



BS 5837:2012 Arboricultural Survey

Land at CWL1, Crymlyn Burrows, Swansea

Presented
to: **Amazon UK Services Ltd**

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Report Details

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Site Address	CWL1 Crymlyn Burrows, Swansea
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Delta-Simons Contact	Peter Morrell (Pete.Morrell@deltasimons.com)

Quality Assurance

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				Pete Morrell Principal Arboriculturist	Charlotte Sanderson-Lewis Associate Director	Charlotte Sanderson-Lewis Associate Director

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Executive Summary

Purpose	Delta-Simons Environmental Consultants Ltd was instructed by Amazon Service UK Ltd ('the Client'), to undertake a Tree Survey to BS 5837:2012 standard of an area of land situated at Crymlyn Burrows, Swansea CWL 1 (the Site'). The survey was undertaken on 13 th September 2023. The survey was undertaken to inform a planning application for the installation of a new external lighting scheme at the Site and to inform the associated Arboricultural Impact Assessment.
Current Site Status	The Site comprises an internal road running adjacent to woodland/tree screening inside the eastern and southern boundaries. The wider Site is currently used as a storage facility comprising a large industrial warehouse complex with hard and soft landscaping. Car parking and the main entrance to the Site are accessed from the north entrance off Ffordd Amazon. To the south is the bypass A483 (Fabian Way).
Proposed Development	It is understood the proposed external lighting scheme comprises the installation of 20 x 6m lighting columns at the southern Site boundary, utilising the following luminaire: Sylvania Zephyr - Large Zephyr 5500Lm 4k CLI Grey 0050081
Results	A total of six trees and six tree groups were identified and assessed as part of the Tree Survey. The results of a phone conversation and email with the Tree Officer from Neath Port Talbot Borough Council on 18/09/23 indicates that no trees on or immediately adjacent to the Site are covered by a Tree Preservation Order (TPO) or fall within a Conservation Area (CA).
Recommendations	<u>Recommendation 1 (Adequate Tree Protection)</u> Those trees identified within the proposed development plan for retention will need to be adequately protected during any approved development works. Measures to protect trees should follow the best practice principles set out in BS 5837: Trees in Relation to Design, Development and Construction (2012). Prior to any construction or development work proceeding, the Root Protection Area (RPAs) of individual trees to be retained should be marked out. Marking out should be completed by a competent person with arboricultural expertise. All trees retained on-Site and adjacent to the Site should be protected by barriers or ground protection around the calculated RPA, and as indicated on the Tree Constraints Plan (TCP) produced in association with this survey.
This Tree Survey Executive Summary is intended as a summary of the assessment of the Site based on information received by Delta-Simons at the time of production. This Executive Summary should be read in conjunction with the full Report.	

Table of Contents

1.0 INTRODUCTION	4
1.1 Purpose and Scope of the Survey	4
1.2 Site Description	4
1.3 Proposed Development	4
2.0 LEGISLATION	5
2.1 Trees	5
3.0 METHODOLOGY	6
3.1 Trees	6
3.2 Tree Plans and Tree Schedules	8
3.3 Root Protection Area	8
3.4 Limitations of the Survey	9
4.0 RESULTS	10
4.1 Data Search	10
4.2 Survey Details	10
4.3 Young and Semi-Mature Trees	10
4.3.1 Species and their Arrangement in the Landscape	10
4.3.2 Height and Significance in the Landscape	10
4.3.3 Age and Condition	10
4.3.4 Environmental Condition	10
4.4 Tree Schedule	8
5.0 TREE MANAGEMENT	13
5.1 Arboricultural Assessment	13
5.2 Recommendations	13
6.0 LIMITATIONS OF THE TREE SURVEY	16

Figures

FIGURE 1 – SITE LOCATION MAP
FIGURE 2 – TREE SURVEY
FIGURE 3 – TREE CONSTRAINTS PLAN

Appendices

APPENDIX A – REFERENCES
APPENDIX B – SITE PHOTOGRAPHS

1.0 Introduction

1.1 Purpose and Scope of the Survey

Delta-Simons Environmental Consultants Ltd was instructed by Amazon UK Services Ltd (the 'Client') to undertake an Arboricultural Survey to BS 5837:2012 standard. The survey was undertaken at land situated at Crymlyn Burrows, Swansea CWL 1 (hereafter referred to as 'the Site'). The survey was undertaken on 13th September 2023. The Site location and the area surveyed are shown in Figure 1. The survey was undertaken to inform a planning application for the installation of a new external lighting scheme at the Site, and to inform the associated Arboricultural Impact Assessment.

The aims of the Tree Survey were to:

- Identify the individual tree species present at the Site by means of visual inspection;
- To define the approximate age, condition and canopy spread of all individual mature trees identified and the value of these within the development;
- To identify any trees that present a risk to existing or proposed foundations or other structures that may be constructed on the Site and recommend actions to remove this risk; and
- Recommend tree management or mitigation measures where appropriate.

1.2 Site Description

The Site is centred at Ordnance Survey (OS) grid reference SS 71286 93338, to the north of Fabian Way A483 in Neath Port Talbot, Swansea. The Site comprises an internal road running adjacent to woodland/tree screening inside the eastern and southern boundaries of the wider Site, which supports a large industrial warehouse complex used as a storage facility with associated hard and soft landscaping to the west and north. The Site covers an area of 0.245 hectares (ha). Car parking and the main entrance to the Site are accessed from the north entrance off Ffordd Amazon. To the south is the bypass A483 (Fabian Way).

The north of the wider Site is bordered by Ffordd Amazon. The eastern boundary is defined by a linear group of deciduous and coniferous trees and overflow carpark, with further industrial units and Swansea Bay Golf Club beyond Ffordd Amazon. The southern boundary is defined by groups of trees that form screening from Fabian Way, the A483. The western boundary is adjacent to further industrial properties.

The Site layout and area surveyed is shown in Figure 2.

1.3 Proposed Development

It is understood the proposed external lighting scheme comprises the installation of 20 x 6m lighting columns at the southern Site boundary, utilising the following luminaire: Sylvania Zephyr - Large Zephyr 5500Lm 4k CLI Grey 0050081.

2.0 Legislation

2.1 Trees

Local Planning Authority (LPA) look upon trees as being highly beneficial to the locality. To ensure that any important specimens, or significant groups of trees are retained, they may place Tree Preservation Orders (TPOs) on them. In other situations, villages or whole districts may be classified as conservation areas. In these instances certain trees in the designated area will be protected. When trees are protected, legal procedures must be followed before any work is carried out.

When trees are protected by Preservation Orders, no work should be carried out on them without prior written consent from the LPA. Once an application is made, the Authority personnel must inspect the trees, and make a decision within a statutory eight-week period as to whether work can go ahead. If no decision is made within the eight weeks period, the appellant can appeal to the Office of the Deputy Prime Minister for non-determination. If the LPA refuses the application the appellant still has the right to appeal.

If a tree protected by a Preservation Order is either killed or wilfully destroyed, the owners of the tree, and the contractor who did the work, can both be prosecuted. The fines for killing or wilfully destroying a tree can be high, i.e. the current maximum is £20,000 per tree, and there is an automatic requirement to re-plant. The current maximum for minor unlawful infringements, such as pruning, is £2,500.

Trees which are dead, dying, or dangerous are exempt from the legislation, although if such trees are removed, the onus on proving they fell into one of these categories lies with the tree owner. Whenever possible it is strongly recommended that the LA be given at least five days' notice before any work on such trees is carried out.

Trees in a conservation area that are already protected by a TPO are subject to the normal procedures and controls for any tree covered by such an Order.

Trees in a conservation area that are not protected by a TPO are protected by the provision in Section 211 of The Town and Country Planning Act (1990). These provisions require people to notify the LPA, using a 'section 211 notice', six weeks before carrying out certain works on such trees, unless an exception applies. The works may go ahead before the end of the six-week period if the LPA gives consent. This notice period gives the Authority an opportunity to consider whether to make an Order on the tree.

3.0 Methodology

The methodology set out below is a detailed summary of the suggested approach to tree assessment as described in British Standard 5837:2012. This Report has applied the methodology to all significant individual trees or groups of trees present at or near to the Site. Trees below 15 cm trunk diameter were generally excluded from the survey. All floral names follow the nomenclature of Stace (2010).

3.1 Trees

Trees have been broadly assessed based on guidance set out within the British Standard BS 5837:2012 Trees in Relation to Design, Development and Construction. This standard provides recommendations and guidance on the principles to be applied to achieve successful integration of development with trees, shrubs and hedgerows. Where development is to occur, the standard provides guidance on the approach needed to decide which trees are appropriate for retention, and the means for protecting these trees during the development (including demolition and construction works) and the means of incorporating trees into the developed landscape.

Trees on or adjacent to the Site have been divided into one of four categories (based on the cascade chart for tree quality assessment). These are classed as A, B, C or U (Section 4 of BS 5837) within Table 1. This gives an indication as to the tree's importance in relation to the Site, the local landscape and, also, the value and quality of the existing trees on-Site. This assists informal decisions concerning which trees should be removed or retained should development occur. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).

Categories A, B and C cover trees that should be a material consideration in the development process, each with three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural (nature conservation) values. Category U trees may have no significant landscape value but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. In assigning trees to the A, B or C categories, the presence of any serious disease or tree-related hazard is taken into account. If the disease is considered fatal and/or irremediable, or likely to require sanitation for the protection of other trees it may be categorised as U with a recommendation for work or even removal, even if they are otherwise of considerable value.

Category (A): Trees whose retention is most desirable and are of high quality and value. These trees are considered to be in such a condition as to be able to make a lasting contribution (a minimum of 40 years) and may comprise:

- Trees which are particularly good examples of their species, especially rare or unusual, or essential components of groups or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue);
- Trees, or groups of trees, which provide a definite screening or softening effect to the locality in relation to views into or out of the Site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups); and
- Trees or groups of significant conservation, historical, commemorative or other value (e.g. Veteran or wood-pasture trees).

Category (B): Trees whose retention is considered desirable and are of moderate quality and value. These trees are considered to be in such a condition as to make a significant contribution (a minimum of 20 years) and may comprise:

- Trees that might be included in the high category but because of their numbers or slightly impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage), are downgraded in favour of the best individuals;

- Trees present in numbers such that they form distinct landscape features and attract a higher collective rating than they would as individuals. Individually these trees are not essential components of formal or semi-formal arboricultural features, or trees situated mainly internally to the Site and have little visual impact beyond the Site; and
- Trees with clearly identifiable conservation or other cultural benefits.

Category (C): Trees that could be retained but are considered to be of low quality and value. These trees are in an adequate condition to remain until new planting could be established (a minimum of ten years) or are young trees with a stem diameter below 150 mm and may comprise:

- Trees not qualifying in higher categories;
- Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value and or trees offering low or only temporary screening benefit; and
- Trees with very limited conservation or other cultural benefits.

Category (U): Trees that are considered to have no significant landscape value but it is not presumed that there is any overriding need to remove these unless stated otherwise in the description and recommendations. They are for this reason not considered as being significant within the planning process. These trees will be in such a condition that any existing value would be lost within 10 years and which should in the current context be ignored or removed for reasons of sound arboricultural management. Trees within this category are:

- 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;
- Trees that are dead or are showing signs of significant, immediate or irreversible overall decline; and
- 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.

Species have been recorded by common and scientific name. Height has been estimated in metres and stem diameter measured in centimetres unless impractical, taken at a height of 1.5 m from the base of the tree.

In the assessment particular consideration has been given to:

- The health, vigour and condition of each tree;
- The presence of any structural defects in each tree and its life expectancy;
- The size and form of each tree and its suitability within the context of the proposed scheme; and
- The location of each tree relative to existing Site features, e.g. its value as a screen or as a skyline feature.

Age class is assessed according to the age class categories referred to in BS 5837.

- Y: Young trees age less than 1/3 life expectancy;
- SM: Middle age trees 1/3 – 2/3 life expectancy;
- M: Mature trees over 2/3 life expectancy; and
- OM: Over mature – declining or moribund trees of low vigour.

The overall condition of any individual tree, or group of trees, has been referred to using one of the definitions listed below. A more detailed description of condition has been noted in the Tree Schedule:

- G **Good:** A sound tree or trees needing little, if any, attention;

- F **Fair:** A tree or trees with minor but rectifiable defects or in the early stages of stress, from which it may recover;
- P **Poor:** A tree or trees with major structural and physiological defects or stressed such that it would be very expensive and inappropriate to retain; and
- D **Dead:** A tree or trees no longer alive. However, this could also apply to those trees that are dying and will be unlikely to recover, or are becoming or have become dangerous.

Major defects or diseases and relevant observations have also been recorded. Dead wood has been defined as the following:

Twigs and small branch material	-	Up to 5 cm in diameter.
Minor dead wood	-	5 cm to 10 cm in diameter.
Major dead wood	-	10 cm in diameter and above.

The survey was completed from ground level only. Aerial inspections were not undertaken. Evaluations of tree conditions given within this assessment apply to the date of survey and cannot be assumed to remain unchanged, and it may be necessary to review these within 24 months, in accordance with good arboricultural practice.

3.2 Tree Plans and Tree Schedules

The extent and positions of significant individual trees or groups of trees close to the Site are shown on the Arboricultural Survey Plan (Figure 2). The Root Protection Areas (RPA) of the key trees of value identified for or recommended for retention have been marked within the Constraints Plan (Figure 3) using the RPAs provided in the Tree Schedule within Table 1.

A summary that includes the trees identified on or near to the Site is included in the Tree Assessment Report detailing information on each group of trees. This is also provided in Table 1. Within the summary table maximum RPAs (m²) for estimated tree diameters have been included where appropriate, as well as a calculated corresponding radius of the circle for that RPA. The RPAs are formulated as described below and assist when designing layouts in relation to trees.

3.3 Root Protection Area

Below ground constraints to development are represented by the root plate around a tree, which needs protecting in order for the tree to be incorporated into a proposed scheme without adverse harm to the tree or structural integrity of any proposed foundation structures.

This area is illustrated by the RPA and is calculated according to the formula set out in BS 5837:(2012). This area is equivalent to a circle with a radius 12 x the stem diameter for single stem trees or the basal diameter for trees with more than one stem arising less than 1.5 m above ground level.

$$\text{RPA (m}^2\text{)} = (\text{stem diameter (mm)} \times 12/1000)^2 \times 3.142$$

This figure should be capped to 707 m², that is, equivalent to a circle with a radius of 15 m, or a square with approximately 26 m sides

Taken from Table 2: Calculating the RPA, BS 5837 (2005).

3.4 Limitations of the Survey

There were no limitations to the survey in terms of timing and weather conditions. Access was not possible to trees beyond the southern and eastern boundaries at the time of the survey. Where access to trees within off-Site land was not possible, approximations of the dimensions of the trees were made, including of the stem diameter at breast height. As most trees were clearly visible from the Site this is not anticipated to be detrimental to the survey.

4.0 Results

4.1 Data Search

The results of a phone conversation and email with the Planning Officer Matthew Griffiths from Neath Port Talbot Borough Council on 18/09/23 indicates that no trees on or immediately adjacent to the Site are covered by a Tree Preservation Order (TPO) or fall within a Conservation Area (CA).

4.2 Survey Details

The tree inspection took the form of a walkover inspection completed by Gareth Meadows MArborA on 13th September 2023. Each individual tree of significance that could be impacted upon by any proposed development was identified and visually inspected and classified. The trees identified during the survey at the Site have been individually noted and identified within this Report and are shown in the Tree Survey Plan within Figures 2, and within the Photograph Section of this Report (Appendix B).

4.3 Young and Semi-Mature Trees

A total of six individual Trees (T) and six Tree Groups (TG) have been identified and assessed as part of the tree survey. The majority of trees surveyed lay outside the boundaries, apart from TG3, TG4 and TG5 in the south although they extended beyond the boundary. The canopy of T6 extended into the Site.

4.3.1 Species and their Arrangement in the Landscape

There are a limited range of tree species on, and immediately adjacent to, the Site, with no dominant species. buddleia, *Buddleja davidii*, white poplar, *Populus alba*, silver birch *Betula pendula*, elder *Sambucus nigra*, pedunculate oak *Quercus robur* and alder *Alnus glutinosa*, are present in multiple numbers. Hornbeam *Carpinus betulus*, goat willow *Salix caprea*, ash *Fraxinus excelsior* are represented as single specimens.

4.3.2 Height and Significance in the Landscape

The trees T2, T3, T4, T5 and T6 are at an average height of 14 m and all located behind the southern boundary. While highly visible when viewed from within the Site, their significance with the wider landscape is limited, being screened by TG6 that runs parallel with Fabian Way. Tree Group 6 is highly visible when viewed from Fabian Way and offers good screening into and out of the Site. The group also contributes significantly to the street scene. To a slightly lesser extent, TG1 also acts as a screening between the Site and wider landscape. For this reason, these trees and group are placed within Category B (see Table 1).

The remainder of trees within groups on the southern boundary stand up to 9 m and dominate the area within which they stand. However, their contribution to the wider area is restricted by the surrounding taller and trees within TG6 outside the boundary. For this reason, these trees are placed within Category C due to their low landscape contribution and condition.

4.3.3 Age and Condition

The trees present within the Site are young to semi-mature with many young trees forming dense groups. A number of the trees within the Site boundary show signs of past management in the form of crown lifting and crown reduction within areas of hardstanding and footpaths.

The on-Site trees range between fair to poor condition with the exception of one alder in TG4 which is dead and T6 which has an extreme lean to the north over the boundary fence. Trees from TG2 through to TG5 adjacent to the road have suffered canopy damage through mechanical flailing.

4.3.4 Environmental Condition

Given the Site's current use and the location of trees beyond hard surfaces, it is surmised that no damage to the root system of boundary and on-Site trees has been sustained through any recent on-Site working practices. The trees on-Site and immediately adjacent to the Site are not in an exposed position, having been protected from prevailing winds by the surrounding buildings and further tree groups.

Groundwater conditions are not assessed to be a significant factor in present or future growth or health of trees since the generally flat Site appears to be well drained and this situation will probably improve further following completion of any development.

4.4 Tree Schedule

Table 1 - BS 5837:2012 Tree Schedule

Tree No.	Species Name	Botanical Name	Ht (m)	Stem dia (mm)	No of Stems	Crown Spread				Crown Clearance (m)	Life Stage	Physiological Condition	Structural Condition	Comment	Cat Grading	Estimated remaining contribution (yrs)	Radius of RPA (m)	RPA (sq m)	Recommendations
						N	E	S	W										
T1	Buddleia	<i>Buddleja davadii</i>	3	<100	m/s	2	2	2	2	1.5	Y	Fair	Fair	2m behind boundary fence	C2	<10	1.2	4.52	
T2	White poplar	<i>Populus alba</i>	17+	Est 400	3	10	10	10	10	4	SM	Fair	Fair	Est 8m behind boundary fence	C2	>20	4.80	72.38	Overhanging boundary fence, prune back behind fence line
T3	Common alder	<i>Alnus glutinosa</i>	15	Est 450	1	4	4	4	4	2.5	SM	Fair	Fair	Est 6m behind boundary fence	C2	>20	5.40	91.61	
T4	Silver birch	<i>Betula pendula</i>	10	Est 150	1	2.5	2.5	2.5	2.5	2	SM	Fair	Fair	1.5m behind boundary fence	C2	>20	1.80	10.18	Overhanging boundary fence, prune back behind fence line
T5	Common alder	<i>Alnus glutinosa</i>	13	Est 200	1	3	3	3	3	2		Fair	Fair	2.5m behind boundary fence	C2	>20	2.40	18.10	Overhanging boundary fence, prune back behind fence line
T6	White poplar	<i>Populus alba</i>	17+	Est 500	1	12	12	12	12	4	SM	Fair	Fair	Broken branch leaning on boundary fence	B2	20 - 40	6.00	113.10	Overhanging boundary fence, prune back behind fence line and remove broken branch.
TG1	Common alder Pedunculate oak Goat willow	<i>Alnus glutinosa</i> <i>Quercus robur</i> <i>Salix caprea</i>	Av 9	Av 200	1	2.5	2.5	2.5	2.5	2	Y/SM	Fair	Fair	Canopies read as one	B2	>20	2.40	18.10	
TG2	Common alder Buddleia	<i>Alnus glutinosa</i> <i>Buddleja davadii</i>	Av 6	<150	1	0	0.5	0.5	0.5	1	Y/SM	Fair/ Poor	Poor	Flail damage on northside.	C2	10-20	1.80	10.18	
TG3	Common alder Silver Birch	<i>Alnus glutinosa</i> <i>Betula pendula</i>	Ab 8	<150	1	0	0.5	0.5	0.5	1.5	Y/SM	Fair/ Poor	Fair/ Poor	Flail damage on northside.	C2	10-20	1.80	10.18	
TG4	Common alder Pedunculate oak Silver Birch	<i>Alnus glutinosa</i> <i>Quercus robur</i> <i>Betula pendula</i>	Av 8	<200	m/s	1	1.5	2.5	2.5	0.5	Y/SM	Fair	Fair	Flail damage on northside. Dead alder in group.	C2	>20	2.40	18.10	Consider removing dead tree
TG5	Common alder Pedunculate oak Silver Birch	<i>Alnus glutinosa</i> <i>Quercus robur</i> <i>Betula pendula</i>	Av 9	<200	m/s	1	1.5	2.5	2.5	0.5	Y/SM	Fair	Fair	Flail damage on northside	C2	>20	2.40	18.10	

TG6	Common alder Common hornbeam White poplar Pedunculate oak Goat willow Scots pine	<i>Alnus glutinosa</i> <i>Carpinus betulus</i> <i>Populus alba</i> <i>Quercus robur</i> <i>Salix caprea</i> <i>Pinus sylvestris</i>	Av 11	Av 450	1	4	3.5	3.5	3.5	1.5	SM	Fair	Fair	Linear group with canopies that read as one	B2	20 - 40	5.40	91.61	
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Table 2 - Key to Tree Schedule

BS 5837: 2012 Tree Survey Key to Terminology		
Term	Explanation	Notes
Tree Ref.	Sequential reference number for individual tree or distinct tree in hedgerow	The measurement conventions are as follows. Height, crown spread, and crown clearance are recorded to the nearest half metre (crown spread is rounded up) for dimensions up to 10 m and the nearest whole metre for dimensions over 10 m Stem diameter is recorded in millimetres, rounded to the nearest 5 mm Estimated dimensions (e.g. for off-site or otherwise inaccessible trees where accurate data cannot be recovered) should be clearly identified as such (e.g.suffixed with a "#") RPA_r - Radius of nominal circle of Root Protection Area in metres from centre of tree stem. Figures used originate from Annex D BS5837: 2012 (p.40). Provided as a minimum distance and calculated in accordance with section 4.6 BS5837: 2012 (p.10) RPA_{m2} - Extent of root protection area * signifies dimensions have not been recorded
Common Name	Tree species listed by common name	
Height	Overall tree height measured in metres (m)	
Branch Spread	Taken as a minimum at the four cardinal points (North, South, East & West) to derive a representation of the crown spread	
Stem Diameter	Diameter of single stem trees on level ground measured at 1.5m above ground level. Diameters of other commonly encountered tree stems should be measured in accordance with Annex C (BS5837 2012 p39)	
Existing Height Above Ground Level - FSB/DG	Height of first significant branch (FSB) and its direction of growth (DG) identified as height in metres and direction of growth (e.g. 2.4-N)	Measurements taken to provide information relating to ground clearance, crown/stem ratio and shading of site
Life Stage	Young (Y)	Tree within the first one quarter of life expectancy
	Semi mature (SM)	Tree in second quarter of life expectancy
	Early mature (EM)	Tree in third quarter of life expectancy
	Mature (M)	Tree in final quarter of life expectancy

	Over mature (OM)	Tree having reached the anticipated maximum height and spread typical for its species and setting and which has entered a period of stasis where physiological processes maintain a functional status quo.
	Veteran tree (V)	Tree that, by recognized 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. NOTE: These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem. Veteran trees may be subject to a tree preservation order (TPO). Clients are responsible for determining whether a TPO is present.
General Observations	To provide information on the structural and/or physiological condition (e.g. the presence of any decay and physical defects), and/or preliminary management recommendations	
Physiological Condition - An assessment of the physiological condition (i.e. health/vitality) of the tree	GOOD FAIR POOR DEAD	Tree in a healthy condition with no significant problems Tree generally in good health with some problems that can be remediated Tree in poor health with significant problems that can't be remediated Tree without sufficient live material to sustain life
Structural Condition - An assessment of the structural/safe condition of the tree	GOOD MODERATE POOR	Tree in a sound condition with no significant defects Tree in a sound condition at present but with defects or with significant defects that can be remediated Tree with significant defects that can't be remediated
Notes related to both physiological and structural condition follow the categorisation in order support	the statement and give greater detail on the true quality and value of the tree	
Preliminary Management Recommendations	These may include further investigations for the presence or extent of decay or climbed inspections, ivy removal or pruning works when access is a nonmoveable aspect etc. (NB this is not intended to be a specification for	

	tree work and further advice maybe required prior to implementation). Trees assessed as being in apparently immediately hazardous condition will be notified to the client separately as soon as practicable	
Estimated remaining contribution (yrs)	An estimate of the remaining life contribution in years that the tree or group of trees is expected to have based on species, condition on the site in its current context	<10 - Tree is dead or dying and unlikely to contribute beyond 10 years 10+ - Tree is assessed as being able to contribute to the site for 10+ years 20+ - Tree is assessed as being able to contribute to the site for 20+ years 40+ - Tree is assessed as being able to contribute to the site for 40+ years
Category grading	Category of tree in accordance with BS5837 2012 Cascade Chart (Source BS5837 2012 p9)	'U' Unsuitable for retention, within the context of the current land user 'A' Trees of high quality with 40yr remaining lifespan 'B' Trees of moderate quality and remaining lifespan of at least 20yrs 'C' Trees of low quality with an estimated remaining lifespan of at least 10 yrs or young trees with a stem diameter below 150mm Categories A-C are further classified as 1 (mainly arboricultural qualities), 2 (mainly landscape qualities), 3 (mainly cultural values, including conservation). For further details refer to Cascade Chart in BS 5837 2012 p. 9

5.0 Tree Management

5.1 Arboricultural Assessment

Adjacent to the southern boundary of the Site are a number of tree groups and individual trees that could be impacted by the proposals. It may be possible to retain and incorporate certain trees and tree groups currently present within the Site into the landscaping scheme of the proposals.

It appears limited management has taken place to the trees present on-Site, confined to historic crown lifting and reduction of trees within areas of hardstanding and footpaths. For safety reasons, the broken branch on T6 should be removed and the dead tree within TG4 should also be removed.

To ensure that the root areas and canopy extremities of the individual trees and the tree groups that may be retained are not damaged, a Constraints Plan has been prepared to show the extent of RPAs and where the locations where protective fencing should be erected for any trees selected for retention (see Figure 3). Any tree surgery required is best carried out towards the conclusion of the development so that, if necessary, any known root damage can be corrected by the appropriate crown thinning to restore root/shoot balance.

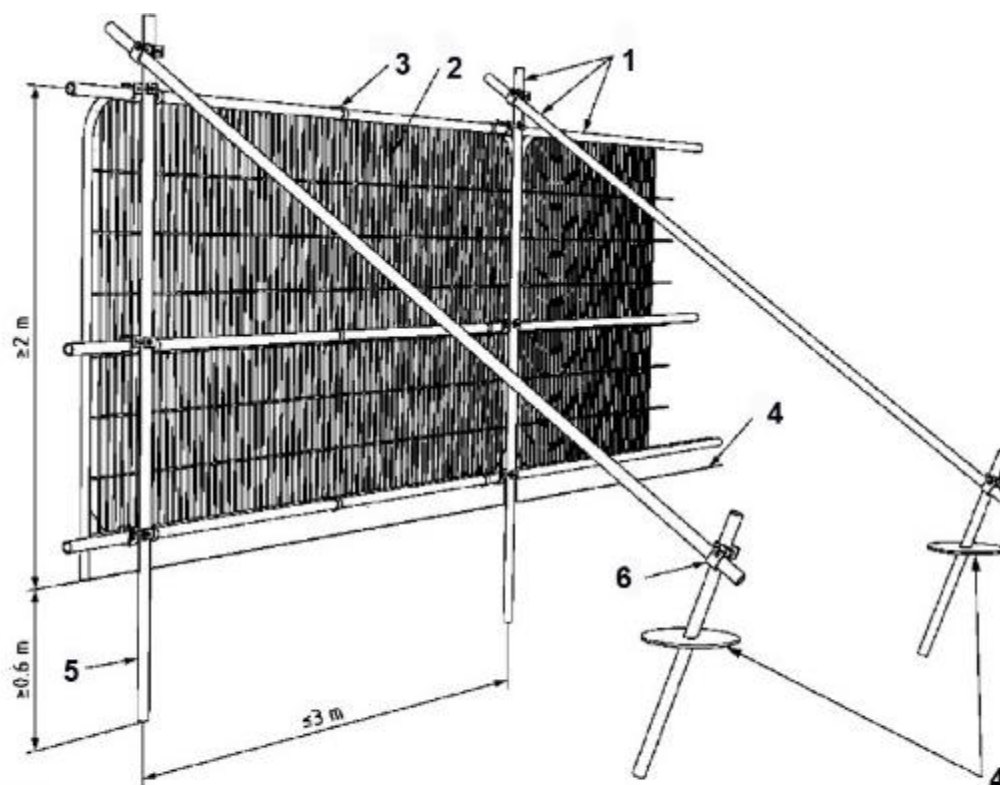
5.2 Recommendations

Recommendation 1 (Adequate Tree Protection)

Those trees identified within any development plan for retention will need to be adequately protected during any approved development works. As a general rule at this Site, measures to protect trees should follow the best practice principles set out in BS5837: Trees in Relation to Design, Development and Construction (2012). Prior to any construction or development work proceeding, the RPAs of individual trees to be retained should be marked out using the distances provided in the Table 1. Marking out should be completed by a person with arboricultural or horticultural expertise as individual trees will have root zones that may be affected by local conditions and allowances would need to be made to accommodate this.

The best practice principles have been broadly summarised below:

- All trees retained adjacent to the Site should be protected by barriers or ground protection around the calculated RPA and as indicated on any Tree Constraints Plan (TCP) that may be produced in association with the assessment;
- Any fencing required should be erected prior to commencement of construction and before demolition including erection of any temporary structures. Once set up fences should not be removed or altered without prior consultation with the arboricultural advisor;
- Arrangements should be made for an arboriculturist to supervise works and tree protection where trees are particularly vulnerable or sited close to access points;
- Pre-development works may be undertaken prior to the installation of fencing with the agreement of the local planning authority;



1. Standard scaffold poles
2. Heavy Gauge 2m tall galvanised tube and weld mesh infill panels
3. Panels secured to uprights and cross members with wire ties
4. Ground Level
5. Uprights driven into ground until secure (up to 0.6m)
6. Standard scaffold clamps

- All tree works should follow best practice procedures as set out in BS 3998 (2010). All trees should be maintained in good condition on-Site and be inspected annually (where overall condition requires) or every two years and after any major storm events, with safety a priority;
- Fencing should be clearly visible and suitable for the location, type and proximity of construction activity;
- It may be appropriate on some sites to use temporary site offices as components of the protection barriers;
- Where it has been agreed and shown on a Tree Protection Plan, construction access may take place within the RPA if suitable ground protection measures are in place (e.g. existing surfaced car park areas). In other areas this may comprise single scaffold boards over a compressible layer laid onto geo-textile materials for pedestrian movements. Vehicular movements over the RPA will require the calculation of expected loading and may require the use of proprietary protection systems;
- Once areas around trees have been protected by fencing, any works on the remaining Site area may be commenced providing activities do not impinge on protected areas. Notices should be placed on fencing to indicate that operations are not permitted within the fenced area;
- Wide or tall loads etc should not come into contact with retained trees. Banksman should supervise transit of vehicles, jibs, booms etc where this is in close proximity to retained trees;

- Oil, bitumen, cement or other material that is potentially injurious to trees should not be stacked or discharged within 10 m of a tree bole. No concrete mixing should be done within 10 m of a tree. Allowance should be made for the slope of ground to prevent materials running towards the tree;
- No fires should be lit where flames are anticipated to extend to within 5 m of tree foliage, branches or trunk, taking into consideration wind direction and size of fire;
- Notice boards, telephone cables or other services should not be attached to any part of a retained tree;
- Where it is deemed necessary to operate a wide or tall load, plant bearing booms, jibs and counterweights or other such equipment, as part of construction works, and such equipment would have potential to cause injurious contact with crown material i.e. low branches and limbs, of retained trees within the RPA fencing, it is best advised that appropriate, but limited, tree surgery be carried out beforehand to remove any obvious problem branches. This is classed as 'Facilitation Pruning' within BS 5837 (2012). Any such pruning should be undertaken in accordance with a specification prepared by an arboriculturist;
- It is advised that a Pre-Commencement Site Meeting is held with contractors who are responsible for operating machinery, as described above, to firstly highlight the potential for damage occurring to tree crowns and to ensure that extra care is applied when manoeuvring machinery during such operations within close proximity to retained trees to avoid any contact;
- In the event of having caused any such branch or limb damage to retained trees it is strongly recommended that suitable tree surgery be carried out, in accordance with BS 3998 (2010) Recommendations for Tree Work, to correct the damage, upon completion of development; and
- All of the above precautionary measures should be applied to minimise the effect of any damage to long-term tree health and safety.

6.0 Limitations of the Tree Survey

The recommendations contained in this Report represent Delta-Simons' professional opinions, based upon the information referred to in Section 1.0 of this Report, exercising the duty of care required of an experienced Environmental Consultant.

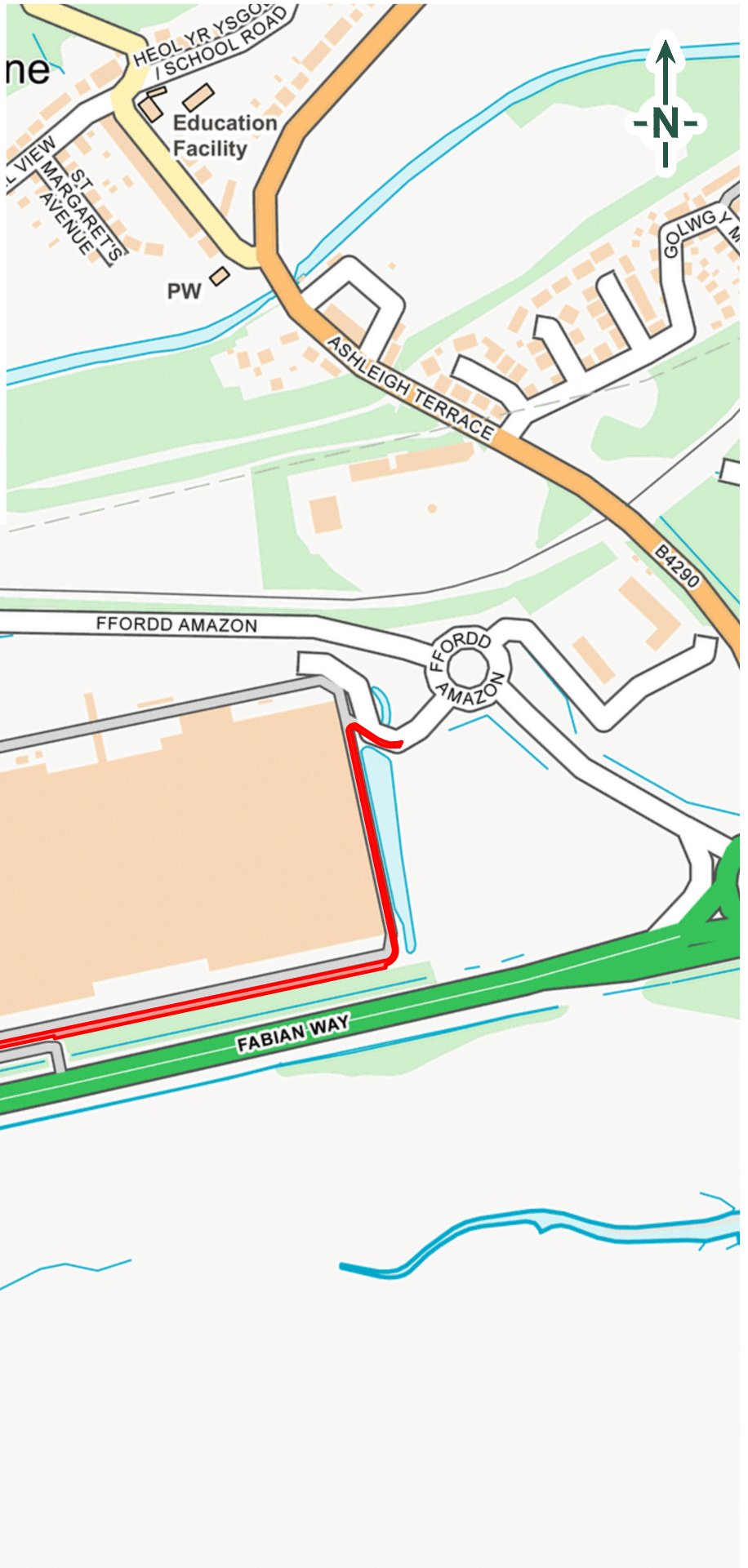
This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed as defined in Section 1.1 of this Report. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Figure 1 – Site Location Map



LEGEND

Site Boundary



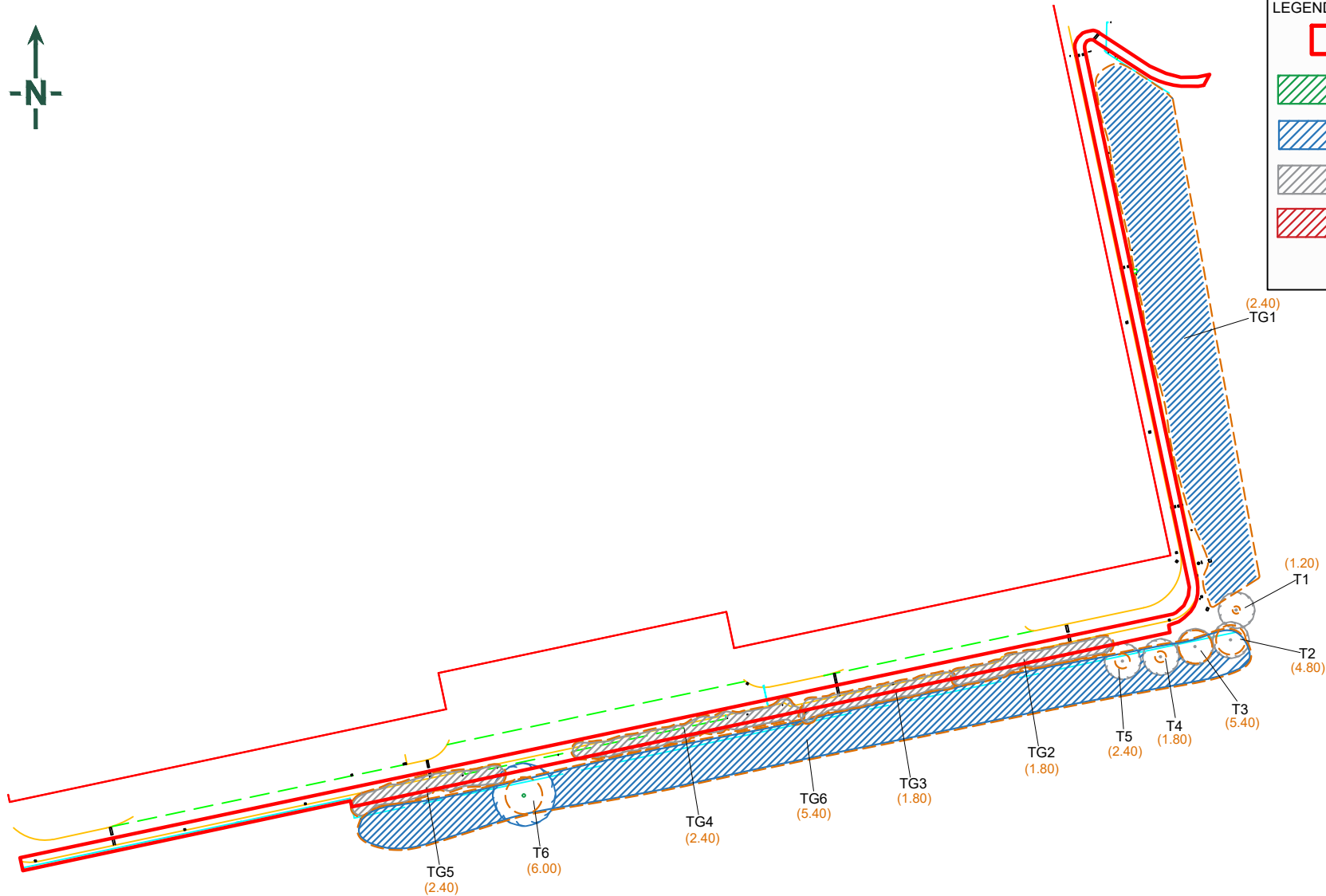
Scale: 1 / 10,000 @ A4

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Figure 2 – Tree Survey



LEGEND	
	Site Boundary
 	Category A: High value retention most desirable Tx/TGx
 	Category B: Moderate value retention desirable Tx/TGx
 	Category C: Lower value could be retained Tx/TGx
 	Category U: For removal Tx/TGx
	RPA: Root Protection Area (m)



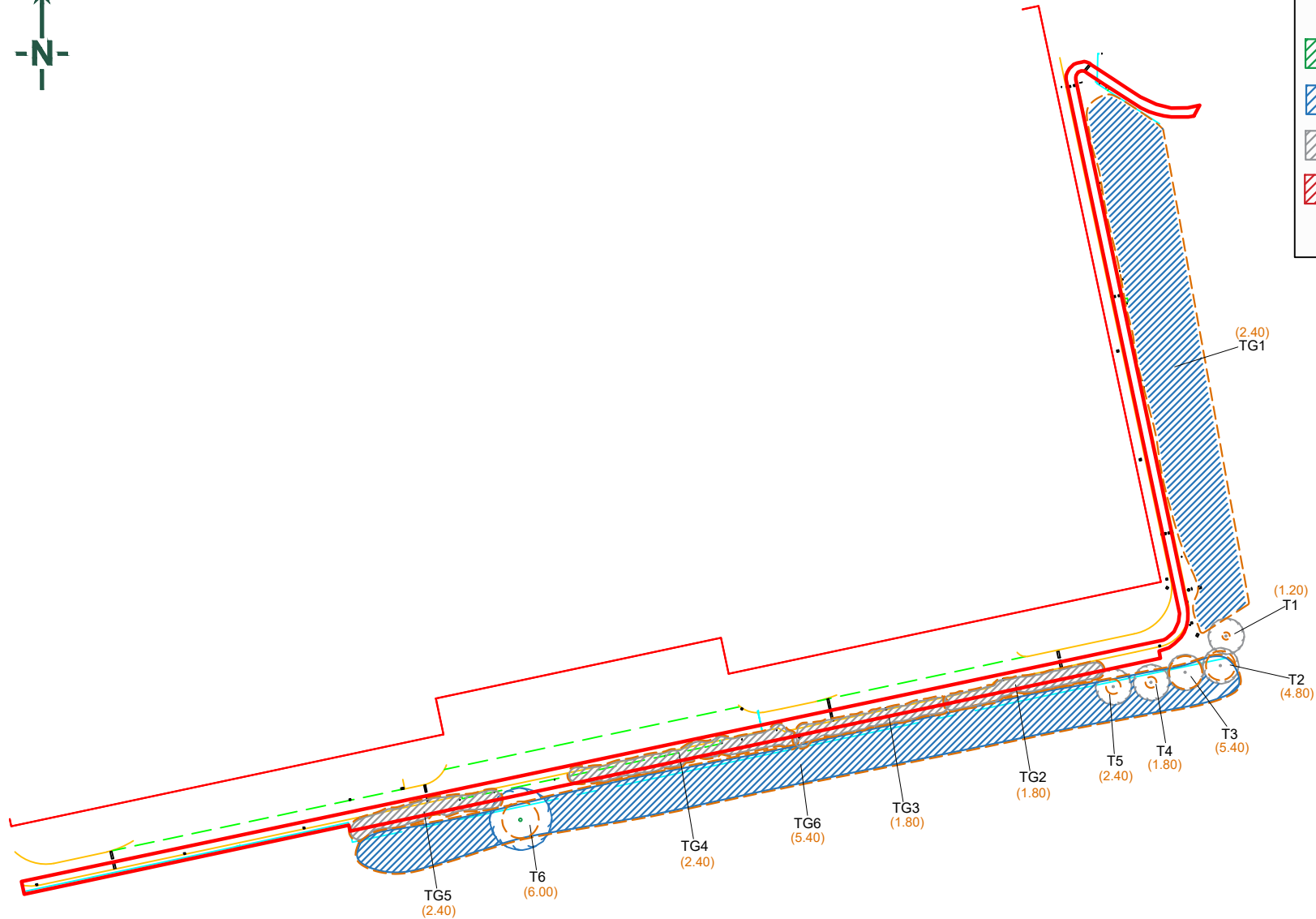
Site Plan Provided by Client

Figure 3 – Tree Constraints Plan



LEGEND

	Site Boundary
	Category A: High value retention most desirable
	Category B: Moderate value retention desirable
	Category C: Lower value could be retained
	Category U: For removal
	RPA: Root Protection Area



Site Plan Provided by Client

Appendix A - References

References

BSI Publication BS 5837:2012 Trees in Relation to Design, Demolition and Construction - Recommendations.

BSI Publication BS 5837:2005 Trees in Relation to Construction - Recommendations.

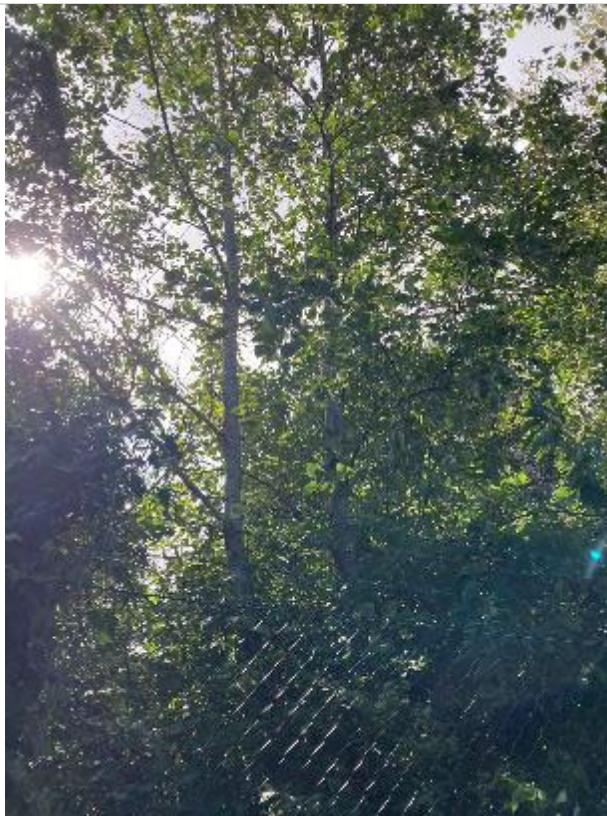
Stace, C. (2010). *New Flora of the British Isles 3rd edition*. University Press, Cambridge.

Appendix B – Site Photographs

Site Photographs



Photograph 1 - T1



Photograph 2 - T2



Photograph 3 - T3



Photograph 4 - T4



Photograph 5 - T5



Photograph 6 - T6



Photograph 7 - TG1



Photograph 8 - TG2



Photograph 9 - TG3



Photograph 10 - TG4



Photograph 11 - TG5



Photograph 12- TG6