Treework Environmental Practice

Arboricultural Impact Assessment

College Gardens, London, NW1 9NB

Report Reference Number: 181029-1.0-CG-AIA-MW

On behalf of

London Borough of Camden

26 October 2018

Document Control Sheet

Project Name: **College Gardens, London, NW1 9NB**

Report Ref: **181029-1.0-CG-AIA-MW**

Report Title: **Arboricultural Impact Assessment**

	Name	Position	Date
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Revision	Date	Description	Prepared by
1.0	29/10/2018	For Submission	MW

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Executive Summary

- This report provides an assessment of the impact upon trees and a proposal to realign railings, construct new entrance ways and path works within College Gardens. The report 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 across the site.

- 14 trees were surveyed to inform this report. The data for each is presented within the Tree Schedule at Appendix A.

  None of the trees will need to be removed to facilitate the works. Sufficient space and adequate protection measures will be 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. Tree protection measures are discussed throughout this report and on the Tree Protection Plan at Appendix B.

- Several trees including T9, T6, T7, T5, T13, T14, will be subject to construction within their root protection areas, which will include installation of street lamps, new surfaces and railings. An Arboricultural Method Statement is recommended to ensure that these trees are not damaged, with supervision where appropriate.

- It is not anticipated that any of the trees will require remedial tree work to facilitate the development and/or to reduce the likelihood of their being subject to excessive pressure after the completion of the development.

- Nick Bell, Tree and Landscape Officer at London Borough of Camden has confirmed that no Tree Preservation Orders apply to the trees on site; however the site is within Jeffery's Street Conservation Area and are therefore all protected.

1 Introduction

1.1 Brief and Context

1.1.1 Treework Environmental Practice was instructed by Graeme Shimmin of London Borough of Camden on 23 October 2018 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 the proposals on trees at the College Gardens site.

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 the realignment of railings and construction of new entrance ways, path works and installation of street lights within College Gardens, London, NW1 9NB.

1.3.2 The following documents have reviewed by Treework Environmental Practice to inform this report:

Document Title	Document/Drawing number	Originator
Topographical Survey	95442-CollegeGardens-SiteSurvey	Kings Land and Architectural Surveyors
Landscape Masterplan	627.02.01 Landscape Masterplan	leit-werk ltd
Draft Utilities Plan	Not provided	-
Tree Constraints Plan	181026-1.0-CGL-TCP-MM	Treework Environmental Practice

2 Existing Tree Population and Constraints

2.1.1 A survey covering trees on site and trees on adjacent land close enough to be affected by the development was undertaken on 25 October 2018. The full survey results are presented in the Tree Schedule at Appendix A.

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

2.1.3 The proposed development site currently houses one mature *Platanus x hispanica* and 13 *Tilia sp.* The *Tilia sp.* are currently managed as pollards. The *Platanus x hispanica* is a full crown tree located at the North West of the site, currently just outside of the perimeter railings.

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)	Total
A	T9	1
B	T2, T3, T4, T6, T7, T8, T10, T11, T12, T13, T14	11
C	T1, T5	2
U	None	0
Total	**14**	

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) 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 Nick Bell, Tree and Landscape Officer at London Borough of Camden has confirmed that no Tree Preservation Orders apply to the trees on site; however the site is within Jeffery's Street Conservation Area and are therefore all protected.

3 Arboricultural Impact of the Proposals

3.1 Proposed Tree Works

3.1.1 The epicormics shoots at the base of T9 will need to be removed to enable the construction of stem protection (see below). No further tree pruning works will be required and no trees will need to be removed.

3.2 Tree Protection

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

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. Construction Exclusion Zones (CEZ) are areas within the RPA which are usually protected by barriers.

3.2.2 This site is not considered suitable for barriers to be installed and RPAs are generally situated all through the site. Therefore tree protection methods are recommended to comprise of a detailed Arboricultural Method Statement with supervision where considered necessary and pre-commencement tool box talk. Monitoring Forms should be completed, filed and supplied to Camden Council Tree Officer's following each visit.

3.2.3 It is however, recommended that the stem of 'A' category tree T9 is protected to avoid potential mechanical damage. Stem protection should comprise:

- Robust plywood-sided (min. 15 mm gauge) crate, reaching from ground level to a minimum height of 2m.
- The crate should be free standing and mounted on a frame (min. 50 mm x 50 mm thickness), boxed around the trunk
- A separation of at least 50 mm must be maintained between the outer face of the stem and the inner framework of the crate.
- No part of the crate should be attached to the tree.

3.3 Arboricultural Method Statement and Special Technical Measures

3.4.1 Conflicts between retained trees and aspects of the proposed development can be mitigated by the use of special technical measures. These are measures to minimise the impact on trees whilst working within the RPA. It is recommended that a detailed Arboricultural Method Statement is produced once full construction details are available before construction starts to guide sensitive works around trees. The AMS should provide specific details on special technical measures required for the proposed works at this site and ensure any potential damage to trees above or below ground are minimised.

3.4 Additional Precautions

3.4.1 ***Utilities and Services***

Information on the location of utility and service runs for the proposed street lamps 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***

The Arboricultural Consultant should review any landscape operations that involve any work within the RPAs of retained trees and input additional site specific methodology where necessary.

Appendix A

Tree Schedule

College Gardens, London, NW1 9NB
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	Tilia x vulgaris Common Lime	8.0	1	21	N 1.0 E 1.0 S 1.0 W 1.0	2.0	2.0	Semi Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	20.0	2.5	40+	C	1
T2	1	Tilia x vulgaris Common Lime	11.0	1	55	N 2.0 E 2.0 S 2.5 W 2.0	2.0	5.0	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut. Raised surface roots.	136.8	6.6	40+	B	1
T3	1	Tilia x vulgaris Common Lime	10.0	1	32	N 1.5 E 1.5 S 1.5 W 1.5	2.0	6.0	Early Mature	Good	Altered ground level - Suspected. Bark wound - Major. Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	46.3	3.8	40+	B	1
T4	1	Tilia x vulgaris Common Lime	10.0	1	46	N 2.0 E 2.0 S 2.0 W 1.5	2.0	6.0	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut. Structural impact - Footpath / highway / drive disturbance.	95.7	5.5	40+	B	1
T5	1	Tilia sp. Lime sp.	10.0	1	37	NW 2.0 NE 2.0 SE 2.5 SW 1.0	2.5	3.0	Early Mature	Fair	Bark wound - Major. Decay / structural defect in crown limb / limbs - Localised. Decay / structural defect - Localised. Epicormic growth - Base. Epicormic growth - Crown. Pollard - Recently cut. Appears to be lower vitality than adjacent limes with less epicormic growth.	61.9	4.4	10-20	C	1
T6	1	Tilia x vulgaris Common Lime	10.0	1	51	N 2.0 E 2.0 S 1.5 W 2.0	2.0	6.0	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	117.7	6.1	40+	B	1
T7	1	Tilia x vulgaris Common Lime	10.0	1	38	N 2.0 E 1.5 S 1.5 W 1.5	2.0	6.5	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	65.3	4.6	40+	B	1

College Gardens, London, NW1 9NB
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
T8	1	Tilia x vulgaris Common Lime	8.0	1	28	N 1.0 E 1.0 S 1.0 W 1.0	2.0	6.5	Semi Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	35.5	3.4	40+	C	1
T9	1	Platanus x hispanica London Plane	25.0	1	118	N 13.0 E 10.0 S 12.0 W 12.5	3.5	9.0	Mature	Good	Arboricultural work - Historic. Epicormic growth - Base. Epicormic growth - Remove from base.	629.9	14.2	40+	A	1
T10	1	Tilia x vulgaris Common Lime	10.0	1	51	N 2.0 E 2.0 S 2.0 W 2.0	2.0	3.5	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut. Raised surface roots.	117.7	6.1	40+	B	1
T11	1	Tilia x vulgaris Common Lime	10.0	1	49	N 2.0 E 2.0 S 2.0 W 2.0	2.0	6.0	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	108.6	5.9	40+	B	1
T12	1	Tilia x vulgaris Common Lime	10.0	1	51	N 2.0 E 2.0 S 2.0 W 2.0	2.0	2.5	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	117.7	6.1	40+	B	1
T13	1	Tilia x vulgaris Common Lime	10.0	1	47	N 1.5 E 1.5 S 1.0 W 2.5	2.0	3.0	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut.	99.9	5.6	40+	B	1
T14	1	Tilia x vulgaris Common Lime	10.0	1	47	N 3.0 E 1.5 S 2.0 W 2.0	2.0	4.5	Early Mature	Good	Epicormic growth - Crown. Epicormic growth - Base / bole / principal stems. Pollard - Recently cut. Structural impact - Footpath / highway / drive disturbance.	99.9	5.6	40+	B	1

Tree Schedule Key

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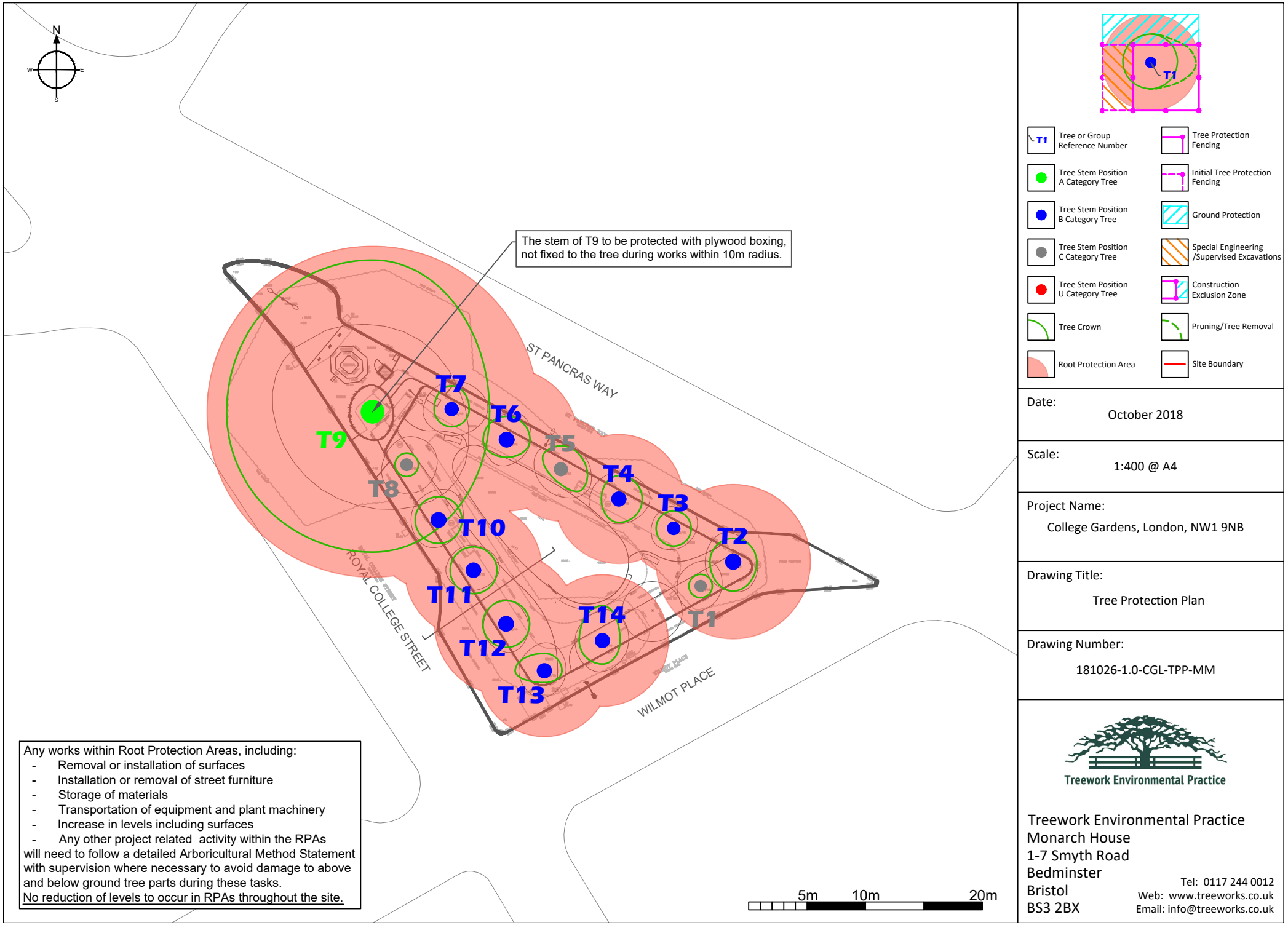
Tree/Group Reference	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland), H (Hedge) or S (Shrub) to indicate the type of feature.
Tree Count	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single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

Appendix B

Tree Protection Plan



Any works within Root Protection Areas, including:

- Removal or installation of surfaces
- Installation or removal of street furniture
- Storage of materials
- Transportation of equipment and plant machinery
- Increase in levels including surfaces
- Any other project related activity within the RPAs

will need to follow a detailed Arboricultural Method Statement with supervision where necessary to avoid damage to above and below ground tree parts during these tasks.
No reduction of levels to occur in RPAs throughout the site.

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

Date:
October 2018

Scale:
1:400 @ A4

Project Name:
College Gardens, London, NW1 9NB

Drawing Title:
Tree Protection Plan

Drawing Number:
181026-1.0-CGL-TPP-MM

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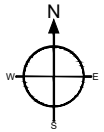
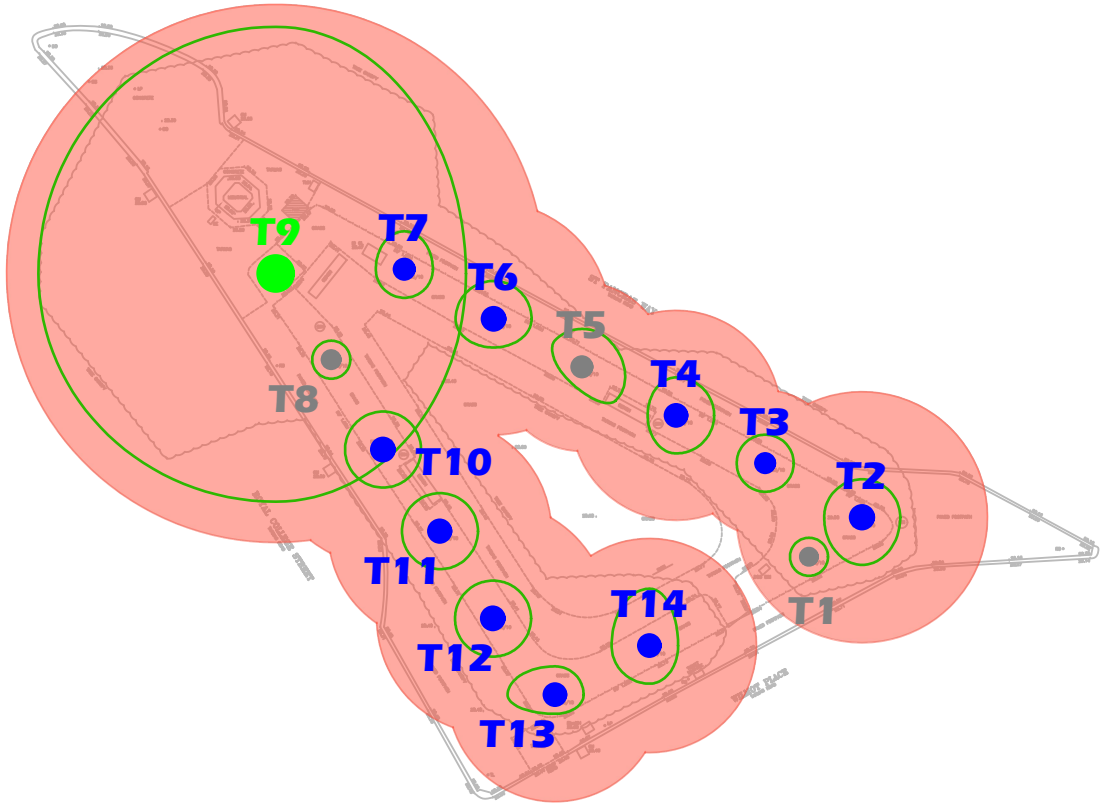
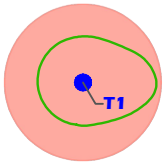
Appendix C

Tree Constraints Plan







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:
October 2018

Scale:
1:400 @ A4

Project Name:
College Gardens, London, NW1 9NB

Drawing Title:
Tree Constraints Plan

Drawing Number:
181026-1.0-CGL-TCP-MM

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Appendix D

Example Site Monitoring Form

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Site Inspection Report
Completion of Arboricultural Operations – Monitoring Form

Site Name:		
Site Address:		
Client Name:	**Instructed By:**	
Site Manager:		
Arboricultural Operation Checked By:	**Date:**	**Approved / Not Approved**
Operation Completed / Additional Works Required:		**Number of Photographs Supplied:**
Completed By (Contractor Name):		**Contractor / Subcontractor**
Copied to LPA	**Yes / No**	**Contact Name:**
Copied to Client	**Yes / No**	**Contact Name:**
Copied to Site Manager	**Yes / No**	**Contact Name:**

Operation Completed / Additional Works Required (Continued):

Appendix E

Tree Survey Method and Limitations

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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.