AN ARBORICULTURAL METHOD STATEMENT

AND A TREE PROTECTION PLAN

Hambrook School, Leylands Rd, Burgess Hill RH15 8HY

Prepared on instruction by

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March & June 2024

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Arboricultural ASSOCIATION Professional Member

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Drawing

Appendices

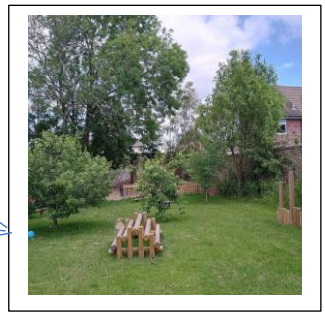
1.0 Introduction

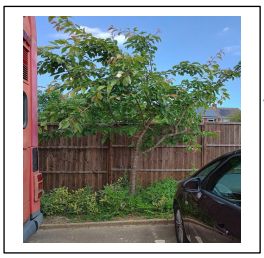
1.1 This Arboricultural Method Statement aims to identify and address those matters concerning the successful retention of the existing mature trees within Hambrook School, Leylands Rd, Burgess Hill RH15 8HY.

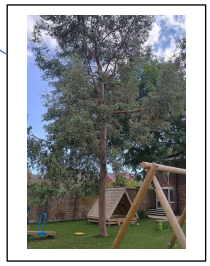
1.2 The trees were inspected in March and June 2024 by Jonathan Alexander Green, who holds an HND in Arboriculture and is a Professional Member of the Arboricultural Association. The report follows the guidelines given in BS5837: 2012.

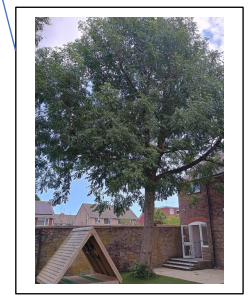
1.3 The trees have been inspected from ground level only. Should further more detailed inspection be deemed appropriate, this is under **' Preliminary Management Recommendations, in the Pre-Development Site Tree Survey Table, Appendices A** '. Trees are dynamic living organisms whose health and condition can rapidly change depending on several external and internal factors. The conclusions and recommendations in this report relate to the trees at the time of the inspection.

Tree Location Plan









T29
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T28
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T30
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T1
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T16 Group
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T15
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T2
B
T14 Group
C
T3 Group
C
T17 Group
B
T4
C
T6
B
T5
C
T13
B
T11
A
T9
A
T8
A
T12
A
T10
C
T7 Group
B

2.0 Impact of Proposed Development

2.1 Proposal:

The intention is to landscape a grassed area at the back of the school and construct a multi-use games area and play equipment. The multi-use games area will be surrounded by a 3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels.

- The proposal is carefully designed, where possible, to ensure a successful juxtaposition with the existing mature trees.

2.2 The proposed development WILL involve the removal of the T4 and T6 trees, one tree in the T14 Group, and one tree in the T17 Group (see the tree protection plan and survey table Appendices A).

2.3 The proposed development WILL be within the root protection area of the surveyed trees:

- T1, T2, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17

(see the tree protection plan and survey table and Appendices B Photos).

2.4

What You Need to Know About Trees At:

Hambrook School

Ensure you have the following documents.

- Arboricultural Method Statement.
- Tree protection plan in colour.
- Tree Survey Table & Schedule of Works

Note – There are several large mature trees, three of which are wellingtonias, the dominant feature. Some trees are subject to a TPO.

Key Areas of Concern:

- Condition of T8, T9 and T11 Wellingtonias.
- A suitably qualified contractor carries out a detailed inspection of T8, T9 and T11.
- A suitably qualified contractor carries out the tree surgery.
- Landscaping and installation of multi-use play area.

The tree protection fencing must be installed and braced, and signs must be displayed before demolition begins. It must not be breached during the project. Any deviation from the method statement could lead to a breach in the planning condition.

(If in doubt, phone I am here to help)

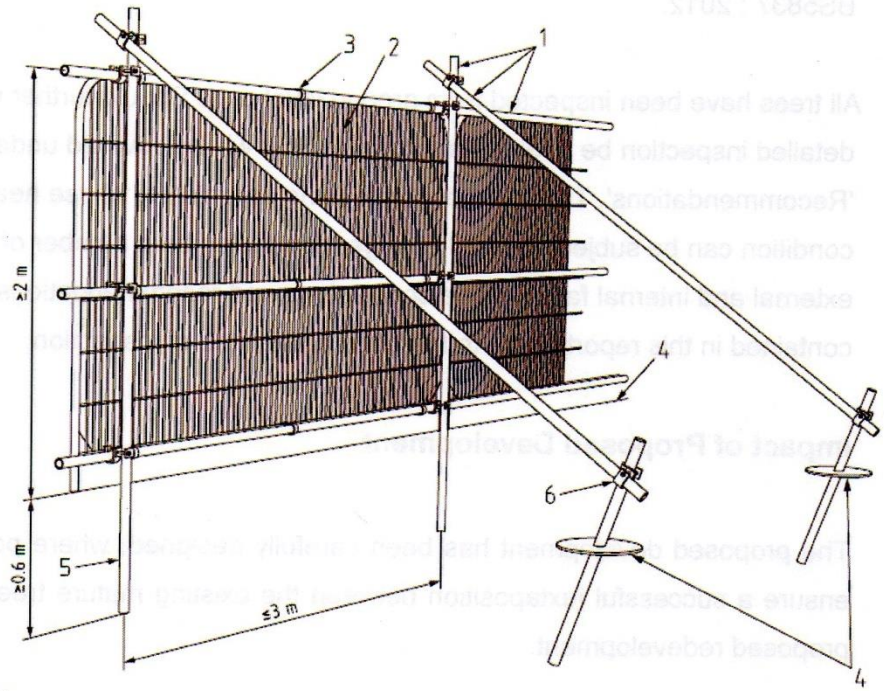
Jonathan A. Green MArborA

jagrabconsultancy@gmail.com

Tel: 07792096453

3.0 Tree Protection

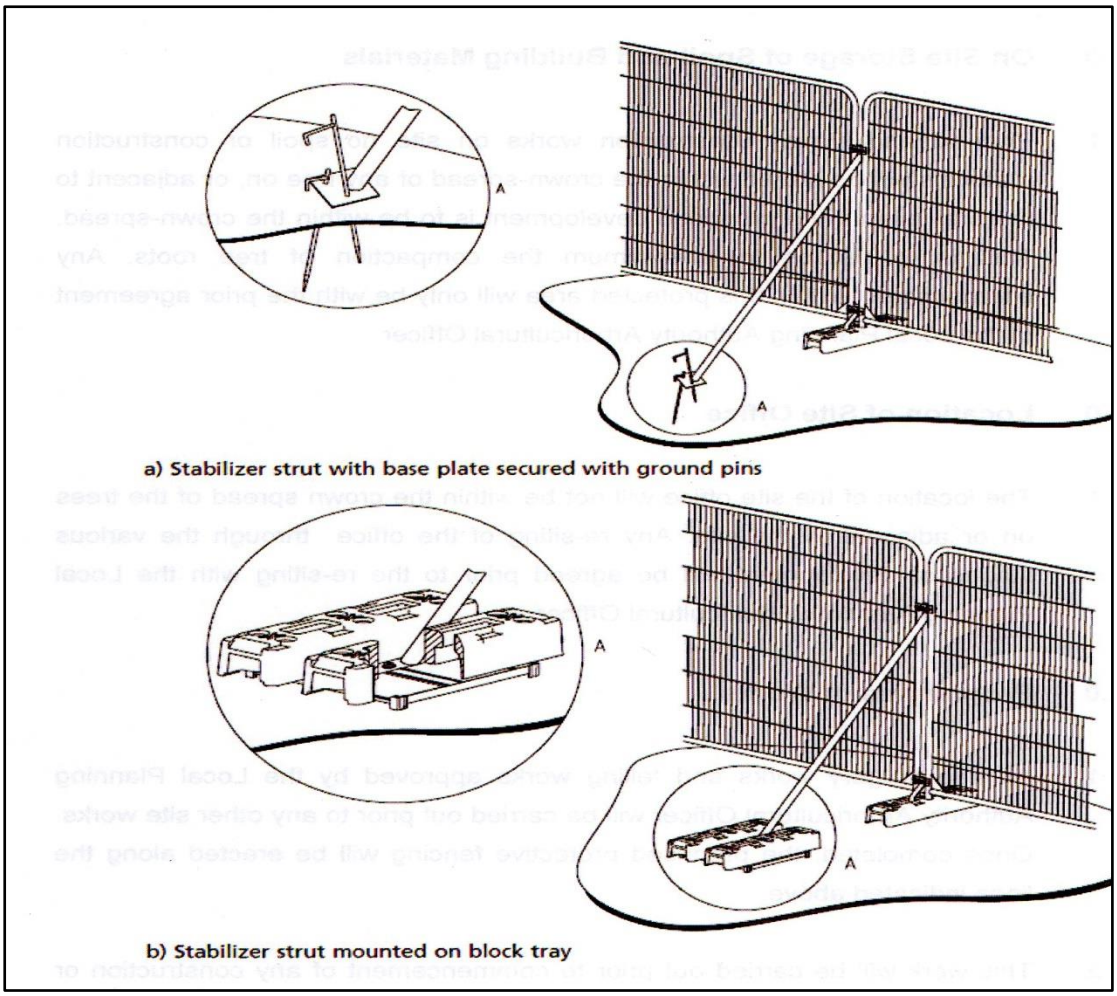
3.1 The trees to be retained adjacent to or within the site will be protected by stout fencing erected at specific distances from the base of the tree. This fencing will be constructed with weld mesh on a framework of scaffolding or similarly sturdy material (Herras type fencing), driven into the ground to a suitable depth to ensure its suitability, all in line with BS5837: 2012 figure 2 (shown below)



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Alternatively, the herras fencing may be supported as shown below, and in line with BS5837 :2012 figure 3



3.2 The tree protection fencing must be regarded as inviolate. The tree protection fencing will be erected before the commencement of the development to protect the tree and, if relevant, any hedges. Once erected, the fencing will remain in situ. It will not be removed or altered without the prior consent of the Local Planning Authority Arboricultural Officer in consultation with the named arboriculturalist.

Construction Exclusion Zone Notice


TREE PROTECTION AREA
KEEP OUT!
(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECT OF A TREE PRESERVATION ORDER.
CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

The protective fencing will be erected on the line shown on the Tree Protection Plan drawing.

- The table below will further aid the reader in correctly placing the tree protection fencing to create a construction exclusion zone **(refer to the tree protection plan drawing)**.

Tree I.D.	Root Protection Area	Tree Protection Fence Location
T1	9m	Protected by the boundary fence.
T2	4.5m	Protected by the boundary fence.
T3 Group – mini hedge	1.5m	Protected by the boundary fence.
T4	1m	N/A - to be removed due to conflict with the proposal.
T5	2m	N/A - to be removed due to conflict with the proposal.
T6	8m	N/A – to be removed due to condition.
T7 Group	7.5m	Protected by the boundary fence.
T8	15m	The tree protection fence must be installed 7m from the southern boundary fence and run 22m in the west direction. The tree protection fence must start at the south boundary fence and end at the north wall/ patio area.
T9	15m	The tree protection fence must be installed 7m from the southern boundary fence and run 22m in the west direction. The tree protection fence must start at the south boundary fence and end at the north wall/ patio area.
T10	1.5m	The tree protection fence must be installed 7m from the southern boundary fence and run 22m in the west direction. The tree protection fence must start at the south boundary fence and end at the north wall/ patio area.
T11	15m	The tree protection fence must be 15m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area.
T12	8.5m	Protected by the boundary fence.
T13	8m	The tree protection fence must be 15m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area.
T14 Group	3m	The tree protection fence must be 15m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area.
T15	6.5m	The tree protection fence must be 7m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area.
T16 Group	1.5m	The tree protection fence must be 7m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area.

T17 Group	5.5m	The tree protection fence must be 11.5m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area.
T18	6.5m	N/A
T19	6.5m	N/A tree is already protected by high permanent fencing.
T20	3.5m	N/A tree is already protected by high permanent fencing.
T21	1m	N/A tree is already protected by high permanent fencing.
T22	2.5m	N/A tree is already protected by high permanent fencing.
T23	1.5m	N/A tree is already protected by high permanent fencing.
T24	1m	N/A tree is already protected by high permanent fencing.
T25	1m	N/A tree is already protected by high permanent fencing.
T26	1m	N/A tree is already protected by high permanent fencing.
T27	3m	N/A tree is already protected by high permanent fencing.
T28	3m	N/A tree is already protected by high permanent fencing.
T29	1.5m	N/A tree is already protected by high permanent fencing.
T30	8m	N/A tree is already protected by high permanent fencing.
T31	1.5m	N/A tree is already protected by high permanent fencing.
T32	1.5m	N/A tree is already protected by high permanent fencing.
T33	1m	N/A tree is already protected by high permanent fencing.
T34	1m	N/A tree is already protected by high permanent fencing.
T35	1m	N/A tree is already protected by high permanent fencing.
T36	1m	N/A tree is already protected by high permanent fencing.
T37	1m	N/A tree is already protected by high permanent fencing.

4.0 Onsite Storage of Spoil and Building Materials

4.1 To minimise root compaction before and during construction work onsite, no spoil or construction materials are stored within the crown spread of any tree on or adjacent to the site, even if the proposed development is within the crown spread. Any encroachment within this protected area will only be with the prior agreement of the Local Planning Authority Officer.

- CEZ Construction Exclusion Zone.

5.0 Location of Site Office

5.1 The site office location will not be within the crown spread of a tree. Any re-siting of the office through the various stages of development will be agreed upon before the re-siting with the Local Planning Authority Arboricultural Officer.

6.0 Program of Works

6.1 All tree surgery and felling works approved by the Local Planning Authority Arboricultural Officer will be done before any other site work. Once completed, the proposed protective fencing must be erected along the indicated lines.

- **Tree surgery work is required to undertake this proposal (see appendices C schedule of works)**

6.2 A chosen contractor will complete the required work before any onsite construction or demolition commencement.

6.3 During construction, the developer will make every effort to prevent unnecessary tree damage by ensuring that the tree protection fencing is in place and in good condition.

6.4 The site should be inspected regularly by a competent and qualified arboriculturist. The Arboricultural Officer will be notified immediately of any unforeseen damage. The necessary remedial tree surgery will be carried out as soon as possible with the arboricultural officer's approval.

(See Appendices F Arboricultural Input and Site Supervision Schedule)

6.5 After the development work is completed on-site, it would be advisable to carry out a further tree survey to identify any remedial tree surgery necessary as a result of the development work and suggest details for future tree management.

7.0 Remedial Tree Surgery

7.1 Any proposed tree surgery work identified and agreed upon with the Local Planning Authority will be carried out following BS3998: 2010 (Tree Work— Recommendations). A competent arboricultural contractor will carry out the work. Alterations to the proposed work schedule will be agreed upon with the Arboricultural Officer before the commencement of the work.

(Tree surgery work is required to undertake this proposal (see appendices C schedule of works)

7.2 Accidental damage to the tree during the construction phase of the development will be noted and reported as per paragraph 11.2 of this document.

8.0 Levels

8.1 Should any levels be changed in areas adjacent to the tree or within the minimum recommended distance, the appropriate measures must be taken to minimise the detrimental effect on the tree in question.

- **Level changes are required and will affect trees:**
- **T4 – T9.**

8.2 Where necessary, a granular material that will not inhibit gaseous diffusion, e.g., no-fine gravel or cobbles, is used. All hard surfaces, such as brick paviors, will suit gaseous diffusions.

8.3 Also, where no dig principles have been used to avoid root loss, the extent of the level increase will be shown as a section on the appropriate engineering drawing.

8.4 Minor level change may be required to hide a ground beam or edge of a built-up surface. In all cases, a gentle taper will be used so that the change in level runs out before it reaches the tree affected.

8.5 If excavations close to the tree roots greater than 50mm in diameter are likely to be encountered, particular care must be taken to avoid damage. The excavation of these areas will be undertaken by hand, preventing any damage to the bark. The roots will be surrounded by sharp sand before replacing any soil or other material in the vicinity. Use a concrete plinth to bridge roots over 50mm in diameter.

- **Excavations will be required within the RPA of the following trees:**

Multi-use play area: **T1 – T2, T4 – T9**

Soft Landscaping: **T10 – T17**

9.0 Services

9.1 All service runs are placed outside the crown spread of trees on or adjacent to the site. If impossible to achieve, a section of service run passes within a tree protection area around a retained tree; this must be dug by hand following 'broken trenches' (NJUG 4). To ensure that tree roots are not damaged during the service installation. All root pruning will be agreed upon beforehand with the named arboriculturist in consultation with the Local Planning Authority Arboricultural Officer. All root pruning will be following BS3998: 2010. All routes for overhead services will aim to avoid the tree. Where this is unavoidable, any tree work will be agreed upon before commencement with the Arboricultural Officer.

- **No new service runs are proposed.**

9.2 All service runs are to be agreed upon with the Local Planning Authority before the commencement of work.

- **Not applicable.**

10.0 Construction Within the Tree Protection Area

10.1 The development **DOES** fall within the calculated root protection area of the following trees:

Multi-use play area: **T1 – T2, T4 – T9**

Soft Landscaping: **T10 – T17**

<u>Construction of a multi-use games area and 3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels.</u>

- Effected trees T1, T2, T4, T6 - T9.
- Before beginning construction, the tree protection fencing must be installed. As detailed in paragraphs 3.0 and 3.2, the tree protection plan and appendices A.

<u>Multi-use games area:</u>

- Excavations may be appropriate to remove the turf layer and surface vegetation, but this must be done under the agreement of the supervising arboriculturist.
- Before installing the final surface layer, you must fill low points on undulating surfaces to an even level with any high points using an agreed granular material such as sand or stone.
- Do not mechanically compact new fill or existing soil.
- Wooden pins can be used for edge retention.
- Always work backwards when working within the RPA; lay down wooden boarding or decompact the soil with hand tools as you progress.
- Soil storage from excavation within the root protection area must be on wooden boarding (see the tree protection plan). Heavy equipment, such as a wheelbarrow full of material, must also be wheeled over wooden boarding.

Illustration taken from SGN3 Ground Protection - Jeremy Barrell.

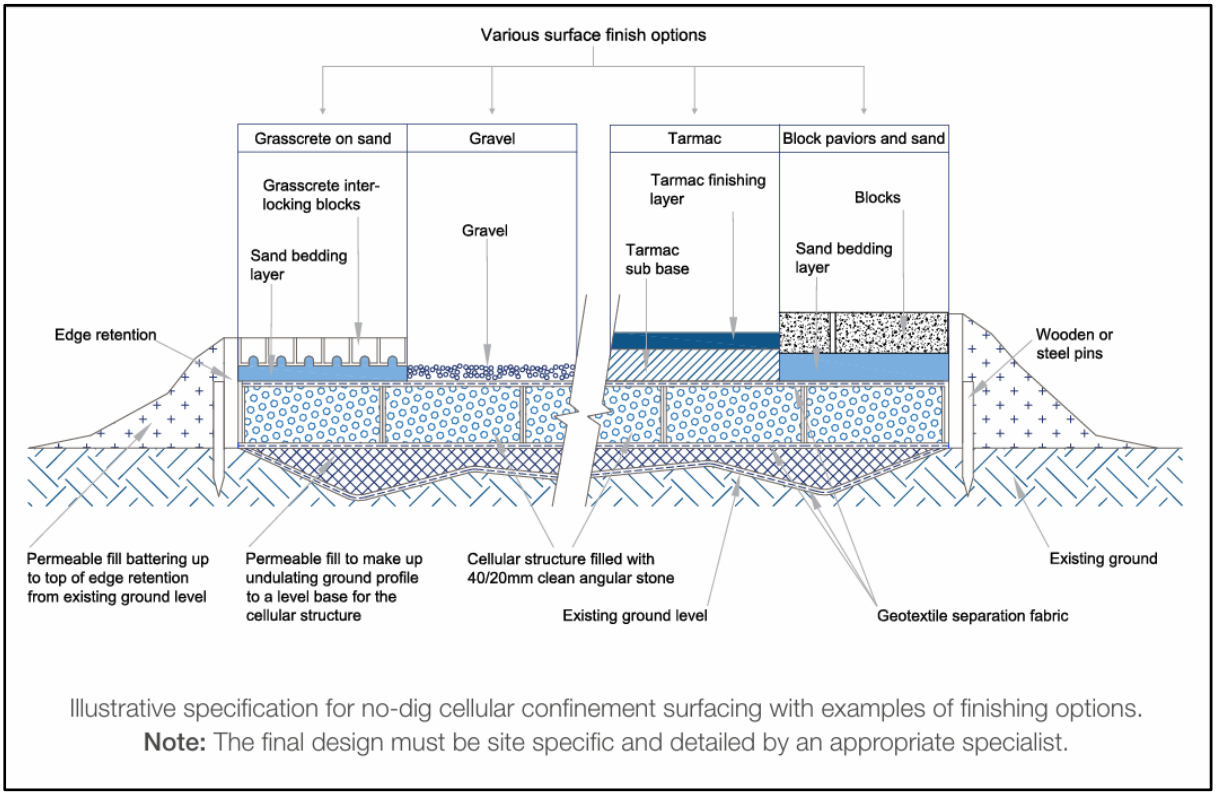


Illustration taken from SGN9 Installing/upgrading surfacing in root protection areas – Jeremy Barrell.

- A cellular confinement system can also be a suitable base for the final surface layer. However, this must be filled using clean 40/20mm angular stone and installed in accordance with the manufacturer's instructions.

The pictures below are examples of the installation of a cellular confinement system. These have been taken from:

Jeremy Barrell SGN 9 Installing/upgrading surfacing in root protection areas.

Case Study

Cellweb® Tree Root Protection

Location:
Gibside,
Burnopfield
Gateshead

Client:
National Trust

Project:
Car Park

Contractor:
Owen Pugh

OWEN PUGH

The National Trust's site at Gibside are Georgian landscape gardens and a vibrant nature haven on a grand scale. After centuries of decline Gibside has been restored to increase visitor numbers especially families. Large quantities of additional parking would be required to cope with the increase in vehicle numbers.

An area of the grounds were identified as a suitable site to house the new car park, however the area was filled with trees and in addition the ground conditions were very poor. The trees were removed to allow the engineers to carry out CBR tests to determine the bulk density of the existing soils.
To create a traditional car park would not have been in keeping with the rural environment also there would have been high costs associated with traditional types of construction on very weak soils.
A solution was needed to provide a free draining, shallow depth construction and to give it the stability required to take vehicular traffic.
We designed a Cellweb*TRP system 150mm in depth. This was infilled with a clean angular 20/4mm stone. Cellweb*TRP is a cellular confinement system that increases the shear strength of infill. This allows a minimal thickness of sub base materials to be used to provide load bearing surfaces.

The Cellweb*TRP was positioned and infilled with the granular material and then topped with a decorative gravel.
Cellweb*TRP provided a cost effective solution, sympathetic to its surroundings and allowed reduced construction thicknesses.
The car park has now opened and is taking up to 200 cars per day during the summer opening times.

"We selected the Cellweb® TRP system due to its history of use and performance capabilities. The system was clearly the best solution of its type on the market."

Lee Buchannan – Owen Pugh.

Geosynthetics Limited
Fleming Road
Harrowbrook Ind. Est
Hinckley
LE10 3DU
Tel. 01455 617 139
sales@geosyn.co.uk
www.geosyn.co.uk

Taken from Cell Web brochure.

<u>3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels:</u>

- Excavate using specialised compressed air tools or hand tools such as forks and spades, with a preference for air tools.
- Note: Do not mechanically excavate.
- When working close to a tree use a fork to loosen the soil to help locate any substantial roots. Use a smaller tool, such as a trowel, to clear the soil away from roots without damaging the bark.
- Remove soil/material from the excavation without disturbing the adjacent rooting environment.
- Retain flexible clumps of smaller fibrous roots if they can be displaced temporarily or permanently beyond the excavation without damage.

Illustration taken from Jeremy Barrell SGN7 Excavation In Root Protection Areas – using hand tools to dig around large roots. ***An example of exposing roots with a trowel.***

- Any roots which require cutting must be cut cleanly using a secateur or saw.

*Illustration taken from Jeremy Barrell SGN7 Excavation In Root Protection Areas – using hand tools to dig around large roots****. An example of cutting exposed roots with a secateur.***

- Where large amounts of soil are excavated to expose roots, it should be temporarily protected from light, drying out, and extremes of temperature by covering it with hessian sacking and/or boards until they can be covered back with soil.

Illustration taken from Jeremy Barrell SGN7 Excavation In Root Protection Areas – protecting exposed roots.

- When back-filling, place an inert granular material mixed with topsoil or sharp sand around retained roots greater than 2.5cm in width before light compaction.
- Fence post installation - any mixing of cement must be done away from the trees.
- Soil storage from excavation within the root protection area must be on wooden boarding (see the tree protection plan). Heavy equipment, such as a wheelbarrow full of material, must also be wheeled over wooden boarding.

Illustration taken from Jeremy Barrell SGN7 Excavation In Root Protection Areas – trenching.
Example of storage of material on wooden boarding within an RPA.

<u>Garden/Landscaping:</u>

- Trees T8, T9, T10, T11, T13 -T17 must be adequately protected when working close to the trunk, and wooden boarding or equivalent must be wrapped around the trunk to prevent damage.

Illustration taken from Jeremy Barrell SGN 2 Fencing protected trees. ***Example of trunk protection.***

- If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan.
- Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan).
- Excavations should be done using hand tools when working within the root protection area (see the tree protection plan).
- Any cultivation within root protection areas should be undertaken carefully by hand.
- No heavy mechanical cultivation, such as ploughing or rotation, should occur.
- If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots.
- Decompaction methods - forking, spiking, soil augering, and tilted radial trenching.
- Soil storage from excavation within the root protection area must be on wooden boarding (see the tree protection plan). Heavy equipment, such as a wheelbarrow full of material, must also be wheeled over wooden boarding.

11.0 Reporting Procedure

11.1 The development period: A qualified arboriculturist should be named the contact so that arboricultural issues that arise during the development period can be effectively addressed.

- **See paragraph 2.4 for contact details.**

11.2 When an inspection occurs, planned or otherwise, a report will be written and provided to the client. The report will be copied to the Local Authority Arboricultural Officer if appropriate.

11.3 Ensure that the arboricultural aspects of the planning permission are enforced and dealt with, and advise upon any problems that arise during the development process.

11.4 The site and proposed development are monitored/inspected regularly by the named arboriculturist. The site manager will contact the named arboriculturist if any problems arise during the development. The Local Planning Authority must be notified of any arising arboricultural issues, and appropriate action must be taken with the client's prior permission.

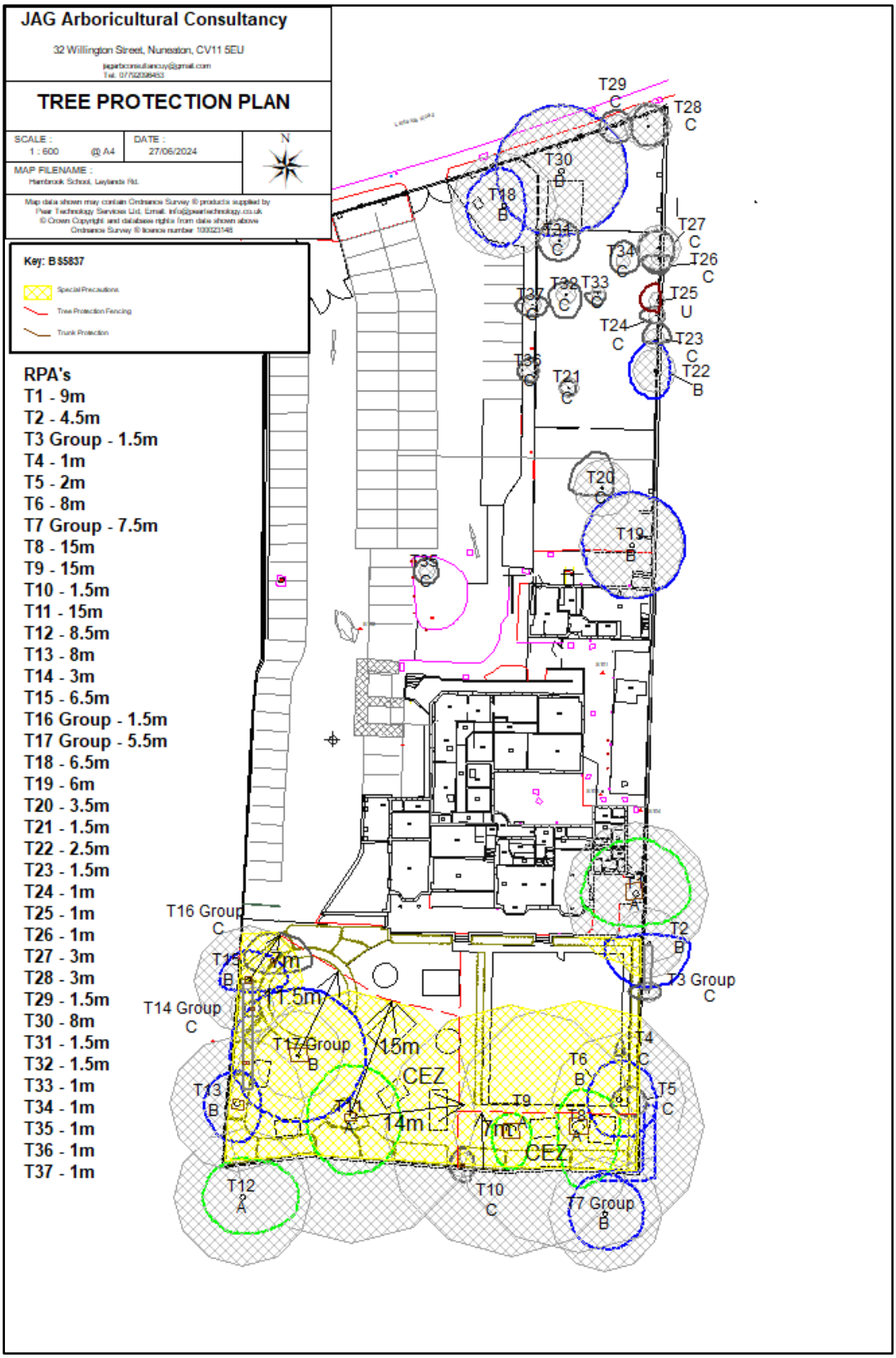
- **See paragraph 2.4 for contact details.**

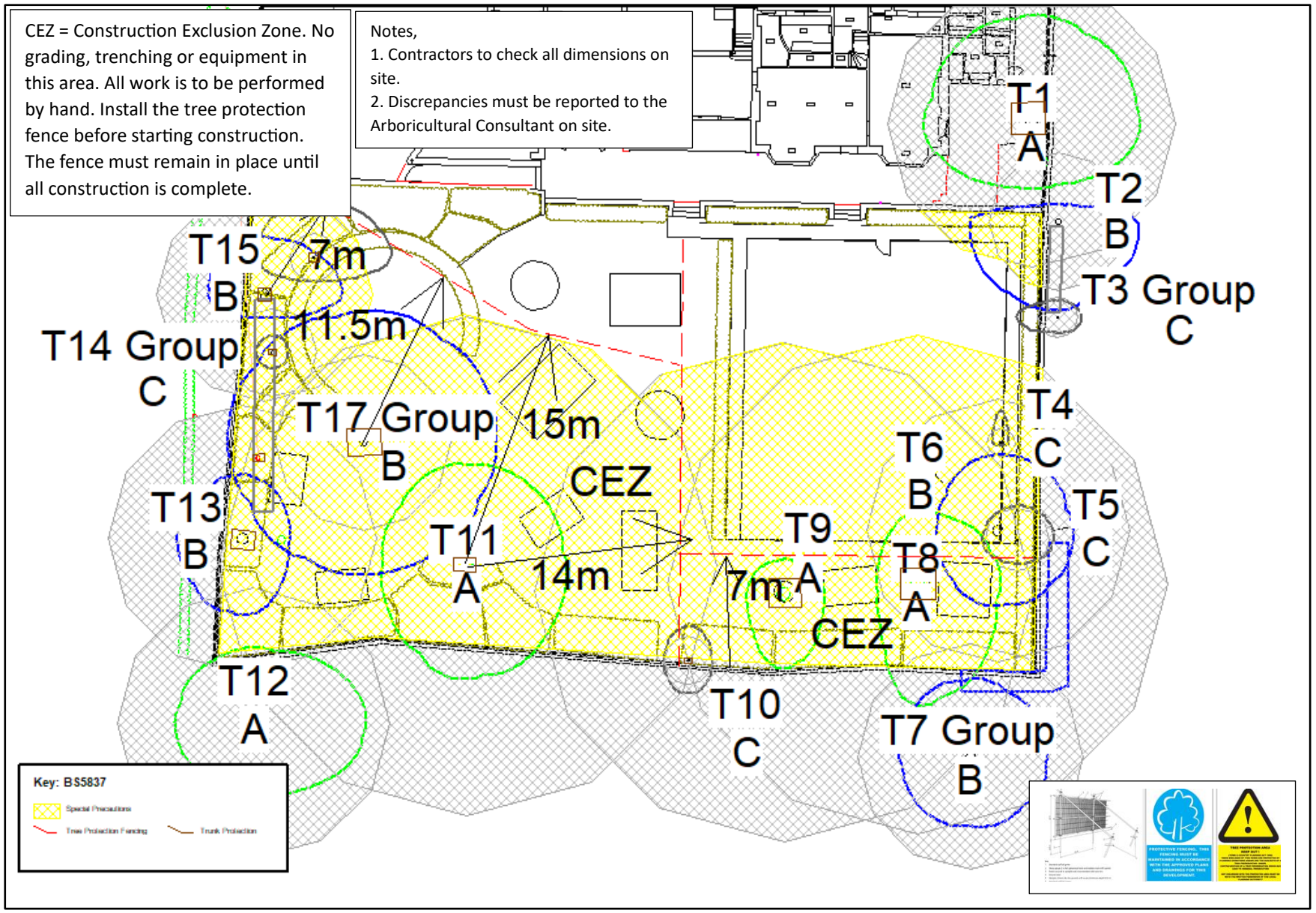
12.0 Tree Protection Plan

12.1 The Tree Protection Plan drawing indicates the trees marked for retention and those in poor condition in brown, indicating removal. **However, T4 Cat C and T6 Cat B trees, one tree in the T14 Group, and one tree in the T17 Group are recommended for removal**.

12.2 The drawing also indicates the location for the erection of the tree protection barriers, based upon the calculation of Root Protection Area (R.P.A.) as part of the Tree Protection Plan. This drawing shows the actual position of the tree protection barriers. Areas that require special precautions are indicated in yellow hatching.

Tree Protection Plan


JAG Arboricultural Consultancy
32 Willington Street, Nuneaton, CV11 5EU
TREE PROTECTION PLAN
SCALE : 1 : 600 @ A4
DATE : 27/06/2024
MAP FILENAME : Hambrook School, Leylands Rd.
Key: BS5837
Special Precautions
Tree Protection Fencing
Trunk Protection
RPA's
T1 - 9m
T2 - 4.5m
T3 Group - 1.5m
T4 - 1m
T5 - 2m
T6 - 8m
T7 Group - 7.5m
T8 - 15m
T9 - 15m
T10 - 1.5m
T11 - 15m
T12 - 8.5m
T13 - 8m
T14 - 3m
T15 - 6.5m
T16 Group - 1.5m
T17 Group - 5.5m
T18 - 6.5m
T19 - 6m
T20 - 3.5m
T21 - 1.5m
T22 - 2.5m
T23 - 1.5m
T24 - 1m
T25 - 1m
T26 - 1m
T27 - 3m
T28 - 3m
T29 - 1.5m
T30 - 8m
T31 - 1.5m
T32 - 1.5m
T33 - 1m
T34 - 1m
T35 - 1m
T36 - 1m
T37 - 1m
CEZ
CEZ


CEZ = Construction Exclusion Zone. No grading, trenching or equipment in this area. All work is to be performed by hand. Install the tree protection fence before starting construction. The fence must remain in place until all construction is complete.
Notes,
1. Contractors to check all dimensions on site.
2. Discrepancies must be reported to the Arboricultural Consultant on site.
T1
A
T2
B
T3 Group
C
T15
B
7m
11.5m
T14 Group
C
T17 Group
B
15m
CEZ
T4
C
T6
B
T5
C
T13
B
T11
A
14m
T9
A
7m
T8
A
CEZ
T12
A
T10
C
T7 Group
B
Key: BS5837
Special Precautions
Tree Protection Fencing
Trunk Protection

Appendices

Appendices A – Pre-Development Tree Survey

APPENDICES A

The following details were recorded, conforming to the guidelines of BS5837: 2012.

Estimate	#
Construction Exclusion Zone	CEZ
Tree No	Cross-referenced to the tree survey plan
Species	Common names used
Height in meters	Approximately measured on-site
Stem Diameter	Taken in millimetres at 1.5m from ground level where applicable
Branch Spread	Taken at the four cardinal points to derive a more accurate representation of the tree canopy, N, E, S, W
Crown clearance	Height in metres of branches from the ground
Age Class	Y = Young, SM = Semi Mature, EM = Early-Mature, M = Mature, OM = Over-Mature
Physiological Condition	G = Good, F = Fair, P = Poor, D = Dead
Structural/ Condition/Comments	e.g. Collapsing, the presence of any decay and physical
Preliminary Management - Recommendations	Work required before commencing onsite
Remaining Contribution In years:	Less than 10, 10-20, 20-40, more than 40
Grading Category	U (remove), A (high quality), B (medium quality) or C (low quality) Sub-Categories: 1 = mainly arboricultural qualities, 2 = mainly landscape qualities 3 = mainly cultural values Assessed by visual inspection, considering species, ages, condition, location and suitability.

Surveyed By: Jonathan Alexander Green MArborA
Site: Hambrook School, Leylands Rd, Burgess Hill RH15 8HY
Date: March 2024 & June 2024

A Pre-Development Site Tree Survey & Schedule of Works

Tree No	Species	Height	Stem Diameter	Age Class	Notes	1 Preliminary Management Recommendations 2 Special Precautions 3 General Comment	Cat Grading
T1	Sycamore	17.5	720	M	No new features were noted.	1 Install trunk protection. 2 N/A. 3 N/A.	A1
T2	Ash	17	200, 200, 200,	M	No new features were noted.	1 Protected by the boundary fence. 2 N/A. 3 N/A.	B1
T3 Group – mini hedge	Sycamore	3.5	100	M	No new features were noted.	1 Protected by the boundary fence. 2 <u>Construction of a multi-use games area and 3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels:</u> If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur.	C1

						• If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A	
T4	Ash	5	70	Y	No new features were noted.	Fell in the way of the proposed MUGA.	C1
T5	Holly	7.8	160	Y	No new features were noted.	Fell in the way of the proposed MUGA.	C1
T6	Sycamore	17.5	660	M	No new features were noted.	Fell - sooty bark infection.	B1
T7 Group	Yew, Laurel, Sycamore,	11.5	380; 420	M	No new features were noted.	1 Protected by the boundary fence. 2 N/A. 3 Park tree.	B1
T8	Wellingtonia	36	1450	M	No new features were noted.	1 Further investigation is required. Tomography inspection. Resistograph inspection. The tree must be adequately protected when working close to the trunk, and wooden boarding or equivalent must be wrapped around the trunk to prevent damage. The tree protection fence must be installed 7m from the southern boundary fence and run 22m in the west direction. The tree protection fence must start at the south boundary fence and end at the north wall/ patio area. 2 <u>Sensory Garden/Landscaping:</u> If small machinery is used, wooden boarding must be installed as ground protection when working within	A1

						the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. <u>Multi-use games area:</u> •Excavations may be appropriate to remove the turf layer and surface vegetation, but this must be done under the agreement of the supervising arboriculturist. • Before installing the final surface layer, you must fill low points on undulating surfaces to an even level with any high points using an agreed granular material such as sand or stone. • Do not mechanically compact new fill or existing soil. • Wooden pins can be used for edge retention.	

						• Always work backwards when working within the RPA; lay down wooden boarding or decompact the soil with hand tools as you progress. • Soil storage within the root protection area must be on wooden boarding (see the tree protection plan). Heavy equipment, such as a wheelbarrow full of material, must also be wheeled over wooden boarding. 3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels: • Excavate using specialised compressed air tools or hand tools such as forks and spades, with a preference for air tools. • Note: Do not mechanically excavate. • When working close to a tree use a fork to loosen the soil to help locate any substantial roots. Use a smaller tool, such as a trowel, to clear the soil away from roots without damaging the bark. • Remove soil/material from the excavation without disturbing the adjacent rooting environment. • Retain flexible clumps of smaller fibrous roots if they can be displaced temporarily or permanently beyond the excavation without damage. • Any roots which require cutting must be cut cleanly using a secateur or saw. • Where large amounts of soil are excavated to expose roots, it should be temporarily protected from light, drying out, and extremes of temperature by covering it with hessian sacking and/or boards until they can be covered back with soil.	

						• When back-filling, place an inert granular material mixed with topsoil or sharp sand around retained roots greater than 2.5cm in width before light compaction. • Fence post installation - any mixing of cement must be done away from the trees. 3 N/A.	
T9	Wellingtonia	35	1270	M	No new features were noted.	1 Further investigation is required. Tomography inspection. Resistograph inspection. The tree must be adequately protected when working close to the trunk, and wooden boarding or equivalent must be wrapped around the trunk to prevent damage. The tree protection fence must be installed 7m from the southern boundary fence and run 22m in the west direction. The tree protection fence must start at the south boundary fence and end at the north wall/ patio area. 2 Sensory Garden/Landscaping: If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees.	A1

						• Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. Multi-use games area: •Excavations may be appropriate to remove the turf layer and surface vegetation, but this must be done under the agreement of the supervising arboriculturist. • Before installing the final surface layer, you must fill low points on undulating surfaces to an even level with any high points using an agreed granular material such as sand or stone. • Do not mechanically compact new fill or existing soil. • Wooden pins can be used for edge retention. • Always work backwards when working within the RPA; lay down wooden boarding or decompact the soil with hand tools as you progress. • Soil storage within the root protection area must be on wooden boarding (see the tree protection plan). Heavy equipment, such as a wheelbarrow full of material, must also be wheeled over wooden boarding.	

						3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels: • Excavate using specialised compressed air tools or hand tools such as forks and spades, with a preference for air tools. • Note: Do not mechanically excavate. • When working close to a tree use a fork to loosen the soil to help locate any substantial roots. Use a smaller tool, such as a trowel, to clear the soil away from roots without damaging the bark. • Remove soil/material from the excavation without disturbing the adjacent rooting environment. • Retain flexible clumps of smaller fibrous roots if they can be displaced temporarily or permanently beyond the excavation without damage. • Any roots which require cutting must be cut cleanly using a secateur or saw. • Where large amounts of soil are excavated to expose roots, it should be temporarily protected from light, drying out, and extremes of temperature by covering it with hessian sacking and/or boards until they can be covered back with soil. • When back-filling, place an inert granular material mixed with topsoil or sharp sand around retained roots greater than 2.5cm in width before light compaction. • Fence post installation - any mixing of cement must be done away from the trees. 3 N/A.	

T10	Ash	7.8	120	Y	No new features were noted.	1 The tree must be adequately protected when working close to the trunk, and wooden boarding or equivalent must be wrapped around the trunk to prevent damage. The tree protection fence must be installed 7m from the southern boundary fence and run 22m in the west direction. The tree protection fence must start at the south boundary fence and end at the north wall/ patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A.	C1

T11	Wellingtonia	36	1650	M	No new features were noted.	1 Further investigation is required. Tomography inspection. Resistograph inspection. The tree protection fence must be 15m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A.	A1
T12	Holm Oak	15	680	M	No new features were noted.	1 Protected by the boundary fence.	A1

						2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 Park tree.	
T13	English Oak	17.5	670	M	No new features were noted.	1 Monitor. The tree protection fence must be 15m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan.	B1

						• Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A	

T14 Group	Line of Yew, Laurel, Holly	6	220	M	No new features were noted.	1 The tree protection fence must be 15m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A.	C1
T15	Yew	13	340; 340; 170; 170	M	No new features were noted.	1 Remove deadwood in the crown. The tree must be adequately protected when working close to the trunk, and wooden boarding or equivalent must be wrapped around the trunk to prevent damage.	B1

						The tree protection fence must be 7m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A.	
T16 Group	Ash, Holly	8	120	Y	No new features were noted.	1 Monitor. The tree must be adequately protected when working close to the trunk, and wooden boarding or equivalent must be wrapped around the trunk to prevent damage.	C1

						The tree protection fence must be 7m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A.	
T17 Group	Laurel is very old and has numerous suckers	11.5	440	OM	No new features were noted.	1 Fell sucker stem marked with orange paint and remove the deadwood. Monitor tree. The tree must be adequately protected when working close to the trunk, and wooden boarding or equivalent	B1

						must be wrapped around the trunk to prevent damage. The tree protection fence must be 11.5m from the trunk and linked to the tree protection fence running from the south boundary fence and north wall/patio area. 2 If small machinery is used, wooden boarding must be installed as ground protection when working within the yellow hatched area (RPA) on the tree protection plan. • Any soil storage within the root protection area must be on wooden boarding (see the tree protection plan). • Any mixing of cement must be done away from the trees. • Excavations should be done using hand tools when working within the root protection area (see the tree protection plan). • Any cultivation within root protection areas should be undertaken carefully by hand. • No heavy mechanical cultivation, such as ploughing or rotation, should occur. • If decompaction measures are required, they must be done carefully to minimise the risk of further damage to roots. • Decompaction methods - forking, spiking, soil augering, and tilted radial trenching. 3 N/A.	
T18	Ash	14	350; 390	M	No new features were noted.	1 N/A. 2 N/A. 3 N/A.	B1
T19	Ash	17	520	M	Very minor deadwood	1 Remove the deadwood.	B1

						2 N/A. 3 N/A.	
T20	Eucalyptus	17	280	M	Leaning moderate wounding stem base	1 Monitor as part of health and safety inspection. 2 N/A. 3 N/A.	C1
T21	Hazel	2.5	100	M	No features were noted.	1 N/A. 2 N/A. 3 N/A.	C1
T22	Fig	6.5	210	M	No features were noted.	1 N/A. 2 N/A. 3 N/A.	B1
T23	Sycamore	7.5	100	Y	Self-seeder, and included fork.	1 Formative prune. 2 N/A. 3 N/A.	C1
T24	Sycamore	6.5	80	Y	Self-seeder.	1 N/A. 2 N/A. 3 N/A.	C1
T25	Wild Cherry	5	80	Y	Sparse crown and root plate movement.	1 Fell to ground level. 2 N/A. 3 N/A.	U1
T26	Wild Cherry	2.5	70	Y	No features were noted.	1 N/A. 2 N/A. 3 N/A.	C1
T27	Contorted Willow	10	220	M	Minor wound on the scaffold limb (good reaction wood).	1 N/A 2 N/A. 3 N/A.	C1
T28	Silver Birch	10	230	M	A large wound on the main stem and a slight canker infection.	1 Monitor as part of health and safety inspection. 2 N/A. 3 N/A.	C1
T29	Ash	7	70; 70; 70	Y	Regrowth from an old stump.	1 N/A. 2 N/A.	C1

						3 N/A.	
T30	Ash	19	470; 310; 340	M	Dieback west side, wound stem base west side. Minor deadwood in the crown (mainly west side).	1 Remove the deadwood. Monitor as part of health and safety inspection. 2 N/A. 3 N/A.	B1
T31	Cherry Plum	4	100	Y	Wound stem base south side.	1 Monitor as part of health and safety inspection. 2 N/A. 3 N/A.	C1
T32	Apple	3	100	Y	Wound stem base north side.	1 N/A. 2 N/A. 3 N/A.	C1
T33	Cherry Plum	2	70	Y	Major wounding of lower stem base.	1 Monitor as part of health and safety inspection. 2 N/A. 3 N/A.	C1
T34	English Oak	3.5	7	Y	No features were noted.	1 N/A. 2 N/A. 3 N/A.	C1
T35	Cherry Plum (Nigra)	3.5	8	Y	There is a slight wound stem base on the west side.	1 Monitor as part of health and safety inspection.2 N/A. 3 N/A.	C1
T36	Cherry sp	2.5	9	Y	No features were noted.	1 N/A. 2 N/A. 3 N/A.	C1
T37	Cherry sp	4	9	Y	No features were noted.	1 N/A. 2 N/A. 3 N/A.	C1

APPENDICES B

Photos:

This photo shows trees T1 to T9.

This photo shows trees and groups T11 to T17.

This photo shows T18 and the exit gate.

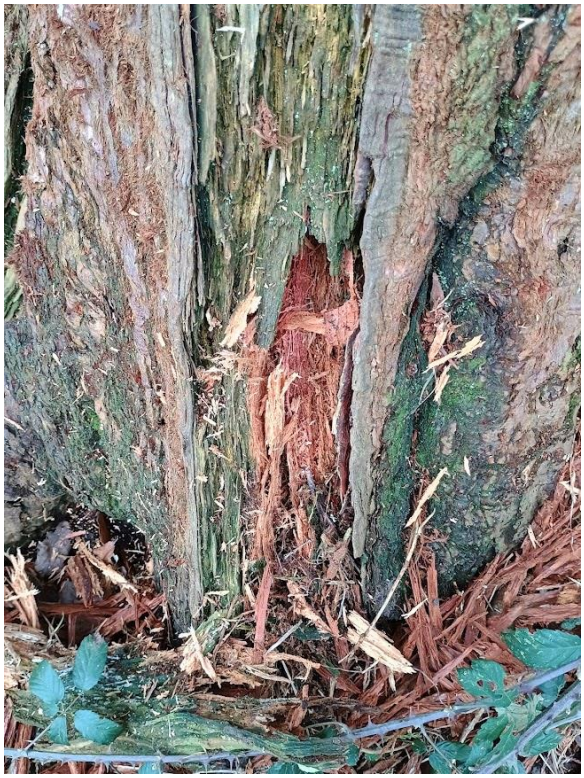
This photo shows the main entrance.

This photo shows the entrance to the site from the car park.

This photo shows the main building and the entrance from the site to the car park.

These photos show T6 with a likely sooty bark infection.


These photos show T8 with decay to the stem base, possibly a Honey fungus infection.

This photo shows T9 debarking from squirrels and apparent decay to the main stem.

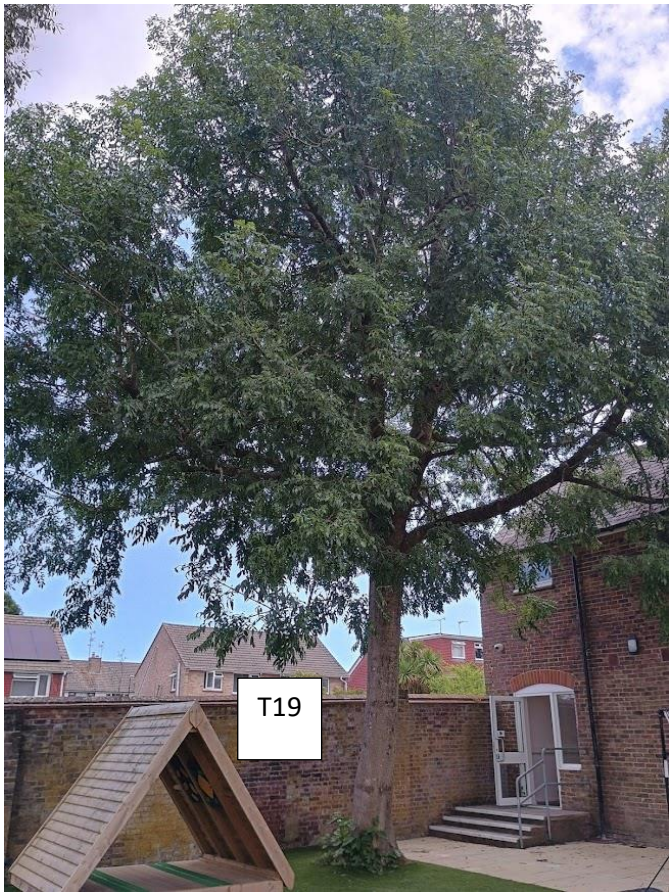
This photo shows T11 with debarking and possible decay.

This photo shows T13 with a minor wound.

This photo shows the tree with split fork (part of T14 Group)

This photo shows the sucker stem with decay (part of the T17 Group).

These photos show the trees surveyed:



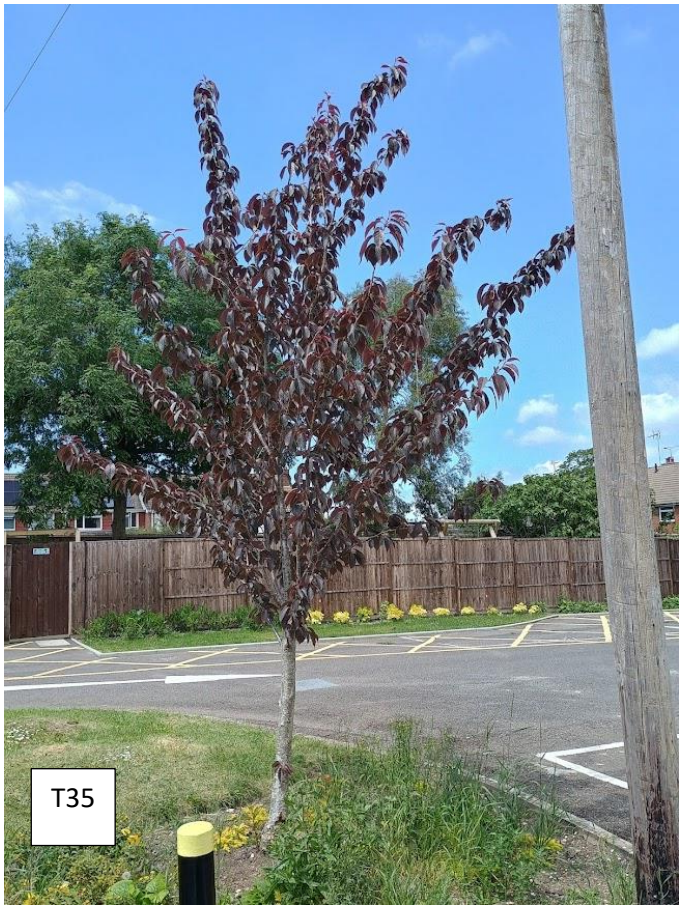

T20

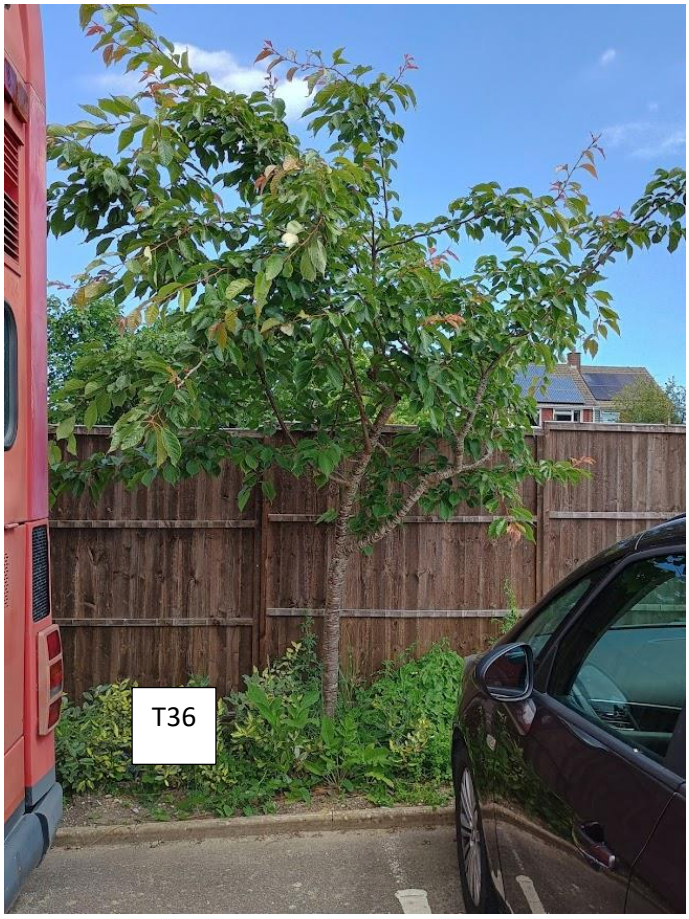

T21

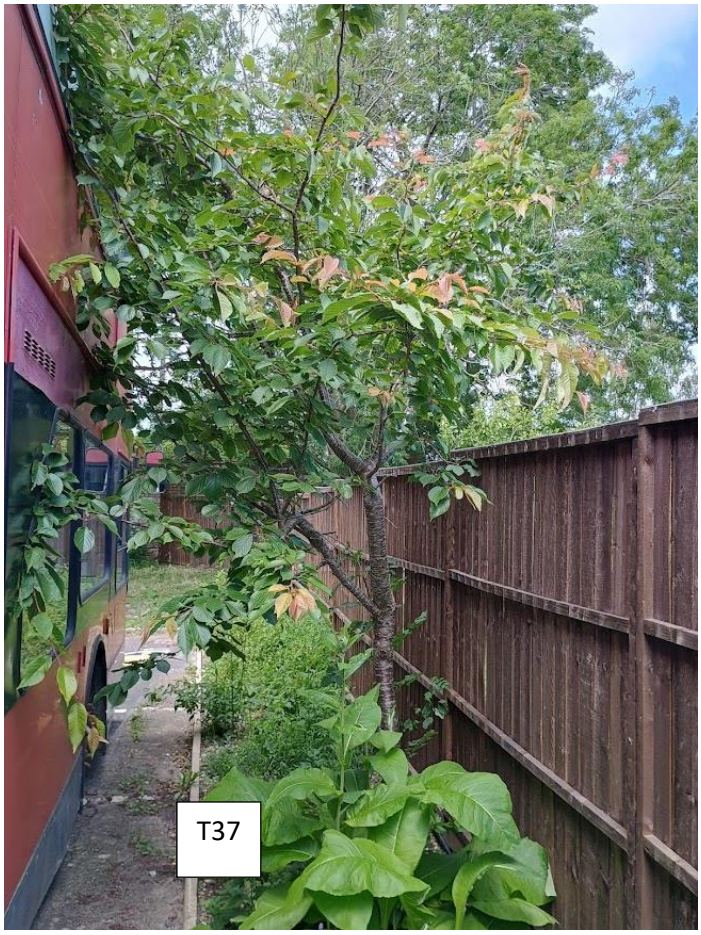

T22


T25
T24


T26, T27, T28, T29, T32, T33, and T34


T35


T36


T37

Wound on stem base of T20.

T23 with included fork.

T25 with a sparse crown.

T27 with wounding on the stem.

T28 with a wound.

T29 shows regrowth form a stump.

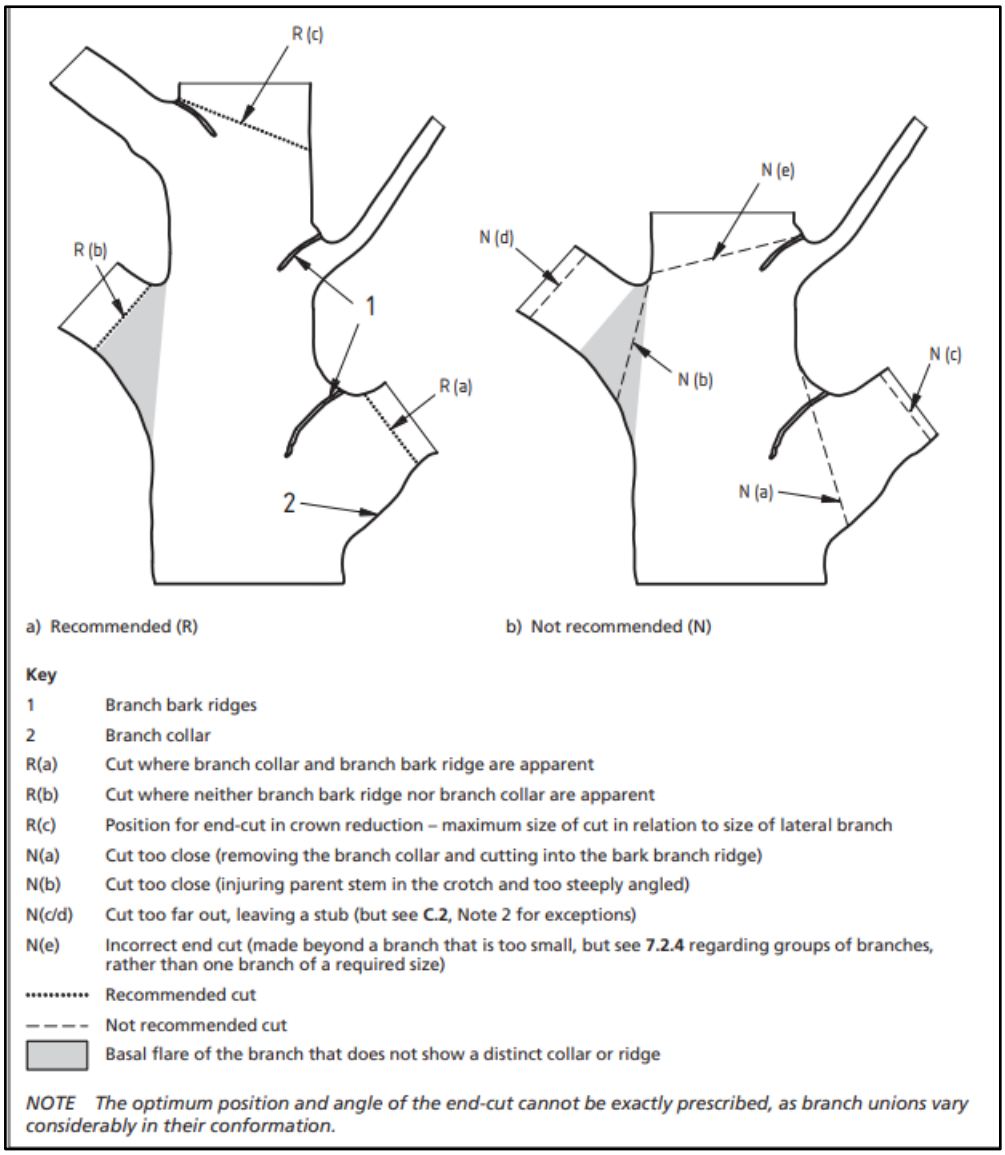
T29 shows wounding on the stem base

Example of damage to the stem base of the young cherry trees this is T33.

APPENDICES C

Schedule of works:

Tree I.D	Species	Recommendation	Specification	Timeframe
T4	Ash.	Fell and grind out stump and reinstate.	BS3998:2010 Paragraph 12	Complete before starting construction.
T5	Holly.	Fell and grind out stump and reinstate.	BS3998:2010 Paragraph 12	Complete before starting construction.
T6	Sycamore.	Fell and grind out stump and reinstate.	BS3998:2010 Paragraph 12	Complete before starting construction.
T15	Yew	Remove deadwood in the crown	BS3998:2010 Paragraph 12	Complete before starting construction.
T17 Group	Laurel	Fell sucker stem marked with orange paint and remove the deadwood.	BS3998:2010 Paragraph 12	Complete before starting construction.
T19	Ash	Remove deadwood in the crown	BS3998:2010 Paragraph 12	Complete before starting construction.
T23	Sycamore	Formatively prune	BS3998:2010 Paragraph 7.4	Complete before starting construction.
T25	Wild Cherry	Fell and grind out stump and reinstate.	BS3998:2010 Paragraph 12	Complete before starting construction.
T30	Ash	Remove deadwood in the crown	BS3998:2010 Paragraph 12	Complete before starting construction.



a) Recommended (R)

b) Not recommended (N)

Key

1	Branch bark ridges
2	Branch collar
R(a)	Cut where branch collar and branch bark ridge are apparent
R(b)	Cut where neither branch bark ridge nor branch collar are apparent
R(c)	Position for end-cut in crown reduction – maximum size of cut in relation to size of lateral branch
N(a)	Cut too close (removing the branch collar and cutting into the bark branch ridge)
N(b)	Cut too close (injuring parent stem in the crotch and too steeply angled)
N(c/d)	Cut too far out, leaving a stub (but see **C.2**, Note 2 for exceptions)
N(e)	Incorrect end cut (made beyond a branch that is too small, but see **7.2.4** regarding groups of branches, rather than one branch of a required size)
·····	Recommended cut
– – – –	Not recommended cut
	Basal flare of the branch that does not show a distinct collar or ridge

NOTE The optimum position and angle of the end-cut cannot be exactly prescribed, as branch unions vary considerably in their conformation.

Taken from - BS 3998:2010 Tree work – Recommendations

Dead branches should be shortened or if necessary removed if they pose an unacceptable risk to people or property, and if other options (e.g. diverting a footpath) are not practicable. In assessing risk, attention should be paid to the rate of wood decay, particularly at the bases of the branches.

If it is appropriate to cut any dead branches, this should be done so as to avoid injury to living bark or sapwood, which could lead to the development of further dysfunction and colonization by decay fungi or pathogens.

Taken from - BS 3998:2010 Tree work – Recommendations

12.2 Tree felling

*NOTE 1 Standing trees may be treated before felling to prevent root sucker development (see also **12.3.3**). Guidance on treatment is given in* The use of herbicides in the forest *[39].*

A tree should be felled in one piece only when there is no significant risk of damage to people, property or protected species (see Annex A). Where restrictions (e.g. lack of space, buildings, other features, land ownership or use, or other trees which are to be retained) cannot be overcome, trees should be dismantled in sections (see **4.4**). This also applies where a tall stump is being retained but where branches are to be removed/pruned.

Extensively decayed trees can be unpredictable when they are being felled, and special precautions should therefore be taken, such as the use of a winch to guide the direction of fall.

NOTE 2 Guidance on the use of winches is given in AFAG 310 [14].

Taken from - BS 3998:2010 Tree work – Recommendations

12.4.2 Digging out stumps

Stump removal by digging out should include disposal/utilization of the woody material (see Clause **13**).

NOTE Whether done by hand or machine, digging out can cause severe disturbance of the site.

Where possible, when winching out a stump, a ground or other anchor should be used rather than a tree to be retained. If there is no alternative to using such a tree as an anchor, appropriate protective measures should be adopted.

12.4.3 Stump grinding

The reason for grinding the stump should be ascertained and the appropriate depth of operation agreed. Stump grinding should normally extend through the base of the stump leaving the major roots disconnected if the intention is to reduce the potential for the spread of Honey fungus.

The grinding residue should be treated as arisings (see Clause **13**) and their use or disposal specified.

NOTE Mechanical destruction of a stump by stump grinding is less disruptive to the site than digging out.

Taken from - BS 3998:2010 Tree work – Recommendations

12.4.4 After stump removal

The hole left by stump removal, whether by digging out or grinding, should be filled with soil or other material. The filling should be appropriate for future site usage, and for any surface treatment that is to be installed.

Where future plant growth is desired, the backfill material should be firmed in 150 mm layers by treading, avoiding excessive compaction and destruction of the soil structure.

Taken from - BS 3998:2010 Tree work – Recommendations

7.4 Formative pruning

*COMMENTARY ON **7.4***

The main aim of formative pruning is to produce a tree which in maturity will be free from any major physical weaknesses and which will complement the management objectives for the site.

*The term "formative pruning" can also be applied to more specialized practices, e.g. utility pruning (**7.9.2**), pollarding (**7.10**), cutting overgrown hedges (**7.11**), pleaching, the results of which are sometimes likened to a hedge on stilts, and more formal types of pruning, e.g. cloud pruning.*

If, in order to influence the structure, shape or size of a tree crown, formative pruning has been started in the nursery, any pruning at or soon after planting should be kept to a minimum in order to retain an adequate leaf area. Formative pruning should normally be resumed three to five years later, but if the tree has been allowed to develop an unsuitable branch structure, some of the branches may be shortened or removed at an earlier stage of establishment. The early removal of all the lowermost branches should, however, be avoided if possible, as it could impair the development of a sturdy taper in the stem.

If branches need to be removed or shortened to deal with undesired patterns of growth, this should be done in stages so as not to remove too much leaf cover at any one time. Ideally, none of the selected branches to be removed should exceed 20 mm in diameter at the point of attachment to the stem. At least two-thirds of the height of the tree should always consist of live crown.

Within areas of high usage or formal plantings, potentially weak unions in young trees should be managed so that only one dominant stem or branch continues to grow from such a union. Where the total removal of an unwanted co-dominant stem or branch would create a large wound, it should instead be shortened, thus causing it to lose dominance.

NOTE 1 Failure to manage co-dominant leading shoots might eventually lead to compression fork weakness and thereby necessitate premature felling so as to safeguard people and property.

If two branches are crossing each other and likely to rub together, one of them should be removed or cut back so that further contact between the branches is avoided (see Clause **10** for restraint and support systems as an alternative).

NOTE 2 If crossing branches are in contact with each other, frictional damage or altered growth patterns could eventually lead to loss of strength or possible fracture. When one of a pair of crossing branches is cut and the remaining branch would be left weakened and/or exposed and therefore likely to break, it might also need to be cut.

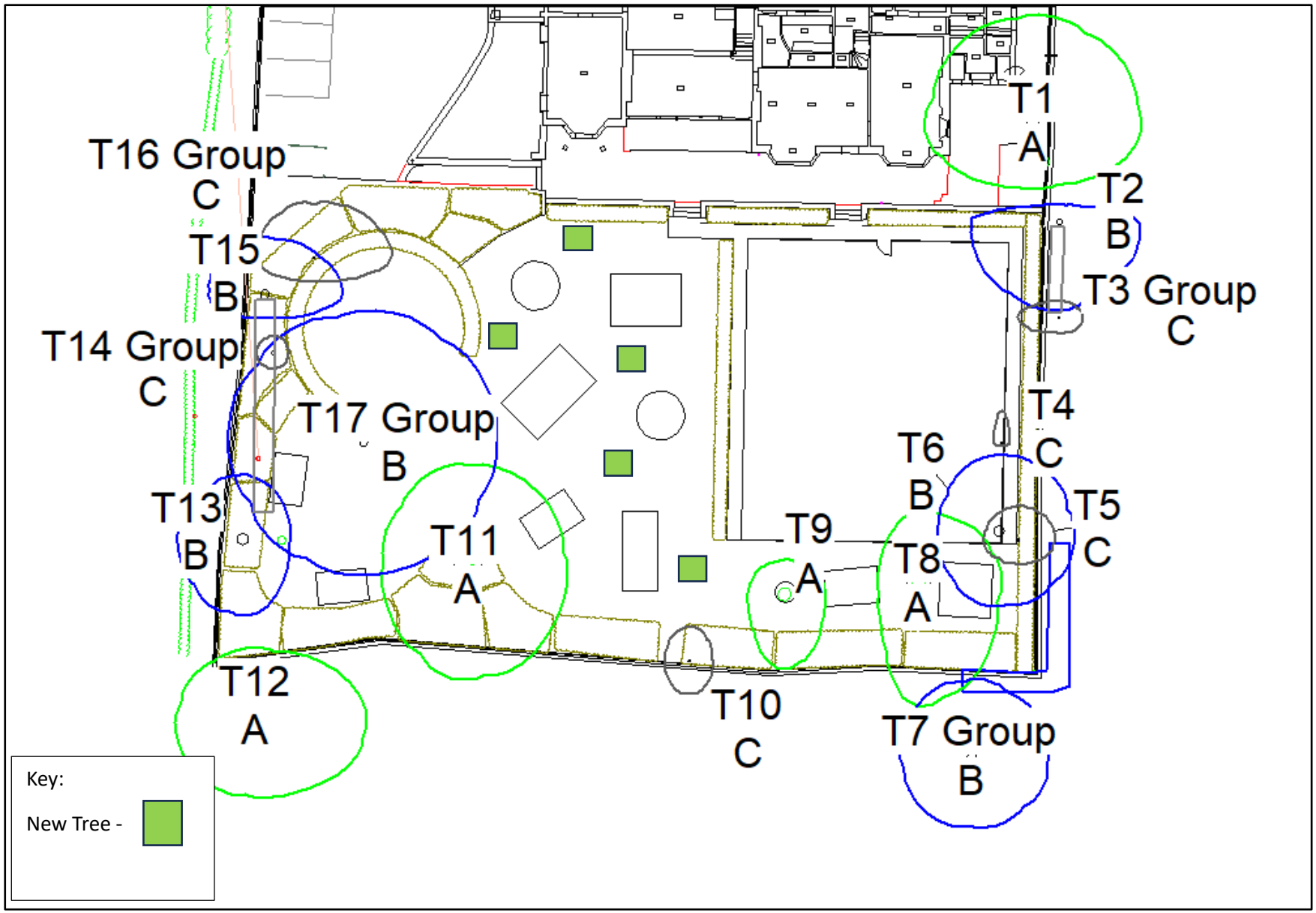
Taken from - BS 3998:2010 Tree work – Recommendations

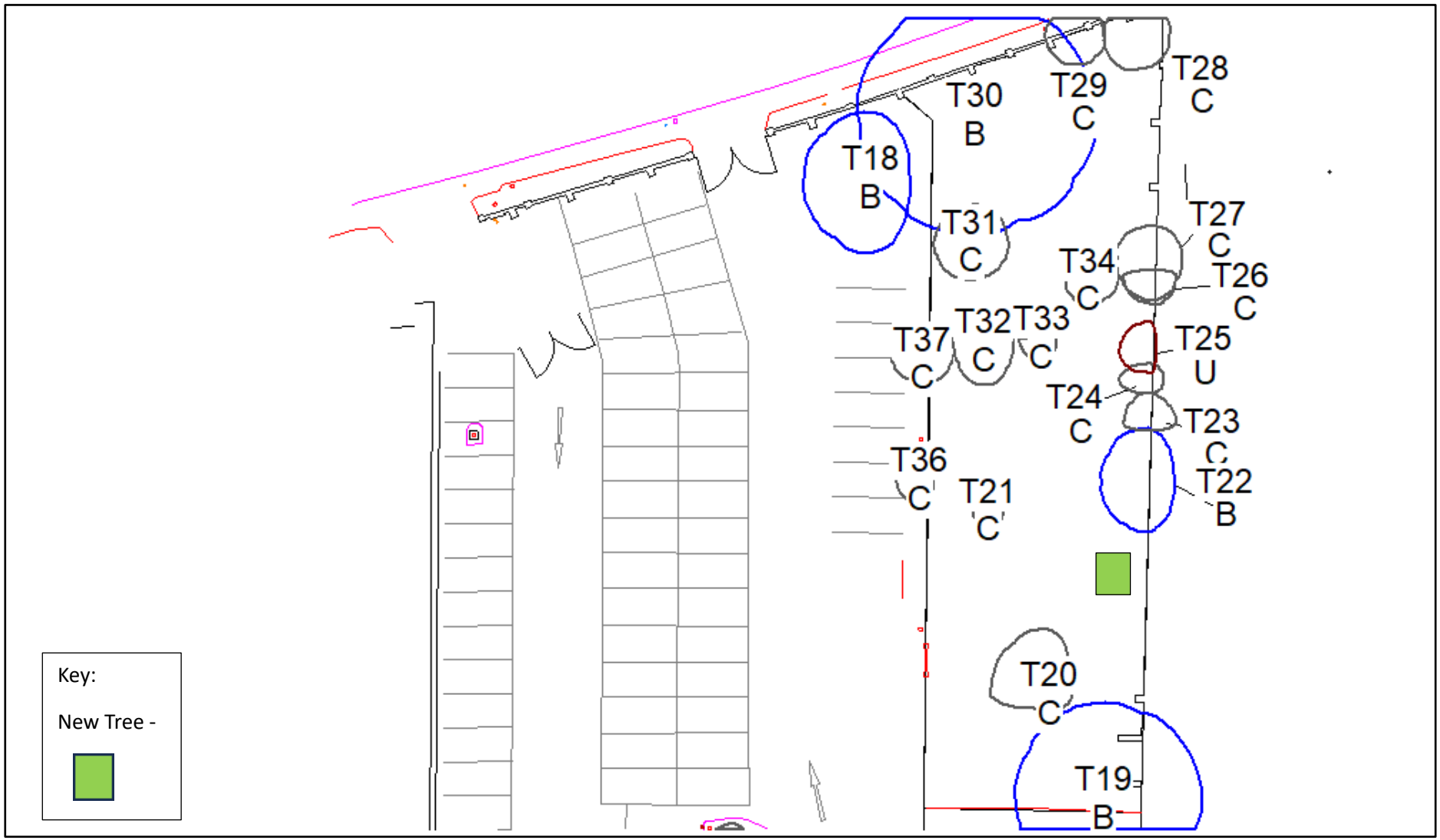
APPENDICES D

Tree Planting Specification BS 8545:2014:

The minimum size shall be a "Standard" in accordance with British Standard BS8545 2014 - Trees: from nursery to independence in the landscape - Recommendations: The girth at 1m shall be 8 to 10 cm, the tree shall be between 2.5 and 3.0 m tall with a clear stem of 1.75 to 2.0 m. The tree shall be planted in accordance with industry good practice.

Removed Tree - Identification	**Replacement Tree Species**	**Specification**
T4	Acer pseudoplatanus Sycamore	Container grown 3-4m tall.
T5	Ilex aquifolium Common Holly, European Holly, English Holly	Container grown 3-4m tall.
T6	Quercus robur Common Oak, English Oak	Container grown 3-4m tall.
T14 Group (one tree)	Taxus baccata English Yew, Common Yew	Container grown 3-4m tall.
T17 Group (one tree)	Ilex aquifolium Common Holly, European Holly, English Holly	Container grown 3-4m tall.
T25 Wild Cherry	Prunus avium, Wild Cherry	Container grown 3-4m tall.


T1
A
T2
B
T3 Group
C
T4
C
T5
C
T6
B
T7 Group
B
T8
A
T9
A
T10
C
T11
A
T12
A
T13
B
T14 Group
C
T15
B
T16 Group
C
T17 Group
B
Key:
New Tree -

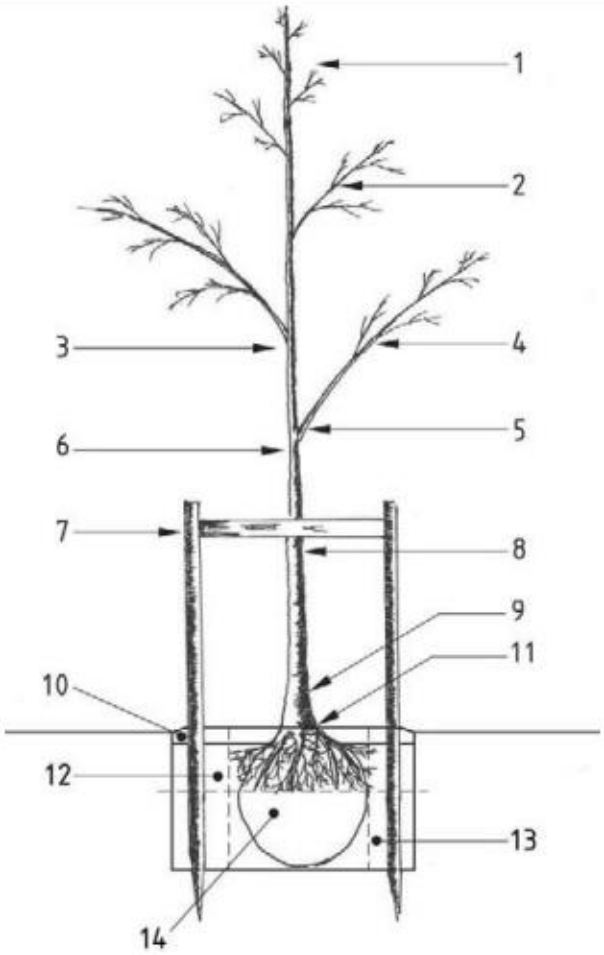

T28
C
T30
B
T29
C
T18
B
T31
C
T27
C
T34
C
T26
C
T37
C
T32
C
T33
C
T25
U
T24
C
T23
C
T36
C
T21
C
T22
B
T20
C
T19
B
Key:
New Tree -

F.3 Planting the tree

F.3.1 General

The key factors involved in tree planting are illustrated in Figure F.8.

Figure F.8 **Factors involved in tree planting**



Key

1	Straight leader	8	Clear stem
2	Formative pruning, as necessary	9	Bud/graft union
3	Size	10	Mulch
4	Lateral branch subordination, as necessary	11	Root flare
5	Branch union with no included bark	12	Irrigation
6	Height/stem diameter ratio	13	Soil volume
7	Support	14	Type and condition of root system

Illustration from BS8545:2014 British Standard

f) weighted underground guying;

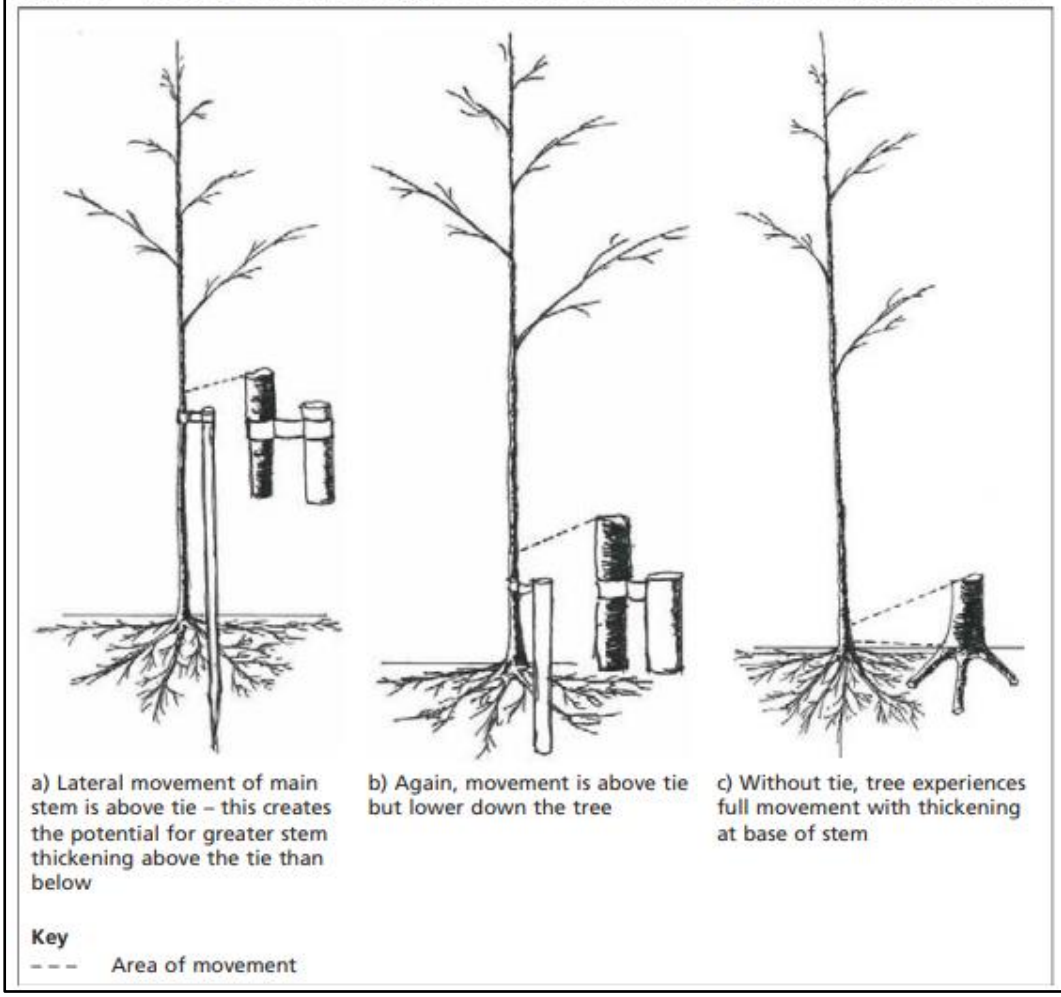
g) anchored underground guying.

Methods a) to e) involve all or part of the support system being visible above ground. All involve connecting the tree to the support system in some way while allowing a degree of stem movement. All involve regular maintenance to ensure that no damage occurs to the main stem of the tree.

Where a staking system is used, the lower the position of tie in relationship to the main stem, the lower the lateral movement of that stem. This movement encourages stem thickening at the fulcrum point. It is advantageous for stem thickening to occur as low down the main stem as possible, reinforcing the development of the stem taper above the tree's natural root flare (see Figure F.6).

With methods f) and g), the support system is below ground and not visible. There are numerous methods available and these need to be installed according to the manufacturer's instructions and maintained accordingly.

Figure F.6 **Impact of stake and tie height on position of stem thickening caused by lateral movement**



a) Lateral movement of main stem is above tie – this creates the potential for greater stem thickening above the tie than below

b) Again, movement is above tie but lower down the tree

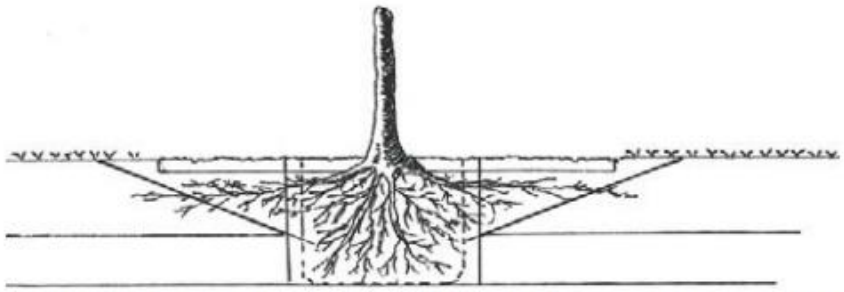
c) Without tie, tree experiences full movement with thickening at base of stem

Key

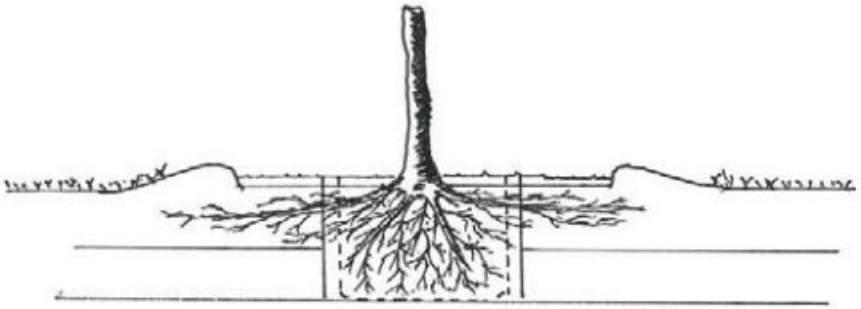
– – – Area of movement

Illustration from BS8545:2014 British Standard

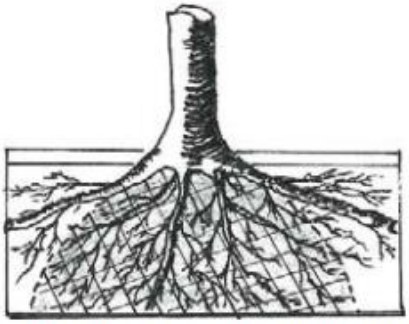
Figure F.3 **Tree pit design: Options for planting pit where site constraints are non-existent or minimal**



a) Sloping side to tree pit increases amount of worked topsoil for lateral root expansion



b) Mounded sides to tree pit create reservoir to hold water to percolate through pit horizon



c) Mounding under bare root trees provides support against shrinkage and ensures correct planting depth

Illustration from BS8545:2014 British Standard

F.1.5 Mycorrhizae

Mycorrhizae are highly specialized root-inhabiting fungi which form beneficial relationships with the fine feeder roots of plants. Mycorrhizae are active living components of the soil, and have some properties like those of roots and some like those of micro-organisms. There are no reports in the scientific literature of any species of forest tree in its natural habitat not having either mycorrhizal or actinorhizal association.

Mycorrhizal colonization is complex. There are essentially three types of mycorrhizae, but it is beyond the scope of this standard to explore the differences in any detail.

The benefits of mycorrhizal associations are well documented and include a tree's fertility requirement, its ability to absorb minerals and nitrogen from the soil, its rooting habit, and the amount of available fertility in the soil. However, there is little literature to support the value of adding commercial mycorrhizal cocktails to the backfill soil used for young tree planting.

F.1.6 Below-ground irrigation aids

There are several irrigation aids available that can be inserted below ground at the time of planting.

Below-ground irrigation systems take the form of perforated tubing wrapped around the root ball or container in the tree pit, with water delivered through an entry point which sits above the soil surface. This might or might not be capped, depending on the system being used.

Below-ground systems have the advantage of delivering a known quantity of water, avoiding the risk of run-off, but it is difficult to monitor whether the actual amount has been applied once irrigation has been carried out. It is also likely that the roots above the pipe will remain dry, and overhead watering might be necessary to correct this deficit.

Where the system is not capped, the tubing can become clogged with debris over time and the perforations in the tubing become blocked, making water movement difficult, if not impossible.

F.2 Considerations above ground

F.2.1 Supporting young trees

There are many methods of supporting young trees after transplanting. In some instances young trees do not need supporting, and any support system used has implications for the future development of the tree itself (see Figure F.6) and the subsequent maintenance necessary.

The choice of support system used depends on many factors, including identified site constraints, the nursery production system and the size of tree planted. The support system itself might also be used to offer other advantages such as protection of the tree and an attachment point for irrigation delivery systems.

The purpose of supporting young trees after transplanting is to allow lateral or anchor roots to develop without excessive movement.

Some of the methods used widely to support young trees are:

a) angled stake;

b) upright single stake;

c) double stake and bridge;

d) four stakes and bridge;

e) wired guying;

Illustration from BS8545:2014 British Standard

F.2.2 Mulching

The benefits of mulches are well documented. They include minimizing the fluctuations in soil temperature and soil moisture, weed suppression, soil nutritional enrichment, the prevention of soil erosion from heavy rains, regulation of pH and cation exchange capacity, pathogen suppression, increasing soil microbial activity, improving aeration and mitigating compaction.

Mulches are most effective when they are 50 mm to 100 mm in depth and applied from the drip line almost up to the base of the stem. (Mulch placed against the stem is likely to retain moisture, which can result in disease.) If this is not practical, typical minimum mulch circle radii would be 0.3 m for small trees, 1 m for medium trees and 3 m for large trees.

Research has indicated that pure mulches, i.e. those derived from single tree species, can have a substantial positive effect on tree survival rate. Pure mulches from *Prunus* (cherry) and *Crataegus* (hawthorn) have been shown to be suitable.

F.2.3 Permeable and impermeable surfacing for tree pits

Each surfacing material has a number of advantages and disadvantages, some of which are shown in Table F.1.

F.2.4 Above-ground irrigation aids

There are several types of above-ground irrigation aid available. These allow a known quantity of water to be applied to the tree, avoiding the risk of run-off.

With above-ground systems, it is easy to monitor the amount of water actually being applied and this is delivered gradually allowing water to percolate through the pit horizon. However, above-ground systems can be vulnerable to vandalism.

F.2.5 Tree protection

When using grids, grilles, guards and other forms of tree protection, it is the tree which is the important feature and the one which will provide the greatest longevity in the landscape.

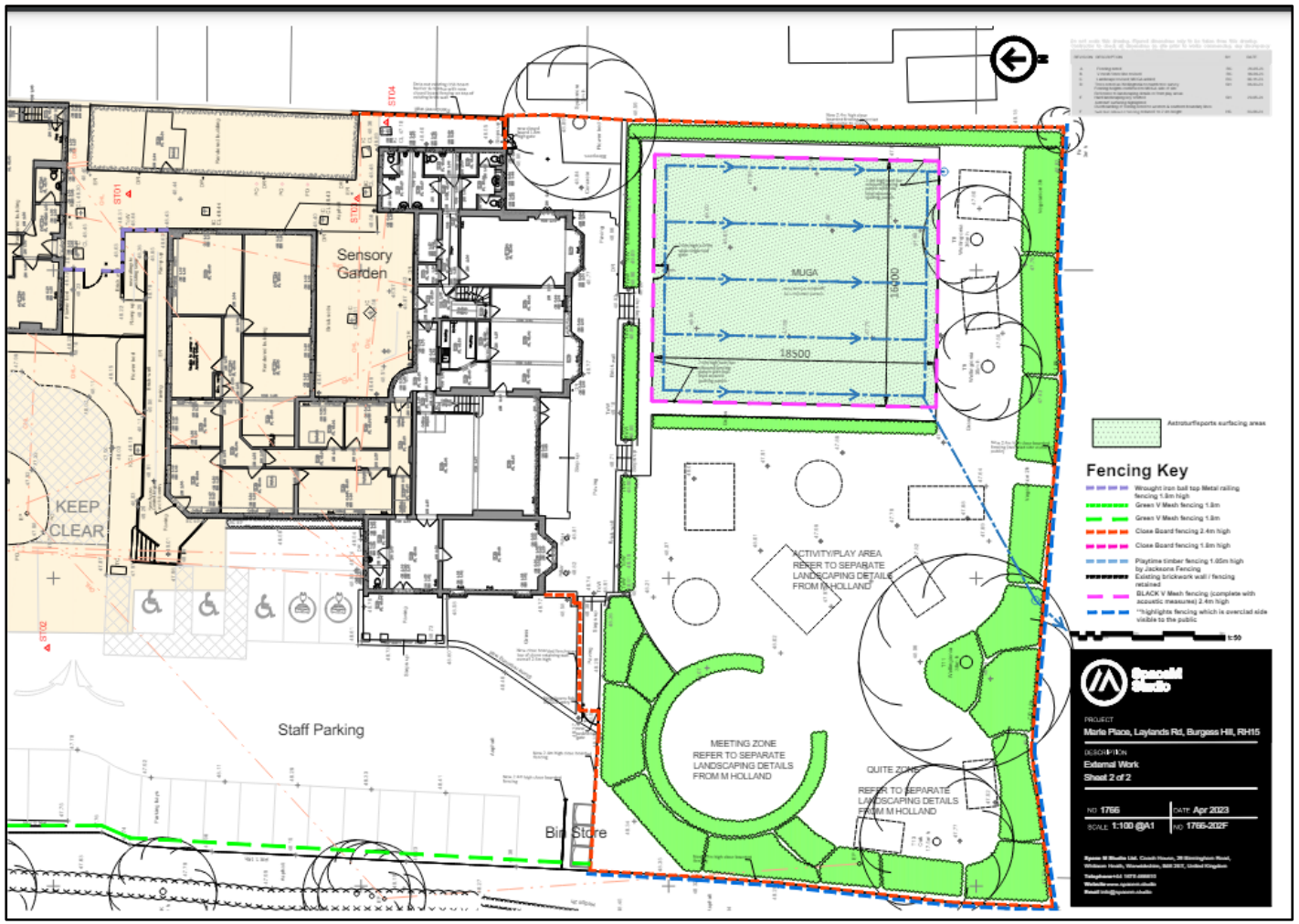
The choice of tree protection is site-specific and relates to both site constraints and the aesthetics of the design concept, but the protection is always a temporary feature, installed to protect the tree when it is planted but then removed once the tree is established. In many instances, failure to remove tree protection is the cause of the damage or failure of the young tree it was installed to protect.

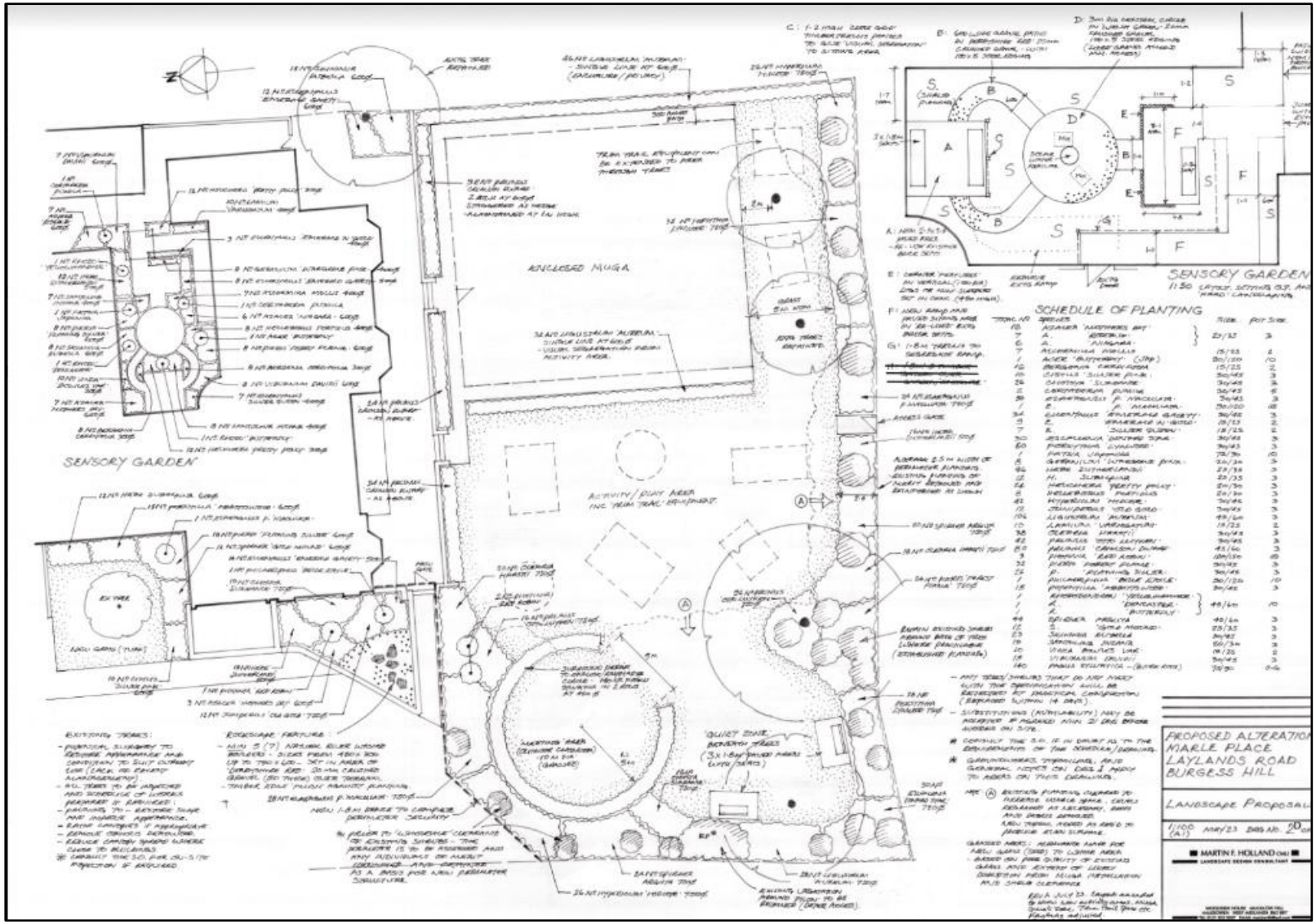
Types of damage caused by failure to remove tree protection are illustrated in Figure F.7.

Illustration from BS8545:2014 British Standard

APPENDICES E

Proposal and Landscape drawing:




ENCLOSED MUGA
SENSORY GARDEN
SENSORY GARDEN
1:50
SCHEDULE OF PLANTING
PROPOSED ALTERATION
MARLE PLACE
LAYLANDS ROAD
BURGESS HILL
LANDSCAPE PROPOSAL
1:100
MAY 23
MARTIN E. HOLLAND

APPENDICES F

Arboricultural Input and Site Supervision Schedule:

Stage and likely date	Activity and who is involved	Reference documents
Pre-commencement meeting.	Tool Box Talk: Arboricultural Consultant, Main contractor, To check and walk around the site to discuss matters arising. Clarify tree protection measures. Clarify access. This is to be done onsite.	This document, in particular: paragraph 12.0 plans and table.
Installation of tree protection measures.	Overall site examination. Check tree protection fencing and ground protection. Check retention of existing surfacing. This is to be done onsite.	This document, in particular: paragraphs 10.0 and 12.0
Installation of the new multi-use play area and 3.0m high twin bar rebound fencing panels with low-level acoustic quilting panels. Installation of new landscaping.	Tool Box Talk: Main contractor. Arboricultural Consultant This is to be done onsite.	This document, in particular: Paragraph 10.0