HAMPTON WATER TREATMENT WORKS, UPPER SUNBURY ROAD, HAMPTON

TREE SURVEY & ARBORICULTURAL IMPACT ASSESSMENT

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Tree Survey & Arboricultural Impact Assessment
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Quality Management

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1 INTRODUCTION

1.1 This Tree Survey and Arboricultural Impact Assessment (AIA) has been prepared by RPS on behalf of Waterfall Planning Ltd to support their development proposals at Upper Sudbury Road, Hampton, TW12 2DS.

1.2 A tree survey of the application area was carried out by RPS on 12 June 2019 in accordance with the requirements of BS5837:2012 Trees In Relation to Design, Demolition and Construction – Recommendations.

1.3 The purpose of this report is to:

- Provide an assessment of the quality of the surveyed trees with reference to the categories and sub-categories listed within Table 1 - BS5837:2012 Trees In Relation to Design, Demolition and Construction – Recommendations.
- Assess and quantify the arboricultural impact of the proposed development within the survey area, based on the proposed development layout.
- Provide additional arboricultural information and advice in relation to the protection of trees throughout the development of the site.
- Provide a Tree Protection Plan to detail the proposed protective measures to be taken in respect of the trees during development of the site.

1.4 The Tree Retention / Removal Plan JSL3365_701D included at Appendix C identifies the following:

- Trees to be retained;
- Trees requiring removal and;
- Root Protection Area (RPA) of trees.

1.5 The Tree Removal / Retention Plan shall be made available to all relevant site operatives prior to and throughout the construction process, so they understand the scope and importance of the tree protection measures.

1.6 To minimise the potential for harm to occur to retained trees all works shall be carried out with regard to an accompanying Arboricultural Method Statement where Tree Protection Measures and construction techniques would be detailed.

1.7 In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing will minimise the potential for harm to occur to retained trees.

2 SITE INFORMATION

2.1 The survey area comprises of The Hampton Waterworks which comprise three existing buildings and two residential cottages. The site is located on the south side of Upper Sudbury Road and north of the River Thames in Hampton.

2.2 The site is approximately centred on OS grid reference TQ13441 69500.

2.3 The soilscape of the area within which the survey site is located typically comprises 'Freely draining slightly acidic loamy soils.'[1]

2.4 The surrounding area comprises of The Hampton Waterworks to the south and east and residential building to the north and west. A local school, care home, library and Hampton train station can be found nearby.

3 TREE SURVEY METHODOLOGY (BS5837:2012)

3.1 This tree survey was carried out by Stefan Kowalczyk for RPS Group.

3.2 The report and survey were carried out in general accordance with the requirements set out in BS 5837:2012 "*Trees in Relation to Design, Demolition and Construction – Recommendations*[2]".

3.3 The tree survey involved a visual inspection from the ground of individual specimens and groups of trees in order to record their amenity value, management recommendations and dimensions. Where observed, the general condition of all the trees has been noted. The survey does not constitute a full arboricultural condition assessment involving the detailed inspection of trees in relation to their structural condition, decay, and any other physical and pathogenic defects.

3.4 The locations of the trees were based upon topographical survey supplied by the client from M.J. Rees and Company Ltd, Job Number 8245, September 2014.

3.5 The survey assesses individual trees and groups of trees for quality and benefits within the context of proposed development. The quality of each tree or group of trees has been recorded by allocating it to one of four categories as described in table 1. These categories have been differentiated on the tree survey plan (JSL3365_700, Appendix B) by colours.

3.6 The survey information was recorded on the attached Tree Survey Schedule (Appendix A) in general accordance with the guidance contained within Section 4 of BS 5837:2012[2].

3.7 The information recorded is detailed in Table 1 on the following page.

Table 1 Tree characteristics recorded during survey

Tree Ref No:	Sequential reference number of trees or groups of trees. Avenues, woodlands and hedgerows were also recorded on the tree survey plan. # - denotes trees in an estimated location (best estimates are made about the location). *- Denotes an offsite tree (Best estimates are made about physical characteristics and dimensions).		
Species	Species listed by common name, with scientific names (italic lettering).		
Height (m)	Estimated height of canopy to nearest metre.		
Crown Spread	Crown spread, taken as a minimum at the four cardinal points, to derive an accurate representation of the crown		
Stem diameter @ 1.5 m (m)	Measured diameter of trunk at 1.5 m above ground level in metres unless otherwise indicated, multi-stemmed trees being measured in accordance with Annex C: BS5837		
Existing height above ground level	To inform on ground clearance, crown/stem ratio and shading the estimated height of the first significant branch and direction of growth and canopy above ground level.		
Stem No.	Number of stems (if necessary) of individual tree.		
Life Stage	Expressed as:-	Y (Young) SM (Semi-mature) EM (Early mature) M (Mature)	OM (Over-mature) V (Veteran) D (Dead)
Structural/ Physiological Condition	Apparent condition expressed as the following categories, based upon a brief visual inspection from the ground only:-		Good Fair Poor Dead
Comments / Management Recommendations	General observations, particularly of structural and/or physiological condition (e.g. the presence of any decay and physical defect), and/or preliminary management recommendations and potential for wildlife habitats (not exhaustive).		
Estimated remaining contribution (years)	Estimated remaining contribution, in years (<10, 10+,20+,40+)		
Tree Quality Assessment Value: **Category**	Criteria grading with regards to Table 1: BS 5837:2012, expressed as:-	**A** (Trees/Vegetation of high quality and value) **B** (Trees/Vegetation of moderate quality and value) **C** (Trees/Vegetation of low quality and value) **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)	
	* Category U trees can have existing or potential conservation value which might be desirable to preserve.		
Tree Quality Assessment Value: Sub - Category	Criteria grading with regards to Table 1: BS 5837:2012, expressed as:-	**1** (Trees with mainly *arboricultural* value) **2** (Trees with mainly *landscape* value) **3** (Trees with mainly *cultural / conservation* value)	

3.8 A glossary of arboricultural terms is included in Appendix I.

Limitations

3.9 The findings of this survey are not valid following adverse or unpredictable weather conditions or for any failure due to 'force majeure' or unpredictable events.

3.10 Trees were not climbed or inspected below ground level and inaccessible trees will have best estimates made about the location, physical dimensions and characteristics.

3.11 Trees and woody vegetation were not assessed for their potential impact upon future construction issues such as foundation designs (re: NHBC chapter 4.23). Whilst this report may assist in assessing likely future impacts, it should not be classed as a comprehensive vegetation survey in relation to impact upon future designs.

4 SUMMARY OF FINDINGS

Generally

4.1 During the survey, 11 nr. individual trees and 2 nr. tree groups were recorded.

4.2 The north of the site is where the majority of trees were identified as requiring material consideration through planning. Three large and good quality trees were identified - T1 (offsite), T3 and T10, all affording a high degree of public visual amenity due to their location. Together, these formed a linear group, adding to the visual amenity of the area. Each of these trees were deemed to be of moderate retention value (Category B).

4.3 Remaining trees other than the described category B trees above were of low quality, either self-seeded Sycamore and/or Ash with some planted conifer. These trees were all awarded category C as low quality tree that should not unnecessarily restrict development.

4.4 One category A (T11) tree was identify in this study. This tree is protected by law under the Tree Preservation Order legislation, it is however located offsite and is far enough away from any development proposals to be impacted.

4.5 No category U trees were observed in this survey.

Planning considerations

4.6 The survey site falls within the boundaries of London Brough of Richmond upon Thames. A desktop investigation carried out on 15.08.2022, confirmed that the site is located within **Conservation Area No.12, Hampton Village**[1]. The area was designated 14.01.1969 and extended in 1982 and 1991. Further details of the conservation area can be found on the Local Councils website - https://www.richmond.gov.uk/my_richmond?pid=100023685002#my_conservation

4.7 The conservation area protects any tree over 75mm in diameter measured at 1.5m above ground level. The Local Planning Authority must first be notified of any tree works to trees fulfilling these criteria through the submission of a section 211 notice. The removal of dead and imminently dangerous branches/trees are exempt from this legislation.

4.8 A request (28.06.2019) for **Tree Preservation Order (TPO)** information was sent to the LPA, confirmation was received of TPO affecting an offsite Lime Tree – T11 (see appendix H). Any works to this tree must first be approved by the rightful owner and granted permission from the Local Planning Authority.

4.9 There are no current ancient woodlands[2] within the survey site.

4.10 The wildlife and Countryside Act 1981, as amended by the Countryside and Right of Way Act 2000, provided statutory protection to birds, bats and other species that inhabit tree. In addition, European Protected Species legislation places a duty upon landowners to ensure

[1] https://mapping.richmond.gov.uk/map/Aurora.svc/run?script=%5CAurora%5Cpublic_Richmond.AuroraScript%24&nocache=e1f776ab-9778-f492-7bc0-77311fa86c88&resize=always&show_layers=LBR_CA

[2] https://magic.defra.gov.uk/

that best practise is followed, or an appropriate licence issued prior to any works commencing which may affect bats, reptiles or dormice. These could impose constraints on the use and timing of access to the site in addition to any of the tree matters considered in this report.

4.11 Under the UK planning system, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by a tree preservation order or by their inclusion within a conservation area) or not, is a material consideration that is taken into account in dealing with planning applications.

4.12 Trees can offer many benefits, including the provision of visual amenity, softening or complementing the effect of the built environment, and adding maturity to new developments by making places more comfortable in tangible ways e.g. contributing screening and shade, reducing wind speed and turbulence, intercepting snow and rainfall, and reducing glare.

4.13 Particular care is needed regarding the retention of large, mature trees which become enclosed within the new development. Where such trees are retained, adequate space should be allowed for their long-term physical retention and future maintenance.

Planning Policy

London Plan 2021

4.14

Policy G7 Trees and woodlands

A London's urban forest and woodlands should be protected and maintained, and new trees and woodlands should be planted in appropriate locations in order to increase the extent of London's urban forest – the area of London under the canopy of trees.

B In their Development Plans, boroughs should:

1) protect 'veteran' trees and ancient woodland where these are not already part of a protected site[139]
2) identify opportunities for tree planting in strategic locations.

C Development proposals should ensure that, wherever possible, existing trees of value are retained.[140] If planning permission is granted that necessitates the removal of trees there should be adequate replacement based on the existing value of the benefits of the trees removed, determined by, for example, i-tree or CAVAT or another appropriate valuation system. The planting of additional trees should generally be included in new developments – particularly large-canopied species which provide a wider range of benefits because of the larger surface area of their canopy.

139 Forestry Commission/Natural England (2018): Ancient woodland and veteran trees; protecting them from development, https://www.gov.uk/guidance/planning-applications-affecting-trees-and-woodland

140 Category A, B and lesser category trees where these are considered by the local planning authority to be of importance to amenity and biodiversity, as defined by BS 5837:2012

London Borough of Richmond Upon Thames Local Plan 2018

4.15

Policy LP 16

Trees, Woodlands and Landscape

A. The Council will require the protection of existing trees and the provision of new trees, shrubs and other vegetation of landscape significance that complement existing, or create new, high quality green areas, which deliver amenity and biodiversity benefits.

B. To ensure development protects, respects, contributes to and enhances trees and landscapes, the Council, when assessing development proposals, will:

Trees and Woodlands

1. resist the loss of trees, including aged or veteran trees, unless the tree is dead, dying or dangerous; or the tree is causing significant damage to adjacent structures; or the tree has little or no amenity value; or felling is for reasons of good arboricultural practice; resist development that would result in the loss or deterioration of irreplaceable habitat such as ancient woodland;
2. resist development which results in the damage or loss of trees that are considered to be of townscape or amenity value; the Council will require that site design or layout ensures a harmonious relationship between trees and their surroundings and will resist development which will be likely to result in pressure to significantly prune or remove trees;
3. require, where practicable, an appropriate replacement for any tree that is felled; a financial contribution to the provision for an off-site tree in line with the monetary value of the existing tree to be felled will be required in line with the 'Capital Asset Value for Amenity Trees' (CAVAT);
4. require new trees to be of a suitable species for the location in terms of height and root spread, taking account of space required for trees to mature; the use of native species is encouraged where appropriate;
5. require that trees are adequately protected throughout the course of development, in accordance with British Standard 5837 (Trees in relation to design, demolition and construction – Recommendations).

The Council may serve Tree Preservation Orders or attach planning conditions to protect trees considered to be of value to the townscape and amenity and which are threatened by development.

Landscape

1. require the retention of important existing landscape features where practicable;
2. require landscape design and materials to be of high quality and compatible with the surrounding landscape and character; and
3. encourage planting, including new trees, shrubs and other significant vegetation where appropriate.

Design and Site Layout Considerations

4.16 A tree constraints plan defines the Root Protection Area (RPA) for each tree shown as a circle. This area may be adjusted should physical constraints or topographical features limit root activity in a particular area, however, the total area should remain the same. Prior to any adjustment of the tree's RPA zones the changes should be assessed by an Arboricultural Consultant. During any site planning exercises the current and future growth potential of the trees should be considered.

4.17 The RPA for single stem trees broadly equates to a radius 12 times the stem diameter of the tree at 1.5m above ground level or the extent of canopy spread, whichever is the greater. For multi-stemmed, low branching trees or those with trunks with an irregular girth the point of

stem diameter measurement is adjusted in consideration of these factors and in accordance with the illustrations in BS5837:2012 (Annex C).

4.18 The RPA for trees to be retained and protected should become an exclusion zone during construction works and for any development. It should be fenced-off and protected in accordance with BS5837:2012. The canopy is likewise susceptible to damage during construction work and requires similar protection.

4.19 No activities that result in excavations, changes in level or soil compaction should take place within the RPA of any retained trees, especially older mature trees. This would include the storage of materials, any construction work, trafficking by vehicles or even excessive trafficking by pedestrians.

4.20 If some form of construction has to take place within the RPA then certain measures need to be adopted to avoid disturbance or damage to the roots and to maintain moisture infiltration and gaseous diffusion into the soil.

Installation of Underground Services

4.21 Services should be routed outside the existing or potential root zone of trees. Where it is unavoidable, then the project arboricultural consultant and local authority must first be notified prior to any tree protection barrier removal and following details adhered to.

4.22 The location and siting of new facilities near trees should consider the potential impact on and conflict with both tree roots and canopy. This should take into account the ultimate size of existing young and middle-aged trees at maturity

4.23 Trenching for the installation of underground services will sever any roots present and is likely to adversely affect the health trees by altering the local soil hydrology.

4.24 At all times where underground services are to be directed through RPA's, detailed plans showing the proposed route shall be drawn up in collaboration with the Arboricultural Consultant.

4.25 BS5837:2012 provides a summary of trenchless solution for differing utilities to be installed without the need for significant impact to RPA's. The type of technique employed shall be the decision and responsibility of the client.

4.26 For smaller operations trenching within RPAs can be achieved by using an 'air-spade' or similar. This method uses compressed air to remove soil from around roots while maintaining the large roots intact.

4.27 At all times, reference should be made to the National Joint Utilities Group Volume 4 (NJUG 4) for guidance. Any approach should first be overseen by the project Arboricultural Consultant and presented to the Local Authority Tree Officer for consideration.

Trees and Management of Health and Safety

It is recommended that a programme of periodic arboricultural assessments be undertaken in order to regularly assess the full health and safety of all trees both in full leaf and bare stemmed. The assessments should prioritise areas based on levels of access and presence of target (i.e. exposure of people to hazard) and accord with arboricultural advice, taking account of relevant factors (where known) that affect safety such as the age class, condition, size and species of the trees.

5 ARBORICULTURAL IMPACT ASSESSMENT

Introduction

5.1 Trees have finite energy reserves, developed each year throughout the growing season, which are utilised for biological processes such as growth and defence against pests or diseases throughout the following year.

5.2 Any development in proximity to trees has the potential to cause harm to those trees unless control measures are identified and acted upon; as such it is essential to consider the relationship between the proposed development and the retained trees to identify what precautions are necessary, proportionate and appropriate.

5.3 Development has the potential to impact upon the above ground and below ground parts of trees. Whilst some damage that can occur, such as physical damage to the trees stems and branches from machinery movements, is clearly visible the impact from other aspects of work common on development sites which can have a significant effect upon the continued health of trees are not always immediately evident.

5.4 Damage that is not immediately evident, but which can cause long term harm to retained trees includes things such as damage to the soil structure by compaction causing root damage and levels changes altering the water table and affecting moisture availability.

5.5 To minimise the potential for harm to occur to retained trees all works must be carried out with regard to the Tree Protection measures detailed within this report.

5.6 In general, it can be seen that, by adopting appropriate methods of working, precautionary and protective measures, significant harm to retained trees can be avoided.

5.7 In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing will minimise the potential for harm to occur to retained trees during construction.

5.8 The retention and protection of the significant vegetation will assist in assimilating the proposed development into the wider landscape and offer longer term tree cover. Furthermore, redevelopment of the site may offer an excellent opportunity to actively manage the retained vegetation and accordingly we recommend restorative tree works be undertaken. This will further improve the amenity value and landscape setting of the site and increase the useful life of the trees.

Brief Description of Proposed Development

5.9 This report relates to the following:

- Conversion and extension of the site including Ruston and Karslake Buildings to provide 36 no. residential units (Use Class C3) and 306sqm flexible business space (Use Class E(g)), associated car parking, access and landscaping works.

Statutory Tree Protection

5.10 The survey site falls within the boundaries of London Brough of Richmond upon Thames. A desktop investigation carried out on 15.08.2022, confirmed that the site is located within **Conservation Area No.12, Hampton Village**. The area was designated 14.01.1969 and

extended in 1982 and 1991. Further details of the conservation area can be found on the Local Councils website - https://www.richmond.gov.uk/my_richmond?pid=100023685002#my_conservation

5.11 The conservation area protects any tree over 75mm in diameter measured at 1.5m above ground level. The Local Planning Authority must first be notified of any tree works to trees fulfilling these criteria through the submission of a section 211 notice. The removal of dead and imminently dangerous branches/trees are exempt from this legislation.

5.12 One **Tree Preservation Order (TPO)** was identified and affects an offsite Lime Tree – T11. Any works to this tree must first be approved by the rightful owner and granted permission from the Local Planning Authority. Any works to this tree that are not exempt must first be approved by the rightful owner and granted permission from the Local Planning Authority.

5.13 There are no current ancient woodlands within the survey site.

5.14 Trees may have the potential to provide valuable habitat for significant and/or protected species. It is recommended that consideration be given to the requirement for ecological surveys.

Root Protection Areas

5.15 Root Protection Areas for each tree and group of trees surveyed have been determined in accordance with BS5837:2012.

5.16 A 'No-dig' style of construction is required in new construction areas beside retained trees, see appendix E of this report for further detail.

5.17 The control measures are set out in the following sections of this document

Outline of Impact on Trees

5.18 Construction activity within the RPAs of retained trees – T1*#(offsite) and T3.

5.19 T1*# has a proposed elevated shared garden space that is existing and will remain as it is.

5.20 Where the proposed bin store and car parking spaces 20 and 21 are within the RPA of T3, it should be constructed in a 'no dig' style, where existing soil levels are retained, and no positive soil excavation shall occur at all. New surfacing works shall the use of suitable permeable, load distribution systems shall be employed such as 'Cellweb' (or similar and equal system). Furthermore, timber edging will be used instead of concrete edging/ haunching.

5.21 Trees proposed for removal which should not pose a constraint to development due to being low quality and relatively easily replaceable are as follows;

- T4, T5, T6, T7, T8, T9 – category C trees and,
- G1 – Category C

5.22 Good quality trees lost to the development footprint:

- T10 – Category B

5.23 In order to mitigate the loss of trees proposals for new tree planting should be detailed in a Landscape Plan at the appropriate stage of the project.

5.24 An improvement to the area beneath T1*# to the east is proposed to become garden space. Existing levels should be utilised in order to achieve this proposal when within the RPA.

5.25 Works within the RPA of T3 propose a change in the existing ground conditions however, all works are likely possible by working with exiting levels and not decreasing levels.

5.26 Access to the stem of T3 was not possible so a detailed assessment of the ground conditions was not undertaken however, subject to detailed design, car parking and bin stores can be constructed above ground and possibly within and area of existing hardstanding.

5.27 Services shall be routed outside the existing or potential root zone of trees. Where it is unavoidable, then hand excavation shall be employed to avoid damage to the larger roots and the services slid through or below the root system. Ducting shall be used to carry cables. Reference shall be made to the recommendations included within Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (NJUG 4)[3].

5.28 Details of Tree Protection Fencing and ground protection are detailed in the following section of this document.

5.29 The RPA should become an exclusion zone during construction works and for any development. It should be fenced-off and protected in accordance with BS5837:2012. The canopy is likewise susceptible to damage during construction work and requires similar protection.

5.30 No activities that result in excavations, changes in level or soil compaction should take place within the RPA of any retained trees, especially older mature trees. This would include the storage of materials, any construction work, trafficking by vehicles or even excessive trafficking by pedestrians.

5.31 The location and siting of new facilities near trees should consider the potential impact on and conflict with both tree roots and canopy. This should take into account the ultimate size of existing young and middle-aged trees at maturity. Conversely the impact of the tree on the activities should also be considered with regard to obstruction, shading, leaf fall and root action. These are problems that can be managed provided sufficient space is allowed for.

5.32 Where works within the RPA are unavoidable works must be undertaken by hand and the soil levels should be carefully reduced by hand to avoid damage to the bark of larger roots directly beneath and adjacent to the excavation. Where these become exposed, they should be further protected from drying out. Where root pruning is unavoidable it should be made at a suitable place within the root system, avoiding damage to surrounding tissue in accordance with BS 3998:2010. Final pruning cuts shall be made at right angles to the axis of the root and the final cut wound should be smooth and as small as possible, free from ragged torn ends.

5.33 To minimise harm occurring as a result of the works existing hardstanding should be reused. Any necessary hard surface removal within the Root Protection Area (RPA) shall be carried out by low impact hand held pneumatic tools. Removal of the surface shall occur in strips working from the undisturbed surface, working in a retreating manner away from the retained trees. Subsequent removal of arisings / debris shall also be carried out by hand.

5.34 Some existing areas of hardstanding within the area of the proposed development can be restored to soft landscaping. When restoring hard landscaping into soft landscaping within the

[3] NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees – Volume 4 (2007)

RPA of trees, breaking out with handheld machinery in a retreating manor is essential to not cause unnecessary disruption or damage to any roots that may be unearthed.

5.35 The restoration from hard landscaping to soft will help to benefit the tree by providing an increased area for potential rooting and allow for increased gaseous exchange through the soil.

5.36 Where excavation is required within the RPA and is unavoidable, in some locations it has been recommended that excavation be completed by hand to ensure that any roots are uncovered and pruned with hand tools to allow for minimal impact for the tree.

6 TREE WORKS

Standard of Work

6.1 All tree works shall be carried out in accordance with BS3998:2010 and latest arboricultural best practice.

6.2 All tree work shall be carried out by suitably qualified, competent and insured arboricultural contractors in accordance with Arboricultural Association Standard Conditions of Contract and Specifications for Tree Works (2008) Edition and BS 3998:2010 Tree Work.

6.3 All green and woody waste generated by the tree works shall be removed from site and disposed of in an environmentally sustainable manner.

6.4 When a branch is removed at its point of attachment, injury of the wood and bark of the parent stem or branch above the cut shall be avoided. If a branch collar is visible, the final cut shall be just outside it and care shall be taken to avoid tearing retained wood and bark when the cut is made. Preliminary cuts shall be made, if necessary, so as to remove weight, before a final cut is made. Care shall be taken to prevent falling branches from harming other parts of the tree (including its roots), its surroundings, people or property. Heavy branches shall be removed in sections and, where necessary, shall be lowered with ropes.

6.5 Prior to the commencement of any tree works an appropriate risk assessment shall be produced to describe the measures required to fulfil the statutory safety obligations. It shall aim to identify and prioritise the necessary control measures and precautions.

6.6 Following the works, it is recommended that the trees are monitored on a regular basis to ensure their ongoing vitality and health. These inspections shall be completed by a suitably qualified and experienced person.

Timing of Works

6.7 All tree works, and tree protection measures shall be completed prior to commencement of any construction and enabling works on the site.

6.8 All works shall be timed to have regard to the phenological cycles of protected species that are associated with trees; notably birds and bats.

6.9 Selective pruning shall be undertaken with regard to the phenological cycle of trees, i.e. when energy reserves are highest; generally observed to be late winter before budburst (optimal), or mid-summer before leaf drop, dependent on species.

6.10 Nesting birds are protected by law and any removal / tree works should not be carried out during the bird nesting season (March-August inclusive). Should any vegetation be outlined for removal during this period, then an ecological inspection would be required to check that no nesting birds are present. Should checks reveal nesting birds the vegetation must remain until September or until an ecologist has certified that the fledglings have left the nest.

6.11 Similarly bats and bat roots are also protected by law and the advice of an ecologist should be sought prior to removing any trees.

7 TREE PROTECTION MEASURES

Construction Exclusion Zone

7.1 The Construction Exclusion Zone (CEZ) shall be defined by the protection fence line as shown on the Tree Retention / Removal Plan JSL3365_701C.

7.2 The tree protection fence shall be erected prior to any works commencing on site (including site clearance an enabling works) and shall remain in place until after all construction activities have been completed and then only with the prior approval of the arboricultural consultant.

7.3 This CEZ shall not be disturbed, and the protective fencing shall not be moved or taken down at any time.

7.4 Within the Construction Exclusion Zone there must be no mechanical digging or scraping, no alteration to existing ground levels including soil stripping, no earthworks, no handling or discharge of any chemical substance, concrete washings or of any fuels.

7.5 Vehicular or pedestrian access and the storage of any materials is prohibited within the CEZ.

7.6 No materials that may contaminate the soil such as concrete mixings, diesel oil and vehicle washings shall be discharged within 10m of the stem of any tree and no fires shall be lit within 10m of the maximum extent of a trees crown.

Tree Protection Fencing

7.7 The tree protection fence shall be erected as shown on the Tree Protection Plan included with is report.

7.8 Two phases of protective fencing have been specified – phase one and two shall be constructed at the beginning of the project. Only when the landscaping works begin will the phase one protective fencing be removed. All other protective fencing must remain in situ for the duration of the project. This will allow the hard and soft landscape to be constructed in line with the guidelines set out in appendix D of this report.

7.9 The fence line shown is the minimum required and the length of the fence shall be extended or adjusted on site as agreed with the Arboricultural Consultant to ensure satisfactory protection of all retained trees and RPAs.

7.10 Where proposed (permanent) construction site-hoarding provides the same level of protection to the retained trees and RPAs as the proposed tree protection fence, subject to agreement with the Arboricultural Consultant, the hoarding may serve as the tree protection fence. Notwithstanding, depending on the form and alignment of the construction site-hoarding it may be necessary to provide additional tree protection fence to ensure adequate protection of retained trees and RPAs as shown on the Tree Retention / Removal Plan.

7.11 Unless otherwise agreed in writing with the Arboricultural Consultant and/or LPA Tree Officer, the fencing system to be utilised shall be in accordance with Appendix D and compliant with BS5837:2012.

7.12 Once the protective barrier is in place it must remain in situ throughout the course of the development until the completion of development, other than to facilitate agreed tree removal; see below or, landscaping works.

7.13 Where necessary, tree protection fencing may be temporarily re-aligned in order to facilitate tree removal. Fencing is to be re-instated immediately following removal in a manner that encompasses the remaining trees and their respective RPAs. During tree removal, no wheeled or tracked machinery is to enter the area previously encompassed by tree protective fencing as shown in the Tree Protection Plan.

7.14 Copies of the Tree Retention & Removal Plan shall be placed in the site office for reference by all site staff.

7.15 Signs detailing the purpose of the protective barrier shall be attached to the barriers at 10m intervals. Such signs should be weatherproof and shall be substantially in the form of the specimen provided at Appendix G. Signs must be replaced as necessary should they be removed or become illegible.

7.16 Following erection of the protective barriers and prior to commencement of the development it is recommended that an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, is arranged to confirm fencing has been installed in accordance with the Tree Removal & Protection Plan and that any relevant arboreal conditions attached to the planning consent have been met.

Site Compounds and Materials Stores

7.17 Activities related to the establishment of a temporary site compound have the potential to impact upon retained trees by various means. In particular the storage and mixing of chemicals and materials such as concrete can have a damaging effect on tree health if precautions are not taken.

7.18 To prevent harm occurring to trees, provision for materials storage, deliveries and other related activities shall be made available in areas away from retained trees.

7.19 Under no circumstances shall materials or plant be stored beneath the canopy or within or abutting the Root Protection Zone of any retained trees/hedges, whether fenced or not.

Monitoring

7.20 Following erection of the protective fencing and prior to commencement of the development an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, should be arranged to confirm fencing has been installed in accordance with the Tree Protection Plan and any relevant conditions that may be attached to a grant of planning consent for the development.

7.21 Further monitoring visits shall be carried out following implementation of the works on site, ideally on at least a monthly basis.

Reporting

7.22 Should any arboricultural issues become apparent during the works the site manager should immediately contact the Arboricultural Consultant or the Council's Tree Officer for advice upon how to proceed.

8 REFERENCES

[1] British Standards Institute. *British Standard (BS5837) Trees in Relation to Design, Demolition and Construction - Recommendations*. 2012.

[2] Magic map application. [Online].Available at: https://magic.defra.gov.uk/magicmap.aspx (Accessed 09/10/2019)

[3]NHBC. 'Chapter 4.2- Building Near Trees'. *NHBC Standards 2016.* 2016.

[4] Richmond upon Thames conservation area maps available at: https://www.richmond.gov.uk/myrichmond?USRN=22401189&findproperty=Go&ufprt=FAD4A0A98A3EF382417E572A6EEE9341481B7C48331BDEFBD0D698BA84B7A40CC711BC3C0E1F4708F8D6924E65351488E0B8BE84C45C2DE8CFB30DBF4B7DB63228963D5C5735B5F7EA144CE5E4BD14C8961E2263AF9E107A0F8EBBF1CF7806926873538A4BA114447CFBECABE80828206147C0A05CB786D481CAF8B86006CF4949B995044FA42AC549A725F5413E0E12BDF4CF8A1D937D675A5553415C7B75A1. (Accessed 09/10/2019)

[5]The National Joint Utility group. *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.* [Online]. Available at: http://streetworks.org.uk/wp-content/uploads/V4-Trees-Issue-2-16-11-2007.pdf (Accessed 05/09/2019).

APPENDICES

Appendix A

Tree Survey Data JSL3365_750

Tree Survey Schedule

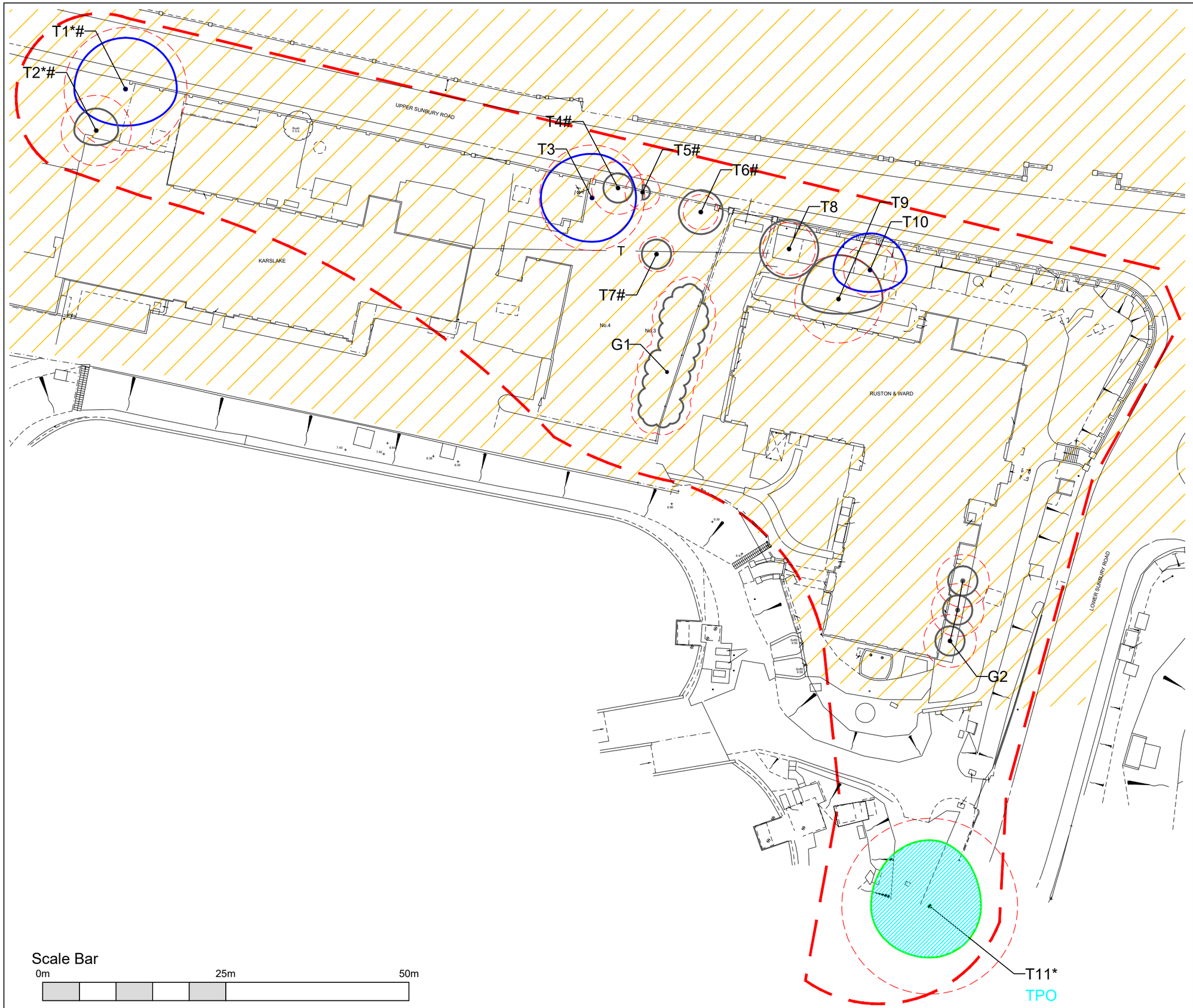
Site Ruston & Ward and Karslake Buildings, Hampton Waterworks, Upper Sudbury Rd
Surveyor: Stefan Kowalczyk
Project schedule ref: JSL3365_750
Status: For information
Drawing reference: JSL3365_700
Revision: Version 1
Survey date: 12/06/2019
Notes: Stem dia. (mm) for trees with 6 or more stems are estimated averages.

Ref. no.	Species	Height (m)	Crown spread (m)				Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural condition	Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
			N	E	S	W										
T1*#	Acer pseudoplatanus - Sycamore	15.0	7.0	7.0	5.0	7.0	0.70	1.00	3.00	W	M	G	G	Offsite*. Large open grown canopy. Stem in close proximity to boundary fence.	20+	B2
T2*#	Taxus baccata - Common Yew	5.0	3.0	3.0	2.0	3.0	0.40	1.00	2.00	N	EM	G	G	Offsite*. Close proximity to building. Growing under canopy of adjacent Sycamore T1.	10+	C2
T3	Acer pseudoplatanus - Sycamore	15.0	6.0	6.0	6.0	7.0	0.60	1.00	3.00	N	EM	F	G	Multi stemmed from 2m. Close proximity to site boundary wall.	20+	B2
T4#	Fraxinus exselsior - Common Ash	10.0	2.0	2.0	2.0	2.0	0.30	1.00	3.00	S	Y	F	G	Self set Ash sapling growing in close proximity to boundary fence.	10+	C2
T5#	Fraxinus exselsior - Common Ash	10.0	1.0	1.0	1.0	0.0	0.20	1.00	1.00	E	Y	F	G	Self set Ash sapling growing in close proximity to boundary fence.	10+	C2
T6#	Acer pseudoplatanus - Sycamore	10.0	3.0	3.0	3.0	3.0	0.20	*4	2.00	N	Y	F	G	Self set Sycamore sapling. Unremarkable.	10+	C2
T7#	Chamaecyparis lawsoniana - Lawson Cypress	10.0	2.0	2.0	2.0	2.0	0.20	1.00	0.00	N	EM	G	G	Individual conifer growing under and into utility line.	10+	C2
T8	Cotoneaster cornubia - Cornubia	5.0	4.0	4.0	4.0	4.0	0.30	1.00	2.00	S	M	G	P	Small ornamental tree. Sparse canopy, obvious dieback.	<10	C2
T9	Ilex aquafolium - Common Holly	10.0	6.0	6.0	2.0	5.0	0.50	1.00	2.00	N	M	G	G	Open grown holly adjacent building in shrub bed.	10+	C2
T10	Laurus nobilis - Bay Laurel	10.0	5.0	5.0	3.0	5.0	0.30	x 8	2.00	N	M	G	G	Good public visual amenity. Multi-stemmed from ground level.	20+	B2
T11*	Tilia cordata - Small leaved Lime	15.0	1.0	7.0	7.0	8.0	1.00	1.00	3.00	N	M	G	G	Offsite*. One of a mature avenue of Lime trees along Lower Sudbury Road.	40+	A2
G1#	Chamaecyparis lawsoniana - Lawson Cypress	10.0	2.0	2.0	2.0	2.0	0.30	approx 9	2.00	N	M	F	P	Linier group of conifers growing along fence line. Poor vitality. Low amenity value.	<10	C2
G2	Taxus baccata 'Fastigiata' - Irish Yew	10.0	2.0	2.0	2.0	2.0	0.30	3 trees	0.00	N	M	G	G	3 mature Irish Yew Trees growing together and immediately adjacent the building. Good amenity value as viewed from Lower Sudbury Road.	10+	C2

Note: This survey is based on a brief visual inspection from the ground.
It is not intended as a full arboricultural inspection.
- Indicates estimated tree. * - Indicates off site tree.

Appendix B

Tree Survey Plan/s JSL3365_700



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Notes

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Key

N

- Survey boundary.
- T1 — Tree with numbered reference. Canopy spread and BS5837:2012 tree quality category as shown below.
- T1# — Tree (location estimated) with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- T1* — Tree off-site with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- G1 — Vegetation group with numbered reference. Canopy extents and BS5837:2012 tree quality category as shown below.

BS 5837:2012 Tree Quality Categories - Table 1

- Category A - High quality
- Category B - Moderate quality
- Category C - Low quality
- Category U - Unsuitable for retention

- Root protection area (RPA) Calculated in accordance with Section 4.6 - BS5837:2012
- Hampton Village Conservation Area
- T1 — Tree protected by London Borough of Richmond upon Thames Tree Preservation Order.

NOTES:

- Refer to RPS Tree Survey Report & Schedule for further details.
- Survey based on a visual inspection from the ground and is not intended as a full arboricultural inspection.
- Plan produced in accordance with recommendations set out in BS 5837:2012 - 'Trees in Relation to design, demolition and construction'.
- Due to the legal protection afforded to breeding birds vegetation removal should not take place during the bird nesting period; generally, although not restricted to, March - August inclusive.
- Survey based upon topographic survey produced by M.J.REES and COMPANY Ltd. Chartered Land Surveyors in Bristol, October 2014.

Rev	Description	By	CB	Date

Scale Bar

0m 25m 50m

MAKING COMPLEX EASY

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Client: Waterfall Hampton Investment Limited

Project: Ruston & Ward and Karslake Buildings, Hampton Waterworks Upper Sudbury Road, Hampton UK

Title: Tree Survey

Status	Drawn By	PM/Checked by
For information	JMB	SK

Job Ref	Scale @ A3	Date Created
JSL3365	1:500	27/06/2019

RPS Drawing / Figure Number: 700

Rev: -

rpsgroup.com

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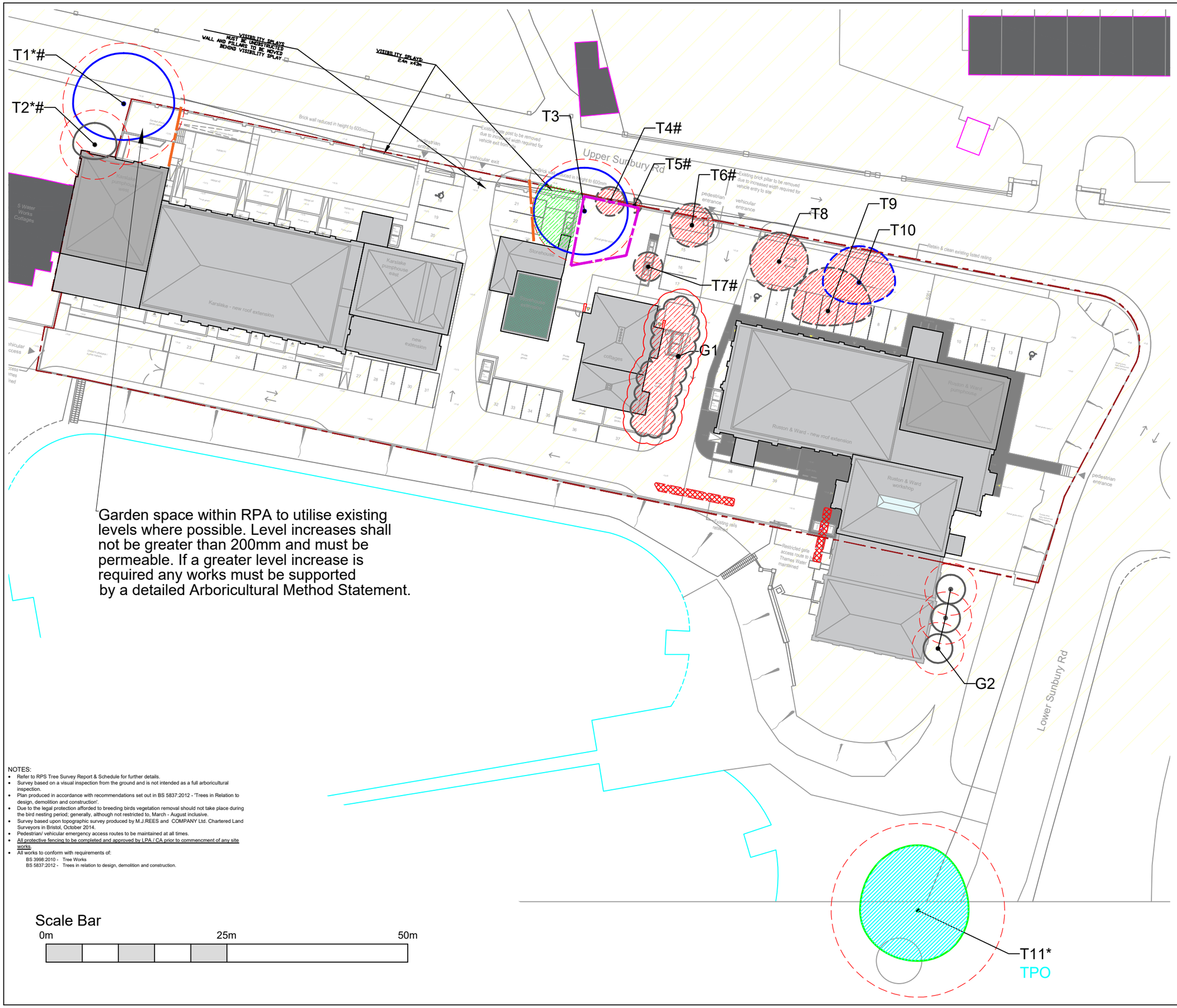
Appendix C

Tree Retention / Removal JSL3365_701D



NOTES:

- Refer to RPS Tree Survey Report & Schedule for further details.
- Survey based on a visual inspection from the ground and is not intended as a full arboricultural inspection.
- Plan produced in accordance with recommendations set out in BS 5837:2012 - 'Trees in Relation to design, demolition and construction'.
- Due to the legal protection afforded to breeding birds vegetation removal should not take place during the bird nesting period; generally, although not restricted to, March - August inclusive.
- Survey based upon topographic survey produced by M.J.REES and COMPANY Ltd. Chartered Land Surveyors in Bristol, October 2014.
- Pedestrian/ vehicular emergency access routes to be maintained at all times.
- All protective fencing to be completed and approved by LPA / CA prior to commencment of any site works.
- All works to conform with requirements of:
  - BS 3998:2010 - Tree Works
  - BS 5837:2012 - Trees in relation to design, demolition and construction.

Scale Bar

0m 25m 50m

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Notes

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Key

- Tree with numbered reference. Canopy spread and BS5837:2012 tree quality category as shown below.
- Tree (location estimated) with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- Tree off-site with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- Vegetation group with numbered reference. Canopy extents and BS5837:2012 tree quality category as shown below.

BS 5837:2012 Tree Quality Categories - Table 1

- Category A - High quality
- Category B - Moderate quality
- Category C - Low quality
- Category U - Unsuitable for retention

- Root protection area (RPA) Calculated in accordance with Section 4.6 - BS5837:2012
- Tree to be removed with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- Vegetation group or hedge to be removed with numbered reference. Canopy spread and BS5837:2012 tree quality category.
- Temporary protective fencing in accordance with Section 6.2 - BS5837:2012.
- Phase 1 tree protective fencing to be removed when car park and landscape works begin. Fence in accordance with Section 6.2 - BS5837:2012.
- Above ground construction requiring "No-dig" design principles in accordance with AA Guidance Note 12 Cellular Confinement Systems Near Trees. Works to be completed as part of landscape works after main construction works have been completed, using light/ hand tools only.
- Hampton Village Conservation Area
- Tree protected by London Borough of Richmond upon Thames Tree Preservation Order.

Rev	Description	By	CB	Date
D	Updated layout	SK	DC	Aug 20
C	Updated layout	SK	DC	May 20
B	Updated layout	AB	SK	May 20
A	Updated layout	RK	SK	May 20

MAKING COMPLEX EASY

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Client: Waterfall Hampton Investment Limited

Project: Ruston & Ward and Karslake Buildings, Hampton Waterworks Upper Sudbury Road, Hampton UK

Title: Tree Retention/ Removal Plan

Status	Drawn By	PM/Checked by
For Planning	JMB	SK

Job Ref	Scale @ A3	Date Created
JSL3365	1:500	09/10/2019

RPS Drawing / Figure Number	Rev
701	D

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Appendix D

Root Protection Area Fencing Details

Protective Fencing Specifications

Since trees are living organisms which interact with their immediate environment any changes made to their surroundings may have a bearing on that tree's future. Developing a site will undoubtedly place any trees within close proximity under some level of stress, which could predispose them to infection.

The most effective way of offering protection is by erecting protective barriers set at a distance from the tree stem using the methods given within BS 5837: 2012 Trees in Relation to Construction. Barriers should be braced and constructed to resist impacts; see figures below for barrier specifications.

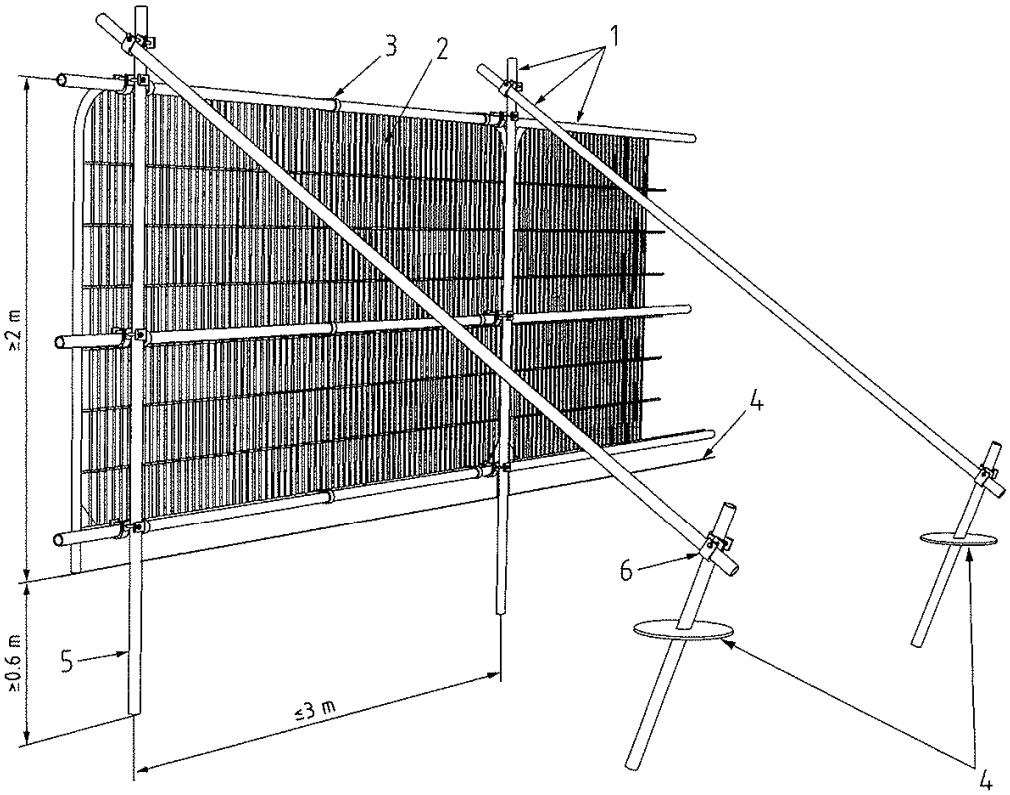
Barriers should be erected before any works commence on site with the exception of recommended tree work. Areas of retained and future structure planting should be similarly protected.

All personnel should be made aware of the protected areas and instructed to keep them free of materials, waste and excess soil. Soil disturbance should be prohibited and travel of any kind, including foot traffic should also be excluded within the root protection area (RPA) unless previously agreed and adequate ground protection has been installed. Where foot traffic is agreed within the RPA, single thickness scaffold boards laid over a compressible material on a geotextile, or supported by scaffold should suffice. Where vehicular access through the RPA is agreed an engineer should be consulted to design adequate ground protection methods.

Suggested Barrier Specification (as per BS5837: 2012)

Figure 1

Figure 2 **Default specification for protective barrier**

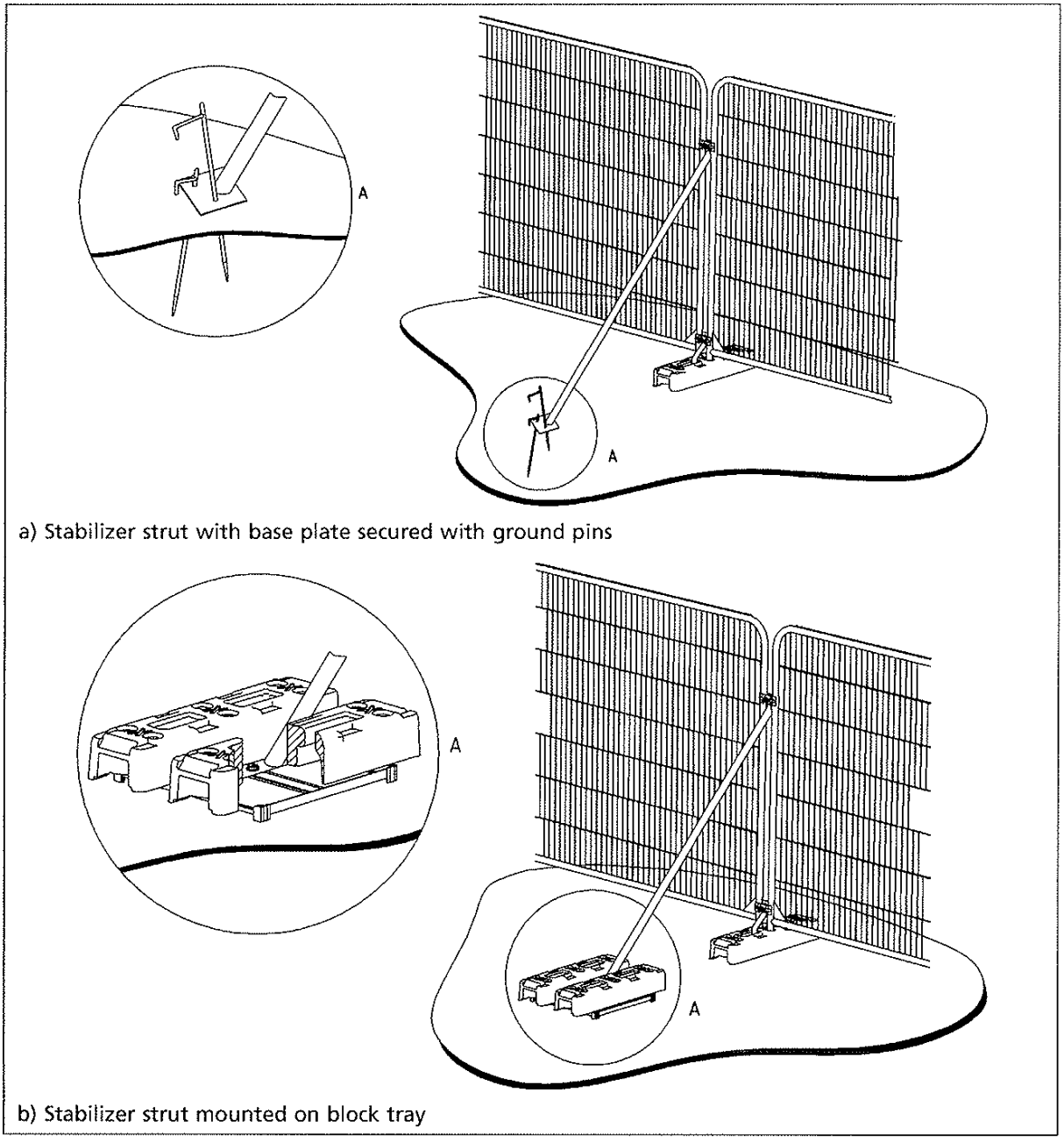


Key

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 2

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



Appendix E
Hard Surface Installation Methodology

The following methodology sets out the requirements and stages in construction of new hard surfaces in relation to existing trees.

This methodology is not meant to be considered as a specification and whilst examples of products that meet the arboricultural requirements for the installation of hard surfacing adjacent to trees are given the final construction detail must be designed by a suitably qualified and experienced engineer, whilst ensuring the arboricultural requirements are met, to ensure that the finished surface is fit for purpose.

In this respect it should be noted that Geosynthetics Limited, who supply cellular confinement systems, offer a design service to develop site specific solutions.

Arboricultural Requirements

Wherever it is intended to undertake demolition or construction operations within the Root Protection Areas of trees precautions must be taken to maintain the condition and health of trees root systems.

In particular:

- Works shall be conducted in such a manner as to prevent physical damage to roots during demolition or construction, such as soil compaction or root severance.
- Provision for water and oxygen to reach the roots must be made and the soil structure must not be disturbed.
- Provision must be made for future root growth and precautions taken to ensure that such root growth does not cause unacceptable levels of damage to the finished construction.
- The soil must not be compacted, and soil bulk density must be maintained at suitable levels for tree root growth and function. In this respect a soil bulk density of over 1.8g/cm^3 will impede root growth and function.

To achieve the above requirements for tree root growth and function the surface shall be designed so that:

- No excavation is required for their installation; to ensure that physical root damage does not occur.
- The surface can be installed without compaction of the existing soils; thus, ensuring damage to the soil structure does not occur.
- The surface is permeable; thus, ensuring that oxygen and water can reach the root system and that CO_2 can diffuse vertically out of the soil as high concentrations can cause root suffocation.

There are various methods of creating such a surface however one that is commonly in use and is therefore recommended here is the use of a three-dimensional cellular confinement system to provide for load suspension above the existing soil grade and reducing vertical loads on the underlying soils. One such product is ‘CellWeb’ produced by Geosynthetics.

Prior to installation of any new surfacing the following factors shall be considered:

- The exact location of the area to receive the special surfacing shall be determined.
- The area should be investigated to identify any existing services.

- The area shall be fenced off with tree protection fencing until installation of the special surfacing is to take place. Such installation should generally be phased to occur following substantial completion of the development.
- The final surface shall be decided upon, the surface must be permeable and several options for final surfacing are considered in the following section.

Methodology for Surface Installation

Prior to the installation of the new surface, existing ground cover and surface vegetation should be killed using an appropriate herbicide.

Specialist advice should be sought in order to determine the most appropriate herbicide to use due to the potential for leaching through soils and the potential impacts that this will have on retained vegetation.

As an alternative or addition to herbicide treatment the existing surface vegetation may be carefully removed by using hand tools.

All dead organic matter is to be removed by hand following herbicide treatment to prevent anaerobic conditions, as a result of the decomposition of dead vegetation, occurring.

All major protrusions such as rocks shall be removed by hand and all tree or shrub stumps from removed vegetation shall be ground out to minimise ground disturbance.

The soil surface **must not** be skimmed or stripped to achieve a level surface and where necessary major hollows shall be filled using a granular fill, such as no-fines gravel, washed aggregate or cobbles, to achieve a level surface.

In some cases it may be appropriate to consider the removal of the top layers of soil by non-mechanical means to achieve desired levels, establish rooting patterns and potentially provide for some embedding of the new surface into the existing ground level. Such works shall be completed using pneumatic soil excavation techniques and the works must be supervised by an Arboricultural consultant. The need for such works to occur shall be considered during the detailed design of the surface.

Following surface preparation, the soil shall be covered by a permeable geotextile to prevent the cellular confinement fill from migrating into the existing soils.

The geotextile layer shall be laid with overlaps of 300mm beyond the edge of the proposed construction and shall be temporarily retained with pins, stakes or weights.

The cellular confinement system shall then be installed and fixed in position in accordance with the manufacturer's recommendations.

The cellular confinement system shall then be filled with the specified aggregate in accordance with the manufacturer's recommendations. All works involved in the filling of the system with aggregate must be completed by hand and be supervised by the site supervisor.

The infill aggregate shall then be rolled or whacked to ensure cohesion of the granular fill with the cellular confinement system.

The desired finished surface shall then be installed. This shall be permeable and gas porous. Options for the type of finished surface are:

- Washed gravel – This retains porosity unless excessively consolidated and will be particularly useful where the final surface is not level. However, it may not be suitable in areas with high pedestrian and

vehicular passage. If gravel is used, this shall be distributed in a 75mm layer over the exposed infill aggregate.

- Paving slabs / brick paviours – These shall be laid dry jointed on a bed of sharp sand to allow air and moisture to permeate. Specialist slabs and paviours with inbuilt infiltration holes may be used.
- Tarmacadam – This shall not be used where it will cover over 20% of a trees Root Protection Area.

Following completion of the hard surface protective fencing shall be erected around the trees until the completion of development.

Appendix F

Design Considerations for New Planting

This section of the report is designed to provide guidance on the factors to be considered for any new tree planting that may be carried out as part of the proposed development.

All new tree planting proposals should take into consideration the future use, layout and design of the site, constraints of soil and climate, the local landscape character and the context of the local surroundings.

As trees generally form the dominant elements of the long-term landscape structure of a site careful consideration of their ultimate size, form, habit, colour, density of foliage and maintenance obligations should be given.

In addition, it is important to consider a number of site specific factors regarding the proposed location of new trees. In particular it is inadvisable to plant trees at distances closer to a structure than those shown in the table below (ref: BS5837:2005 Table 3) unless special precautions have been taken. Additionally, on shrinkable soils, account should be taken of the foundation type of existing and proposed nearby structures; new planting should not compromise the structural performance of the foundation.

Minimum distance (m) between young trees or new planting and structures to avoid direct damage to a structure from future tree growth.

Type of structure	Diameter of stem at 1.5m above ground level at maturity		
	<30cm	30-60cm	>60cm
Drains and underground services			
<1m Deep	0.5	1.5	3
>1m Deep	-	1	2
Masonry boundary walls*	-	0.5	1
	-	(1.0)	(2.0)
In situ concrete paths and drives*	-	0.5	1.5
	(0.5)	(1.0)	(2.5)
Paths and drives with flexible surfaces or paving slabs*	-	0.5	1
	(0.7)	(1.5)	(3.0)

* These distances assume that some movement and minor damage might occur. Guidance on distances which will generally avoid all damage is given in brackets.

Where planting new trees adjacent to buildings it is important to also consider the effect of shade and the likely extent and density of the trees crown when fully grown.

Where planting adjacent to roads and within car parks the siting and species selection of the trees should take into account other highway design considerations such as sight lines, lighting schemes, CCTV, underground and overhead service routes and signage. The likelihood of such features to be obstructed or damaged by future tree growth should be considered and consideration to periodic maintenance requirements made.

Trees should not be planted where they might obstruct overhead power lines or cables. In new development underground services should be ducted or otherwise protected (e.g. by the use of root barriers to reduce the risk of root intrusion into service runs) at the time of construction to enable trees to be planted nearby without conflict.

Ground works and preparation for new planting should take into account guidance contained within BS4428 – Code of practice for general landscape operations. In particular the following factors should be considered:

Drainage

New development may have an effect upon the existing drainage pattern and ground water levels of a site. Where ground water conditions are liable to such change expert advice on both drainage and tree selection should be sought.

Soil Conditions

Before any of the landscape operations listed in BS4428 are undertaken and where contamination is apparent soils in areas to be planted should be analysed for structure and content by a specialist laboratory and expert advice taken on remediation measures.

If contaminants (e.g. oil, diesel, toxic materials, heavy metals, etc) are present soils should either be removed to the full depth of new planting and new soil imported or expert advice on remediation measures should be obtained.

Where the structure of the soil is in an unsuitable condition to encourage growth remediation measures, such as the physical decompaction of soil by mechanical plant or compressed air injection, the incorporation of bulky additive materials or the installation of new drainage systems, may be required.

Surfaces around Newly Planted Trees

The settlement of soil within tree pits, which occurs gradually after planting, may cause the overlying surface to move. This may result in the partial collapse or instability of paved surfaces or the disruption of flexible surfaces. The unpaved area around new plantings should, therefore, be of an adequate size to enable surrounding paving to be retained by a conventional edging and foundation. Due allowance should be made for the future growth of stem and roots of a tree when considering the finished dimensions and the design of edge or kerb treatments of tree pits and planted areas.

Where load bearing paving is to be laid over a tree pit it should either:

- be laid when the soil has settled and the level made good; or,
- be laid on a supported foundation that spans the tree pit; or,
- incorporate a tree grille with appropriate support around the edges; or
- utilise structural soil.

In all cases any surface over a tree pit must be permeable to allow adequate moisture infiltration and gaseous exchange.

The use of specialist geo-textiles, cellular confinement systems and structural soils should be considered in the design of any tree pit.

Where there is any risk of a tree pit receiving surface water run off that may be contaminated, for example by rock salt, fuel spillages or other materials harmful to plants, paving should be designed and laid to fall away from the pit.

Maintenance of newly planted trees is of particular importance to ensure their long-term survival. A detailed maintenance schedule covering the establishment period should be prepared in conjunction with the landscape design proposals and arrangements made for its implementation.

Appendix G

Construction Exclusion Zone (CEZ) Sign

Appendix H

TPO Confirmation by Email

From:	trees&parks@richmond.gov.uk
To:	Stefan Kowalczyk
Subject:	RE: TPO Check - Thames Water Hampton Water Treatment Works
Date:	28 June 2019 11:57:40
Attachments:	image001.jpg image002.png

CAUTION: This email originated from outside of RPS.

Dear Mr Kowalczyk
Thank you for your email.
Further to our conversation on the phone, This site is in a Conservation Area and the only TPO's are the avenue of trees on Lower Sunbury Road.
Once again thank you for your email and for taking my call.
We are conducting a Customer Experience Survey to gather customer feedback to help improve our services. The survey only takes 5 minutes and can be completed by using the link below.
www.richmond.gov.uk/customer_feedback
Kind regards
David Short
Corporate Customer Services
Serving Richmond and Wandsworth Councils
Tel: 0208 891 1411
www.richmond.gov.uk / www.wandsworth.gov.uk
You can also follow us on Twitter for up to date information and news: Twitter @LBRUT_help

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From: Stefan.Kowalczyk@rpsgroup.com
Sent: 28/June/2019 10:40 (BST)
To: customer.services@richmond.gov.uk
Subject: TPO Check - Thames Water Hampton Water Treatment Works

Good morning,
Further to my telephone call this morning could you please confirm to me whether there are any TPO's that affect the land within the blue outline in the picture below?

If you require any further information, please do not hesitate to get in touch.
Kind regards,
Stefan

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Appendix I

Arboricultural Glossary

Age-class - A general classification of the tree into either - young, semi-mature, early mature, mature, over-mature, or veteran.

Apical Bud/Shoot – The apical bud, also known as the leading shoot, is responsible for shoot extension and is dominant.

Apical Dominance – A singular, leading shoot remains dominant.

Arboriculturalist – Person who has, through relevant education, training and experience, gained recognised qualifications and expertise in the field of trees in relation to construction.

Asymmetric crown- Crowns that have a morphological bias in a particular direction. This can give the tree an aesthetically unfavourable appearance, but can also subject the tree to uneven wind- loading forces and potentially result in failure.

Basal – Referring to the bottom part of a tree's stem.

Bifurcated - A growth characteristic, where two stems of similar size grow from the same point. Can create an inherent weakness.

Branch union/junction - The point at which a branch joins a larger stem. Can be a point of weakness, especially in certain species.

Brown Rot- Decay caused by certain species of fungus which results in the affected wood becoming brittle and liable to suddenly 'break out', especially if in key structural areas.

Buttress flares – Extensions of the basal stem of a tree that provide additional structural support. See reaction wood.

Bifurcated- A growth characteristic, where two or more stems of similar size grow from the same point. Can create an inherent weakness.

Canker – A clearly defined area of dead and sunken or malformed bark, caused by bacteria or fungi. Can have a bearing on structural integrity of infected limb(s) depending on size and location.

Central leader- See apical dominance.

Chalara ash dieback- A disease affecting ash trees caused by the fungus *Hymenoscyphus fraxineus*. Usually fatal, the disease causes leaf loss and crown dieback in infected trees. It was first confirmed in Britain in 2012.

Chlorosis- yellowing of leaves which can be caused by a range of factors, often an indicator of nutrient deficiency.

Compaction - The compressing & hardening of soil around tree root systems, due to vehicular/pedestrian use etc. Loss of pore space between soil granules limits water movement and gaseous exchange, and inhibits root growth.

Companion shelter- Shelter provided by neighbouring trees in groups to one another, factors such as wind throw are reduced due to supporting branches and interlocking root systems. Removing individual trees on the peripheries of such groups can expose neighbouring trees to environmental factors they have not previously been subjected to and can lead to individual failure.

Competent person – Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached

Note 1 A competent person understands the hazards and the methods to be implemented to eliminate or reduce the risks that can arise. For example, when on site, a competent person is able to recognise at all times whether it is safe to proceed.

Note 2 A competent person is able to advise on the best means by which the recommendations of this British Standard may be implemented.

Condition – Assessment based on a visual and professional view giving consideration to many factors such as tree health, structural integrity and suitability of its position.

Conservation dead- wooding- Removal of deadwood using 'coronet cuts' that mimic the way a branch would naturally break off, maximising deadwood habitat availability for invertebrates.

Coppice - The method of managing trees by cutting the stems at between 1.0 inch and 1.0 foot from the ground level on a regular cycle, the cut stumps of the trees or shrubs are allowed to re-grow many new stems.

Crown spread - Gives distances between extreme limits of the crown and the stem, usually along the four compass points. Helps to show crown symmetry.

Crown Reduction – The removal of branch ends to reduce the extreme limits of a trees branch spread and height.

Crown Thin – The removal of selected branches within the crown to thin the internal branch structure.

D.B.H. - 'Diameter at Breast Height', an industry standard to gauge tree stem size and development. Within arboriculture, breast height is taken to be 1.5m above ground level.

Dieback - The reduction in crown vigour and extension growth progressing to death of distal parts; often associated with decline.

Epicormic growth - New growth from dormant buds that can often form tenuous attachments. Although some species readily form such shoots, it can be an indication of stress.

Form - A general assessment of the shape and position of the tree within its environment.

Hanger – Term used to describe a branch that has become detached and is being supported by other branches. Can be a hazard to persons and property below.

Hazard Beam – After the loss of a distal part, a limb concentrates growth upwards creating adverse end weights that can render the limb susceptible to failure.

Included bark – Growth characteristic usually caused when two or more stems/branches growing in close proximity 'fuse' together entrapping the bark from when the parts were separate in the middle, creating a structural weakness.

Invertebrate tower – Pollarding of a (usually dead) tree to a safe height that leaves part of the main stem as a deadwood habitat for invertebrate species.

Live Crown Ratio – Ratio of the foliage canopy to the total height of the tree. Trees grown in close proximity to other trees/ buildings will often have a low live crown ratio and can become vulnerable to failure if suddenly exposed to wind e.g. by removal of adjacent trees.

Occlusion/Occluded – Normally used to describe the overgrowth of a wound. Also, immoveable foreign objects in contact with a tree part can become encased or 'occluded' by the tree as it grows incrementally.

Pathogen - An agent that causes disease, especially a living microorganism such as a bacterium or fungus.

Pollard – The removal and subsequent regular re-removal of the crown of a tree above animal browsing height. Can be an effective method of controlling the size of trees in urban areas. This is ideally begun in the trees early stages and maintained throughout its life.

Reaction wood - Essentially additional wood laid down by the tree to compensate for structural defects such as cavities.

Ring barking/Girdling – the removal of bark around the entire circumference of a stem or branch, causing the death of all distal parts.

Root Protection Area (RPA) – Layout design tool indicating the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree, shown in plan form in m^2.

Scaffold limbs - The main structural branches within the crown.

U.L.E – 'Useful Life Expectancy' is an estimate based on currently known factors of the possible remaining life of the tree as an asset. AKA 'Estimated remaining contribution'.

Veteran tree – Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

Vitality - A general classification, as to the present and future potential growth and development of a tree. A comment regarding the health status of the tree specific to its species.

White Rot - A type of decay caused by certain species of fungi which results in the affected wood becoming flexible with little compressive strength.