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Arboricultural Report

for development purposes following BS 5837: 2012 Trees in relation to design, demolition and construction - Recommendations

at

Wythenshawe West Youth Centre
Moor Road
Brooklands
Manchester
M23 9BQ

Produced by

Scott Fitzgerald BSc (Arboriculture), M Arbor A

of

Scott Fitzgerald Tree Consultants Ltd

on behalf of

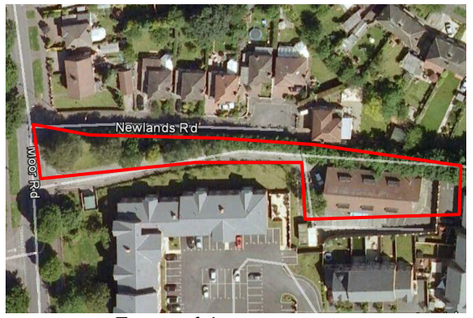
Ketumati Buddist Vihara Trust

23rd October 2012

Report Summary

The pie charts to the far right present key statistics found within our survey. The bar charts to the right indicate the age distribution, species distribution and the works we have recommended. Other sections within the report summary are self explanatory.

Site Location: Moor Road, Brooklands



Extent of the survey

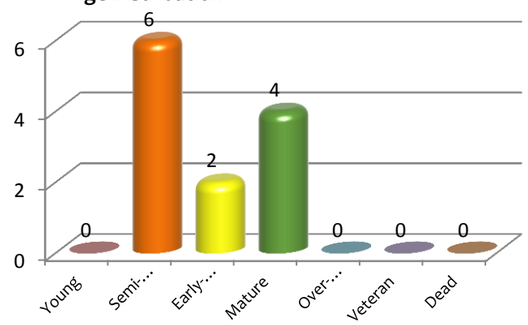


Site location

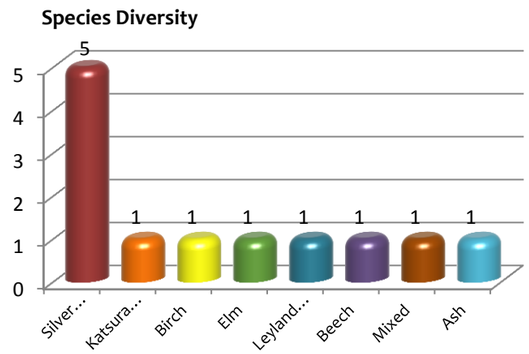
Summary

- It is proposed to install new car parking spaces to the west of site.
- A survey was conducted to BS5837. The condition of all trees on site was assessed and a Retention Category was allocated. Tree positions and Root Protection Areas are plotted on a Tree Constraints Plan.
- No Arboricultural Impact Assessment has been conducted at this stage.
- We recommend that this report and the constraints plan are used within the design process to help achieve a proposal with minimal impact.
- Where possible category A and B trees should be retained and works within their Root Protection Area should be undertaken in a sympathetic manner. General advice is included within this report as to how this may be achieved.
- Upon instruction Scott Fitzgerald Tree Consultants will be happy to provide Impact Assessments to assist the design process and an Arboricultural Method Statement to ensure that the retained trees are not damaged during the construction process.

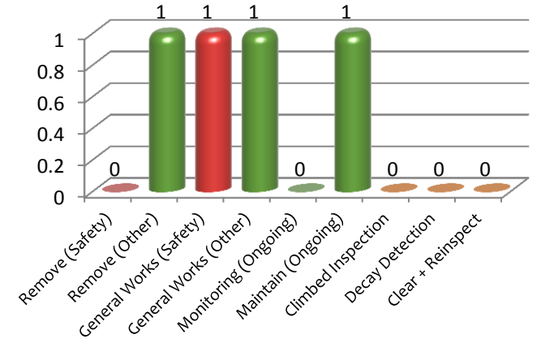
Age Distribution



Species Diversity

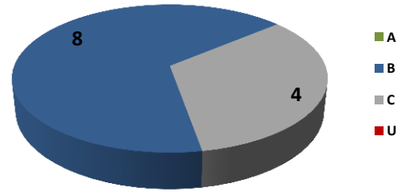


Recommended Works

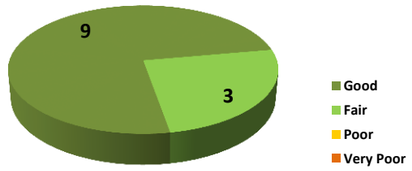


Trees surveyed as individuals: 10
groups: 1
hedges: 1
woodlands: 0

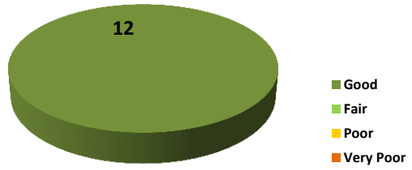
Retention Categories



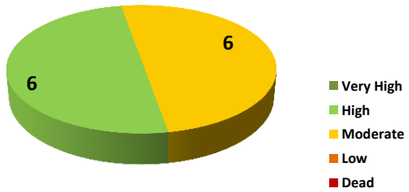
Structural Condition



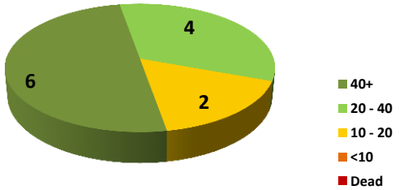
Physiological Condition



Amenity Values



Life Expectancy



Contact Details.

Local Authority:	Manchester City Council	Tel.	0161 234 5000
Arboricultural Consultant:	Scott Fitzgerald	Tel.	0161 637 5242

Tree Protection Status

We are informed that:

- The site is not within a conservation area.
- There are no TPOs affecting trees within the site.

See Section 4 for further details.

Contents

1. Introduction 3
1.1. Instructions and references 3
1.2. Scope and limitations of the report 3

2. Site overview 5
2.1. Location 5
2.2. Site description 5

3. Tree data schedule 6

4. Tree condition and recommendations 7
4.2. Summary of findings 7
4.3. Work priority and future management 7
4.4. Tree protection status 8
4.5. Tree protection – general advice 8

5. Arboricultural Impact Assessment 10
5.2. Tree constraints 10
5.3. Tree protection during construction 10
5.4. Impact of general construction activity 10

Appendix 1 – Tree Data Schedule 12

Appendix 2 - Tree Survey Schedule Explanatory Notes 13

Appendix 3 - Site Plans 16

Appendix 4 – Recommendations for Tree Protection during Demolition and Construction 17

Appendix 5 - Tree Work Schedule and Pruning Diagrams 26

Appendix 6 - Method Statement for Cellular Confinement System 28

Appendix 7 - Professional Résumé: Scott Fitzgerald 29

1. Introduction

1.1. Instructions and references

1.1.1. All trees, regardless of their statutory status, are a material consideration in a planning application. It is therefore essential that the potential effects of any Proposed Development on existing trees are fully assessed.

1.1.2. We have been instructed by FPS Inception Ltd on behalf of the client to carry out an Arboricultural Survey to British Standard 5837:2012 guidelines, at Moor Road, Brooklands and produce our findings in a report.

1.1.3. The purpose of the report is to provide a Tree Constraints Plan to aid in the design of the proposed car parking spaces and to minimise the impact on any retained trees.

1.1.4. Measurements have been taken on site in order to plot the positions of trees.

1.1.5. A summary of Scott Fitzgerald's qualifications and experience is included in Appendix 7.

1.2. Scope and limitations of the report

1.2.1. The report is designed to accompany a planning application following guidance set out in BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations.

1.2.2. The report is based upon a visual inspection. The consultant shall not be responsible for events that happen after the date of the report due to factors that were not apparent at the time, and the acceptance of this report constitutes an agreement with the guidelines and the terms listed in this report.

1.2.3. Any defects seen by a contractor or the employer that were not apparent to the consultant must be brought to the consultant's attention immediately.

1.2.4. The consultant accepts no liability in respect of the trees unless the recommendations of this report are carried out under his supervision.

1.2.5. Assessing the potential influence of trees upon load bearing soils, beneath existing and proposed structures resulting from water abstraction by trees or rehydration of shrinkable soils was not included in the contract brief and is therefore not considered in the report. The consultant cannot be held responsible for damage arising from such action.

1.2.6. Trees have the potential to cause indirect damage to existing and proposed structures by desiccation of the soil. Where soils are suspected to be shrinkable, they should be analysed by laboratory testing to determine the plasticity index. This will allow management decisions to be made relating to foundation depths, new planting and the effect of tree removals.

1.2.7. Potentially hazardous trees are highlighted and appropriate recommendations are made. However, this report should not be seen as a substitute for a full tree risk assessment or management plan which are specifically designed to minimise risk and liability associated with responsibility for trees.

1.2.8. Scott Fitzgerald carried out the survey and assessment of trees on 10th October 2012. Weather conditions during the site visit were fine with good visibility.

2. Site overview

2.1. Location

2.1.1. The site is situated in Brooklands, South Manchester. The co-ordinates are 53°24'18.58"N, 2°17'36.98"W, the OS reference is SJ 8057889856 and the altitude is 34m above sea level.

2.1.2. The survey was limited to the area shown in Figure 1 which is sufficient to consider the impact of the proposals.

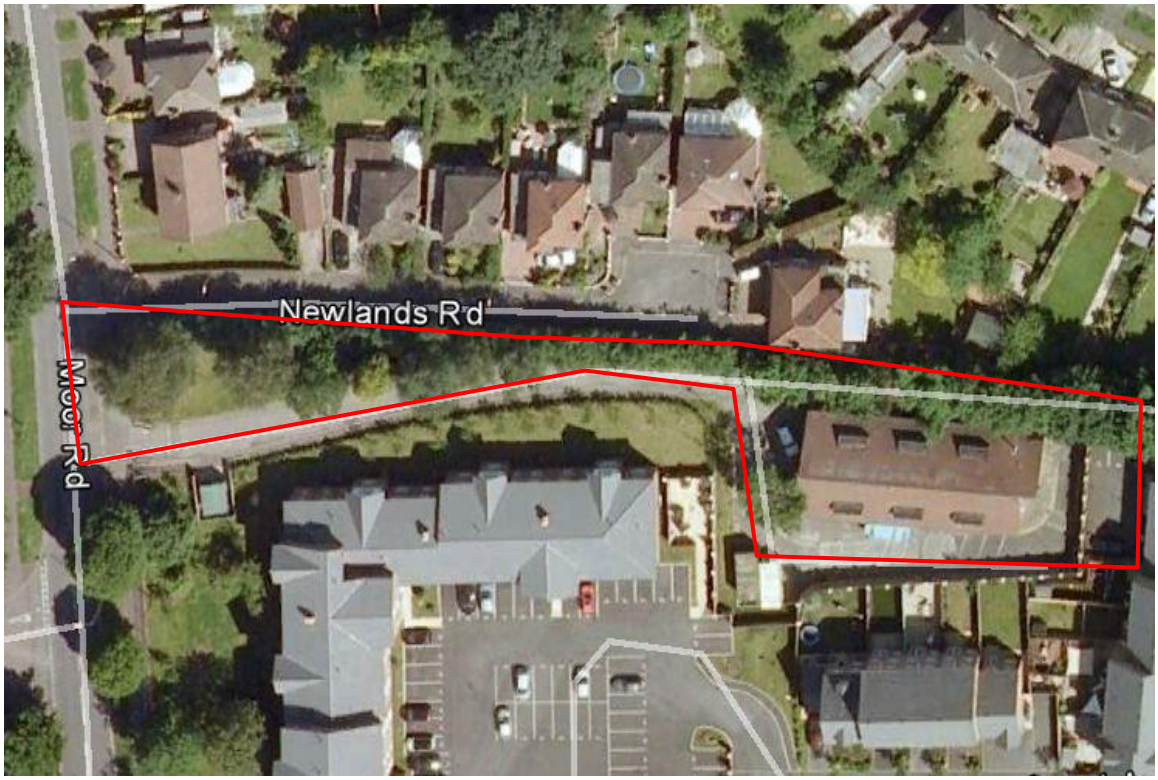


Figure 1 Extent of the survey.

2.2. Site description

2.2.1. The site consists of a detached building to the eastern boundary and a landscaped driveway where vehicular access exists from Moor Road to the west. The majority of trees are situated along the north boundary.

3. Tree data schedule

3.1.1. The Tree Data Schedule in Appendix 1 contains information gathered during the survey conducted on 10th October 2012.

3.1.2. The reader should refer to Appendix 2 in order to correctly interpret the tree data.

3.1.3. All images within the Tree Data Schedule are diagrammatical only. Their purpose is to indicate, at a glance, the relative dimensions of each tree. The images are computer generated based on measurements recorded for stem diameter, crown spread, crown height and overall height.

4. Tree condition and recommendations

4.1.1. The recommendations found in the Tree Data Schedule in Appendix 1 are based on assessments from a health and safety perspective and are made regardless of the Proposed Development. Section 4 discusses in further detail our findings during the site visit in relation to the health and safety of the trees, and future users of the site.

4.2. Summary of findings

4.2.1. T12 is recommended for removal due to its poor condition but not considered to be immediately hazardous or likely to cause injury or damage. Its removal is of a lower priority.

4.2.2. T6 is potentially hazardous and requires works in order to make it safe. This should be prioritised as indicated on the Tree Data Schedule.

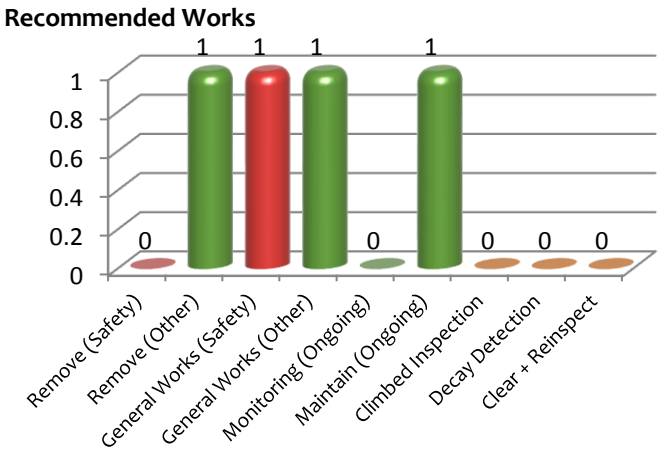
4.2.3. G11 is in an acceptable condition at present but will require works in order to prevent future defects from developing. Such work is of a relatively low priority.

4.2.4. H10 will require occasional maintenance in order to maintain a suitable height or spread.

4.2.5. All other trees are deemed to be in an acceptable condition and no further works have been recommended.

4.3. Work priority and future management

4.3.1. The Tree Data Schedule in Appendix 1 details what works are required to individual trees in order to ensure that they are in an acceptable condition. The chart below summarises these works:



Key:

Bars coloured red indicate hazardous trees.

Bars coloured orange indicate trees which may be hazardous and require further investigation.

Bars coloured green indicate trees which are not hazardous and the work is therefore of a lower priority.

4.3.2. The following table suggests a schedule for prioritizing works required to individual specimens, as outlined in the Tree Data Schedule in Section 3, in order to ensure that the associated risks are abated:

Priority	Definition	Tree Number
Urgent	As soon as possible	None
Very High	Within 1 Month	None
High	Within 3 Months	T6
Moderate	Within 1 year	H10, G11, T12
Low	Within 3 years	None

4.3.3. Upon completion of any recommended works, the trees will be in an acceptable condition from a health and safety perspective. However, they should be regularly inspected according to the following suggested schedule:

Inspection Frequency (years)	Tree Number
0.5	None
1	T1, T2, T6, T7, T8, T9, H10
1.5	None
3	T3, T4, T5, G11

4.4. Tree protection status

4.4.1. We have been informed by the planning department at Manchester City Council that the site is not within a conservation area and There are no Tree Preservation orders (TPOs) affecting trees within the site.

4.5. Tree protection – general advice

4.5.1. It is recommended that the local authority is consulted before any tree works are undertaken, as new TPOs may have been created since the time of enquiry, and heavy fines exist for unauthorised works to protected trees.

4.5.2. A TPO can be overridden by planning consent, where tree removal is necessary to enable the Proposed Development to proceed.

4.5.3. All works to protected trees require consent from the local authority, including pruning. However, this does not include the removal of dead wood, which is exempt. Although dead and dangerous trees are exceptions to a TPO, it is advisable to give the local authority five days' notice in writing of any intended removal.

4.5.4. In a conservation area, all trees are effectively protected. Where tree work is required in a conservation area, the local authority must be given six weeks' notice of intent, which allows them to either make a TPO or give consent for the intended work. The proposed tree work can proceed after six weeks, if the local authority has not responded.

5. Arboricultural Impact Assessment

5.1.1. There are plans to install car parking spaces at the west of site near the entrance. We have included a Tree Constraints Plan in Appendix 3 to aid in the design of the layout to minimise the impact on retained trees. We have also included a Tree Removal Plan highlighting the areas where tree loss will have the least impact.

5.1.2. The design should avoid excavation into the soil within Root Protection Areas (RPAs). Any incursion of hard surfacing into RPAs will be designed to avoid soil compaction and will utilise a permeable surface. Any permanent hard surfaces will not exceed 20% of any un-surfaced ground within the RPA. A supplementary method statement detailing sympathetic construction techniques is included in Appendix 6.

5.1.3. A Tree Protection Plan highlighting positions of Temporary Protective Fencing can be provided once the layout of proposed car parking spaces has been finalised.

5.2. Tree constraints

5.2.1. BS 5837:2012 recognises that conflicting requirements of the planning system for development means that trees are only one factor which need to be taken into consideration. Although there may be certain specimens that can pose significant constraints to development due to their importance, it is essential that inappropriate tree retention is avoided.

5.2.2. In order to avoid expensive delays and to maximise the landscape potential of the Proposed Development, it is strongly recommended that the arboriculturist is consulted during the early stages of the design process.

5.3. Tree protection during construction

5.3.1. BS 5837 recommends that an Arboricultural Method Statement is adhered to which ensures that all retained trees are adequately protected during the construction phase. This should be highly site specific and take into account such things as hard surface design, implementation of services and foundations, storage of materials, scaffolding, use of heavy plant such as cranes or excavators, fencing specification, and necessary tree works. Adherence to such a Method Statement will help to minimise the impact of the development.

5.4. Impact of general construction activity

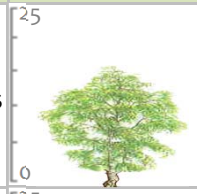
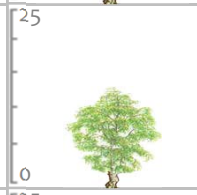
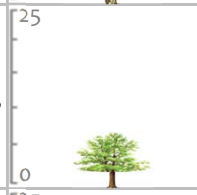
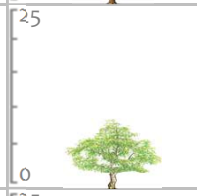
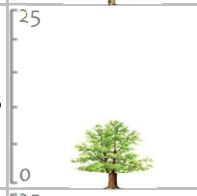
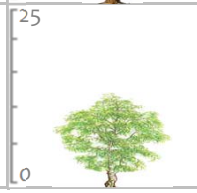
5.4.1. Existing trees can be easily damaged directly due to root severance and indirectly due to soil compaction which can cause anaerobic conditions in the rooting zone. Spillage of toxic materials can also cause root death. Protection for trees selected for retention is essential to ensure their sustainable position within the proposed scheme.

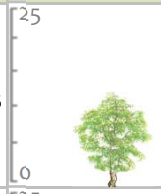
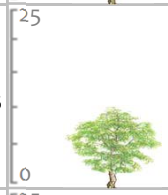
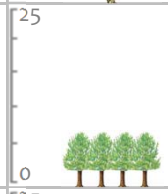
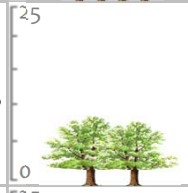
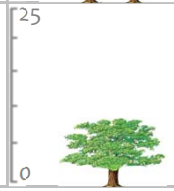
5.4.2. An Arboricultural Method Statement will be required to advise on the protection of trees during the construction process. In addition, a Tree Protection Plan may be required to highlight areas of site where trees require protection and where care is needed in Root Protection Areas (RPAs) not protected by fencing.

5.4.3. A generic Method Statement highlighting tree protection measures during demolition and construction activities is included in Appendix 4.

Appendix 1 – Tree Data Schedule

- The following pages contain information gathered during the site survey.
- The reader should refer to Appendix 1 in order to correctly interpret the tree data.
- All images within the Tree Data Schedule are diagrammatical only. Their purpose is to indicate, at a glance, the relative dimensions of each tree. The images are computer generated based on measurements recorded for stem diameter, crown spread, crown height and overall height.

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category
T1	Mature **Silver Birch** Betula pendula	15.5	1.5	560	N 6.5, W 7, E 6.5, S 6.5		Form: Single stemmed with a slight lean and a well-formed crown. History: Occasional pruning wounds due to crown lifting. **Defects: No significant defects.**	No action required. n/a	1	High Good Good	High 40+ **B+**
T2	Mature **Silver Birch** Betula pendula	13	1.5	460	N 3.5, W 3, E 4, S 4.5		Form: Single stemmed with a slight lean and a well-formed crown. History: Occasional pruning wounds due to crown lifting. **Defects: No significant defects.**	No action required. n/a	1	High Good Good	High 20-40 **B**
T3	Semi-Mature **Katsura Tree** Cercidiphyllum japonicum	5.5	2.5	130	N 2, W 3.5, E 2.5, S 4		Form: Single stemmed and leaning with an unbalanced crown. History: Occasional pruning wounds due to crown lifting. **Defects: Minor deadwood throughout crown.** Other: Acceptable condition at present.	No action required. n/a	3	High Good Good	Moderate 40+ **C**
T4	Semi-Mature **Birch** Betula sp	8.5	2.5	250	N 3, W 4.5, E 4, S 4		Form: Twin-stemmed at 2.5m with a balanced crown. History: No evidence of significant pruning. **Defects: Minor deadwood throughout crown.** Other: Acceptable condition at present.	No action required. n/a	3	High Good Good	High 40+ **B**
T5	Semi-Mature **Elm** Ulmus sp	7.5	2	250	N 2, W 3, E 3.5, S 3.5		Form: Multi-stemmed at 0.5m with a full crown. History: Main leader has failed previously. **Defects: No significant defects.**	No action required. n/a	3	High Good Good	Moderate 40+ **C**
T6	Early-Mature **Leyland Cypress** x Cupressocyparis leylandii	13.5	0	460	N 1.5, W 1.5, E 1.5, S 1.5		Form: Multi-stemmed at 2m with a narrow, upright habit. History: No evidence of significant pruning. **Defects: Included bark unions at 2m.** Other: Main stem failure evident.	Remove failed stem. High	1	High Good Fair	Moderate 10-20 **C+**
T7	Mature **Silver Birch** Betula pendula	12.5	2	410	N 6, W 6, E 3, S 4.5		Form: Multi-stemmed at 2.5m with a well-formed crown. History: Occasional pruning wounds due to crown lifting. **Defects: Minor deadwood to lower crown.** Other: Acceptable condition at present.	No action required. n/a	1	High Good Good	High 20-40 **B+**

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations: Priority	Recommendations: Inspect Freq (yrs)	Vigour: Physiological Condition / Structural Condition	Amenity Value: Life Expectancy (yrs) / Retention Category
T8	Early-Mature **Silver Birch** Betula pendula	12	2	270	N 3 W 1.5 E 3.5 S 3		Form: Single stemmed with a slight lean and an unbalanced crown. History: Occasional pruning wounds due to crown lifting. **Defects: No significant defects.**	No action required. n/a	1	High Good Good	High 20-40 **B**
T9	Mature **Silver Birch** Betula pendula	10.5	2	290	N 4 W 3 E 3.5 S 4.5		Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects.**	No action required. n/a	1	High Good Good	High 20-40 **B**
H10	Semi-Mature **Beech** Fagus sylvatica	av 5.5	2	70	N 1 W 1 E 1 S 1		Form: Lapsed hedge. History: Previously trimmed at 2.5 - 3m. **Defects: No significant defects.**	Prune hedge to 3m and maintain by regular pruning. Moderate	1	High Good Good	Moderate 40+ **B**
G11	Semi-Mature **Mixed** Species	av 8.5	av 2.5	av 250	N av W 3.5 E 3.5 S 3.5 each		Form: Linear boundary group. History: Previously topped. **Defects: Minor deadwood to upper crowns.** Other: Decay at pruning stubs.	Prune away from building. Moderate	3	High Good Fair	Moderate 40+ **B**
T12	Semi-Mature **Ash** Fraxinus sp	8	2	310	N 4 W 5 E 4 S 4.5		Position: Adjacent existing building. Form: Multi-stemmed at 3.5m with an unbalanced crown. History: Main stem failure at 6.5m. **Defects: Significant bark wound to main stem.** Other: Major distortion of paving and only 2.6m from building.	Remove. Moderate	N/A	High Good Fair	Moderate 10-20 **C**

Appendix 2 - Tree Survey Schedule Explanatory Notes

This section explains the terms used in the **Tree Data Schedule** in Appendix 1.

A2.1 General

A2.1.1 **Numbering System:** Each item of vegetation has its own unique number prefixed by a letter such that:

- **T1**=Tree 1
- **G2**=Group 2
- **H3**=Hedge 3
- **W4**=Woodland 4

A2.1.2 **Age Categories:**

- **Young** Usually less than 10 years old.
- **Semi-Mature** Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
- **Early-Mature** Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
- **Mature** Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
- **Veteran** A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
- **Over Mature** As for veteran except management is not considered worthwhile.

A2.1.3 **Species:** Common names and Latin names are given.

A2.1.4 **Height:** Measured from ground level to the top of the crown.

A2.1.5 **Stem Diameter:** Taken at 1.5m above ground level where possible. On trees with two to five stems, the combined stem diameter is calculated as follows:

$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$

For trees with more than five stems, the combined stem diameter is calculated as follows:

$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$

A2.1.6 **Crown Height:** Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.

A2.1.7 **Tree Diagram:** This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.

A2.1.8 **Crown Spread:** Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest half metre.

A2.1.9 **Observations:** If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.

A2.1.10 **Recommendations:** Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.

A2.1.11 Priority Scale: Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:

- **Urgent** To be carried out as soon as possible.
- **Very High** To be carried out within 1 month.
- **High** To be carried out within 3 months.
- **Moderate** To be carried out within 1 year.
- **Low** To be carried out within 3 years.

A2.1.12 Inspection Frequency:

- An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.

A2.1.13 Vigour: An indication of growth rate and the tree's ability to cope with stresses:

- **High** Having above average vigour.
- **Moderate** Having average vigour.
- **Low** Having below average vigour.
- **Very Low** Tree is struggling to survive and may be dying.

A2.1.14 Physiological Condition:

- **Good** Healthy and with no symptoms of significant disease.
- **Fair** Disease present or vigour is impaired.
- **Poor** Significant disease present or vigour is extremely low.
- **Very Poor** Tree is dying.

A2.1.15 Structural Condition:

- **Good** Having no significant structural defects.
- **Fair** Some defects observed though no high priority works are required.
- **Poor** Significant defects found. Tree requires monitoring or remedial works.
- **Very Poor** Major defects which will usually require significant remedial works or tree removal.

A2.1.16 Amenity Value:

- **Very High** Exceptional specimen, observable by a large number of people.
- **High** Attractive specimen, observable by a significant number of people.
- **Moderate** One of the above factors is not applicable.
- **Low** Unattractive specimen or largely hidden from view.

A2.1.17 Life Expectancy: The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).

A2.1.18 Retention Category: These are explained in detail in Table 1 on the following page.

A2.2 Evaluation of Defects

A2.2.1 Cavities, wounds, deadwood etc are all evaluated as follows:

- **Major** Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
- **Significant** A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
- **Minor** A defect that is not likely to compromise the tree's structural integrity.

Tree retention categorisation

The categorisation of trees is applied to guide the site owner as to the quality and value of their existing tree stock. All trees greater than 75mm in diameter at 1.5m above ground level are surveyed and allocated a ***retention category*** which takes into account amenity value, condition and safe useful life expectancy. The categories are allocated independently of development proposals. BS 5837:2012 recommends using a cascade chart for categorisation purposes. **Table 1** below provides an explanation of retention categories used.

Trees to be removed		Colour on Plan
Category U includes trees of very low quality that offer little or no amenity value.	Trees that are in such a condition that they should be removed as a matter of good arboricultural practice regardless of given proposals.	RED
Trees to be considered for retention		**Colour on Plan**
Category A includes trees of a high quality, usually highly visible to the wider public.	Trees that are excellent examples of their species, usually mature, with a safe useful life expectancy of at least 40 years. Category A trees are likely to enhance a development and should be retained wherever possible	GREEN
Category B includes trees of moderate quality and amenity value.	Trees that are good examples of their species but may have defects or form that downgrade them from category A. Category B trees are usually mature or younger trees with the potential to reach A category in the future. Although the retention of these trees is desirable, some losses may be acceptable.	BLUE
Category C includes trees of low quality and amenity value.	Trees that are either young with a stem diameter less than 150mm or are unlikely to make a contribution for more than 10 years. The removal of these trees should be seen as acceptable in order to allow development to proceed. It may be possible to transplant younger specimens.	GREY
NOTE: Trees that are viewed as borderline and do not fit neatly into either of the categories are given a plus or minus rating (+/-) in the tree data schedule. Therefore C+ would denote a tree being borderline C/B although C is deemed to be the most appropriate category. Similarly B- would denote a tree being borderline B/C with B seen as the most appropriate category.		

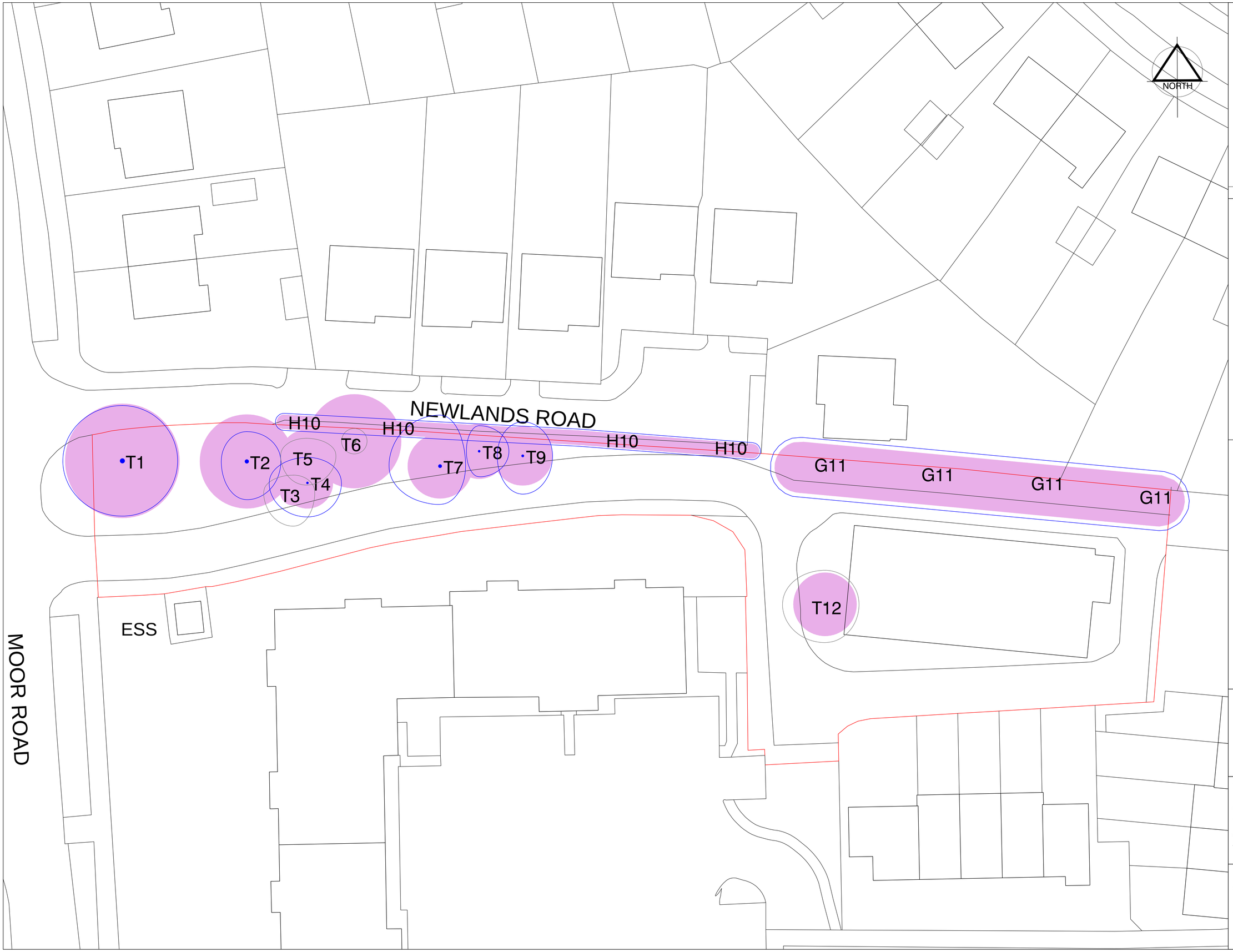
Table 1

Appendix 3 - Site Plans

The site plans referred to in the report follow this page which can include some or all of the following:

- Tree Constraints Plan
- Tree Removal Plan
- Tree Protection Plan
- Proposals

Although included plans are usually to scale, they are only intended to indicate positions of surveyed trees and dimensions should not be taken from these drawings.



Key

T1	Tree number 1
G2	Group number 2
H3	Hedge number 3
1	Photo location
	Panoramic photo location
	Retention category A tree
	Retention category B tree
	Retention category C tree
	Retention category U tree
	Root Protection Area (RPA)

BS 5837 RETENTION CATEGORIES

Category A:
Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

Category B:
Trees of moderate quality and amenity. Usually mature trees, or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

Category C:
Trees of low quality and amenity. The removal of these trees should be seen as acceptable in order tp facilitate development.

Category U:
Trees whose structural condition is such that they should be removed regardless of development proposals.

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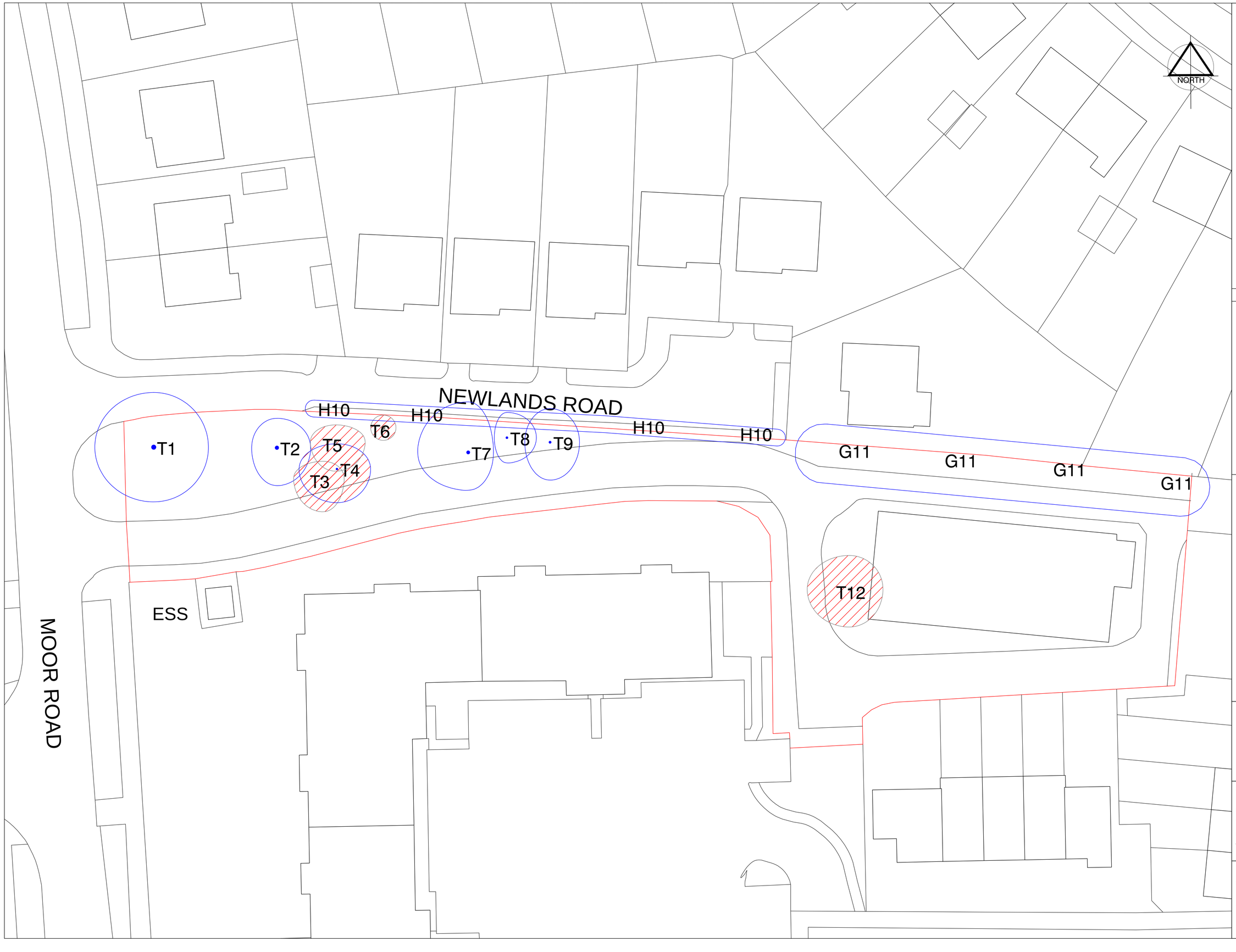
Client
Ketumati Buddist Vihara Trust

Project
Wythenshawe West Youth Centre

Description
Tree Constraints Plan

Scale	Drawn by	Date
1:200 A1	S F	23/10/12
Job number	**Drawing number**	**Revision**
10316	10316.T1	N/A



Key	
T1	Tree number 1
G2	Group number 2
H3	Hedge number 3
	Category A tree to be removed
	Category B tree to be removed
	Category C tree to be removed
	Category U tree to be removed
	Extents of pruning

BS 5837 RETENTION CATEGORIES

Category A:
Trees of high quality and amenity. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

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Trees whose structural condition is such that they should be removed regardless of development proposals.

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Client
Ketumati Buddist Vihara Trust

Project
Wythenshawe West Youth Centre

Description
Tree Removal Plan

Scale	Drawn by	Date
1:200 A1	S F	23/12/10
Job number	**Drawing number**	**Revision**
10316	10316.T2	N/A

Appendix 4 – Recommendations for Tree Protection during Demolition and Construction

1. General

1.1 All operations that could affect trees on and adjacent to the site must be considered as part of the project management of the Proposed Development. It is therefore imperative that an arboricultural consultant is appointed as part of the design and management team to advise on pre-development issues and supervise on-site operations.

1.2 The arboricultural consultant may also have an advisory role in the preparation of site including tree surgery works and the protection of trees during demolition processes.

1.3 This document accompanies the Arboricultural Impact Assessment (AIA) and should be read in conjunction with the Tree Constraints Plan. It is essential to adhere to the recommendations within this document during on-site operations to ensure the successful retention of trees as part of the Proposed Development. Compliance with the Arboricultural Method Statement (AMS) will be a requirement of all relevant contracts associated with the Proposed Development.

2. The objective of this document

2.1 This document aims to provide general guidelines to onsite personnel that must be followed when working close to trees on construction sites. It is typically included as additional, generic guidance as an appendix to a site specific AMS. All site personnel should have access to this document and be made aware of any sections that may be relevant to their specific area of work.

2.2 The developer will inform the Local Planning Authority (LPA) within twenty four hours if the arboricultural consultant is replaced.

3. RPAs explained

3.1 The RPA is an area of ground around the base of a retained tree, which is calculated in relation to the stem diameter, where disturbance should be kept to a minimum and avoided if at all possible.

3.2 The majority of tree roots grow within the upper 100mm of the soil profile where most nutrients are available as the result of the decomposition of organic matter close to the surface. Rooting conditions become less favourable at depth as the soil density increases, creating anaerobic conditions.

3.3 It is essential that roots are protected from construction works including physical damage from excavation and changes in soil structure from compaction and changes in ground levels.

4. Defining the RPA

4.1 The RPA is defined on the Tree Protection Plan by black circles surrounding retained trees. Where necessary, temporary protective fencing will be placed in these positions, beyond which is a construction exclusion zone. This zone precludes all construction activity, with the sole exception of specified arboricultural works that have been agreed by all parties and under the supervision of an arboriculturist.

4.2 Temporary protective fencing will need to be installed prior to any demolition or construction works and delivery of site accommodation and materials.

4.3 There will be no storage or tipping of any materials, including fuels, oils, adhesives, cement or any other deleterious substance within 0.5m of the construction exclusion zone.

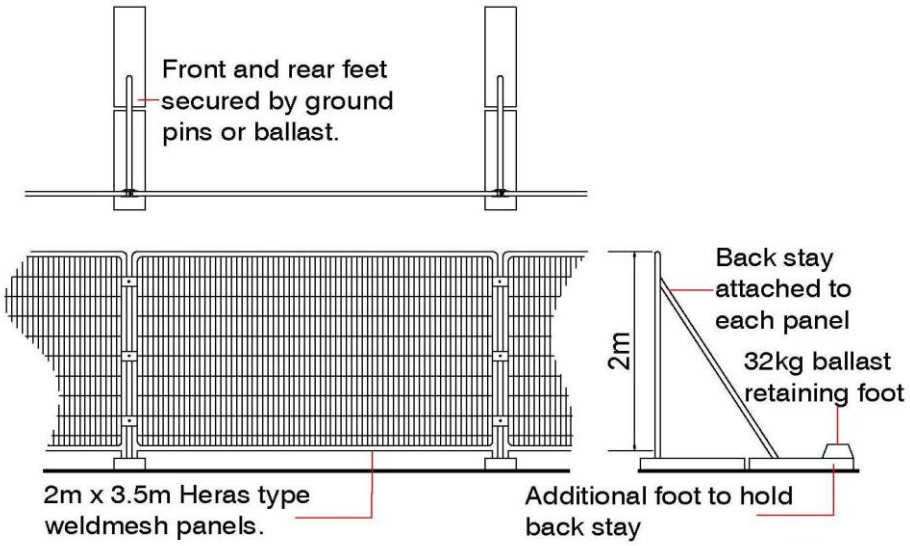
4.4 No fires will be lit within 20 metres of the stem of any tree that is to be retained.

4.5 Any incursion into the construction exclusion zone must be by prior arrangement, following consultation with the LPA.

5. Temporary protective fencing

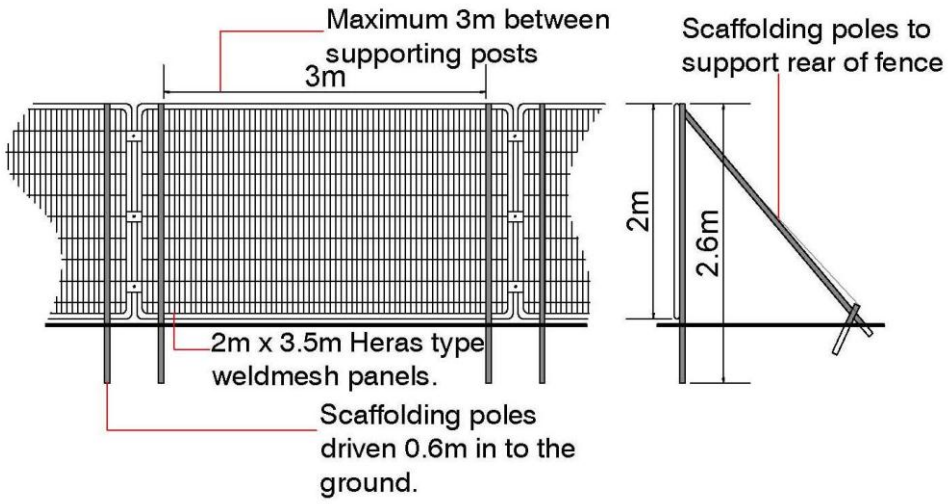
5.1 RPAs will be protected by 'Heras' steadfast type fencing with back stay supports where construction activity is expected to be minimal. (Fig 1. below)

Fig 1. Temporary Protective Fencing with back stay supports



5.2 In areas of site where construction activity is expected in close proximity to RPAs, it will be necessary to employ the more robust 'in-ground' system following BS 5837 guidelines. (Fig 2. below)

Fig 2. Temporary Protective Fencing

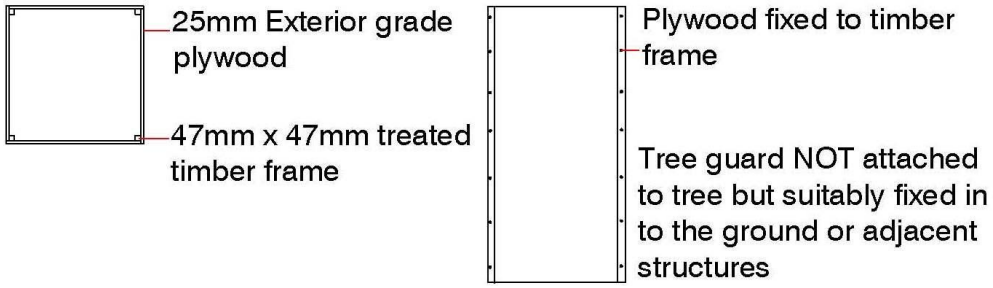


5.3 The 'in-ground' system involves driving vertical scaffold poles approximately 0.6m into the ground onto which are affixed horizontal scaffold poles and bracing struts. 2m high anti-climb weldmesh panels are then wired to the scaffold framework. The vertical scaffold poles should be at a maximum of 3m apart.

5.4 No fixing shall be made to any tree and all possible precautions shall be taken to prevent damage to the tree roots when locating uprights.

5.5 Where space is limited, it is sometimes necessary to construct a temporary tree guard to physically protect the main stem of the tree (Fig 3. below). This should be made by joining together 4 X 25mm Exterior Grade pieces of plywood to 47mm X 47mm treated timber posts to create a box shaped frame which is attached to the ground or adjacent structures. No fixings are to be made to the tree and suitable ground protection should be employed within the RPA of the tree (see Section 12).

Fig 3. Temporary Protective Fencing



5.6 A 600mm x 300mm warning sign reading "TREE PROTECTION AREA KEEP OUT" shall be fixed to every 10m of protective fencing. (Fig 4. below)

Fig 4. Tree Protection Sign



6. Excavation in the RPA

6.1 Any necessary excavation must be carried out using hand tools to avoid direct damage to the protective bark of tree roots. It may be possible in some instances to use specialised equipment such as high air pressure machinery to excavate the soil with minimal disturbance to roots.

6.2 Exposed roots will be wrapped in dry, clean Hessian sacking to prevent desiccation and to protect from rapid temperature changes. In warmer weather, the sacking should be kept moist by regular watering. Sacking should be removed before backfilling.

6.3 Roots less than 25mm diameter may be pruned back, preferably to a growing point. A sharp cutting tool such as bypass secateurs or a handsaw should be used to leave the smallest wound possible. Roots greater than 25mm in diameter should be retained wherever possible.

6.4 Root pruning should be carried out under the supervision of the arboricultural consultant or the Local Authority Tree Officer to ensure that only roots necessary to facilitate the development will be removed and the long-term well-being of retained trees is maintained.

6.5 Backfilling of any excavation should be carried out by hand to avoid direct root damage by excessive compaction and should include, where possible, the replacement of inert granular material mixed with sharp sand (not builder's sand) around retained roots.

7. Demolition and removal of surfaces in the RPA

7.1 During demolition, the following restrictions will apply:

- Where direct damage by falling masonry is likely, the tree should be protected by exterior grade plywood sheets constructed around the main stem.
- The main body of any mechanical excavator will operate outside the RPA.
- Masonry will be pulled away from trees where possible.
- When breaking masonry, a fine water spray will be used to minimise dust particles.
- Excessive dust particles on trees will be removed each day by spraying with water.

7.2 Hard surfaces should be kept in place for as long as possible during construction works in order to prevent soil compaction in the RPA.

7.3 During surface removal, the following restrictions will apply:

- Only hand operated tools will be used to lift existing surfaces and sub-base. No mechanical excavators are to be used.
- No excavation below the existing sub-base will occur.
- Exposed roots are to be treated as in section 6 above.
- All surface removal within the RPA will be supervised by the arboricultural consultant or the Local Authority Tree Officer.

8. Changes in ground level

8.1 Changes in ground level can be harmful to trees where stripping or filling of soil is carried out in the RPA. It is therefore important that no significant changes in level occur within the RPA of retained trees.

9. Soft landscaping

9.1 No machinery used for landscaping such as rotovators are to operate within the RPAs of retained trees.

9.2 All planting must be carried out carefully, by hand to avoid damage to existing roots. Mulch should be used around the base of trees, where possible, to maintain ground level and to avoid mower and strimmer damage to buttresses and surface roots.

10. Surface design

10.1 It is essential to maintain adequate supplies of water and oxygen for trees through the soil. New impermeable surfacing should not cover more than 20% of the RPA.

10.2 Design and construction specification should take account of further growth.

10.3 Paving slabs and block pavers are available with built in infiltration spaces between the slabs or blocks. They should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

10.4 It may be necessary to lay paving and other surfaces on a flexible base to allow movement and to facilitate relaying if distortion becomes excessive due to the activity of tree roots.

10.5 Edgings and associated foundations and haunchings can damage tree roots. This should be avoided within the RPA by either the use of alternative methods of edge support or by not using supports at all.

10.6 Where wheeled traffic is expected in the RPA, it will be necessary to construct the new surface using a cellular confinement system with a permeable surface as detailed in Appendix 5.

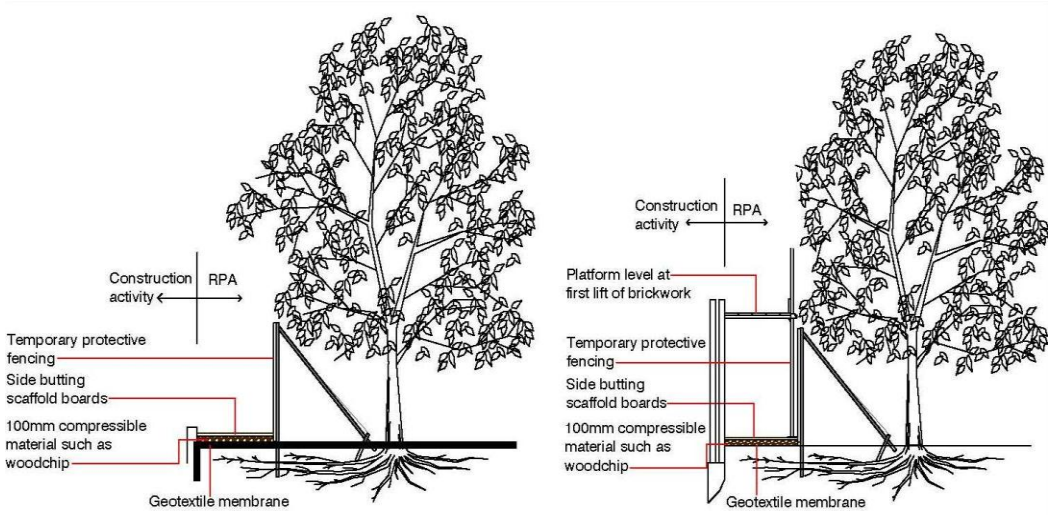
11. Ground protection for wheeled or tracked vehicles

11.1 Occasionally, it may be necessary to drive plant machinery in the RPA. To avoid compaction of the soil during construction, a minimum of 100mm compressible material, followed by temporary interconnected road plates or similar that is capable of sustaining the expected loads should be installed. This system will ensure that the weight is evenly distributed over the affected area.

12. Ground protection for pedestrians or light vehicles

12.1 The primary method of ground protection is the installation of a compressible layer (e.g. woodchip) over a geotextile fabric with side butting scaffold boards. (Fig 3. below)

Fig 3. Ground Protection in RPA



12.2 Ground protection measures whilst working the RPA must be capable of supporting the expected loads and avoid compaction of the soil.

12.3 The boarding will be left in place until the construction works are finished.

12.4 Scaffolding may first be erected with the uprights on spreader boards and the ground protection installed around the uprights.

13. New structures in the RPA

13.1 No concrete strip foundations are to be installed within the RPA of any retained tree. Traditional strip foundations can cause an unacceptable amount of damage during the excavation process where roots are easily torn by mechanical excavators.

13.2 Small, light structures such as sheds and bin stores can be laid directly onto the soil surface without the need for significant excavation. A small amount of excavation may be permissible to provide a level surface, however, no roots over 25mm in diameter should be severed without the advice of an arboriculturist or Local Authority Tree Officer.

13.3 Traditional footings should not be used within the RPA for the construction of non-load bearing walls. It may be possible however, to construct walls in proximity to trees by bridging existing roots with lintels.

13.4 Where foundations are to be laid in the RPA of retained trees, root damage can be minimized by using small diameter piles located to avoid major tree roots. The proposed area for pile installation should be dug by hand to a depth of approximately 750mm in order to ascertain the position of roots present. Beams, slabs and suspended floors should be laid at or above ground level and cantilevered, as necessary, to avoid tree roots.

13.5 Where piling is to be installed in proximity to trees, the smallest practical pile diameter should be used as this reduces the possibility of striking major tree roots, and reduces the size of the rig required to sink the piles. The latter is particularly important where piling within the branch spread is proposed, as mini-rigs reduce the need for access facilitation pruning. Sheathed piles protect the soil and adjacent roots from the potential toxic effects of concrete.

13.6 Backfilling of any excavation should be carried out by hand to avoid direct root damage by excessive compaction and should include, where possible, the replacement of inert granular material mixed with sharp sand (not builder's sand) around retained roots.

13.7 Any pruning should be carried out under the supervision of the arboricultural consultant or the Local Authority Tree Officer to ensure that only branches necessary to facilitate the Proposed Development will be removed and the long-term well-being of retained trees is maintained.

14. Utilities

14.1 The installation of underground utilities within the RPA should not be considered unless it is absolutely necessary. Trenching can cause an unacceptable amount of damage to tree roots.

14.2 The National Joint Utilities Group publication, NJUG10 recommends the following precautions when working in the RPA:

- No excavation should be carried out using machinery.
- When digging by hand, carefully work around roots, retaining as many as possible.
- Do not sever roots over 25mm in diameter without the consent of the arboricultural consultant or Local Authority Tree Officer.
- Any root pruning will be carried out using a sharp tool (eg secateurs or handsaw). Make a clean cut and leave as small a wound as possible.
- Backfill the trench with an inert granular material and topsoil mix. Compact the backfill with care around the retained roots. On non-highway sites backfill only the excavated soil.
- Do not repeatedly move or use heavy mechanical plant except on hard standing.
- Do not store spoil or building material, including chemical and fuels.
- Protect roots with dry sacking if they are to be left exposed overnight when there is a risk of frost. Sacking must be removed before backfilling.

15. Monitoring

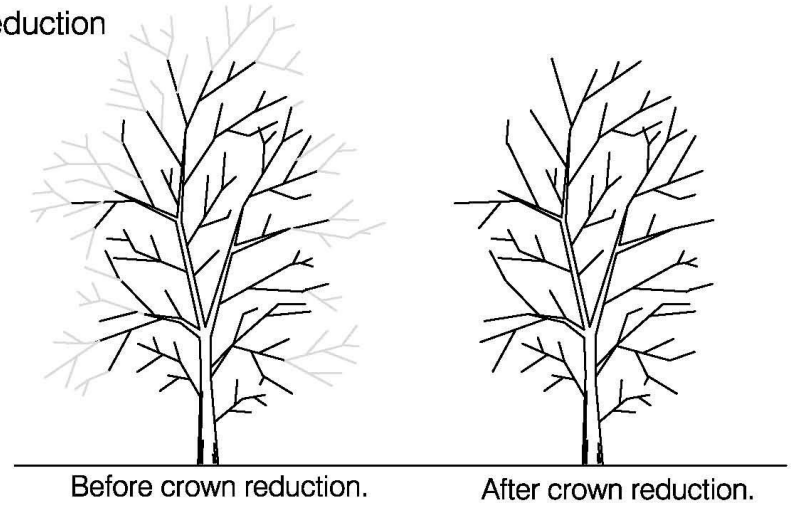
15.1 The arboricultural consultant will be responsible for monitoring of all arboricultural works and issuing a certificate of practical completion. In addition, the arboricultural consultant will inspect the protective fencing and monitor any works within exclusion zones.

15.2 A record of site visits will be maintained for inspection on site and copies forwarded to the developer/agent and to the local planning authority.

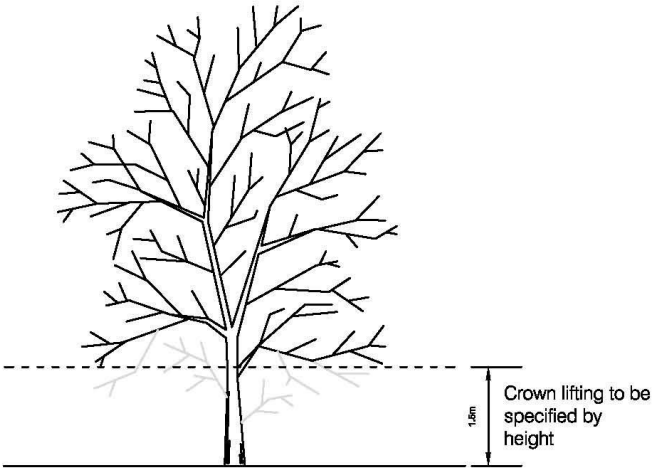
Appendix 5 - Tree Work Schedule and Pruning Diagrams

Tree ID	Species	Recommendations	TPO Information	Work time Scales	Re-inspect
T3	Katsura Tree	Fell to approximately ground level	No TPO	As necessary	N/A
T4	Birch	Fell to approximately ground level	No TPO	As necessary	N/A
T5	Elm	Fell to approximately ground level	No TPO	As necessary	N/A
T6	Leyland Cypress	Fell to approximately ground level	No TPO	As necessary	N/A
H10	Beech	Reduce to 3m in height and trim south side	No TPO	Within 12 months	12 months
G11	Mixed	Crown lift branches on south side of crown to provide 2m clearance from adjacent property	No TPO	Within 12 months	3 years
T12	Ash	Fell to approximately ground level	No TPO	As necessary	N/A

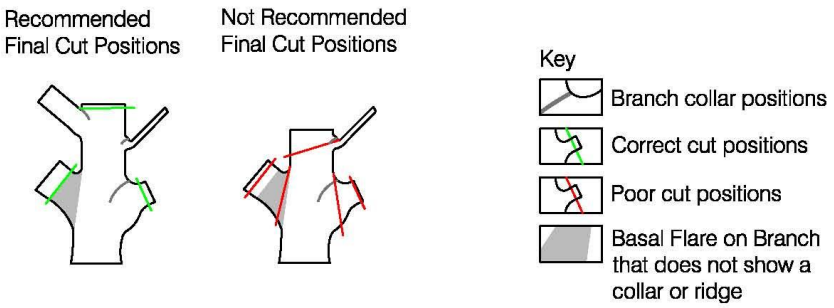
Crown Reduction



Crown Lifting



Final Cut Positions



Appendix 6 - Method Statement for Cellular Confinement System

BODCELL™ TREE ROOT PROTECTION GEOCELL

MIS 456 Issue 1: Jan 2011

SPECIFICATION & INSTALLATION GUIDANCE



BODCELL™ GEOCELL CONFINEMENT SYSTEM FOR TREE ROOT PROTECTION

Bodcell™ is a geocellular sub-base confinement system designed for the protection of tree roots where the construction of roads, car parks and access routes are required in the vicinity of trees and where Tree Preservation Orders (TPO) may be enforced. The structure confines and stabilises the sub-base stone ensuring that vehicle loads are dissipated, rutting and soil compaction is prevented and damage to tree roots is avoided. When installed as advised, Bodcell™ will also allow the continued passage and circulation of air, water and nutrients to tree roots to sustain a healthy growing environment as recommended by the following 2 documents:

- British Standard BS5837: 'Trees in Relation to Construction' (2005).
- Arboricultural Advisory and Information Service: Practice Note 1 – 'Driveways Close to Trees' (APN1)

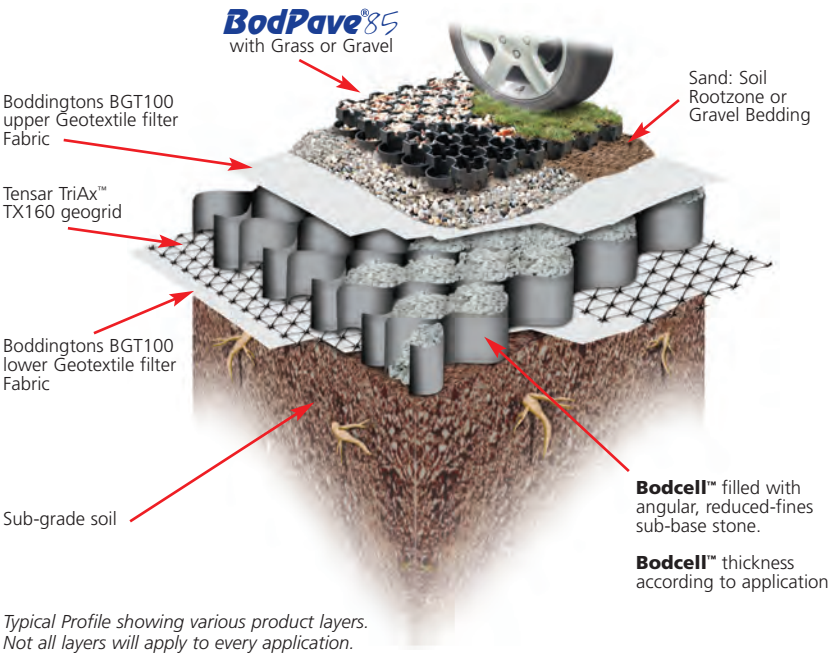
Bodcell™ is supplied flat packed and opens to form a strong geocellular structure. It is simply pinned in place using metal fixing pins as described.

In this type of 'Reduced-Dig' or 'No-Dig' Tree Route Protection application, Bodcell™ is intended for use in conjunction with a water and gas permeable SuDS (Sustainable Drainage System) compliant pavement surface product such as Boddingtons BodPave®85 cellular plastic paving, Concrete Porous Block Paving or Porous Asphalt surfaces. Although Bodcell™ can be used by traffic in isolation for a very limited period when filled; it is not advised that Bodcell™ is used as the permanent surface finish for vehicle access routes. Exceptions may arise where Bodcell™ is installed as a temporary haul road for example as a site access route and may be removed and disposed of or fully re-surfaced after use. Refer to installation method details for further information.

GENERAL INSTALLATION ADVICE FOR ALL APPLICATIONS

Prior to commencing works it is advisable to seek the professional opinion and approval of the Local Planning Department and Arboriculture Officer. Specific design limitations may be determined by Tree Officers, Engineers or Planners and must be closely adhered to. All applications will vary according to the site conditions and specific tree species involved. The ground and tree roots within the tree root protection zone must be protected from compaction and damage at all stages of the construction works. Works may involve varying degrees of excavation or build-up where edge retention is required, which must avoid root damage and soil compaction. The use of mechanical equipment or even low ground pressure machinery in the tree root protection zone must be avoided and hand tools may be the only method of excavation close to the root system.

Bodcell™ Typical Profile



Typical Profile showing various product layers. Not all layers will apply to every application.

SPECIFICATIONS

PRODUCT	PANEL SIZE	CELL DIAMETER & DEPTH	PANEL WEIGHT	MATERIAL	LOADING APPLICATION	PART No.
Bodcell™ 250/100	5m x 7m	250mm x 100mm	18kg	Non-woven Polypropylene	Pedestrians	051397
Bodcell™ 250/150	5m x 7m	250mm x 150mm	25kg	Non-woven Polypropylene	Cars/Light vehicles	051403
Bodcell™ 220/200	6m x 3m	220mm x 200mm	20kg	Non-woven Polypropylene	HGV's	051380

PRODUCT	MATERIAL	SIZE	UNIT	PART No.
Fixing J-Pin	Steel rod	550mm long x 8mm dia	Each	051038



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BODCELL™ TREE ROOT PROTECTION GEOCELL

MIS 456 Issue 1: Jan 2011

INSTALLATION METHOD FOR PERMANENT ACCESS ROUTES AND CAR PARKS

1. Obtain the approval of the Local Planning Department and Arboriculture Officer that this method of construction is appropriate and acceptable for the application and to determine the limits of construction and proximity to the tree.
2. Prepare the site by carefully removing all debris and reducing surface levels to the allowable reduced dig as appropriate to the specification, whilst strictly avoiding soil compaction and tree root damage. Build-up directly on the existing surface levels may be necessary.
3. Ensure that the prepared surface is reasonably even and fill any localised depressions with sharp sand to achieve an even surface profile. Do not roll or consolidate the area.
4. Install tanalised timber edging boards or other approved edge retention to the perimeter of the construction zone as appropriate to the total layer profile thickness. Avoid damage to tree roots when placing fixing posts and pegs. Concrete kerbs are unlikely to be appropriate or allowed.
5. Install a layer of Boddingtons BGT100 Geotextile Fabric across the site, overlapping adjacent rolls by a minimum of 150mm. It may be necessary to lightly pin the Geotextile in place until the overlying layers are installed.
6. An optional layer of Tensar TX160 TriAx™ Geogrid may be required at this stage, possibly determined by the site soil strengths (i.e. weak CBR% strength*), the proposed application and applied load such as HGV's. In some cases the TX160 layer may also aid the reduction of the required layer thickness of Bodcell™ where an extremely limited allowable excavation or build-up has been applied. Place the Geogrid layer over the Geotextile Fabric layer and fix down using steel pins to hold flat. Overlap adjacent rolls by minimum 150mm. Avoid tree root damage and soil compaction.
7. Open out and lay the specified layer thickness of Bodcell™ (100mm/150mm/200mm deep) and pin in place between the edging boards. It may be necessary to cut the Bodcell™ to size using a sharp knife or it can be left uncut and folded up against the edgings if preferred.
8. Pin the Bodcell™ in place using Boddingtons Steel Fixing Pins or similar approved. The pins are generally used to maintain the cells in an open and fully expanded position whilst the cells are being filled and also to stop the structure from being pushed up by migrating aggregate during the filling process. Pin spacing will vary according to the site conditions, but will generally be required at 1m – 2m centres on flat surfaces, mainly placed around the perimeter of the area and where adjacent sections of Bodcell™ abut each other , with less in the middle of the area. Drive the pins in so that they are just touching the top of the cells but do not compress the fabric. Avoid tree root damage during the pinning process.
9. Fill the Bodcell™, working toward the tree from the furthest point away and using the filled Bodcell™ as a platform. The cells must be filled with clean, open graded angular aggregate, normally in the particle size range of 5mm - 45mm. Not single sized or rounded aggregate. The project engineer may determine alternative fill materials such as clean 4/20 or 4/40 stone or a reduced-fines DoT Type 1X sub-base. It is not acceptable to use a standard DoT Type 1 Sub-base within the cells for tree root protection. Do not roll the surface, a light vibratory compaction plate (whacker) may be permitted to settle the stone into the cells, seek advice from the specifier or Tree Officer on this detail. Do not contaminate the filled cells with site debris, soil or mud.
10. Install the permeable pavement layer/wearing course i.e. BodPave®85, Block Paving, Porous Asphalt, on top of the Bodcell™ according to the manufacturers recommendations. Each porous pavement layer will have a specific design layer requirement; therefore for example, where a sand or sand:soil bedding layer is specified or a contaminant filtration layer is required, then a layer of Boddingtons BGT100 Geotextile Fabric shall be placed above the Bodcell™ prior to the pavement bedding layer being installed and finished according to manufacturers instructions. The Geotextile will stop the pavement bedding layer from migrating down into the aggregate voids within the Bodcell™.

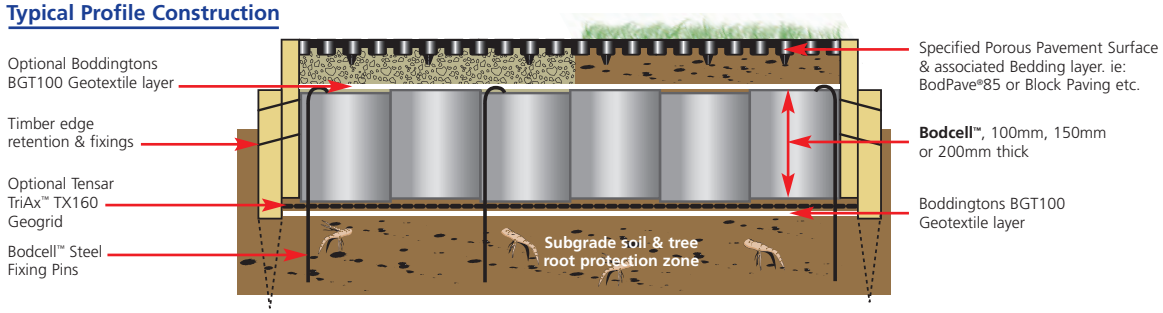
For installation recommendations for BodPave®85 cellular paving for Grass & Gravel, refer to Boddingtons BodPave®85 Specification and Installation Guidance Notes. For all other pavement layer products, refer to the specific manufacturers' guidance.

INSTALLATION METHOD FOR TEMPORARY ROADS AND SACRIFICIAL PAVEMENT LAYERS IN HAUL ROADS

In some applications Bodcell™ may be installed as a temporary haul road base and completely removed after use. Alternatively it may have a sacrificial stone layer placed over it which is removed and replaced with a permanent permeable pavement solution when use of the haul road is complete.

1. Obtain the approval of the Local Planning Department and Arboriculture Officer that this method of construction is appropriate and acceptable for the temporary access and to determine the limits of construction and proximity to the tree.
2. Apply all construction detail as for items 2 to 9 above for 'Permanent Access Routes'.
3. Place a layer of Boddingtons BGT100 Geotextile or greater strength Geotextile (i.e Terram 2000) onto the Bodcell™ surface. The geotextile grade will be determined by the specific site design criteria and degree of haul road traffic proposed. This layer will be removed and replaced later if a porous pavement surface is being installed on the Bodcell™.
4. Place a minimum 100mm thick layer of either clean graded stone or DoT Type 1 sub-base stone onto the surface. This will be the sacrificial pavement layer to be removed later. Aggregate specification will be determined by the project manager.
5. During use of the access route, routinely check for erosion of the surface and repair with stone as required to avoid exposure of the geotextile.
6. After the haul road use is completed, remove the sacrificial layer of stone and geotextile and replace with the preferred permeable pavement layer in accordance with manufacturers recommendations. Alternatively remove the entire construction profile to return the site to its original status. is critically important to avoid contamination of the remaining layer of open-graded stone within the Bodcell™ where partial removal is carried out and at all times to avoid damage to tree roots and soil compaction during removal and disposal of the construction layers.
7. Where complete removal of Bodcell™ is required, seek the specifiers' advice on renovation and restoration of the landscaped surfaces within the tree protection zone.

Typical Profile Construction



Other useful notes on Tree Root Protection

- In most applications the total porous pavement area should not exceed 20% of the tree root protection area.
- It is advisable to seek an Engineers advice on the required Bodcell™ layer thickness related to local soil strengths and proposed traffic loadings.
- Soil compaction will severely affect the trees ability to take up water and oxygen; similarly, raising soil levels around trees will deprive roots of oxygen and cause stress and dieback.
- In most cases 80% - 90% of a trees root system are in the upper 1m of soil and the small fibrous tree roots are the most important to a trees health. The fine roots enable transport of oxygen, water and nutrient to the tree via the larger roots which also anchor the tree and provide stability. Severing only a small proportion of the fine surface root structure can severely affect the tree, causing stress, dieback and loss of stability.

* CBR% Strength = California Bearing Ratio – a measure of subgrade soil strength.

Further Reading

- British Standard: BS5837 1991 / 2005 – Trees in Relation to Construction - Recommendations.
- Arboricultural Advisory and Information Service: Practice Note 1 – 'Driveways Close to Trees' (APN1).
- 'Tree Root Systems'. (M. Dobson 1995) – Arboricultural Research Information Note 130/ARB/95.
- 'Driveways Close to Trees' (M. Dobson / D. Patch 1996). Arboricultural Practice Note 1.
- 'Guidance for Trees: Conflict or Compliment?'. (R. Nicholson 2001). Arboricultural Journal No. 25.

Please note that the information above is given as a guide only. Boddingtons cannot be liable for damage caused by incorrect installation of this product. Final determination of the suitability of any information or material for the use contemplated and the manner of its use is the sole responsibility of the user and the user must assume all risk and responsibility in connection therewith.

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Certificate No. FM 33039

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Appendix 7 - Professional Résumé: Scott Fitzgerald

Qualifications:

Scott gained a BSc in Arboriculture from the University of Central Lancashire in 2010, after being awarded a Foundation Degree in Arboriculture with merit at the same institution in 2005.

He is continuing his education further by studying for a Master's Degree in Arboriculture and Urban Forestry at the University of Central Lancashire which began in September 2011.

Scott is a professional member of the Arboricultural Association. Scott maintains his professional development by attending several seminars and conferences throughout the year.

Experience:

Scott has worked in the arboriculture industry since 1993 when he trained as a groundsman and gained NPTC certificates for use of a chainsaw on the ground. In 1994 he gained his NPTC certificate for the use of a chainsaw from a rope and harness. For the next 12 years, he worked as head climbing arborist for a tree surgery company as team leader and was responsible for the day to day management of tree work operations, sales and building client relations.

In 2005, Scott began trading as an independent consultant arboriculturist. He now works solely as an arboricultural consultant, providing expert advice and reports on all matters concerning trees including hazard assessment, TPOs, planning advice and reports for mortgage purposes.