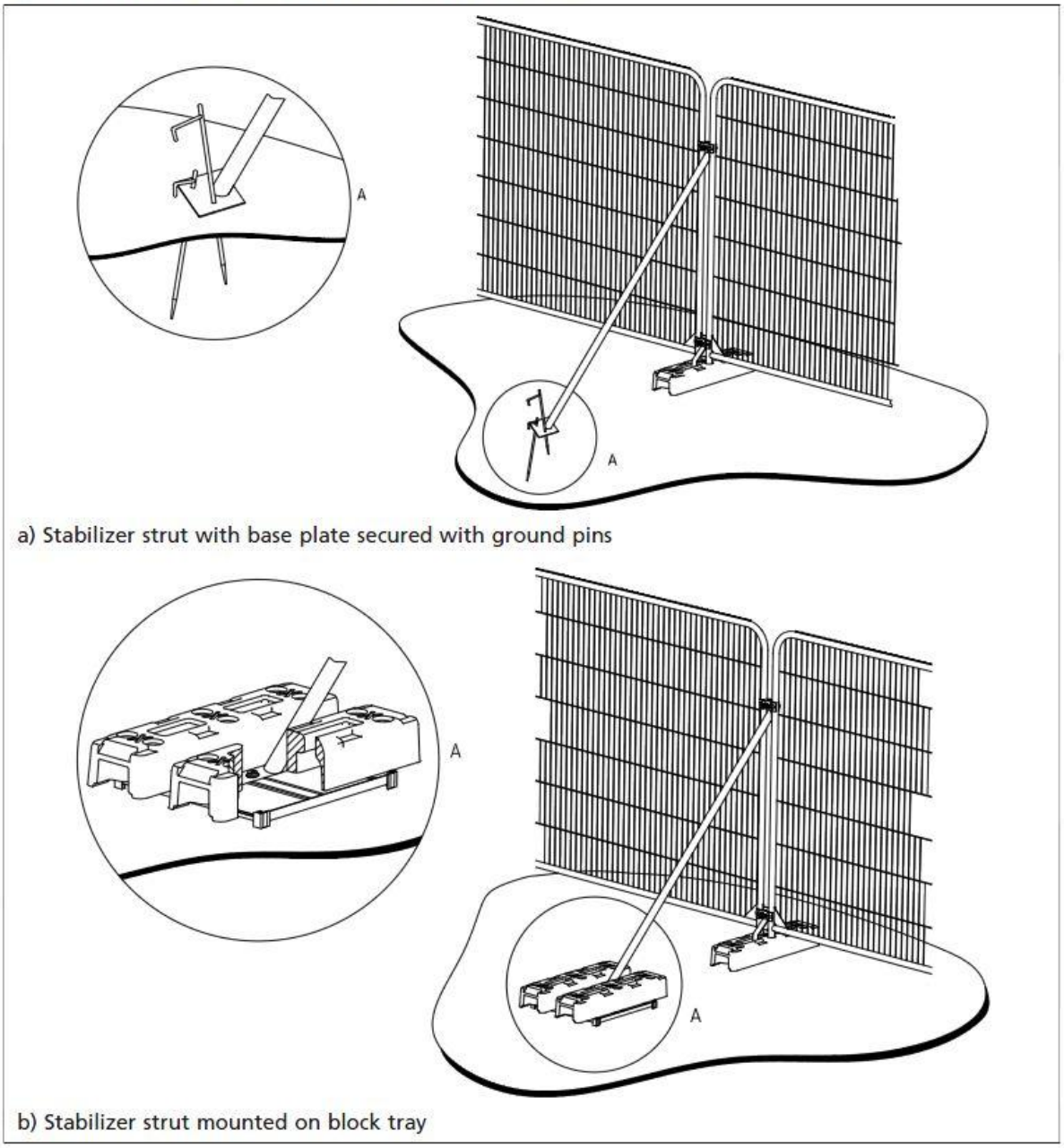
Figure 2 **Default specification for protective barrier**



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

Figure 3 **Examples of above-ground stabilizing systems**



APPENDIX 6

OUTLINE CIRRICULUM VITAE AND PROFESSIONAL EXPERIENCE

Russell Ball BSc. (Hons.), P.G. Dip. LM, CBiol., MSB.
Chartered Biologist

Qualifications

- BSc. (Hons.) Botany (Manchester University).
- Post Graduate Diploma: Landscape Management (Manchester University).
- Chartered Biologist (since 1995).
- *LANTRA* Approved **Professional Tree Inspector** (Ref: HO00178227 504187)
- International Society of Arboriculture **Qualified Tree Risk Assessor** (ID: 2148)

Professional Experience (1984-2012)

- Tree Works Contractor.
- Harrow Council: Assistant Tree Officer (Parks Dept.)
- London Tree Officers Association: Executive Officer.
- International Society of Arboriculture (European office): Senior Executive.
- Arbol Euro Consulting: Technical Director (**Madrid, Spain**).
- Harrow Council: Principal Tree Preservation (TPO) Officer. During my employ with Harrow Council I served on the Executive Committee of the *"London Tree Officers Association"*.
- Arbol Euro Consulting Ltd: Technical Director (**London, UK**).

Professional Memberships

- International Society of Arboriculture (ISA). President of the ISA UK/I Chapter (2010-2012).
- Arboricultural Association
- Consulting Arborist Society
- Chartered Institute of Biology
- Royal Horticultural Society (Chelsea Flower Show *Silver-Gilt* medal Winner: *Rainforest Belize* – 1996)

Contact Details

- Tel. 0208 863 8151
- Mobile: 078844 26671
- Email: russell@arboleuro.co.uk

QTRA Licensed User No. 1521
Quantified Tree Risk Assessment

Consulting Arborist Society.com
PROFESSIONAL MEMBER