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ARBORICULTURAL REPORT COMPRISING:

TREE SURVEY TO BS:5837: 2012
PRELIMINARY TREE CONSTRAINTS PLAN
ARBORICULTURAL IMPACTS ASSESSMENT
TREE PROTECTION PLAN
ARBORICULTURAL METHOD STATEMENT

Site address: **81-83 Summerhouse Drive**
Bexley
Kent
DA5 2EF

Client: **Dr. Parag Pandya**

Ref: SD 11.21
Site visit date: 24th November 2021
Report written date: 29th November 2021

Surveyed by: **William Kent** *Dip Arb(RFS); MArborA*
LANTRA: Professional Tree Inspector
QTRA: Licensed User

Managing Director: William J. Kent Dip Arb (RFS); MArborA; Lantra: Professional Tree Inspector; QTRA: Licensed User

Company Secretary: J.M. Kent

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Company No. 7333789 VAT Reg. No. 995 3196 68

CONTENTS

TABLES

APPENDICES

Table 1: Key Terms and Abbreviations	
Arboriculturist	Person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction
Arboricultural consultant	Arboriculturist instructed by the developer to oversee the retention and protection of trees within or adjacent to the development site
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
Construction	Site Based operations with the potential to affect existing trees
Structure	Manufactured object such as a building, carriageway, path, wall, Service run, and built or excavated earthworks
Service(s)	Any above or below ground structure or apparatus required for utility provision e.g. drainage, gas supply, water, ground source heat pumps, soak-a-ways, CCTV, telecommunications, water, electric. etc.
British Standard 5837 (2012): ***Trees in relation to design, demolition and construction - recommendations***	British Standard document outlining best practice and guidelines for the arboricultural and construction industry in relation to developments
British Standard 3998 (2010): ***Tree work - Recommendations***	British Standard document outlining best practice for Tree Works to the arboricultural industry
Root Protection Area (RPA)	Layout design tool indicating the minimum area around a tree deemed to certain sufficient roots and rooting volume to maintain the trees viability, and where the protection of the roots and soil structure is treated as a priority
Construction Exclusion Zone (CEZ)	Area based on the root protection area from which access is prohibited for the extent of the project.
Pruning	The removal of living or dead parts of a tree, especially branches, to reduce size, to maintain shape, health, safety, or to regulate growth
Arboricultural Implications Assessment (AIA)	An assessment that evaluates the arboricultural effects of the proposed design and where necessary recommends mitigation
Tree protection plan (TPP)	Scale drawing, informed by descriptive text where necessary, based upon the finalized proposals, showing the trees for retention and illustrating the tree and landscape protection measures
Arboricultural method statement (AMS)	Methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained

1. INTRODUCTION

1.1. Instruction

This report follows an email request from Alex Catterall RIBA of Red Works Studio, to carry out arboricultural inspections and assessment of the above site. This report details a survey of trees on-site and nearby off-site trees where appropriate for inclusion. The site visit was carried out by the author on 24th November 2021. At the time of the survey the weather was fine. Deciduous trees were in partial leaf.

1.2. Purpose of the report

1.2.1. The aim of the survey is to identify the quality and value of the existing tree stock and to categorise trees in respect to their suitability for retention using criteria outlined in BS5837:2012, *Trees in relation to design, demolition and construction — Recommendations.*

1.2.2. Following the procedure outlined above, an assessment shall be made to identify the potential constraints on development, imposed by trees, both above and below ground. The tree constraints plan provided in appendix 3 of this report should assist to inform a future development layout design, which shall be deemed acceptable from an arboricultural perspective.

1.2.3. Although it is recognised that the competing needs of development mean that trees are only one factor requiring consideration; certain trees are of such importance and sensitivity as to be a major constraint on development or to justify its substantial modification.

1.3. Development proposal summary

1 x detached dwelling home.

1.4. Limitations of the report

1.4.1. This report and the appended plans have been written up based on: a site visit to survey the trees, utilization of tree data capture software, and information that has been provided by third parties.

1.4.2. WJKent Tree Consultancy (WJK) cannot guarantee the accuracies of documents or information provided by third parties and shall not be held liable for any issues that arise from any discrepancies within or between those items.

1.4.3. WJK has been instructed to survey those trees within or directly adjacent to an identified area for development within the subject property. Trees located either remote from the area of interest within the site, or beyond the constraints of the identified

development area (i.e. trees which do not overhang the identified area and that are located beyond a distance of up to 12 times their estimated stem diameter as measured at 1.5m above ground level) or trees below 80mm in diameter as measured at 1.5m from ground level, have not been included and development impacts to these trees has not be evaluated.

1.4.4. The trees have been surveyed in accordance with the criteria set in the BS 5837 (2012).

1.4.5. Trees are dynamic organisms which undergo structural and physiological change as they continue to grow, age, and in response to changes in their local environment; therefore the findings of the tree survey cannot be fully relied upon after 12 months from the date of survey or after any significant changes to the tree's environment, which includes (but not limited to); construction pressures (e.g. soil compaction, damage to tree parts, root severance), significant weather events and changes to soil levels or water drainage patterns.

1.4.6. A full hazard assessment of the trees (including assessment of decay or their defects) has not been undertaken as part of this planning application as is it considered beyond the scope of this report. Any obvious hazards and defects have been identified where relevant in the tree survey schedule, which may also recommend remedial works.

1.4.7. Any works to trees that are outside of the legal boundaries of the owner would be subject (where relevant by law, statue and common) to the owner's permission or legal right of entry to mitigate a legitimate health and safety concern

1.4.8. Detailed ecological considerations are beyond the scope of this report. UK and European wildlife legislation may affect the timing and even prohibit the enhancement of works and operations described in this report. Most of the information regarding wildlife can be found in the Wildlife and Countryside Act 1981 (as amended). It is recommended that consideration is given to the requirement for ecological surveys. Bats in particular are afforded particular protection and a specialist may be required to determine if bats are

1.5. Supplied documents

The following drawings were supplied by the client:

- Existing topographical survey site plan - DWG and PDF
- Initial proposed layout plans - DWG and PDF

2. THE SITE

2.1. General

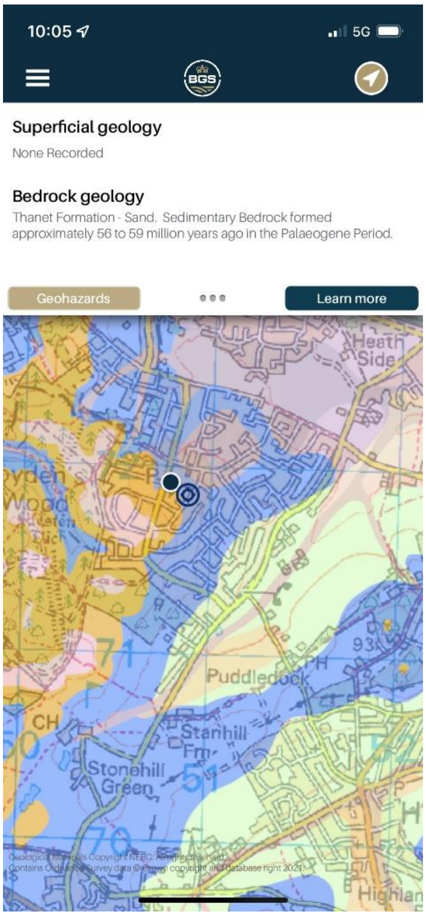
2.1.1. The subject site appears to have originally been two residential plots. The original bungalow, which occupied Northern-most plot No.81 can be seen in the aerial image below. This building has now been demolished. The site is now open and devoid of built structures. Most of the ground is made up of grass interspersed with saplings and disturbed ground where the former dwellings were once positioned. The ground vegetation is unkempt and overgrown. **See aerial photograph below for a visual reference.**

Above photograph shows aerial view of the whole site, prior demolition of bungalow. Approximate site boundary is outlined in red. *Google earth imagery*

2.1.2. The topography of the site is reasonably level with no significant inclines in any direction.

2.2. Soil type

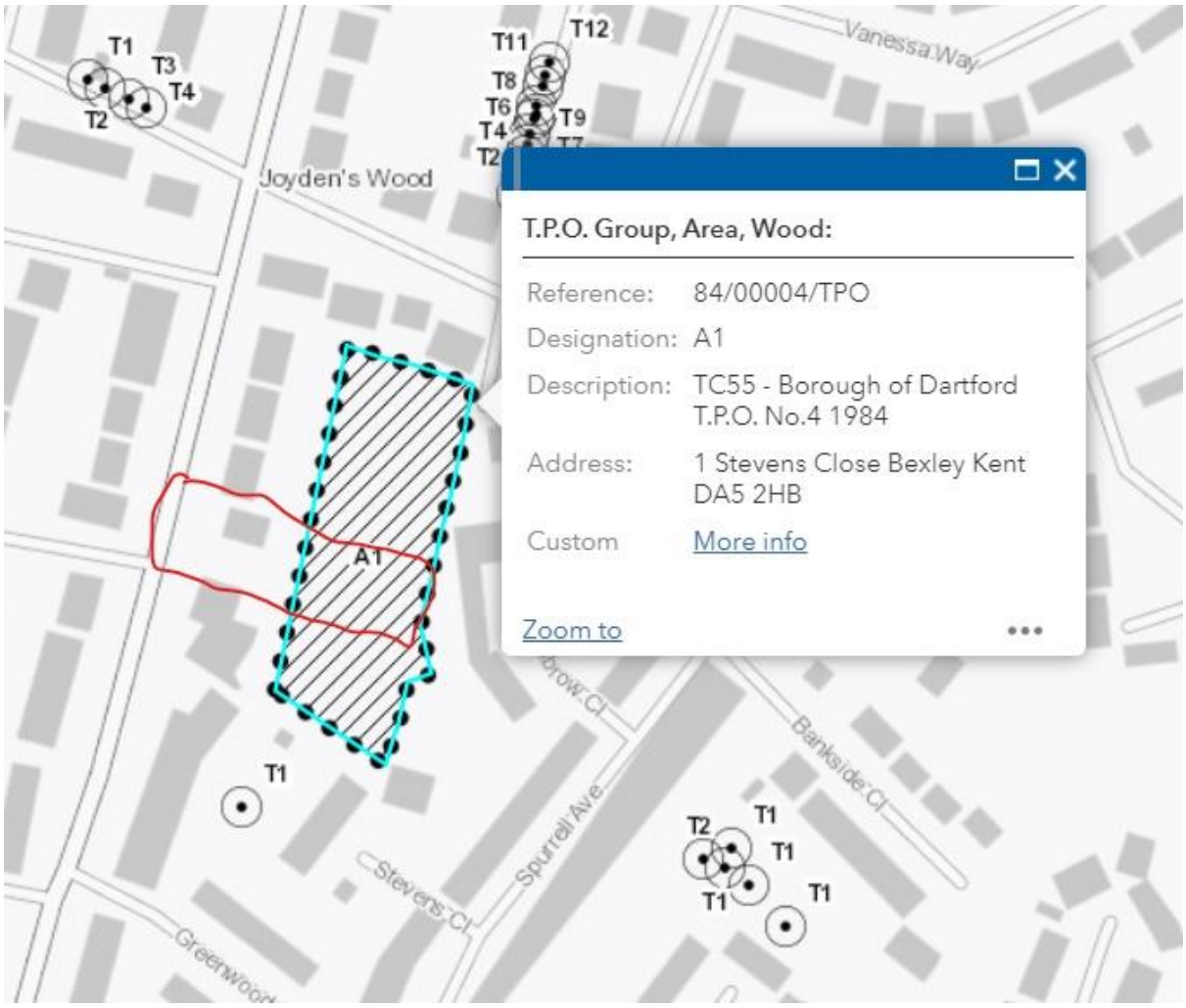
A desktop study using British Geological Survey data describes the site soil type as being Bedrock geology: Thanet formation – Sand, sedimentary bedrock with no superficial deposits recorded. This soil type should be free draining and resistant to compaction, however tree protection measures shall not be relaxed. **See screenshot of soil data below.**


10:05
5G
BGS
Superficial geology
None Recorded
Bedrock geology
Thanet Formation - Sand. Sedimentary Bedrock formed approximately 56 to 59 million years ago in the Palaeogene Period.
Geohazards
Learn more
Heath Side
Puddledock
Stanhill Fm
Stonehill Green

3. THE TREES

3.1 Existing trees

3.1.1. An on-line search of Dartford LPA planning portal interactive map shows that the rear garden area is covered by a tree preservation order, reference number: 84/00004/TPO, designation: A1. I could find no detail to suggest that the site is located within a conservation area; however, we would recommend checking formally with the Council prior to carrying out any tree works on trees outside of the TPO area. **See screenshot below obtained from Dartford Council's planning portal. The subject site location is highlighted with a red outline.**



3.1.2. I inspected and recorded 23 x individual trees and 1 x group of hedging trees located in positions where they could be affected by a proposed development. Details of the trees are found within the appended tree survey schedule (TSS) and their locations are shown on the appended plans. The trees have been categorised as set out in BS5837:2012; a summary of the categorised trees can be seen at **Table 2** (below).

Table 2: Summary of tree categories		
Tree categories	**Individuals**	**Groups**
A	**5**	**-**
B	**6**	**-**
C	**12**	**1**
U	**1**	**-**
Total	**23**	**1**

Category A: of high quality with an estimated remaining life expectancy of at least 40 years
Category B: of moderate quality with an estimated remaining life expectancy of at least 20 years
Category C: of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm
Category U: in such a condition that they cannot realistically be retained for longer than 10 years

3.2 Photographic guide

Photograph #1: T1 – Oak. Council maintained street tree located to the North of existing site entrance (blue barriers).

Photograph #2: T6 – Silver birch. Unprotected boundary tree.

Photograph #3: Facing West, shows the front area of the site, proposed for development.

Photograph #4: Shows the internal area of the site when viewed from the entrance.

Photograph #5: Shows the relationship between T1 – Oak and the site frontage area and existing unprotected Cypress trees T2 & 3.

4. TREE CONSTRAINTS

4.1. Site layout design

4.1.1. Constraints imposed by trees both above and below ground shall be used to inform the site layout design, although it is recognised that the competing needs of development mean that trees are only one factor requiring consideration.

4.1.2. In appendix 2 - Tree constraints plans; the bottom drawing shows the site with a proposed design layout overlaid the existing site. The spatial relationship between T5 - Category A Oak and the Southernmost dwelling is a poor one. There is insufficient space between the Western canopy edge and the proposed dwelling, and the building footprint encroaches on the root protection area (red circle on plan). The dwelling footprint should be redesigned so that it falls outside the root protection area of T1. Not only would this prevent unacceptable levels of potential disturbance to the rooting environment, but it will also create an improved separation between the dwelling and the Western crown edge. The intention is to recommend shortening the Western lateral branches by 2m in length and to raise the low canopy, to facilitate the development and create a reasonably harmonious relationship between retained trees and the development. In doing so a minimum of a 4m separation between the post pruned canopy edge and the amended dwelling location should be supportable.

4.2. The rooting environment

The Root Protection Area (RPA) is a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. The RPA is initially shown as a circle, the shape (but not size of area) may be adjusted, where appropriate, to reflect physical constraints or topographical features limiting root activity.

Consideration should also be given to NHBC Standards Chapter 4.2 in regard to technical requirements and recommendations (for foundations) when building near trees, hedgerows and shrubs, particularly in shrinkable clay soils.

4.3. Tree parts

Surface and buttress roots, the stem, stems and branches of retained trees are all direct constraints on proposed structures and services as well as on working and access space. Care will be needed to make sure that any branch pruning is not excessive and that there is enough space for future canopy growth.

4.4. Future pressure for removal

The relationship of buildings to large trees can cause apprehension to occupiers or users of nearby buildings or spaces, resulting in pressure for the removal of the trees. Buildings and other structures should be sited allowing adequate space for a tree's natural development, with due consideration given to its predicted height and canopy spread.

4.5. Tree retention & removal

Retention: Trees can offer many benefits, including the provision of visual amenity, softening or complementing the effect of the built environment, and adding maturity and sales value to new residential developments (CABE, 2005). Trees make places more comfortable in tangible ways by contributing screening and shade, reducing wind speed and turbulence, intercepting snow and rainfall, and reducing glare.

Removal: Consideration should be given to avoid misplaced tree retention; attempts to retain too many or unsuitable trees on a site can result in excessive pressure on the trees during demolition or construction. Likewise, re-development can provide an opportunity to replace individual trees (usually those with limited potential) with species / specimens that are more suited to the existing or proposed setting; thereby providing a basis for long-term tree cover that can coexist harmoniously within the site.

5. ARBORICULTURAL IMPACTS ASSESSMENT

5.1. Summary

5.1.1. 8 x low-quality category C trees are to be removed to facilitate the proposed development. All individuals to be removed are of small stature or of poor form. They are all non-native and unprotected trees, with the exception of T23; a small Beech tree with a stem diameter of just 140mm. All trees of reasonable arboricultural merit are to be retained and protected during the proposed development.

5.1.2. Some pruning to T1, a category A Oak tree is recommended to create an adequate separation between the retained tree and the completed development. The pruning shall be within the guideline parameters as set out in BS3998. Tree works – Recommendations and shall be a repeat of the last pruning operation that this tree underwent.

5.2. Tree removals

5.2.1. 8 x low-quality category C trees are to be removed to facilitate the proposed development. All individuals to be removed are of small stature or of poor form. They are all non-native and unprotected trees, with the exception of T23; a small Beech tree with a stem diameter of just 140mm. All trees of reasonable arboricultural merit are to be retained and protected during the proposed development. In this instance, due to the negligible loss in amenity as a result of removing these trees and the reasonable number of retained trees on-site, mitigation planting is not considered necessary.

5.3. Facilitation pruning

5.3.1. T1: Category A Oak shall be subject to facilitation pruning - branch end shortening of the Eastern canopy. The extent of this lateral reduction will be up to 4m in length at the greatest point and shall not extend beyond the last cut points. The remaining canopy shall remain unpruned. The pruning specification is within the guidelines as set out in BS3998.2010 Tree work – Recommendations, and should not significantly alter the natural appearance as view from a public viewpoint or health of T1. The pruning shall mirror the last operation.

5.4. Root protection area (RPA) incursions

5.4.1. There are no RPA incursions into retained trees, to facilitate the development building footprints.

5.4.2. New hard surfacing is proposed within the RPAs of T1 & T6. It shall be predominantly a no dig, above soil solution system comprising gravel laid over a three-dimensional cellular confinement. This shall require a 7.5% incursion into the existing unsurfaced RPA of T1 Oak and a 15% incursion into T6 Birch. A further small area of dry-lined block paviors shall require a 2.8% incursion into the existing unsurfaced RPA of T1. This shall be carried out with hand tools,under a direct arboricultural watching brief. In both scenarios a permeable

wearing course shall be used to permit rainwater filtration and gaseous exchange to any roots present beneath the surface. The level of incursion is significantly below the 20% maximum as recommended in BS5837:2012 and shall be carried out in a low-invasive way.

5.4.2. The tree protection measures required shall include the following:

- Appropriate tree protective fencing for the creation of construction exclusion zones and temporary ground protection in the location shown in the tree protection plan. It should be noted that the site soil type is sand, which is resistant to compaction.

- Supervised excavation by the arboricultural consultant, for the installation of new blocked paved area, where it slightly encroaches into the RPA of T1. This is to ensure that no over-dig occurs and for root treatment operations to be carried out, if small roots are encountered.

- A system of site monitoring to be relayed to the LPA. The site visits shall include inspection of tree protection methods and supervised excavations.

5.5. Shading by trees

Shading will not be an issue for the proposed development as the proposed building footprints are located largely outside of the shade forecast for retained trees.

5.6. Spatial relationship to retained trees

There will be sufficient space between the proposed development and retained trees, for both facilitation of the extension construction and as separation between the finished form and trees. Periodic shortening of the branch ends of T1 will likely continue to maintain good separation.

5.7. Site set up and storage of materials

There is a substantial area, away from retained trees, for site set up and storage of materials as shown in the tree protection plans.

5.8. New service runs

5.8.1. We have not been shown any plans for new service installations at this stage. However, it is assumed that existing service routes shall be re-utilised. Where this is not possible, any new service runs should be routed in the space between the RPAs of T1 and T6, or if this is not achievable, installed using trenchless techniques where they fall within RPAs. The service run detail can be secured post planning as a landscape condition.

5.9. New building foundations - construction type and depths

5.9.1. The foundation type can be of the preferred method on arboricultural grounds, as they shall be located outside of RPAs of retained trees.

5.9.2. The foundation construction type and depths should however be designed by a structural engineer and be adequate to support its intended load. The depth of the new footings should be in accordance with: National House Building Council documentation, chapter 4.2 (N.H.B.C. Chapter 4.2) if the soil type is found to be of a shrinkable clay type, which we do not believe to be the case.

5.10. Conclusion

5.10.1. Based on the above considerations, I consider the arboricultural impacts of this scheme to be moderately low. Where minor impacts do exist, they can be adequately mitigated provided that the tree protection measures prescribed are implemented and strictly maintained.

5.10.2. Accordingly, I conclude that, the proposal does not constitute any long-term threat to the character or appearance of the site, in that it is contributed to by the presence of significant trees.

December 2021

6. ARBORICULTURAL METHOD STATEMENT

6.1. Introduction

6.1.1. This Arboricultural method statement (AMS) will detail tree protection measures, as set out below to safeguard the trees to be retained for the duration of the construction phases.

6.1.2. The AMS shall be read and understood by all site personnel. A copy shall be always available on site during the development for referral purposes. **It is essential that all measures specified below are adhered to correctly to protect trees from unacceptable levels of disturbance or damage.**

6.1.3**.** The Local Planning Authority have powers to enforce a 'Stop notice' should it become evident that tree protection measures are not being carried out satisfactorily.

6.2. Sequencing of events

The following key stage events shall take place in chronological order:

- Submission of this report to the LPA as part of the planning application package

Following planning approval:

- Pre-commencement site meeting
- Tree pruning and tree removals
- Provision of construction exclusion zones to include the erection of tree protection fencing and temporary ground protection- to be checked by the arboricultural consultant
- Site set up carried out
- Installation of new service runs and drainage (if applicable)
- Construction of new dwelling house
- Re-positioning of protective fencing & removal of temporary ground boards
- Installation of new hard surfacing, to include above soil installations, to be supervised within the RPAs
- Removal of tree protection fencing
- Soft landscaping

6.3. Pre-commencement site meeting

6.3.1. Prior to the commencement of any works a site meeting shall be held to discuss and go through the tree protection measures set out in this document.

6.3.2. The meeting shall be attended by the Arboricultural consultant, client, construction company site manager and the LPA tree officer should he/she wish to attend.

6.4. Arboricultural site visits & supervision requirements

6.4.1. Site visits are required by the arboricultural consultant for the following activities:

1. Pre-commencement site meeting

2. Inspection of tree protection fencing – including re-positioning - and ground boards

3. Supervision of replacement and new hard surfacing within the RPAs of all retained trees

4. Additional periodic site visits every 6 weeks throughout the course of the development to check that tree protection measures are functioning correctly

6.4.2. All site visits by the arboricultural consultant shall be recorded and communicated to the client and the LPA. This will provide the LPA with evidence of compliance to assist with the discharging of any tree related conditions.

6.5. Tree removals & pruning

6.5.1. The following trees are to be removed to facilitate the proposed development:

T2, T3, T4, T5, T7, T8, T9 & T23. They are all rated as a category C or category U individuals due to their small sizes or poor condition. See the tree survey schedule in appendix 1 for further information regarding these trees and shrub. The loss of these small trees is not considered necessary for mitigation due to their negligible amenity values.

6.5.2. 1 x tree is recommended for pruning, T1 Oak under Local Authority jurisdiction.

Table 3: Trees to be pruned				
Tree no.	**Species/ Location**	**Pruning specification**	**Reasons**	**Category**
T1	Oak/Council owned street tree	Shorten Easterly branches back by between 3-4m in length, target pruning to points not exceeding the last pruning cuts. No cuts shall be made on the tree side of the site boundary.	To repeat the last pruning operation, thus controlling the overextended current regrowth, and to create a better spatial relationship between the tree and proposed new dwelling.	A

All tree works shall be carried out in strict accordance with BS3998, 2010 Tree work – Recommendations, by appropriately experienced and insured arboricultural contractors.

6.6. Construction exclusion zones

6.6.1. Once the protective fencing is in- situ, the arboricultural consultant will visit the site and inspect. The construction exclusion zones shall provide protection for retained trees.

6.6.2. The protective barriers shall form the edge of Construction Exclusion Zones (CEZs) and will restrict access into these areas. The barriers and the areas it protect must be considered as sacrosanct, it must, under no circumstances be moved without the explicit permission of the approved arboricultural consultant.

6.6.3. No construction activities will take place within the CEZs:

- No personnel, plant or vehicles shall enter
- No storage of equipment or materials
- No clearance of existing vegetation
- No changes to soil levels (including topsoil)

6.6.4. Areas for the storage of materials shall be outside the CEZs. Oil, bitumen, diesel, and cement shall not be stored, mixed, or discharged onto the ground within 10m of the trunks of any trees.

6.6.5. No notice boards, or power or telephone cables, shall be attached to any of the trees.

6.6.6. No fires shall be lit within RPAs of trees to be retained or within 10m of the canopies of any trees to be retained (whichever is the greater).

6.6.7. The protective fencing will not be moved or re-located without the approval of the arboricultural consultant. Once all construction works are completed the arboricultural consultant will be informed of when it is intended to remove the fencing and ground protection.

6.7. Tree protection fencing

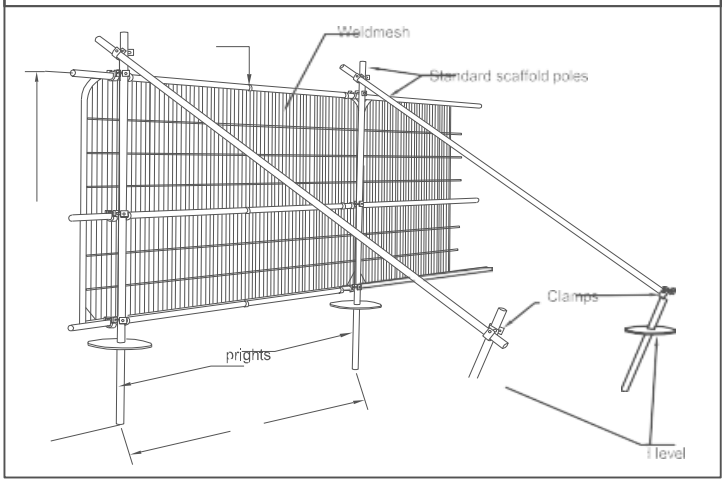
6.7.1. Tree protection fencing shall form a permanent barrier between the area under construction and the construction exclusion zone (CEZ) for the duration of the development phases.

6.7.2. It shall be erected in the positions shown on the scaled tree protection plan (TPP) drawing appendix 3 and shall be in accordance with BS5837: 2012 .

6.7.3. The fencing shall be of 'Heras' type, 2m high, comprising mesh panels supported on a scaffold frame in accordance with BS5837: 2012 figure 3. The panels shall be securely fixed with wire or scaffold clamps joined together using a minimum of two anti-tampler couplers, installed so they can only be removed inside the fence. The distance between the fence couplers shall be at least 1m and shall be uniform throughout the fence. The panels shall be supported on the inner side with stabiliser struts, attached to a base plate secured with ground pins. Please see the tree protection plan in appendix 3 for a diagrammatic illustration. Construction exclusion zone signs shall be fixed to every other panel. See below for an example.

PROTECTIVE FENCING

Protective fencing shall consist of a scaffold framework in accordance with *figure* 2 of British Standard 5837 (2012); comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Onto this, weldmesh panels shall be securely fixed with wire or scaffold clamps. Weldmesh panels on rubber or concrete feet are not resistant to impact and shall not be used. Construction Exclusion Zone signs shall be fixed to every forth panel.



6.8. Temporary ground protection

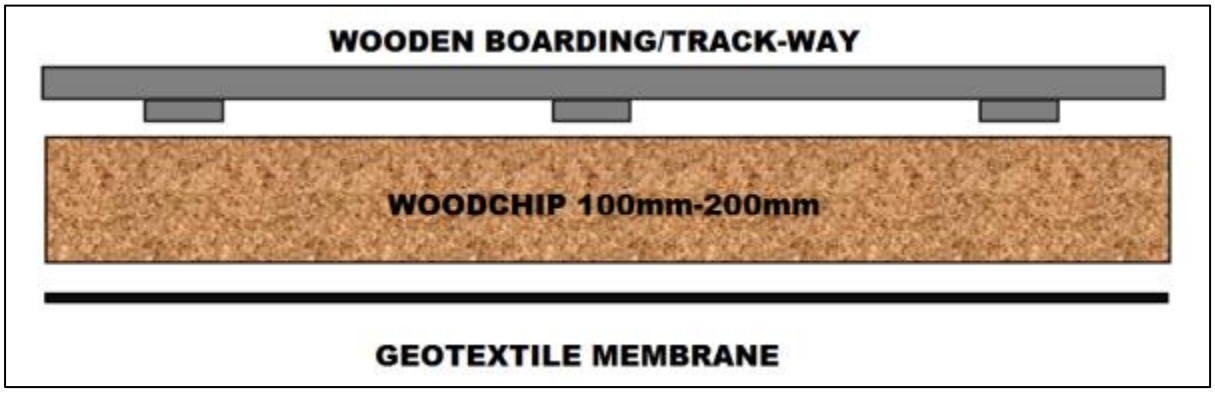
Temporary ground protection shall be installed in the locations shown in appendix 3, tree protection plans construction and landscape phases.

Temporary ground protection shall be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil, so that the tree root functions remain unimpaired.

For pedestrian movements only, a single thickness of scaffold boards shall be placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane.

For pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards (or similar) shall be placed on top of a compression-resistant layer (150 mm depth of woodchip), laid onto a geotextile membrane.

For wheeled or tracked construction traffic exceeding 2t gross weight, interlinking aluminium or metal track way shall be placed on top of a compression-resistant layer (200mm depth of woodchip), laid onto a geotextile membrane



For pedestrian-operated plant up to a gross weight of 2t, A 150mm deep geoweb laid above a permeable geotextile membrane (such as 'Treetex T300') and filled with angular

aggregate with a particle size of between 20mm and 40mm, with no fines (in order to permit vertical gaseous diffusion) shall be used.

For wheeled or tracked construction traffic exceeding 2t gross weight, a 200mm deep geoweb laid above a permeable geotextile membrane (such as 'Treetex T300') and filled with angular aggregate with a particle size of between 20mm and 40mm, with no fines (in order to permit vertical gaseous diffusion) shall be used.

6.9. Site access and storage of materials

6.9.1. All access to the site and the delivery of materials will be via the front of the site.

6.9.2. There is ample scope for the storage of materials within the central part of the site in areas well away from trees to be retained trees or construction exclusion zones. The storage area can be seen in the tree protection plan in appendix 3.

6.9.3. Great care shall be taken to ensure that the booms of excavators and all machinery used in the delivery or movement of materials do not damage the crowns or stems of retained trees. All activities close to trees shall be carefully planned and controlled.

6.9.4. Great care shall be taken to prevent the spillage of toxic chemicals such as cement and oils in any part of the site so that any future planting is not compromised by substances that may prejudice their establishment. All such substances shall be stored (and mixed where necessary) on robust plastic sheeting. Contaminated water from the washing of tools and equipment shall not be permitted to leach into the soils within or adjacent to the RPA or any area designated for future planting.

6.10. Service runs and drainage

6.10.1. No plans have been submitted thus far regarding service routes; however, it is assumed that existing service routes shall be re-utilised. Where this is not possible, any new service runs shall be routed in the space between the RPAs of T1 and T6, or if this is not achievable, installed using trenchless techniques where they fall within RPAs. There shall be no trenching within the RPAs of retained trees.

6.11. New foundations construction type and depths

6.11.1. No restrictions need apply to the preferred foundation construction type on arboricultural grounds, due to the proposed building footprint being outside of RPAs.

6.11.2. The foundation construction type and depths should however be designed by a structural engineer and be adequate to support its intended load. The depth of the new footings should be in accordance with: National House Building Council documentation, chapter 4.2 (N.H.B.C. Chapter 4.2) if the soil type is found to be of a shrinkable clay type, which we believe not to be the case. **See section 2.2 for soil detail.**

6.13. New hard surfacing within RPAs

6.13.1. All existing hard surfaces within the RPAs of retained trees shall be retained throughout the development, up to the landscaping stage. Where re-surfacing works are to take place within RPAs of retained trees, the works shall be carried out with care under direct arboricultural supervision.

6.13.2. The existing material shall be removed with care, using hand tools, to a depth not exceeding the lowest point of the existing sub-base. This is to ensure that the soil beneath remains undisturbed.

6.13.3. The replacement hard surfacing within the RPAs of T1 and T6, with the exception of a small area located at the outer edge of T1s RPA, shall consist of a low-invasive, no dig, above soil installation, using a three-dimensional cellular confinement system to support a gravel wearing course. See further detail below:

1. In order to prevent unacceptable root damage, proposed driveways and other areas of hard standing located within the RPAs of trees should be constructed to the specification given below, in accordance with the recommendations of Section 7.4 of British Standard BS 5837. An illustration of these principles can be found at *Figure 1* below.

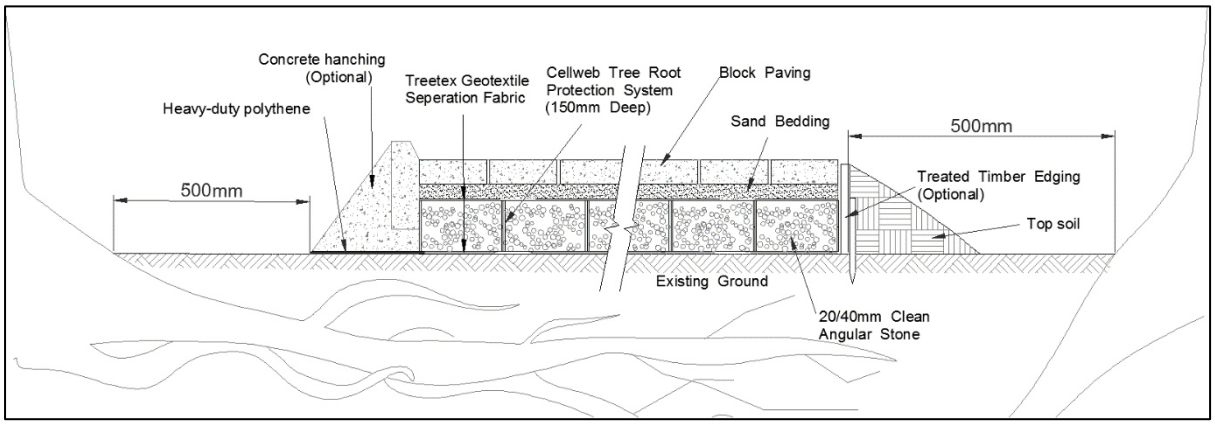


***Figure 1*: Illustration of a typical above-soil hard surface next to trees.**

2. Within RPAs there should be no lowering of existing soil level and no digging should be undertaken: all parts of proposed hard surfaces should be constructed above existing ground level. This is to ensure that roots are not severed, soil is not compacted, and oxygen can continue to reach roots beneath the engineered surface. Construction should be undertaken in dry weather; ideally this should be between May and October when the soil is at its driest and least prone to compaction.

3. No stripping of turf or topsoil should be undertaken: herbaceous (non-woody) vegetation should be cut as close to ground level as possible and be raked off by hand; shrubs should be grubbed out using hand tools, and tree stumps should be ground out rather than dug or grubbed out. Any hollows should be filled with sharp sand.

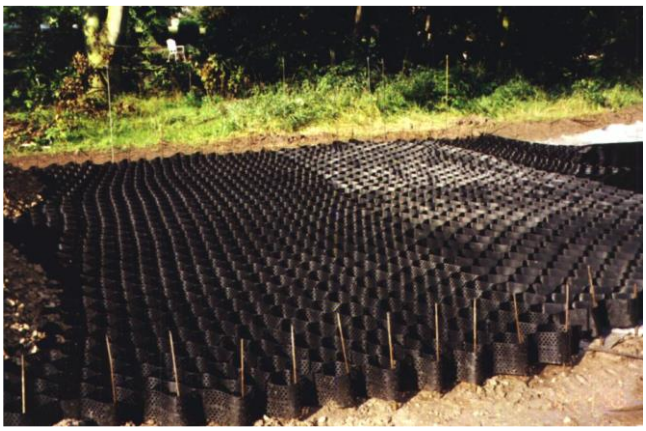
4. New permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA. The hard surface should be resistant to or tolerant of deformation by tree

roots, and should be set back from the stem of the tree and its above-ground root buttressing by a minimum of 500mm to allow for growth and movement.

5. A permeable **geotextile membrane** (such as 'Treetex T300') should be laid on the ground beneath the footprint of the proposed driveway to help prevent pollution contamination of the rooting area below, this should be secured with pegs or pins driven through it into the ground. If the new surface is likely to be subject to de-icing salt application, an impermeable barrier should be laid to prevent contamination of the rooting area and run-off should be directed away from the trunk of the tree (preferably out of the RPA).

6. Edge supports of an appropriate size and strength should be laid above ground level, on top of the geogrid, either on a concrete haunching, or flat on the geogrid itself, secured with pegs or pins driven into the ground. If concrete haunching is used, a strip of heavy-duty polythene should be laid beneath it, on top of the geotextile membrane, to prevent the leaching of wet cement into the soil. The outer side of the edge supports should be banked up with topsoil, graded down to existing ground level.

7. A perforated cellular confinement system ('**geoweb**') should then be laid above the geotextile membrane (see **photograph no. 1** below). The grade and type of this web should be selected by a structural engineer to ensure that anticipated loads can be supported without causing any additional compaction of the soil structure beneath. A 200mm standard cell width should be used; cell depth should normally be a minimum of 100mm for car parking spaces, and 150mm for drives. Where more than one strip of geoweb needs to be employed, the cellular structure should be maintained by stapling adjacent sections together using 10mm galvanised staples.



Photograph no.1: **Geoweb**

8. The geoweb should be filled with an angular aggregate with a particle size of between 20mm and 40mm, with no fines (in order to permit vertical gaseous diffusion). Care should be taken that trucks do not drive onto the area to deposit the aggregate; it should be tipped at the edge of the area and then pushed into position so that machinery moves only on the areas of already laid aggregate and not on the ground either side of it.

Photograph no.2: **Aggregate fill**

9. A second layer of permeable geotextile membrane should be laid on top of the geoweb to prevent sand or other materials used as the base of the wearing course falling into the no-fines aggregate below. The use of a sand bedding depends on selection of the final wearing course.

10. If a permeable surface is to be used by construction traffic, this should be protected with a temporary sacrificial surface laid over a geotextile separator to ensure that its permeability is retained.

Types of hard surface materials and their suitability in proximity to trees.

- Materials with a high fines content, such as self-binding gravels or hoggin, ought not to be used due to their almost impermeable texture when consolidated.

- **Paving slabs and block pavers**: Paving slabs and block pavers are available with built-in infiltration spaces between the slabs or locks. These are ideal, but need to be laid dry-jointed on a sharp sand or coarse aggregate no-fines foundation to allow air and moisture to penetrate to the rooting area.

- **In-situ concrete:** As in-situ concrete forms an impermeable surface, falls and openings need to be provided for water and air to enter the soil. This can be achieved by forming 50mm diameter holes in the construction of a slab at regular spacings of 300mm to 600mm (as determined by an engineer) and backfilling the resulting holes with no-fines gravel or aggregate.

- **Bitumen paving and resin-bonded gravels:** These surfaces can consist of porous or impermeable material. As the interstices in unsealed tar paving should eventually become blocked by fines, it is advisable for such surfaces to be laid following the same principles as those for impermeable surfaces, therefore its use within the RPA also needs to be restricted to the 20% RPA recommendation.

6.14. Soft landscaping, Fencing and reinstatement

6.14.1. All protective barriers must remain in place until the construction activity is finished and there is no realistic risk of damage to the protected soil surfaces.

6.14.2. The final fencing, soft landscaping and reinstatement shall only be undertaken after all the protective fencing has been removed. It is important to note that great care is needed by all the contractors to avoid damage to the trees.

6.14.3. After the removal of the tree protection and final landscaping works the arboricultural consultant shall assess the condition of the underlying soil. It may be the case that regardless of the protective measures that soil compaction has occurred in the vicinity of existing trees.

6.14.4. Potential remedial works may include sub-soil aeration using compressed air, and the addition of other materials, preferably of a bulky, organic nature (but excluding peat), to improve structure. Heavy mechanical cultivation such as ploughing or rotavation should not occur within RPAs.

6.14.5. Any cultivation operations should be undertaken carefully by hand to minimize damage to the tree, particularly the roots. De-compaction measures include forking, spiking, soil augering and tilthed radial trenching. Care should be taken during such operations to minimize the risk of further damage to tree roots.

6.14.6. Soil compaction shall be avoided around existing vegetation, including trees, and in areas where new planting or seeding is proposed: No plant or machinery shall enter or be used within RPAs, which specifically includes rotovators.

6.14.7. Digging (for fence posts etc.) shall be done by hand. If roots or clumps of 25mm diameter and above are encountered they shall be retained and protected; the position of the proposed post will be re-located. All roots exposed shall be back-filled with sharp sand.

There shall be no changes to soil levels within the RPAs of trees.

6.15. Contingencies

6.15.1. Any incidents that may occur during development which have the potential to affect trees shall be reported immediately to the arboricultural consultant.

6.15.2. Following an incident being reported the arboricultural consultant shall visit the site, assess the situation, and make the appropriate recommendations. Details of the incident and remedial measures shall be communicated to the local planning authority.

December 2021

APPENDIX 1 –TREE SURVEY SCHEDULE

TREE SURVEY SCHEDULE

Key to tree survey data

Tree number:	Links the specimen to tree locations plan and survey schedule
Species:	Common name
Height:	Estimated total height in metres from ground level.
Stem diameter:	Tree stem diameter in mm measured at 1.5m height
Crown spread radius;	Radius crown spread distance measured in metres at the greatest point
Branch spread:	Branch spread of crown (in meters) measured from the centre of the trunk at the four cardinal points
Height & direction of 1st significant branch:	
	Height above ground and direction of growth of first significant live branch
Height of canopy:	Distance from adjacent ground level to lowest part of lowest branch, in metres
Age class:	Y (young) – newly planted tree or young sapling/tree usually under 15 years old
	EM (early mature) – tree within first 1/3rd normal life expectancy
	M (mature) – tree in final 2/3^{rds} normal life expectancy
	LM (late mature) – tree reaching the end of or exceeding normal life expectancy.
General Observations and/or preliminary recommendations:	
	Observations of all kinds relating to the subject tree

Estimated Remaining Years:	0	No potential (dead trees)
	<10	Less than ten years

TREE SURVEY SCHEDULE

10+	more than ten years
20+	more than twenty years
40+	more than forty year

Category: Based on the British Standard "Trees in relation to design, demolition and construction - Recommendations", BS 5837: 2012, Table 1 (shown overleaf).

TREE SURVEY SCHEDULE

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

TREE SURVEY SCHEDULE

Tree number	Species	Height m	Stem Diameter	Branch Spread m	Height & direction of 1st significant branch	Height of canopy	Age class	Observations & preliminary recommendations	Estimated Remaining Years	BS5837 Category Colour coded
T1	Sessile Oak	18	910	N: 8 E: 8 S: 7 W: 4	7(E)	3	M	Off-site tree. Street tree. Single trunk with normal taper. Major deadwood (>100mm Ø). Sound unions. No obvious defects present. Of typical form for species. Readily visible from adjacent public areas. Key arboricultural feature. Easterly lateral branches previously shortened back to circa 4m from stem. Approximately 4m of Easterly lateral regrowth since last pruning operation. Recommendations: Consider shortening regrown Easterly lateral branches, by up to 4m in length, back to the last pruning points.	40+	A1
T2	Lawson Cypress	5	100	N: 1 E: 2 S: 2 W: 2	0.5(NE)	0	M	Bushy cypress regrown from previously cut stump at 1m height. Recommendations: None.	10+	C1
T3	Lawson Cypress	5	100	N: 2 E: 2 S: 1 W: 2	0.5(W)	0	M	Bushy cypress regrown from previously cut stump at 1m height. Recommendations: None.	10+	C1

TREE SURVEY SCHEDULE

Tree number	Species	Height m	Stem Diameter	Branch Spread m	Height & direction of 1st significant branch	Height of canopy	Age class	Observations & preliminary recommendations	Estimated Remaining Years	BS5837 Category Colour coded
T4	Cherry Plum	5	120	N: 2 E: 2 S: 1 W: 1	0.5(SE)	2	EM	Small boundary tree. Three stemmed from. 0.2m. Tight forks. Evidence of included bark. Mutually drawn up stems. Recommendations: None.	20+	C1
T5	Sweet Chestnut	6	130	N: 1 E: 2 S: 2 W: 1	3(SW)	2	EM	Small boundary tree. Recommendations: None.	20+	C1
T6	Silver Birch	13	280,180	N: 2 E: 2 S: 2 W: 3	2(W)	2	M	Boundary tree. Twin stemmed from. base. Mutually drawn up stems. Readily visible from adjacent public areas. Short lived species. Recommendations: None.	20+	B1
T7	Sweet Chestnut	8	200	N: 3 E: 3 S: 2 W: 4	4(NW)	3	EM	Boundary tree. Limited potential due to close proximity to neighbouring property. Fast growing species requiring significant space. Recommendations: None.	40+	C1
T8	Sycamore	7	140	N: 1 E: 1 S: 1 W: 1	4(NE)	3	SM	Small boundary tree. Self seeded sapling of inappropriate location for retention, due to very close proximity to neighbouring property. Recommendations: Remove tree and root.	10+	C1

TREE SURVEY SCHEDULE

Tree number	Species	Height m	Stem Diameter	Branch Spread m	Height & direction of 1st significant branch	Height of canopy	Age class	Observations & preliminary recommendations	Estimated Remaining Years	BS5837 Category Colour coded
T9	Sycamore	7	140	N: 1 E: 1 S: 1 W: 1	4(NE)	3	SM	Small boundary tree. Self seeded sapling of inappropriate location for retention, due to very close proximity to neighbouring property. Recommendations: Remove tree and root.	10+	C1
T10	Golden acacia	9	240	N: 2 E: 3 S: 3 W: 1	3(S)	2	EM	Boundary tree. Single trunk with normal taper. Medium deadwood (30mm - 100mm Ø). Necrotic bark on lower Northerly and Southerly stem. Short lived cultivar, rarely exceeding 20-30 yrs of age. Recommendations: None.	20+	C1
T11	Fastigiate Beech	9	200	N: 1 E: 1 S: 1 W: 1	3(E)	3	EM	Boundary tree. Dawyck fastigiate specimen. Of good potential. Recommendations: None.	40+	A1
T12	Pear	4	150	N: 2 E: 2 S: 1 W: 1	1(N)	1	M	Small fruit tree. Recommendations: None.	10+	C1
T13	Pear	7	220	N: 2 E: 1 S: 1 W: 2	2(E)	1	M	Previously topped at 4m height. Fruit tree. Recommendations: None.	20+	B1

TREE SURVEY SCHEDULE

Tree number	Species	Height m	Stem Diameter	Branch Spread m	Height & direction of 1st significant branch	Height of canopy	Age class	Observations & preliminary recommendations	Estimated Remaining Years	BS5837 Category Colour coded
T14	Wild Cherry	8	375	N: 4 E: 4 S: 3 W: 3	1(E)	4	M	Dead tree. Recommendations: Remove tree and root.	<10	U
T15	Sweet Chestnut	17	700	N: 5 E: 6 S: 6 W: 6	6(S)	4	M	Ivy covered trunk. Dense ivy restricts view of lower trunk. Unable to fully assess. Twin stemmed from. 2m. Previous loss of sub-dominant stem with associated unoccluded wound. Recommendations: Carry out further inspection. Remove Ivy.	40+	A1
T16	Sessile Oak	10	350	N: 3 E: 4 S: 2 W: 5	4(W)	3	M	Boundary tree. Ivy covered trunk. Dense ivy restricts view of lower trunk. View of main unions restricted. Unable to fully assess. Asymmetrical crown. Recommendations: Carry out further inspection. Remove Ivy.	20+	B1
T17	Sycamore	8	260	N: 1 E: 3 S: 4 W: 2	3(SE)	3	EM	Boundary tree. Light suppressed development. Recommendations: None.	20+	B1
T18	Sweet Chestnut	8	300	N: 0 E: 2 S: 2 W: 1	3(E)	3	M	Light suppressed development. Significant bark damage on stem. Small crown. Recommendations: None.	10+	C1

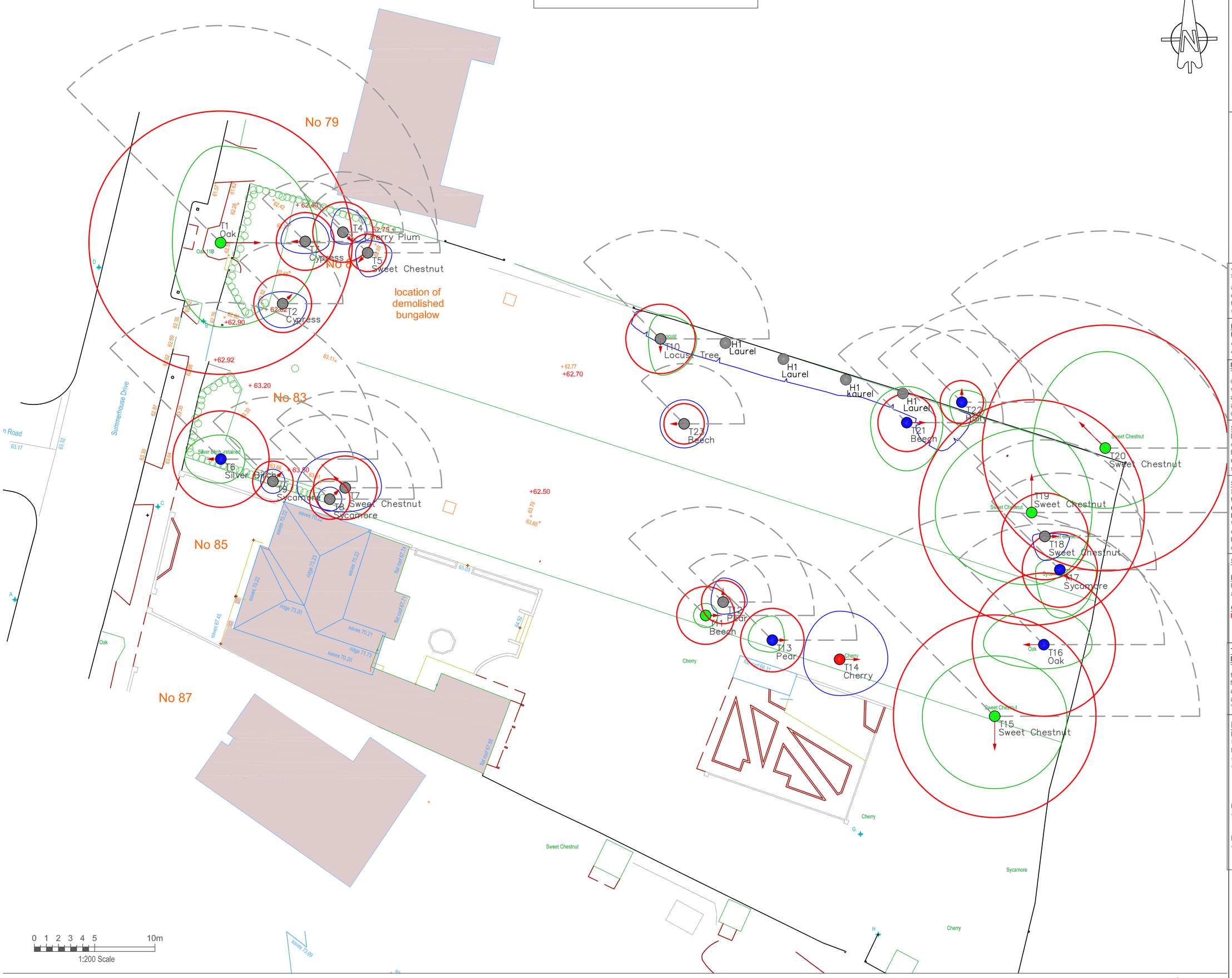
TREE SURVEY SCHEDULE

Tree number	Species	Height m	Stem Diameter	Branch Spread m	Height & direction of 1st significant branch	Height of canopy	Age class	Observations & preliminary recommendations	Estimated Remaining Years	BS5837 Category Colour coded
T19	Sweet Chestnut	18	450,450,450	N: 7 E: 5 S: 6 W: 8	4(N)	2	M	Three stemmed from. 1m. Co-dominant stems. Tight forks. Mutually drawn up stems. Major deadwood (>100mm Ø). Of typical form for species. Key arboricultural feature. Of wildlife habitat value. Recommendations: None.	40+	A1
T20	Sweet Chestnut	18	600,600	N: 8 E: 6 S: 5 W: 6	5(NW)	3	M	Off-site tree. Unable to fully assess. Twin stemmed from. 0.2m. Major deadwood (>100mm Ø). Recommendations: None.	40+	A1
T21	Beech	8	200	N: 3 E: 3 S: 4 W: 3	2(E)	2	EM	Small boundary tree. Recommendations: None.	20+	B1
T22	Holly	6	150	N: 1 E: 2 S: 2 W: 1	1(N)	0	EM	Off-site tree. Small boundary tree. Unable to fully assess. Recommendations: None.	20+	B1
T23	Beech	5	140	N: 2 E: 2 S: 2 W: 2	1(W)	1	EM	Small tree. Recommendations: None.	40+	C1
H1	Cherry Laurel	5	170	N: 2 E: 3 S: 2 W: 2	0.5(E)	0	M	Lapsed Laurel hedge, historically managed at 1.8m high. Now, overgrown. Recommendations: None.	20+	C2

TREE SURVEY SCHEDULE

Root Protection Area: In accordance with paragraph 4.6.1 and Annex D of the British Standard BS 5837: 2012			
Tree number	**Species**	**Radius (m)**	**Area (m^2)**
1	Sessile Oak	10.92	374.6
2	Lawson Cypress	2.4	18.1
3	Lawson Cypress	2.4	18.1
4	Cherry Plum	2.5	19.6
5	Sweet Chestnut	1.56	7.6
6	Silver Birch	4	50.3
7	Sweet Chestnut	2.64	21.9
8	Sycamore	1.68	8.9
9	Sycamore	1.68	8.9
10	Locust Tree	2.88	26.1
11	Beech	2.4	18.1
12	Pear	1.8	10.2
13	Pear	2.64	21.9
14	Wild Cherry	4.5	63.6
15	Sweet Chestnut	8.4	221.7
16	Sessile Oak	5.94	110.8
17	Sycamore	3.12	30.6
18	Sweet Chestnut	3.6	40.7
19	Sweet Chestnut	9.35	274.6
20	Sweet Chestnut	10.19	326.2
21	Beech	2.4	18.1
22	Holly	1.8	10.2
23	Beech	1.68	8.9
H1	Cherry Laurel	2.0	12.56

Tree constraints plan - Existing layout



Tree categorization:
In accordance with the cascade chart in *Table 1* of British Standard 5837 (2012) *Trees in relation to design, demolition and construction — Recommendations*

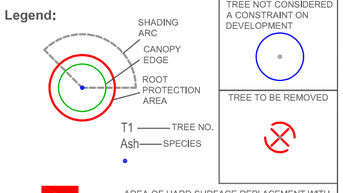
Category U tree
Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years

Category A tree
Trees of high quality with an estimated remaining life expectancy of at least 40 years

Category B tree
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years

Category C tree
Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm

Legend:



TREE CONSIDERED A CONSTRAINT ON DEVELOPMENT:
Trees whose removal could not be fully supported on arboricultural grounds and that the LPA are likely to want to see retained; therefore these trees are considered constraints on proposed development. Below are the constraints that will need to be considered if these trees are to be successfully included within the proposed development:

PRIMARY CONSTRAINTS:
BELOW GROUND = THE ROOTS = ROOT PROTECTION AREAS
ABOVE GROUND = THE BRANCHES = SPACE FOR TREE CANOPY
ABOVE GROUND = SHADING = SHADING ARCS

ROOT PROTECTION AREAS (RPAs):
The RPA is a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. This is a minimum area in m² which should be left undisturbed around each retained tree.There should be no development / soil disturbance on the tree side of the RPA.

SPACE FOR TREE CANOPY:
Development should be designed to allow for adequate space for construction (e.g. installation of scaffolding) and for predicted future growth of branches without necessitating excessive pruning for installation or repeated requests for pruning or tree removal by incoming occupiers, low level structures such as sheds or garden features may be acceptable.

SHADING:
Shading arcs: Indicate the passage of shading created by the tree(s) through the greater part of the day, **shown by dashed lines between the north-west and east of the tree at a distance equivalent to the current height.**
Windows of habitable rooms (e.g. living rooms & dining rooms) should not to directly face trees if on the tree side of the shading arcs - unless the rooms have dual or triple aspect and have at least one other window that does not directly face any trees that are causing shading.

SECONDARY CONSTRAINTS:

EXISTING HARD SURFACING
Hard surfacing within RPAs of tree which should be retained can be replaced as long as the soil beneath the sub-base is not disturbed.

OTHER:
None significant

TREE NOT CONSIDERED A CONSTRAINT ON DEVELOPMENT:
Trees whose removal could be supported on arboricultural grounds; and therefore not considered constraints on proposed development.
Note: The removal of all of the trees shown within this category may be not acceptable to the LPA, therefore this is to be used as a design guide only to allow for selective removal of some of these trees; where possible category 'A' or 'B' trees shown as trees that could be removed should be retained.

RELEVANT STANDARDS
If planning permission is granted the proposed development and associated tree works will have to adhere to the following standards:
BS 5837 (2012) ***Trees in relation to design, demolition and construction — Recommendations.***
- This British Standard gives recommendations and guidance on the relationship between trees and design, demolition and construction processes, It sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures.

BS 3998 (2010) ***Tree work — Recommendations.***
- This British Standard gives general recommendations for tree work. It gives guidance on management options for established trees (including soil care and tree felling) and overgrown hedges.

NHBC Standards Chapter 4.2.
- Gives guidance on meeting the technical requirements and recommendations when building near trees, hedgerows and shrubs, particularly in shrinkable clay soils

Arboricultural impacts plan - Proposed layout

A 5m separation between the Eastern canopy edge and proposed new dwelling exists. Whilst this space is sufficient to facilitate the development, an improved separation is recommended, to create a more harmonious relationship between the completed development and tree. Lateral branches on this side of the canopy have previously been shortened and the recommendation is to repeat the pruning process, shortening Easterly laterals back to the last pruning points.

Existing hard surface to be resurfaced with a no dig, above soil, 3 dimensional cellular confinement system. The existing surface shall be removed with care as to not disturb the soil beneath.

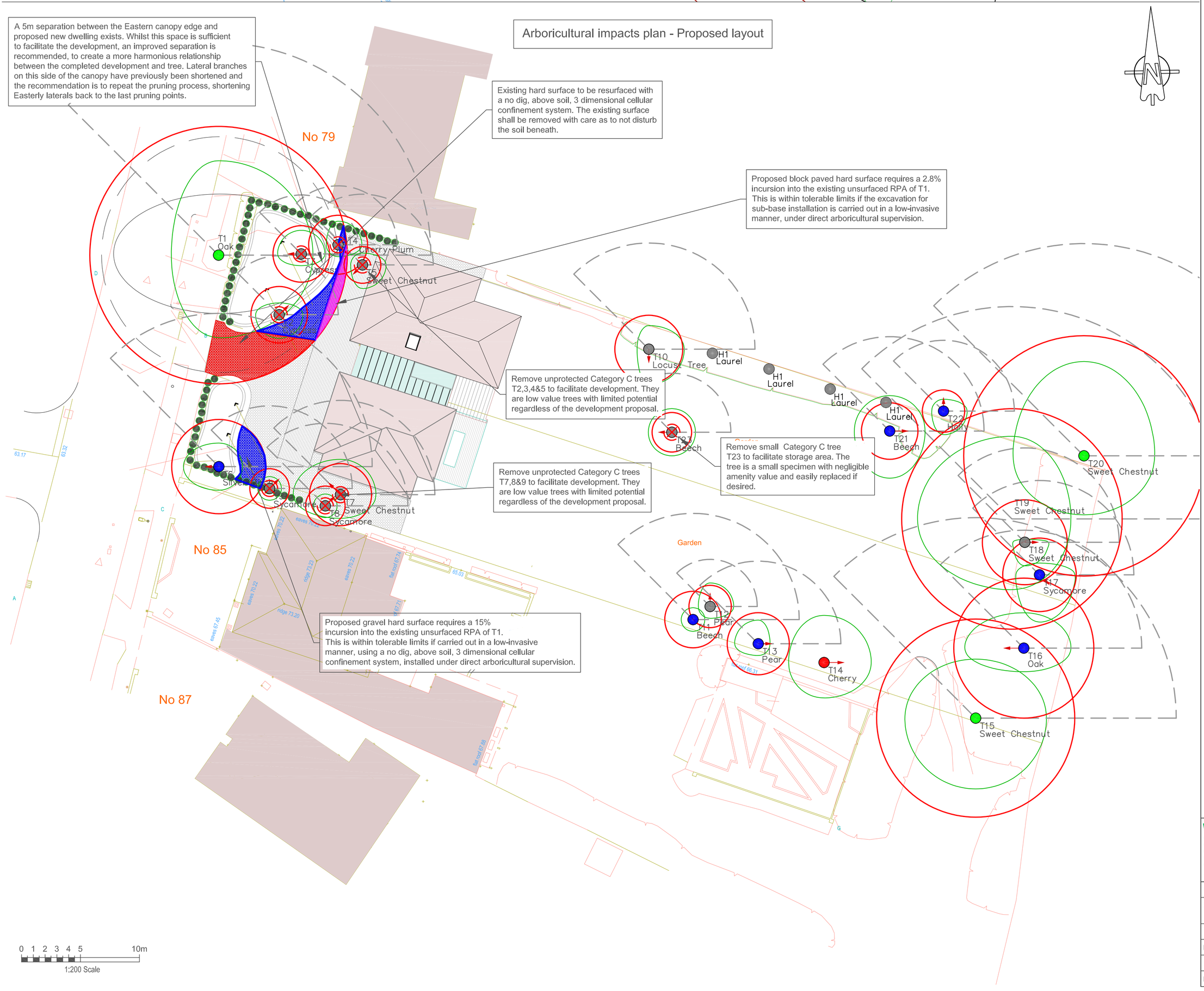
Proposed block paved hard surface requires a 2.8% incursion into the existing unsurfaced RPA of T1. This is within tolerable limits if the excavation for sub-base installation is carried out in a low-invasive manner, under direct arboricultural supervision.

Remove unprotected Category C trees T2,3,4&5 to facilitate development. They are low value trees with limited potential regardless of the development proposal.

Remove small Category C tree T23 to facilitate storage area. The tree is a small specimen with negligible amenity value and easily replaced if desired.

Remove unprotected Category C trees T7,8&9 to facilitate development. They are low value trees with limited potential regardless of the development proposal.

Proposed gravel hard surface requires a 15% incursion into the existing unsurfaced RPA of T1. This is within tolerable limits if carried out in a low-invasive manner, using a no dig, above soil, 3 dimensional cellular confinement system, installed under direct arboricultural supervision.



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Client: Dr. Parag Pandya		
Site: 81-81 Summerhouse Drive Bexley DA5 2EF		
Title: Tree Constraints Plan & Arboricultural impacts plan		
Date: 12.2021	Scale: 1:200	Paper Size: A1
Drawn: WJK	Checked: WJK	Job Ref: SD 11.21
Drawing Number: TCP/AIP-01		

Tree protection plan - Main construction phase

Pale green shaded area shows lateral crown pruning extent. Back to, but not beyond the last pruning points.

Area of temporary ground protection

Site utilities and storage area

Protective fencing

No 79

No 81

No 83

No 85

No 87

T1 Oak

T2 Cypress

T3 Cypress

T4 Cherry Plum

T5 Cypress

T6 Silver Birch

T7 Sweet Chestnut

T8 Sycamore

T9 Sycamore

T10 Locust Tree

T11 Beech

T12 Pear

T13 Pear

T14 Cherry

T15 Sweet Chestnut

T16 Oak

T17 Sycamore

T18 Sweet Chestnut

T19 Sweet Chestnut

T20 Sweet Chestnut

T21 Beech

T22 Holly

T23 Beech

H1 Laurel

CEZ

Summerhouse Drive

0 1 2 3 4 5 10m

1:200 Scale

Tree protection plan - Landscape phase

Existing hard surface to be resurfaced with a no dig, above soil, 3 dimensional cellular confinement system. The existing surface shall be removed with care as to not disturb the soil beneath.

Gravel hard surface using a no dig, above soil, 3 dimensional cellular confinement system, installed under direct arboricultural supervision. See panel in bottom left corner.

Block paved hard surface to carried out in a low-invasive manner, under direct arboricultural supervision.

Site utilities and storage area

Protective fencing

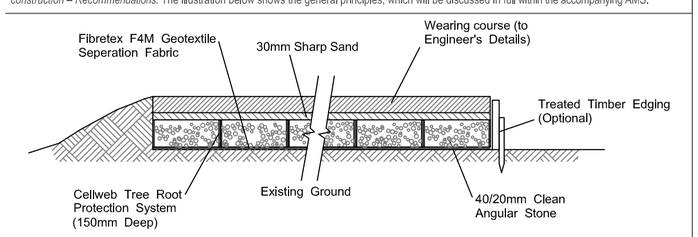
Garden

0 1 2 3 4 5 10m

1:200 Scale

ABOVE SOIL SURFACING WITHIN RPAS

Proposed above soil surfacing shall accordance with guidance set out in section A.1.5 of BS 5837: 2012 *Trees in relation to design, demolition and construction – Recommendations.* The illustration below shows the general principles, which will be discussed in full within the accompanying AMS.



Tree categorization:

In accordance with the cascade chart in *Table 1* of British Standard 5837 (2012) *Trees in relation to design, demolition and construction — Recommendations*

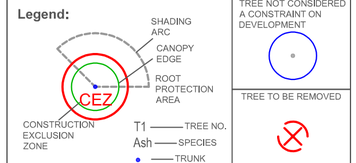
Category U tree
Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years

Category A tree
Trees of high quality with an estimated remaining life expectancy of at least 40 years

Category B tree
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years

Category C tree
Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm

Legend:



TREE NOT CONSIDERED A CONSTRAINT ON DEVELOPMENT

TREE TO BE REMOVED

AREA OF HARD SURFACE REPLACEMENT WITH ABOVE SOIL SURFACING

AREA OF SUPERVISED EXCAVATION FOR NEW PAVED HARD SURFACING

AREA OF NEW ABOVE SOIL SURFACING

ROOT PROTECTION AREAS (RPAs):

The RPA is a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. This is a minimum area in m² which should be left undisturbed around each retained tree.There should be no development / soil disturbance on the tree side of the RPA.

CONSTRUCTION EXCLUSION ZONES (CEZs)

Area which access is prohibited during development (based on the RPAs). Construction Exclusion Zones shall be safeguarded during development by the installation of protective fencing and / or fit for purpose ground protection before any development works occur.

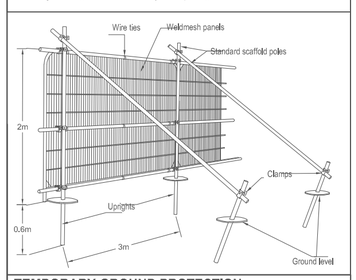
There shall be no development within CEZs including*:

- No soil disturbance
- No trenches for foundations, services or drainage
- No soil level changes
- No new hard surfaces

*If any such works are later proposed within any RPAs of trees to be retained these shall be supervised by the arboricultural consultant.

PROTECTIVE FENCING

Protective fencing shall consist of a scaffold framework in accordance with *figure 2* of British Standard 5837 (2012); comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Onto this, weldmesh panels shall be securely fixed with wire or scaffold clamps. Weldmesh panels on rubber or concrete feet are not resistant to impact and shall not be used. Construction Exclusion Zone signs shall be fixed to every forth panel.



TEMPORARY GROUND PROTECTION

For pedestrian movements within the RPA the installation of ground protection shall be in the form of a single thickness of scaffold boards or ply board on top of a compressible layer of woodchip (at least 100mm deep) laid onto a geotextile, or supported by scaffold.

For wheeled or tracked construction traffic a proprietary system such as GreenTek Ground-Guards (heavy duty plastic ground protection mats clipped together) laid above 150mm deep layer of compressible woodchip. Or; pre-cast reinforced concrete slabs.

No storage or mixing of potentially hazadous materials within these areas; such as diesal fueling or cement mixing (unless specific procautions have been made that prevents runoff / contamination of the ground from any spillage).

EXCAVATION WITHIN RPAS

Excavation within root protection areas (RPAs) shall be carried out carefully by hand, under direct supervision of the arboricultural consultant.

Roots smaller than 25mm diameter; shall be pruned back, making a clean cut with a suitable sharp tool (e.g. bypass secateurs or handsaw), except where they occur in clumps. **Roots occurring in clumps or of 25mm diameter and over;** shall only be severed by the arboricultural consultant if (s)he is satisfied that this action will not lead to significant detriment to the trees' health or safety. Roots, whilst exposed, shall immediately be wrapped or covered by hessian to prevent desiccation and to protect them from rapid temperature changes. Any wrapping shall be removed prior to backfilling, which will take place as soon as possible. Prior to backfilling, retained roots shall be surrounded with topsoil or un-compacted sharp sand (builders' sand will not be used because its high salt content is toxic to tree roots), or other loose inert granular fill, before soil or other suitable material is replaced. This material shall be free of contaminants and other foreign objects potentially injurious to tree roots.

CHRONOLOGICAL ORDER OF EVENTS*

*See the accompanying Aboricultural Method Statement (AMS) for full details of the order of events and specifications for tree protection.

1. Pre-start meeting
2. Tree removals and pruning
3. Protective fencing installed
4. Temporary ground protection installed
5. Installation of service and drainage routes
6. Construction of building
7. Reallignment pf protective fencing
8. Installation of above soil surfacing
9. Removal protective fencing
10. Soft landscaping

RELEVANT STANDARDS

If planning permission is granted the proposed development and associated tree works will have to adhere to the following standards:

BS 5837 (2012) *Trees in relation to design, demolition and construction — Recommendations.*

- This British Standard gives recommendations and guidance on the relationship between trees and design, demolition and construction processes. It sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures.

BS 3998 (2010) *Tree work — Recommendations.*

- This British Standard gives general recommendations for tree work. It gives guidance on management options for established trees (including soil care and tree felling) and overgrown hedges.

NHBC Standards Chapter 4.2.

- Gives guidance on meeting the technical requirements and recommendations when building near trees, hedgerows and shrubs, particularly in shrinkable clay soils

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Site:	81-81 Summerhouse Drive Bexley DA5 2EF		
Title:	Tree protection plan		
Date:	12.2021	Scale: 1:200	Paper Size: A1
Drawn: WJK		Checked: WJK	Job Ref: SD 11.21
Drawing Number: TPP-01			