The Danish Church

ARBORICULTURAL IMPACT ASSESSMENT

& TREE SURVEY

TREEWORK ENVIRONMENTAL PRACTICE

MAY 2018

C.F. Møller

St Katharine's
Den Danske Kirke i London

Treework Environmental Practice

Arboricultural Impact Assessment

The Danish Church, South Garden, London, NW1 4HH

Report Reference Number: 180504-1.0-TDC-AIA-MS

On behalf of

C.F. Moller Architects UK Ltd

4 May 2018

Document Control Sheet

Project Name: **The Danish Church, South Garden, London NW1 4HH**

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Report Title: **Arboricultural Impact Assessment**

	Name	Position	Date
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Revision	Date	Description	Prepared by
1.0	04/05/2018	Draft	MS

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Executive Summary

- This report relates to The Danish Church, London NW1 4HH, located on Albany Street and provides an assessment of on-site and relevant off-site trees and the impact of the proposal. C.F.Moller Architects propose to create a walkway link below the entrance stair and create one connected sunken terrace, with terrace steps to the garden with associated landscaping. This report makes recommendations for mitigating any negative impacts on existing trees and is suitable for submission in support of this full planning application.

- A total of 23 individual trees and three tree groups have been surveyed to inform this report. The data for each is presented within the Tree Schedule at Appendix A.

- Three trees (T2, T9 and T17) have been identified for removal to facilitate the development. Four further individual poor quality trees and a group of poor quality trees are proposed for removal due to their poor health and limited life expectancy, irrespective of the proposal.. These works are detailed in the Tree Schedule at Appendix A.

- The remaining 18 tree features of the total 26 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.

- One tree (T14), will be subject to works within its root protection area. Special measures are recommended to ensure that these trees are not damaged. These measures are detailed in Section 3.4 of this report and are illustrated on the Tree Protection Plan at Appendix B.

- Two retained trees (T 19 and a single tree in Group 20) require remedial tree work to reduce their encroachment upon the existing building. Again, this work is not required to facilitate the development.

- Camden Council has confirmed that there are no Tree Preservation Orders on the site. Reference to Camden Council's on line Conservation Area records has indicated that the entire site stands within a designated Conservation Area.

1 Introduction

1.1 Brief and Context

1.1.1 Treework Environmental Practice was instructed by C.F. Moller Architects UK Ltd, to provide an Arboricultural Impact Assessment (AIA), in accordance with British Standard BS5837: 2012 Trees in *Relation to Design, Demolition and Construction – Recommendations*, of the effect of proposals on trees at The Danish Church.

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, 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 application is to create a walkway link below the entrance stair and create one connected sunken terrace, with terrace steps to the garden and associated landscaping. ("the proposal").

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

Document Title	Document/Drawing number	Originator
Topographical Survey	Drawing No 85331-01-CFM-A-18-130	C.F.Moller Architects UK Ltd
Proposed Site Plan	Drawing No 85331-01-CFM-A-18-130	C.F.Moller Architects UK Ltd
Tree Constraints Plan	171115-1.0-TDCL-TCP-MM	Treework Environmental Practice
Landscape Proposal	April 2018	C.F.Moller Architects UK Ltd
Ground Source Heating Scenarios	CFM-85331-SK-022	C.F.Moller Architects UK Ltd

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 12 October 2017. 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 base map contained a topographical survey of the trees. Trees and hedges were plotted on the base map using the topographical survey as reference.

2.1.3 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.

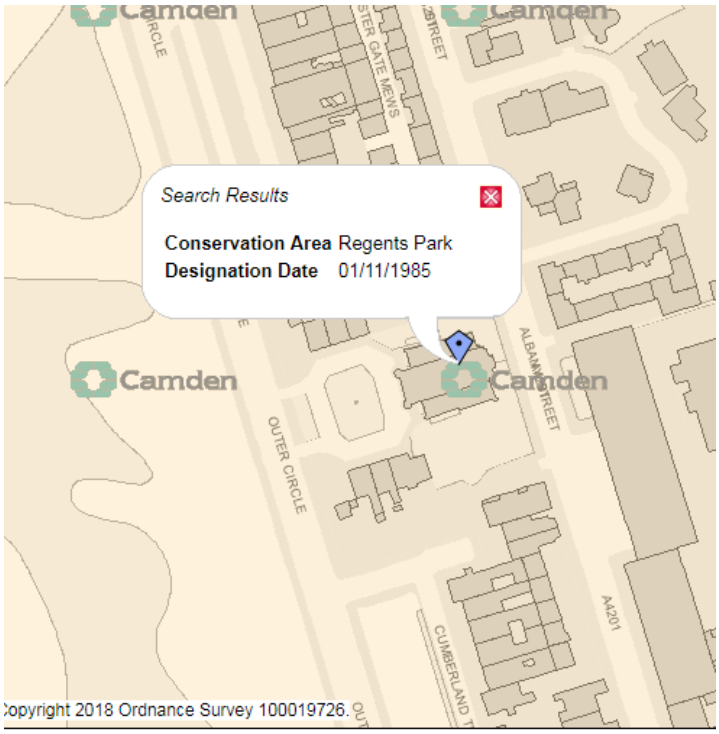
Table 1: Trees/Groups in each Retention Category

BS Category	No. of Trees (T)	No. of Groups (G)	Total
A	0	0	0
B	3	0	3
C	16	2	18
U	4	1	5
Total	**23**	**3**	**26**

2.1.4 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.

2.1.5 The full results of the tree survey on which this report is based are given in the Tree Schedule at Appendix A, and the above, and below-ground constraints are illustrated on the Tree Protection Plan at Appendix B. Each tree (T), tree group (G) 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.

2.1.6 Camden Council has confirmed that there are no Tree Preservation Orders on the site. Reference to Camden Council's on line Conservation Area records has indicated that the entire site stands within a designated Conservation Area (see extract from below). The Tree Works Schedule (Appendix A) is sufficient to notify the local authority of the intention to carry out works to trees in a Conservation Area (as required by Section 211 of the Town and Country Planning Act 1990)



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, for example in the feasibility planning of the ground heat boreholes, the decision to remove such trees has been informed by an iterative process, following a review of alternative options.

3.1.2 Three Category C trees (T2, T9 and T17) are proposed for removal. A further four individual and one group of poor quality trees with limited remaining life expectancy are proposed for removal for good landscape reasons. They are not impacted by the proposed development. Where higher quality 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.

3.1.3 Trees proposed for removal are identified below.

Table 2 – Tree Features Proposed for Removal by BS Category on and off site

Category B - Trees	Category C - Trees/Groups	Category U – Trees/Groups
None	T2, T9, T17	T8, T13,T15 G16, T18
0	**3**	**5**

3.1.5 Individual data for each tree or group proposed for removal is presented at Appendix A – Tree Schedule, with green text confirming the works proposed. 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 Three Category C trees (T2, T9 and T17) are proposed for removal.

3.2.2 Tree T 2, a small, early mature cherry has large, exposed roots, with a poor form, leaning upon the adjacent wall. A suitable replacement would enhance the site and local amenity. Its removal would also facilitate temporary site access from Albany Street during construction.

3.2.3 Tree T9, an early mature lime, with a poor physiological condition is proposed for removal and replacement.

3.2.4 Tree T17 is a small (6 metre high) early mature holly. It has exposed roots which are already beginning to lifting the paving. A suitable replacement would enhance the site and local amenity.

3.2.5 Two trees (T19) and a tree in Group 20 are proposed for minor pruning to clear the adjacent existing building, not to facilitate the development.

3.3 Mitigation

3.3.1 In order to mitigate and indeed enhance the amenity and landscape value of the 3 tree features proposed for removal, it is recommend that at least four new trees are planted. These could be set out in a landscape strategy.

3.3.2 Newly planted trees will be positioned in locations which will increase local amenity value, soften new buildings and hard landscape features and provide a long term legacy for future generations to enjoy. Aftercare of the new trees will also be required.

3.4 Tree Protection

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

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

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

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

3.4.4 **Ground Protection**

Where it is necessary to temporarily breach the CEZ to facilitate the development, and following the approval of the Local Planning Authority and/or an arboriculturist, the roots and soil structure within the RPAs of these trees will be protected by installing ground

protection. Ground protection shall comprise for pedestrian access only, single thickness scaffold boards laid on a compressible layer such as woodchip, laid on a geotextile membrane. The scaffold boards should be fixed together to avoid movement and for vehicular access, purpose-built steel trackway, pre-case reinforced concrete slabs or temporary access road constructed with a cellular matrix (minimum 150 mm depth) with granular infill. The locations of the ground protection are shown cyan on the Tree Protection Plan at Appendix B.

3.4.5 Just one tree (T14) WILL be subject to works within its root protection area. Special measures are recommended to ensure that these trees are not damaged.

3.5 Special Technical Measures

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

3.5.2 Part of the proposal involves the installation of a Ground Source Heating system. Following an iterative process to reduce tree impact, the final proposal will see three x120 metre deep vertical pipes, two of which will be within the Root Protection Area of tree T14. The pipes need to be placed 8 metres away from one another for optimal heat extraction. The proposed position of the three pipes is shown on the Tree Protection Plan (Appendix B)

3.5.3 Outside the Tree Protection Fencing, special measures MUST be employed. These are set out in Appendix D

3.6 Additional Precautions

3.6.1 ***Utilities and Services***

Every effort has been taken to locate new service runs outside of RPA's. The proposed new Ground Heat structures are located within the RPA of T14 and has been discussed in paragraph 3.5.2 above.

3.6.2 ***Soft Landscaping***

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

Appendix A

Tree Schedule

The Danish Church, London, NW1 4HH
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	*Cotoneaster sp.* Tree Cotoneaster	4.0	1	16	N 3.0 E 2.5 S 2.0 W 2.0	2.0	2.0	Early Mature	Fair	Not on topographical survey, plotted freehand.	11.6	1.9		C	2
T2	1	*Prunus sp.* Cherry sp.	6.0	1	39	N 4.0 E 4.0 S 3.5 W 4.0	2.0	2.5	Early Mature	Fair	**Fell - Ground level.**	68.8	4.7		C	2
T3	1	*Ilex aquifolium* Holly	5.0	2	9	N 3.0 E 2.5 S 1.5 W 1.5	0.5	1.0	Semi Mature	Fair	Not on topographical survey, plotted freehand.	7.3	1.5		C	2
T4	1	*Laurocerasus officinalis* Cherry Laurel	4.0	1	12	N 3.0 E 0.0 S 0.5 W 4.0	1.5	1.0	Early Mature	Good		6.5	1.4		C	2
T5	1	*Taxus baccata* Yew	8.0	5	23	N 3.5 E 4.0 S 3.0 W 3.0	1.0	2.0	Early Mature	Fair		72.2	4.8		C	2
T6	1	*Taxus baccata* Yew	5.5	6	12	N 3.0 E 3.0 S 3.0 W 3.0	1.0	2.0	Early Mature	Fair		39.1	3.5		C	2
T7	1	*Cupressus sp.* Cypress sp.	8.0	1	20	N 1.5 E 1.0 S 2.0 W 1.0	2.0	2.0	Early Mature	Fair		18.1	2.4		C	2
T8	1	*Prunus cerasifera* Cherry Plum (Myrobalan)	6.0	3	16	N 1.5 E 3.0 S 4.5 W 2.5	1.5	2.0	Early Mature	Poor	**Fell - Ground level.**				U	
T9	1	*Tilia sp.* Lime sp.	12.5	1	56	N 4.5 E 4.5 S 4.5 W 4.5	2.0	4.5	Early Mature	Poor	**Fell - Ground level.**	141.9	6.7		C	2

The Danish Church, London, NW1 4HH
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
G10	4 3 1	*Cupressus sp.* Cypress sp. *Laurocerasus officinalis* Cherry Laurel *Taxus baccata* Yew	5.0	1	12	N E S W 1.5 1.5 1.5 1.5	1.5	1.5	Semi Mature	Fair		6.5	1.4		C	2
T11	1	*Acer pseudoplatanus* Sycamore	12.5	1	39	N E S W 5.5 5.0 5.0 4.5	2.5	4.0	Early Mature	Fair		68.8	4.7		C	2
T12	1	*Cupressus sp.* Cypress sp.	5.0	1	9	N E S W 1.5 1.5 1.5 1.5	0.5	2.0	Semi Mature	Fair		3.7	1.1		C	2
T13	1	*Acer pseudoplatanus* Sycamore	7.0	4	12	N E S W 5.0 3.0 5.0 5.0	2.0	2.5	Early Mature	Fair	Not on topographical survey, plotted freehand. **Fell - Ground level.**				U	
T14	1	*Quercus cerris* Turkey Oak	15.0	1	101	N E S W 4.5 5.0 6.0 5.0	2.0	4.0	Mature	Fair		461.5	12.1		C	2
T15	1	*Laurocerasus officinalis* Cherry Laurel	4.0	2	8	N E S W 3.0 2.5 0.0 2.0	1.0	2.0	Semi Mature	Fair	Not on topographical survey, plotted freehand. **Fell - Ground level.**				U	

The Danish Church, London, NW1 4HH
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
G16	6 1 1 1 1	*Laurocerasus officinalis* Cherry Laurel *Laurocerasus lusitanica* Portugal Laurel *Buddleia sp.* *Mahonia aquifolium* Oregon Grape *Ligustrum sp.* Privet sp.	4.0	1	9	N 1.5 E 1.5 S 1.5 W 1.5	2.0	1.0	Early Mature	Good	Shrubbery. Stem numbers are approximate. Dimensions are average for group. **Fell - Ground level.**				U	
T17	1	*Ilex aquifolium* Holly	6.0	1	20	N 3.0 E 3.0 S 3.0 W 3.0	2.0	3.0	Early Mature	Fair	**Fell - Ground level.**	18.1	2.4		C	2
T18	1	*Crataegus monogyna* Common Hawthorn/Quick/May	4.5	2	19	N 3.0 E 2.5 S 2.5 W 2.5	2.0	2.0	Early Mature	Poor	**Fell - Ground level.**				U	
T19	1	*Laurocerasus officinalis* Cherry Laurel	7.0	1	14	N 0.0 E 3.0 S 3.5 W 3.0	3.0	2.5	Early Mature	Good	Not on topographical survey, plotted freehand. **Prune from adjacent structure.** Prunne back western canopt to achive a clearance from the building by 1.5 metres.	8.9	1.7		C	2
G20	9	*Laurocerasus officinalis* Cherry Laurel	7.0	1	14	N 1.0 E 3.0 S 1.0 W 3.0	2.0	1.5	Early Mature	Good	**Prune from adjacent structure.** For the southern most tree only, Prunne back western canopt to achive a clearance from the building by 1.5 metres.	8.9	1.7		C	2
T21	1	*Laurocerasus officinalis* Cherry Laurel	7.0	2	14	N 3.5 E 3.5 S 1.0 W 3.5	3.0	2.0	Early Mature	Good	Not on topographical survey, plotted freehand.	17.7	2.4		C	2

The Danish Church, London, NW1 4HH
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
T22	1	*Ligustrum sp.* Privet sp.	4.5	2	17	N E S W 2.5 6.0 3.0 1.0	2.0	2.0	Early Mature	Good		26.1	2.9		C	2
T23	1	*Betula sp.* Birch	7.5	1	10	N E S W 2.5 2.5 2.5 2.5	2.0	2.0	Semi Mature	Good	Tree in neighbouring property.	4.5	1.2		B	2
T24	1	*Betula sp.* Birch	7.5	1	10	N E S W 2.5 2.5 2.5 2.5	2.0	2.0	Semi Mature	Good	Tree in neighbouring property.	4.5	1.2		B	2
T25	1	*Cotoneaster sp.* Tree Cotoneaster	4.0	2	7	N E S W 2.0 3.0 0.5 1.5	0.5	1.5	Semi Mature	Good		3.8	1.1		C	2
T26	1	*Acer pseudoplatanus* Sycamore	18.0	1	71	N E S W 7.0 8.0 7.0 7.0	4.0	5.0	Early Mature	Fair		228.0	8.5		B	2

Tree Schedule Key

Treework Environmental Practice

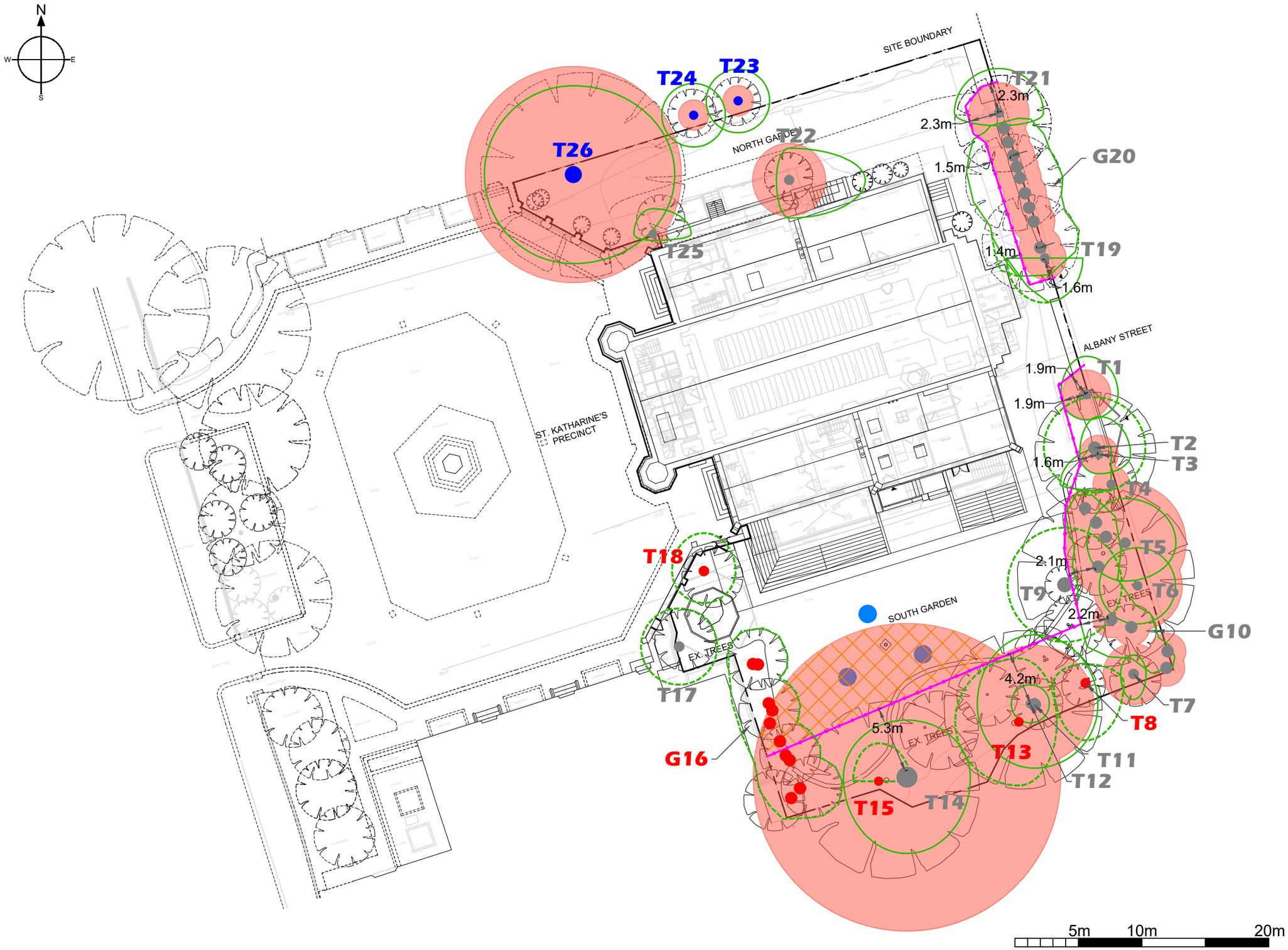
Tree/Group Reference	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland), H (Hedge) or S (Shrub) to indicate the type of feature.
Tree Count	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single trees.
Species	Scientific name followed by common name (where available).
Height (m)	Tree height estimated to the nearest metre. 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 estimated to the nearest 5cm, measured at approximately 1.5m above ground level. Estimated diameter taken at the base for multi-stemmed trees. 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	Description of the tree or trees within a group in terms of basic features and morphology as well as structural and physiological attributes, together with a description of the context in which the tree is growing; specifically growing conditions and other site features pertinent to potential development proposals.
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 in metres of the RPA, 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.

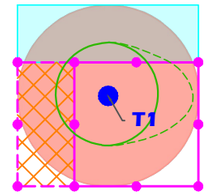
Table 1 **Cascade chart for tree quality assessment**

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 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
- Ground Source Heating Boreholes
- Tree Protection Fencing
- Initial Tree Protection Fencing
- Ground Protection
- Special Engineering /Supervised Excavations
- Construction Exclusion Zone
- Pruning/Tree Removal

Date:
May 2018

Scale:
1:300 @ A3

Project Name:
The Danish Church, London, NW1 4HH

Drawing Title:
Tree Protection Plan

Drawing Number:
180504-1.0-TDCL-TPP-MM

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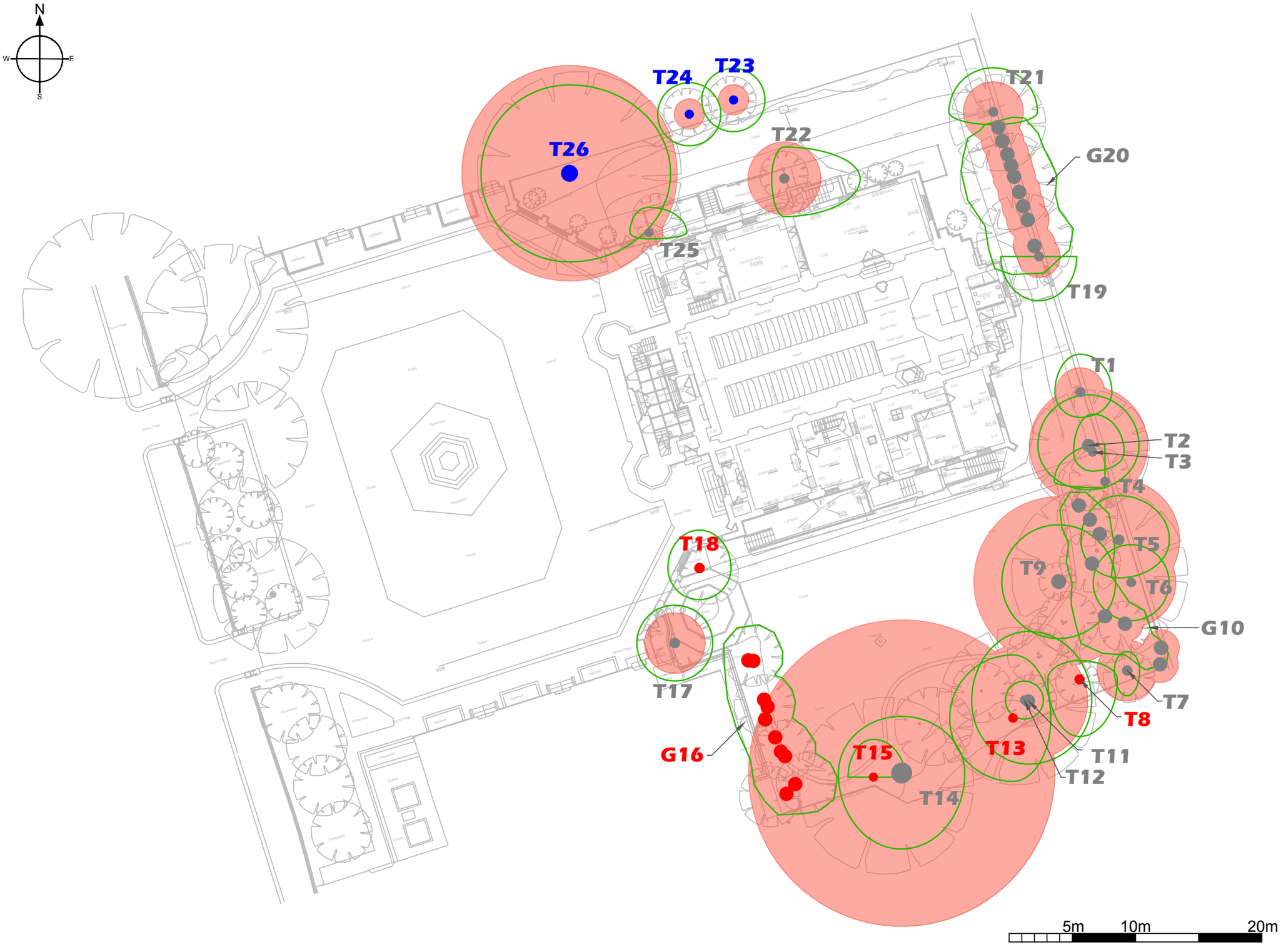
Appendix C

Tree Constraints Plan



T1 Tree or Group Reference Number

Tree Crown

Root Protection Area

Tree Survey Boundary

Tree Stem Position A Category Tree

Tree Stem Position B Category Tree

Tree Stem Position C Category Tree

Tree Stem Position U Category Tree

Date: November 2017

Scale: 1:300 @ A3

Project Name: The Danish Church, London, NW1 4HH

Drawing Title: Tree Constraints Plan

Drawing Number: 171115-1.0-TDCL-TCP-MM

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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

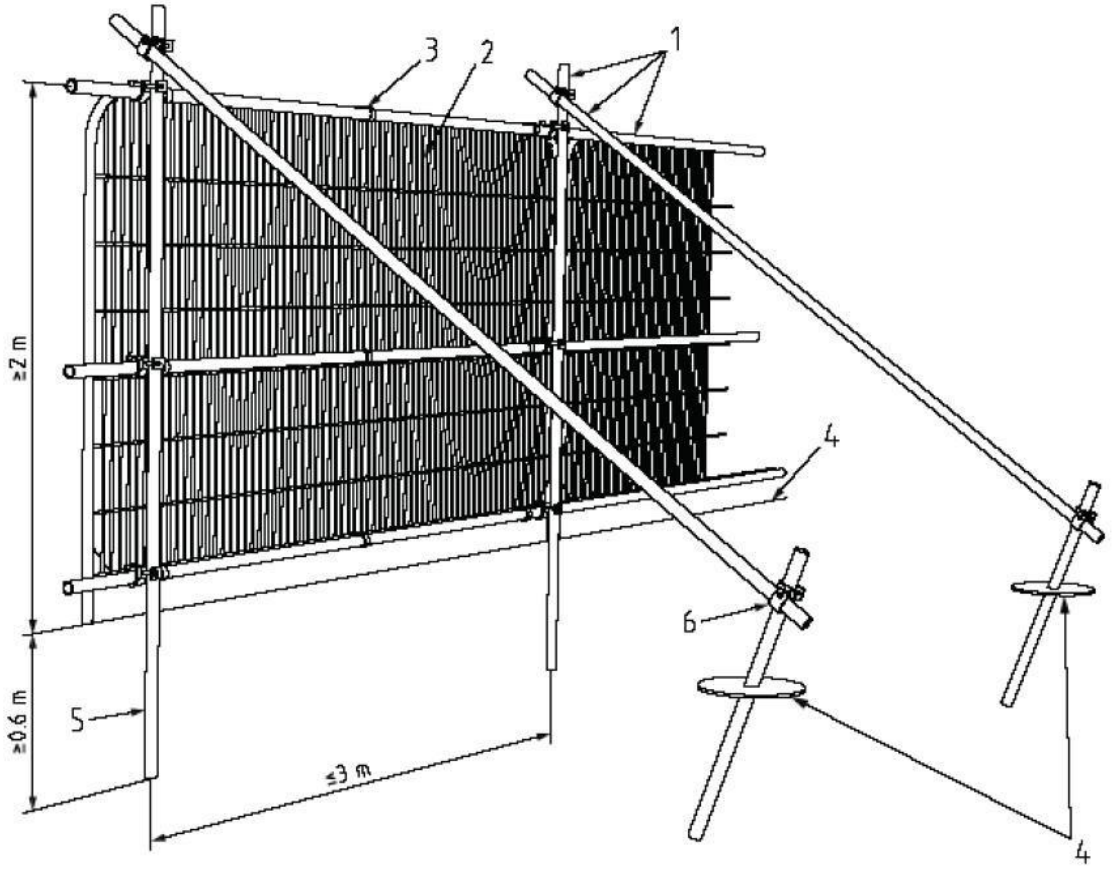
Tree Protection Fencing

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)

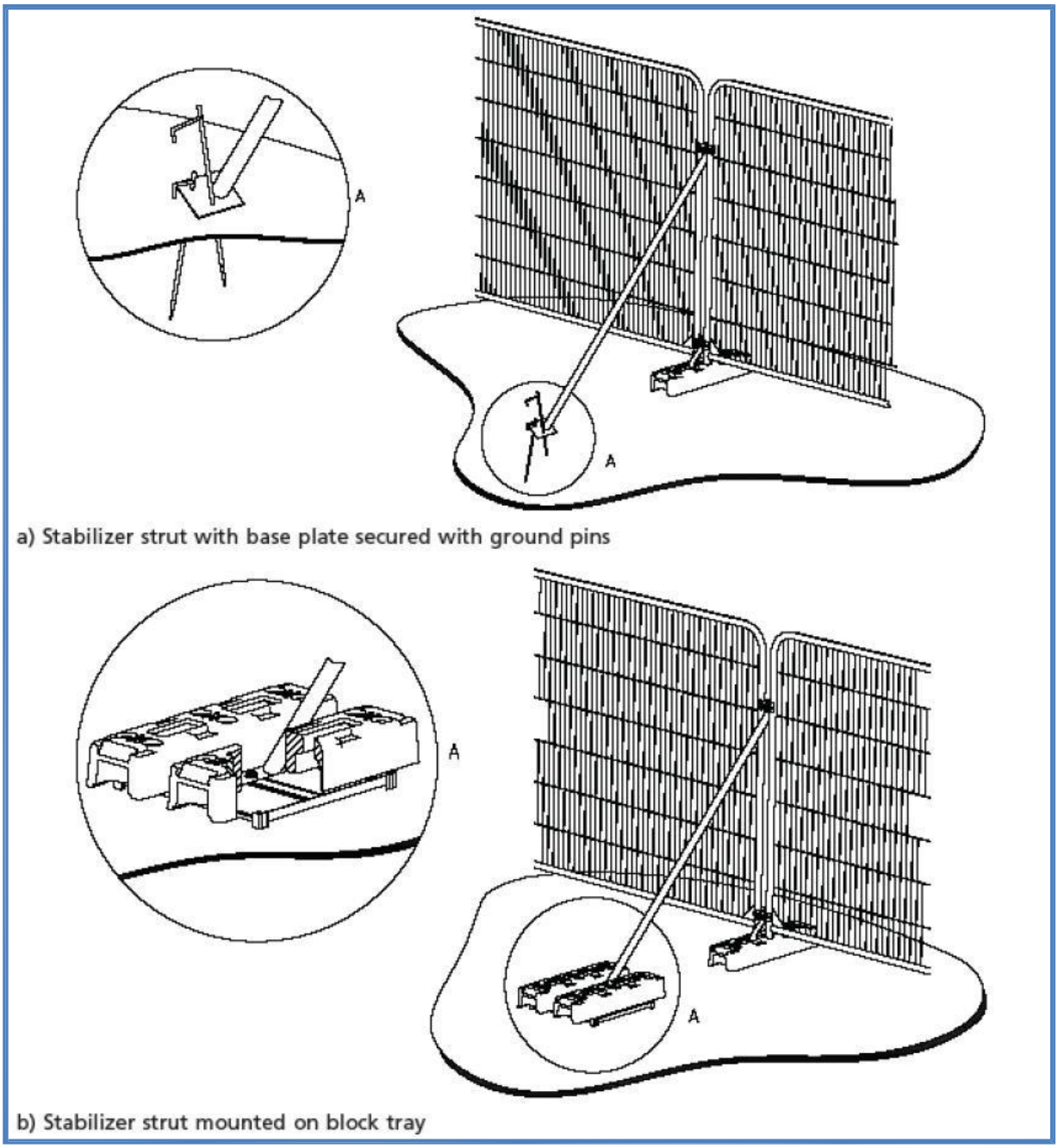
Example Tree Protection Fencing Sign



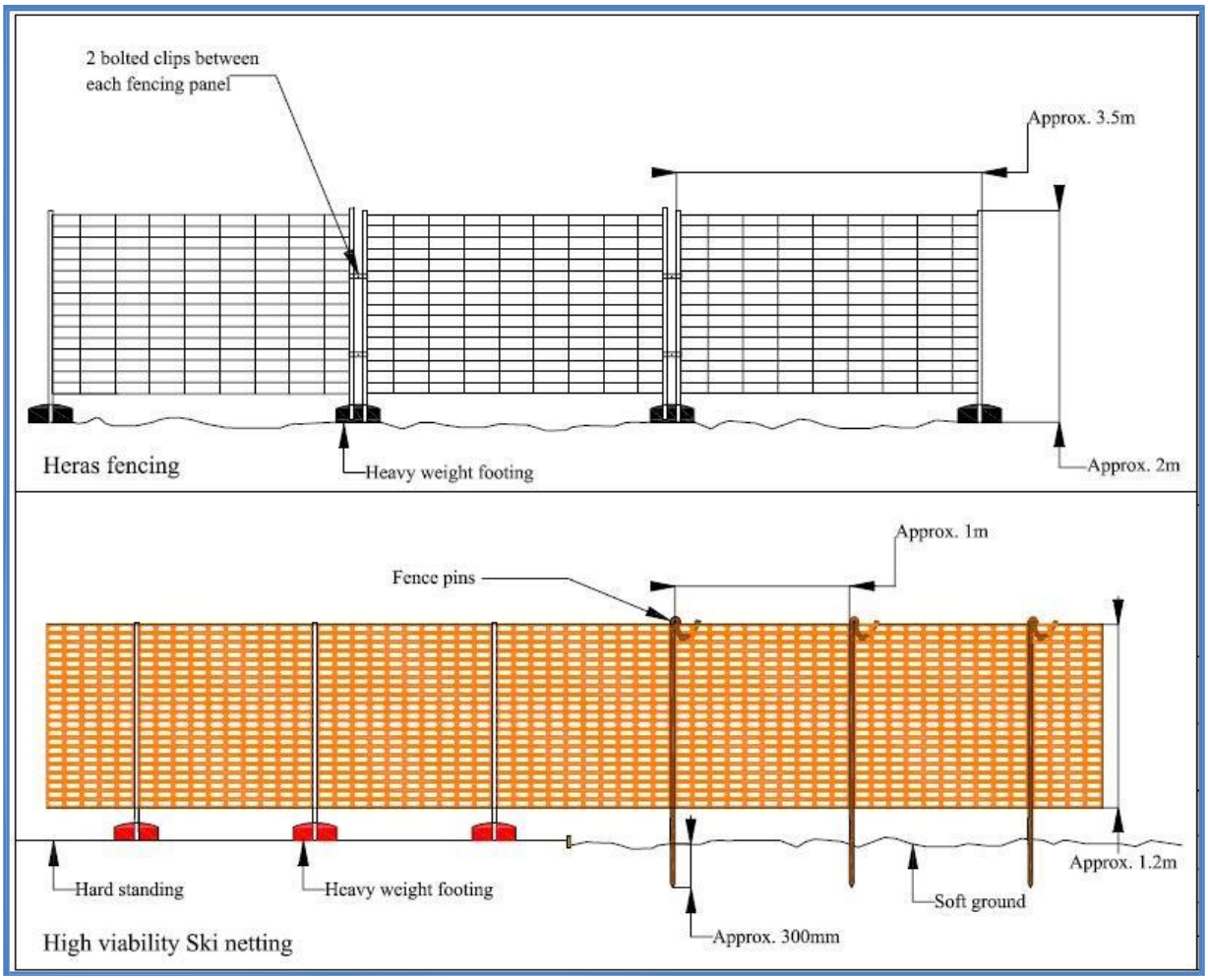
Key

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

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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.

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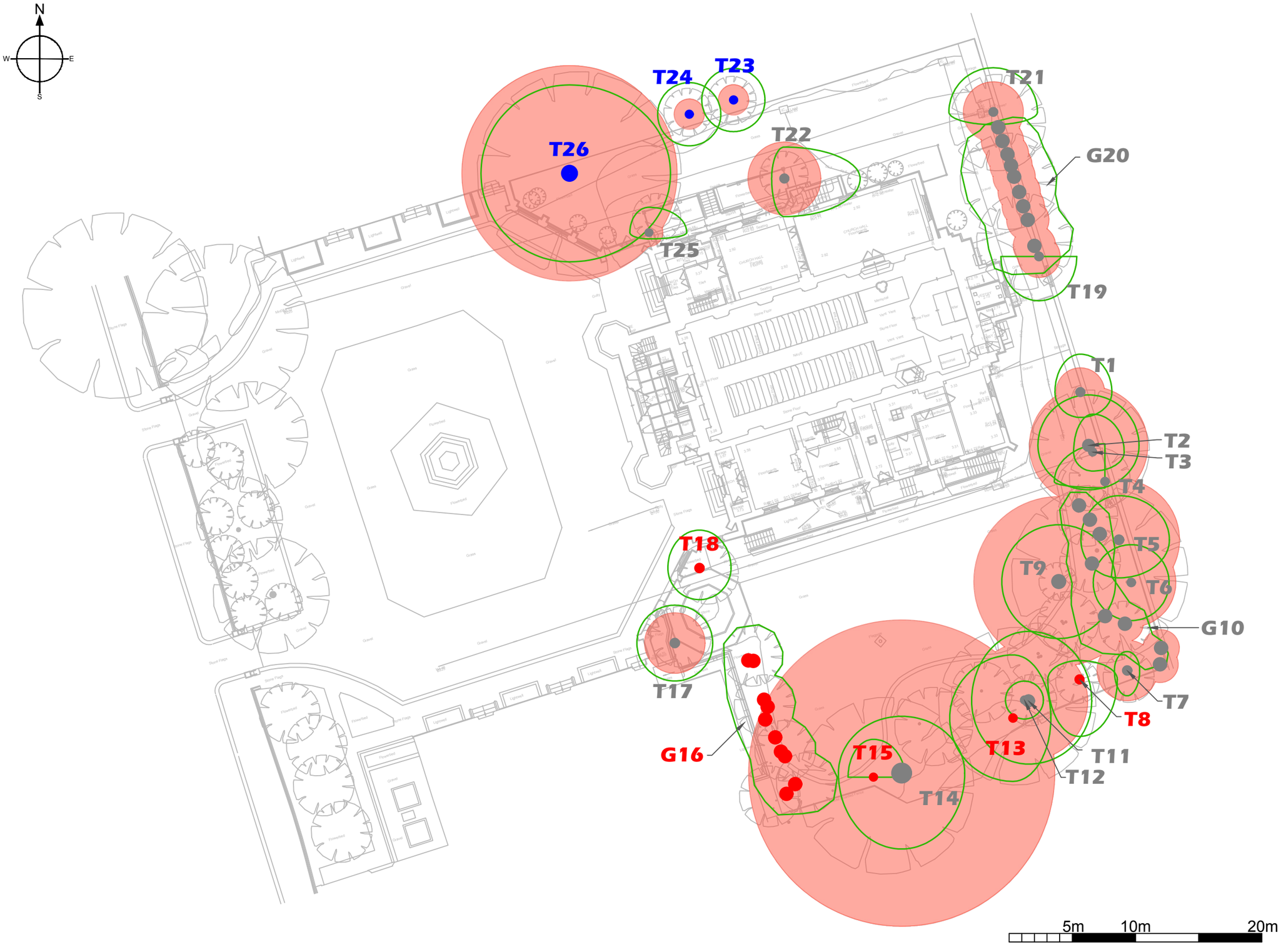

T1 Tree or Group Reference Number

Tree Crown

Root Protection Area

Tree Survey Boundary

Tree Stem Position A Category Tree

Tree Stem Position B Category Tree

Tree Stem Position C Category Tree

Tree Stem Position U Category Tree

Date: November 2017

Scale: 1:300 @ A3

Project Name: The Danish Church, London, NW1 4HH

Drawing Title: Tree Constraints Plan

Drawing Number: 171115-1.0-TDCL-TCP-MM

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The Danish Church, London, NW1 4HH
Tree Survey BS5837-2012

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T1	1	*Cotoneaster sp.* Tree Cotoneaster	4.0	1	16	N 3.0 E 2.5 S 2.0 W 2.0	2.0	2.0	Early Mature	Fair	Not on topographical survey, plotted freehand.	11.6	1.9		C	2
T2	1	*Prunus sp.* Cherry sp.	6.0	1	39	N 4.0 E 4.0 S 3.5 W 4.0	2.0	2.5	Early Mature	Fair		68.8	4.7		C	2
T3	1	*Ilex aquifolium* Holly	5.0	2	9	N 3.0 E 2.5 S 1.5 W 1.5	0.5	1.0	Semi Mature	Fair	Not on topographical survey, plotted freehand.	7.3	1.5		C	2
T4	1	*Laurocerasus officinalis* Cherry Laurel	4.0	1	12	N 3.0 E 0.0 S 0.5 W 4.0	1.5	1.0	Early Mature	Good		6.5	1.4		C	2
T5	1	*Taxus baccata* Yew	8.0	5	23	N 3.5 E 4.0 S 3.0 W 3.0	1.0	2.0	Early Mature	Fair		72.2	4.8		C	2
T6	1	*Taxus baccata* Yew	5.5	6	12	N 3.0 E 3.0 S 3.0 W 3.0	1.0	2.0	Early Mature	Fair		39.1	3.5		C	2
T7	1	*Cupressus sp.* Cypress sp.	8.0	1	20	N 1.5 E 1.0 S 2.0 W 1.0	2.0	2.0	Early Mature	Fair		18.1	2.4		C	2
T8	1	*Prunus cerasifera* Cherry Plum (Myrobalan)	6.0	3	16	N 1.5 E 3.0 S 4.5 W 2.5	1.5	2.0	Early Mature	Poor					U	
T9	1	*Tilia sp.* Lime sp.	12.5	1	56	N 4.5 E 4.5 S 4.5 W 4.5	2.0	4.5	Early Mature	Poor		141.9	6.7		C	2
T11	1	*Acer pseudoplatanus* Sycamore	12.5	1	39	N 5.5 E 5.0 S 5.0 W 4.5	2.5	4.0	Early Mature	Fair		68.8	4.7		C	2
T12	1	*Cupressus sp.* Cypress sp.	5.0	1	9	N 1.5 E 1.5 S 1.5 W 1.5	0.5	2.0	Semi Mature	Fair		3.7	1.1		C	2

The Danish Church, London, NW1 4HH
Tree Survey BS5837-2012

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T13	1	*Acer pseudoplatanus* Sycamore	7.0	4	12	N 5.0 E 3.0 S 5.0 W 5.0	2.0	2.5	Early Mature	Fair	Not on topographical survey, plotted freehand.				U	
T14	1	*Quercus cerris* Turkey Oak	15.0	1	101	N 4.5 E 5.0 S 6.0 W 5.0	2.0	4.0	Mature	Fair		461.5	12.1		C	2
T15	1	*Laurocerasus officinalis* Cherry Laurel	4.0	2	8	N 3.0 E 2.5 S 0.0 W 2.0	1.0	2.0	Semi Mature	Fair	Not on topographical survey, plotted freehand.				U	
T17	1	*Ilex aquifolium* Holly	6.0	1	20	N 3.0 E 3.0 S 3.0 W 3.0	2.0	3.0	Early Mature	Fair		18.1	2.4		C	2
T18	1	*Crataegus monogyna* Common Hawthorn/Quick/May	4.5	2	19	N 3.0 E 2.5 S 2.5 W 2.5	2.0	2.0	Early Mature	Poor					U	
T19	1	*Laurocerasus officinalis* Cherry Laurel	7.0	1	14	N 0.0 E 3.0 S 3.5 W 3.0	3.0	2.5	Early Mature	Good	Not on topographical survey, plotted freehand.	8.9	1.7		C	2
T21	1	*Laurocerasus officinalis* Cherry Laurel	7.0	2	14	N 3.5 E 3.5 S 1.0 W 3.5	3.0	2.0	Early Mature	Good	Not on topographical survey, plotted freehand.	17.7	2.4		C	2
T22	1	*Ligustrum sp.* Privet sp.	4.5	2	17	N 2.5 E 6.0 S 3.0 W 1.0	2.0	2.0	Early Mature	Good		26.1	2.9		C	2
T23	1	*Betula sp.* Birch	7.5	1	10	N 2.5 E 2.5 S 2.5 W 2.5	2.0	2.0	Semi Mature	Good	Tree in neighbouring property.	4.5	1.2		B	2
T24	1	*Betula sp.* Birch	7.5	1	10	N 2.5 E 2.5 S 2.5 W 2.5	2.0	2.0	Semi Mature	Good	Tree in neighbouring property.	4.5	1.2		B	2

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Tree Survey BS5837-2012

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Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)	Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T25	1	*Cotoneaster sp.* Tree Cotoneaster	4.0	2	7	N E S W 2.0 3.0 0.5 1.5	0.5	1.5	Semi Mature	Good		3.8	1.1		C	2
T26	1	*Acer pseudoplatanus* Sycamore	18.0	1	71	N E S W 7.0 8.0 7.0 7.0	4.0	5.0	Early Mature	Fair		228.0	8.5		B	2

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 estimated to the nearest metre. 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 estimated to the nearest 5cm, measured at approximately 1.5m above ground level. Estimated diameter taken at the base for multi-stemmed trees. 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	Description of the tree or trees within a group in terms of basic features and morphology as well as structural and physiological attributes, together with a description of the context in which the tree is growing; specifically growing conditions and other site features pertinent to potential development proposals.
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 in metres of the RPA, 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.